



System Administration

SL1 version 11.1.0

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Chapter

1

Introduction

Overview

This manual describes the tasks that System Administrators who monitor and maintain the health of SL1 must perform, and the tools they can use to perform those tasks.

This chapter includes the following topics:

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<i>What's In This Manual?</i>	9
<i>Requirements</i>	10

Who Should Read This Manual?

This manual is intended for System Administrators who must monitor and maintain the health of SL1 .

This manual describes tasks in the **[System]** tab that are related to maintenance and monitoring of SL1 . This manual also includes advanced tasks that are performed at the console or in an SSH session.

What's In This Manual?

This manual includes information on global settings, collector groups, upgrading SL1 , health tasks, maintenance tasks, licensing, and tools for troubleshooting and debugging.

Requirements

To follow some of the steps listed in this manual, you must have administrator-level access to the console of your SL1 appliances.

Chapter



2

Global Settings

Overview

In SL1, global settings allow you to define default behavior that applies to all elements in the platform. For settings that affect devices, you can override global settings with device-level settings.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon ()
- To view a page containing all the menu options, click the Advanced menu icon ().

This chapter includes the following topics:

<i>Global Settings for API</i>	12
<i>Global Settings for Appliances</i>	13
<i>Global Settings for Asset Automation</i>	18
<i>Global Settings for User Logins, Discovery, Data Collection, UI Features, and Expiration Warnings</i> ..	19
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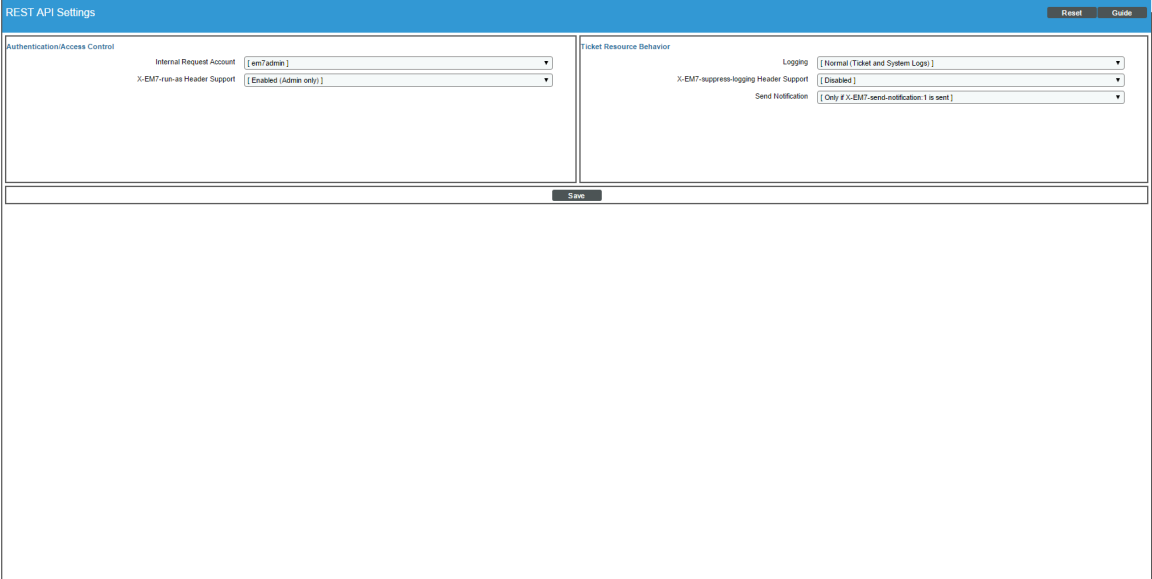
Global Settings for API

The **REST API Settings** page (System > Settings > API) allows you to define global parameters that affect the behavior of the REST API. When defined, these parameters affect all interaction with the API.

NOTE: This page is available only to administrator users.

To edit the settings in the REST API Settings page:

1. Go to the **REST API Settings** page (System > Settings > API).



The screenshot shows the 'REST API Settings' page with two main sections: 'Authentication/Access Control' and 'Ticket Resource Behavior'. The 'Authentication/Access Control' section includes 'Internal Request Account' (set to 'em7Admin') and 'X-EM7-run-as Header Support' (set to 'Enabled (Admin only)'). The 'Ticket Resource Behavior' section includes 'Logging' (set to 'Normal (Ticket and System Logs)'), 'X-EM7-suppress-logging Header Support' (set to 'Disabled'), and 'Send Notification' (set to 'Only if X-EM7-send-notification: 1 is sent'). A 'Save' button is located at the bottom of the form.

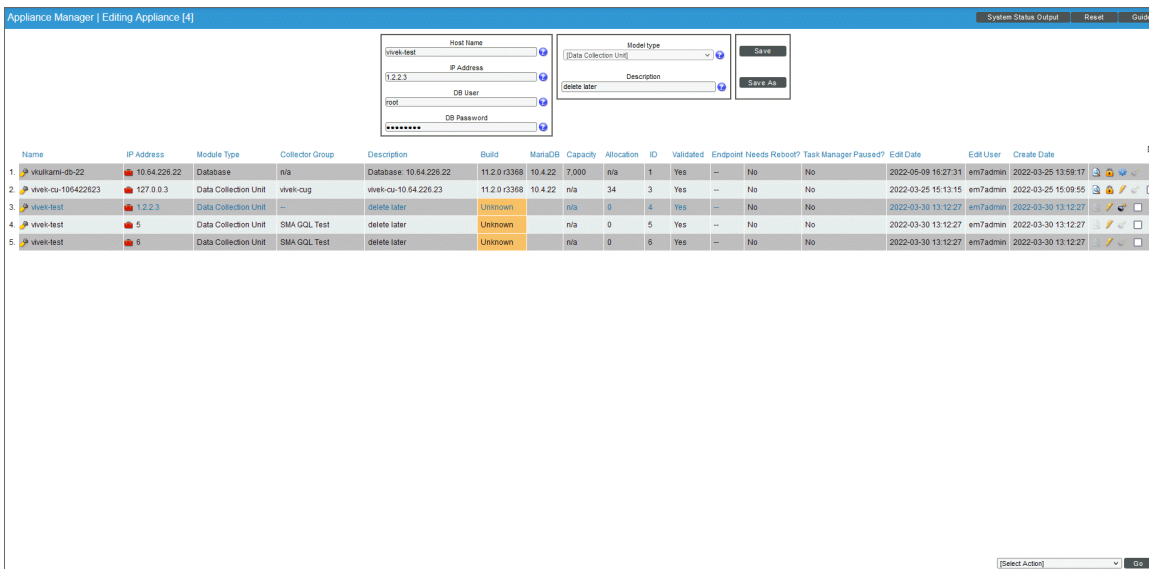
2. In the **REST API Settings** page, edit the values in one or more of the following fields:
 - **Internal Request Account.** Specify the user account that allows SL1 to make API requests without a password. For details on building such an API request, see the **ScienceLogic API** manual.
 - **X-EM7-run-as Header Support.** Specifies whether administrator users can make API requests using the permissions of another user without that user's password. Choices are:
 - *Disabled.* Administrator users cannot make API requests using the permissions of another user.
 - *Enabled (Admin only).* Administrator users can include the X-EM7-run-as Header to make API requests using the permissions of another user. For details on using this header, see the **ScienceLogic API** manual.
 - **Logging.** Specifies which logs SL1 will write to when tickets are created or updated using the API. Choices are:

- *Transaction Logging Only (System Logs)*. If a ticket is created or updated using the API, SL1 will write the standard entry to the audit log that indicates a user performed a write-operation using the API. However, SL1 will not write to the ticket log for the ticket that was created or updated.
- *Normal (Ticket and System Logs)*. If a ticket is created or updated using the API, SL1 will write to the audit log and to the ticket log for the ticket that was created or updated.
- **X-EM7-suppress-logging Header Support**. If *Normal (Ticket and System Logs)* is selected in the **Logging** field, this field specifies whether the X-EM7-suppress-logging header can be used when an administrator creates or updates a ticket using the API. If the X-EM7-suppress-logging header is used when creating or updating a ticket, SL1 will not write to the ticket log for the ticket that was created or updated. Choices are:
 - *Disabled*. The X-EM7-suppress-logging header cannot be used.
 - *Enabled (Admin only)*. The X-EM7-suppress-logging header can be used to stop SL1 from writing to the ticket log for the ticket that was created or updated.
- **Send Notification**. When a ticket is created or updated, SL1 can automatically send notification emails to the ticket assignee and ticket watchers. This option specifies the conditions under which SL1 will send notification emails when tickets are created or updated using the API. Choices are:
 - *Only if X-EM7-send-notification:1 is sent*. SL1 will send notification emails for a ticket only when the X-EM7-send-notification header is set to 1. For details on using this header, see the manual **Using the ScienceLogic API**.
 - *Sent after every write operation*. SL1 will send notification emails for every API request that creates or updates a ticket.

3. Click the **[Save]** button to save changes in this page.

Global Settings for Appliances

The **Appliance Manager** page (System > Settings > Appliances) provides for global appliance configuration and management for your entire system or stack. This includes collector group and load distribution, version information, license status, and other items that are important when you upgrade.



From the **Appliance Manager** page, you can also access the Web Configuration Utility for each ScienceLogic appliance by clicking the toolbox icon (🔧), or you can access the database administration tool for each Database Server or All-In-One Appliance by clicking the gear icon (⚙️).

For each Database Server, Data Collector, and Message Collector, you can click on the magnifying-glass icon (🔍) to view the output of the system status script for that appliance.

During upgrade, table cells will highlight known, pending action items that must be done to successfully complete an upgrade.

This page is useful for ensuring that every Data Collector is assigned to a Collector Group before you begin an upgrade. In some cases, the Data Collector might be assigned to an empty Collector Group, if the collector is new.

You can also use this page to ensure that Data Collector load is near or below the system requirements for each collector.

To edit and view information about an SL1 appliance:

1. Go to the **Appliance Manager** page (System > Settings > Appliances).
2. Locate the SL1 appliance you want to edit. Click its wrench icon (🔧). The fields in the top pane are populated with values from the selected SL1 appliance.
3. You can edit one or more of the following fields:
 - **Host Name.** Name of the appliance.
 - **IP Address.** Primary IP address for the appliance.
 - **Model Type/Module Type.** Type of appliance:

- *All In One Server*
- *Database*
- *Administration Portal*
- *Data Collection Unit*
- *Message Collection Unit*

NOTE: The combination appliance with a Database Server and an Administration Portal on a single appliance will appear with **Module Type** of *Database*. The combination appliance with a Message Collection Unit and a Data Collection Unit will appear with **Module Type** of *Data Collection Unit*.

- *Integration Server (SL1 PowerFlow)*

- **Description.** Description of the appliance.

4. You can edit two optional fields for Data Collector or Message Collector.

- **DB User.** User name that can access the MariaDB database on the Data Collector or Message Collector.
- **DB Password.** Password that allows access the MariaDB database on the Data Collector or Message Collector.

If you are using AWS RDS with your SL1 System, you must define the **DB User** and **DB Password** for each Data Collector or Message Collector.

NOTE: ScienceLogic recommends that you vary the Data Collector and Message Collector database credentials for enhanced per-appliance security. This greatly enhances the security of your central database by disallowing a successful attack to go unnoticed on your Data Collector and then succeed without failure on the central database.

The Appliance Manager page also displays the following columns:

- **Collector Group.** For Data Collectors and All-In-One Appliances, specifies the Collector Group associated with the appliance.
- **Build.** Specifies the latest build installed on the appliance.
- **MariaDB.** Specifies the version of MariaDB running on the All-In-One Appliance, Database Server, Data Collector, or Message Collector.
- **Capacity.** For Database Servers, specifies the licensed capacity of the appliance.
- **Allocation.** For Data Collectors, specifies the number of devices aligned with the appliance.
- **ID.** Unique numeric ID, automatically assigned by the platform to each appliance in the **Appliance Manager** page.

- **Validated**. Specifies whether the license is valid.
 - **Endpoint**. SL1 Agent endpoint for the Gen 1 Agent.
 - **Needs Reboot?**. Specifies whether the appliance requires reboot to add latest kernel or security updates. This column is updated every 30 minutes. Hover your mouse to determine why the reboot is required and information about kernel version, packages, and last reboot.
 - **Task Manager Paused?**. Specifies whether the task manager service (em7) is paused. This value is updated every two minutes.
 - **Edit Date**. Date the appliance's information was discovered or last edited.
 - **Edit User**. User who last edited the appliance's information.
 - **Create Date**. Date and time the appliance was registered and licensed.
5. To view the Web Configuration Utility for an appliance, where you can track license data, interfaces, and other device settings, click the Appliance Manager icon (🔧). Use the same login credentials that you used to log into SL1, and close the pop-up window for the Utility when you are done.
 6. If an SL1 appliance is running a different version of SL1 than the Database Server, that appliance is highlighted in the **Appliance Manager** page. The version number, if known, is listed in the **Build** column.
 7. For all SL1 appliances, SL1 runs the system status script every 15 minutes. You can click the logs icon (📄) to view the results of the latest system status script.
 8. If you are logging in to the "sl1admin" account on an appliance, you can click the padlock (🔒) icon for that appliance to get a one-time password. For more information, see "Using the sl1admin Account" in the *Role-Based User Accounts* chapter of the **Organizations and Users** manual.
 9. For Database Servers, you can click the gear icon (⚙️) to access the phpMyAdmin interface for the Database Server. In this interface, you can view all the database tables on the Database Server.
 10. For Data Collectors and Message Collectors, you can click the lightning bolt icon (⚡) to manually force the Database Server to send the latest configuration information.

NOTE: The bomb icon (💣) does not appear for Database Servers that are not configured for High Availability or Disaster Recovery. The bomb icon does not appear for Database Servers that are configured as the primary database in a High Availability or Disaster Recovery configuration.

11. Click the **[Save]** button to save any changes. Click the **[Save As]** button to save your changes to a new appliance name.

The Web Configuration Utility

The Web Configuration Utility allows you to configure system-level settings for your appliances. Each appliance includes access to the Web Configuration Utility.

The Web Configuration Utility adds an additional layer of security to SL1 by segregating administrative functions from the rest of the user interface and by exposing system-level settings and diagnostic tools that might otherwise require command-line access to the appliance. The Web Configuration Utility can be accessed only through an HTTPS connection and requires its own administrator-level password.

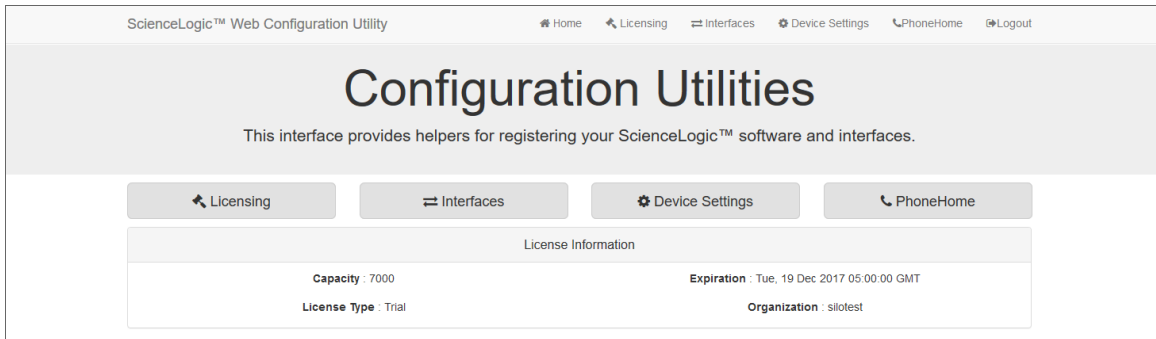
Perform the following steps to log in to the Web Configuration Utility:

1. You can log in to the Web Configuration Utility using any web browser supported by SL1. The address of the Web Configuration Utility is in the following format:

`https://ip-address-of-appliance:7700`

2. Type the address of the Web Configuration Utility into the address bar of your browser, replacing "ip-address-of-appliance" with the IP address or public-facing fully qualified hostname of the appliance.
3. You will be prompted to type your username and password. Log in as **em7admin** with the appropriate password. The default password is **em7admin**. After logging in, the main **Configuration Utility** page appears:

NOTE: For better security, change your Web Configuration Utility credentials. If you leave your Web Configuration Utility credentials as the stock credentials, you greatly increase the risk that your central database could be attacked, or that you could be locked out of the Web Configuration Utility.



4. In the **Configuration Utility**, you can license a SL1 appliance, configure interfaces, and edit settings for the SL1 appliance and the Database Server if applicable.
 - For details on using the **Configuration Utility** to license a SL1 appliance, see the manual **Installation and Initial Configuration**.
 - For details on using the **Configuration Utility** to inform Data Collectors, Message Collectors, and Administration Portals when you change the IP address of a Database Server, see the section on [Changing IP Addresses](#).

Global Settings for Asset Automation

The **Asset Automation** page (System > Settings > Assets) allows you to define the default behavior for all asset records.

The screenshot shows the 'Asset Automation' configuration page. At the top, there is a form for configuring a specific field with the following fields:

- Field Name: [Text Input]
- Data Source: [Dropdown Menu]
- Alert on change: [No] [Dropdown Menu]
- Auto Update: [N/A] [Dropdown Menu]
- Save: [Button]

Below the form is a table listing 23 standard asset fields with their automation settings:

	Field Name	Data Source	Alert on Change	Auto Update	Dynamic Apps	Edit User	Edit Date
1	Make	Dynamic App then Internal	No	Yes	--		2007-12-02 14:49:40
2	Model	Dynamic App then Internal	No	Yes	--		2007-12-02 14:49:40
3	Serial Number	Dynamic App	No	Yes	--		2007-12-02 14:49:40
4	Operating System	Dynamic App	No	Yes	--		2007-12-02 14:49:40
5	Host ID / SID	Dynamic App	No	Yes	--		2007-12-02 14:49:40
6	OS System Name	Dynamic App then Internal	No	Yes	--		2007-12-02 14:49:40
7	CPU Count	Dynamic App then Internal	No	Yes	--		2007-12-02 14:49:40
8	CPU Type/Make	Dynamic App then Internal	No	Yes	--		2010-01-12 14:49:40
9	CPU Speed	Dynamic App then Internal	No	Yes	--	em7admin	2011-01-12 17:17:12
10	Firmware / BIOS Name	Dynamic App	No	Yes	--		2007-12-02 14:49:40
11	Installed Memory	Dynamic App then Internal	No	Yes	--		2011-01-12 14:49:29
12	Hard Disk/Drive	N/A	No	--	--		2008-01-02 14:26:29
13	Asset Notes	N/A	No	--	--		2007-12-02 14:49:40
14	Asset Tag	Dynamic App	No	Yes	--		2007-12-02 14:49:40
15	Disk Array Size	N/A	No	--	--		2007-12-02 14:49:40
16	Disk Count	N/A	No	--	--		2007-12-02 14:49:40
17	Disk Size	N/A	No	--	--		2007-12-02 14:49:40
18	Method	N/A	No	--	--		2007-12-02 14:49:40
19	Annual Rate	N/A	No	--	--		2007-12-02 14:49:40
20	RFID Number	N/A	No	--	--		2007-12-02 14:49:40
21	Technician	N/A	No	--	--		2007-12-02 14:49:40
22	DNS Name	Dynamic App then Internal	No	No	--		2007-12-02 14:49:40
23	DNS Domain Name	Dynamic App then Internal	No	No	--		2007-12-02 14:49:40

For each standard asset field, you can specify:

- Whether the field can be automatically populated by SL1.
- Whether the field's value should be automatically updated by SL1.
- Whether or not SL1 should generate an event if the field's value changes.

You can define the default behavior for each standard field in the following asset pages:

- **Asset Properties**
- **Asset Maintenance & Service**
- **Asset Configuration**
- **Asset Licenses**
- **Asset IP Networks**
- **Asset Components**

The defined behavior will be applied to every asset record in SL1.

For more details on asset records and enabling automation for asset records, see the manual **Asset Management and Vendors**.

Global Settings for User Logins, Discovery, Data Collection, UI Features, and Expiration Warnings

The **Behavior Settings** page (System > Settings > Behavior) allows you to define global parameters that affect:

- User Logins
- Discovery
- Data collection
- Settings that affect the display and behavior of the user interface
- Expiration warnings for asset warranties and SSL certificates

The parameters in the **Behavior Settings** page affect all pages, devices, and discovery functionality in SL1. For most settings, you can define a one-time, manual override in the affected page. You can also override many of these settings per device. For example, you can define global parameters for nightly discovery in this page, but you can override these settings for a specific device on the **Settings** tab of the **Device Investigator** page or the **Device Properties** page (Devices > Device Manager > wrench icon) in the classic user interface.

To define or edit the settings in the **Behavior Settings** page:

1. Go to the **Behavior Settings** page (System > Settings > Behavior).
2. In the **Behavior Settings** page, edit the values in one or more of the following fields:
 - **Interface URL.** URL for accessing the user interface. This value should be in URL format and can be up to 64 characters in length.

NOTE: Do not include a trailing forward slash ("/") at the end of the Interface URL. When SL1 generates URLs for tickets or events (for example, in email messages), the trailing forward slash will be automatically included.

- **Force Secure HTTPS.** [Recommended] If enabled, forces users to use HTTPS (secure HTTP) instead of HTTP when they connect to the user interface. This eliminates the exposure of credentials between the user or API caller and the central database.
- **Password Expiration.** Specifies whether or not the password for a user account will expire and if so, when the password will expire. Choices are:
 - *Disabled.* Passwords do not expire or are managed externally to SL1.
 - *30 Days.* Passwords will expire after 30 days.
 - *60 Days.* Passwords will expire after 60 days.
 - *90 Days.* Passwords will expire after 90 days.
 - *180 Days.* Passwords will expire after 180 days.

- **Password Reset Interval.** The minimum amount of time that must pass before a user can change a password. For example, if the value in this field is *2 Hours*, a user can change a password every two hours. This applies to users changing their own passwords and administrators changing other users' passwords. Values range from 1 hour to 24 hours, in increments of one hour.
- **Password Hash Method.** Specifies how user passwords will be encrypted for storage in the ScienceLogic database. You can choose the hashing algorithm that works best for your enterprise. Choices are:
 - *SHA-512.* AS of 10.2.0, this is the default value. Previous passwords will use their previous hash method until the password is changed.
 - *Automatic (PHP Password API)*
- **Password Minimum Length.** Specifies the minimum number of alphanumeric characters allowed for the password. You can specify any value from 1 to 99. The default value is "8" characters.
- **Account Lockout Type.** If a user enters incorrect login information multiple times in a row, that user will be locked out of the user interface. In this field, you can select how the lockout will be applied. Choices are:
 - *Lockout by IP Address.* All subsequent login attempts from the IP address will be denied once a lockout for that IP address has been identified. Use this option to isolate all access from the remote IP address for any account until a system administrator has validated the lockout and cleared it.
 - *Lockout by Username and IP Address.* All subsequent login attempts by this username from the IP address will be denied. This will permit other users from the same IP address to continue to access the system as long as they are not locked out.
 - *Lockout by Username (default).* All subsequent login attempts by this username from any IP address will be denied.
 - *Disabled.* Lockouts are disabled. This setting can leave your system vulnerable to attacks and as such, it is not recommended.
- **Account Lockout Attempts.** Number of times a user can enter incorrect login information before a lockout occurs. Choices are 1 time through 10 times.
- **Login Delay.** To prevent unauthorized users from using brute-force login attempts, you can set a login delay in this field. After each failed login, SL1 will not allow another attempt for the number of seconds specified in this field. Choices are:
 - *Disabled.* SL1 does not enforce a delay between failed logins.
 - *1 Second.* After a failed login, SL1 will not allow another attempt for one second.
 - *2 seconds.* After a failed login, SL1 will not allow another attempt for two seconds.
 - *4 seconds.* After a failed login, SL1 will not allow another attempt for four seconds.
 - *8 seconds.* After a failed login, SL1 will not allow another attempt for eight seconds.

- **Single Instance Login (Admins)**. Specifies whether more than one instance of a single username can be logged in to the user interface at the same time. Defines the default behavior for users of account type "Administrator". You can specify the following types of behavior:
 - *Disabled*. Multiple instances of the same account name can be logged in to the user interface. There are no requirements or limitations on any of the instances. None of the instances will be automatically logged out.
 - *Session can be transferred after*. If you select one of these options, the second instance of a user account can log in only after the first instance of the account is inactive. In SL1, an account is considered "inactive" if the user has not performed any tasks or navigated within the user interface. You can specify how long the first instance must be inactive before the second instance can log in. When the second instance successfully logs in to the user interface, the browser where the first instance is logged in will display the following message:

"User id 'account name' logged in from a different browser and transferred this session."

NOTE: If this field is set to any value other than *disabled*, you can still override an earlier instance. If you try to log in to the user interface and there is another instance of the account already logged in to the user interface, the login page will display the following message: "User id 'account name' is already logged in to the system. To transfer the session, check 'Transfer Session' and log in."

- If you select the **Transfer Session** checkbox, this logs the first instance out of the user interface and allows the second instance to log in to the user interface.

The browser where the first instance was logged in will see the message:

"User id 'account name' logged in from a different browser and transferred this session."

- *Other (manual entry)*. Allows you to enter a custom value, in seconds. When the first instance of a user account is inactive in the user interface for the specified number of seconds, the first instance is logged out and the second instance is allowed

NOTE: To support single instance login in the current SL1 user interface ("AP2"), you must make the appropriate settings in this field and then perform additional steps. For more information, see the section on [Configuring Single Instance Login in AP2](#).

- **Single Instance Login (Users)**. Specifies whether more than one instance of a single username can be logged in to the user interface at the same time. Defines the default behavior for users of account type "User". You can specify the following types of behavior:
 - *Disabled*. Multiple instances of the same account name can be logged in to the user interface. There are no requirements or limitations on any of the instances. None of the instances will be automatically logged out.

- *Session can be transferred after.* If you select one of these options, the second instance of a user account can log in only after the first instance of the account is inactive. In SL1, an account is considered "inactive" if the user has not performed any tasks or navigated within the user interface. You can specify how long the first instance must be inactive before the second instance can log in. When the second instance successfully logs in to the user interface, the browser where the first instance is logged in will display the following message:

"User id 'account name' logged in from a different browser and transferred this session."

NOTE: If this field is set to any value other than disabled, you can still override an earlier instance. If you try to log in to the user interface and there is another instance of the account already logged in to the user interface, the login page will display the following message: "User id 'account name' is already logged in to the system. To transfer the session, check 'Transfer Session' and log in."

- If you select the **Transfer Session** checkbox, this logs the first instance out of the user interface and allows the second instance to log in to the user interface.

The browser where the first instance was logged in will see the message:

"User id 'account name' logged in from a different browser and transferred this session."

- *Other (manual entry).* Allows you to enter a custom value, in seconds. When the first instance of a user account is inactive in the user interface for the specified number of seconds, the first instance is logged out and the second instance is allowed.





NOTE: To support single instance login in the current SL1 user interface ("AP2"), you must make the appropriate settings in this field and then perform additional steps. For more information, see the section on [Configuring Single Instance Login in AP2](#).

- **Account Lockout Duration.** Specifies how long a user will be locked out of the user interface. Choices are 1 hour – 24 hours, in one hour increments. The shorter the duration, the sooner the system is again vulnerable to a potential attack; however, a shorter duration will also allow a user to attempt to log in again without the help of a system administrator.
- **Lockout Contact Information.** This contact information will be displayed when a user is locked out of the user interface. Can be any combination of alphanumeric characters, up to 255 characters in length. This information should allow the user to contact his/her administrator to unlock the account.
- **Login Header Title.** HTML title of the login page. This text will appear at the very top of the browser on the login page.
- **System Identifier.** Unique name for the current SL1 system. Can be up to 128 characters in length. This field is useful for companies or organizations with multiple SL1 systems. If a value is provided in this field, SL1 will include a "system identifier" value in each event generated by the current SL1 system. This allows users to easily determine the source SL1 system associated with the event.

- **Ping & Poll Timeout (Msec.)**. This field specifies the number of milliseconds the discovery tool or availability polling will wait for a response after pinging a device. After the specified number of milliseconds have elapsed, the poll will timeout. The choices are between 100 and 5000 milliseconds.
- **SNMP Poll Timeout (Msec.)**. This field specifies the number of milliseconds the discovery tool will wait for a response after sending an SNMP query to a device. After the specified number of milliseconds have elapsed, the SNMP poll will timeout. The choices are between 100 and 5000 milliseconds.
- **SNMP Failure Retries**. This field specifies the number of times the discovery tool will try to communicate with a device after a timeout or failure. After that number of times has been met, the discovery tool will not retry unless the user manually restarts the discovery process. The choices are 0–6.
- **Initially Discovered Interface Poll Rate**. This field specifies the frequency with which SL1 will poll newly discovered interfaces. This setting does not affect interfaces that have been previously discovered with a different value in this field or interfaces for which the **Frequency** field has been manually edited in the Interface Properties page. Choices in this field are:
 - *1 min.* SL1 will poll the newly discovered interfaces every minute.
 - *5 mins.* SL1 will poll the newly discovered interfaces every five minutes. This is the default value for this field.
 - *10 mins.* SL1 will poll the newly discovered interfaces every 10 minutes.
 - *15 mins.* SL1 will poll the newly discovered interfaces every 15 minutes.
 - *30 mins.* SL1 will poll the newly discovered interfaces every 30 minutes.
 - *60 mins.* SL1 will poll the newly discovered interfaces every 60 minutes.
 - *120 mins.* SL1 will poll the newly discovered interfaces every 120 minutes.
- **DHCP Community Strings (Comma separated)**. SNMP "read only" community string to use during discovery. This is required only if DHCP servers and devices use a different SNMP community string than other devices in the network. If the community string specified in the **Discovery Control Panel** page (System > Manage > Classic Discovery) does not work for DHCP devices, SL1 will automatically use the community string specified in this field.
- **Strip FQDN From Inbound Email Device Name**. In Events from Email policies, specifies how SL1 will match the regular expression for device name. Choices are:
 - *Enabled*. SL1 will search the text string in the incoming email and match all characters up to the first period that appears in the text string. If multiple devices match the characters up to the first period (for example, my_device.1 and my_device.2), SL1 will align the event with the matching device with the highest Device ID.
 - *Disabled*. SL1 will search the text string in the incoming email for a match for the device name. The text string must include an exact match to the regular expression (defined in the Events from Email policy), including any text following a period in the device name. If SL1 does not find an exact match in the incoming email, SL1 creates an entry in the system log.

- **Inbound Email Alert Message.** In each event policy, the **First Match String** and **Second Match String** fields specify the string or regular expression used to correlate the event with a log message. To trigger an event, the text of a log message must match the value in the **First Match String** and **Second Match String** fields in that event's policy. For Events from Email policies, this field specifies whether only the email message body will be written to the device log or whether both the email message subject and email message body will be written to the device log. Choices are:
 - *Email Message Body Only.* Only the email message body is written to the device log. The **First Match String** and **Second Match String** fields can examine and match only the email message body.
 - *Email Message Subject and Body.* Both the email message body and the email message subject are written to the device log. The **First Match String** and **Second Match String** fields can examine and match against both the email message body.

NOTE: The global setting **Inbound Email Alert Message** affects how events are triggered. This field does not affect the **Regex Pattern** field in the Event from Email policy. The **Regex Pattern** field in an Event from Email policy specifies which device log to write to.

- **Event Console Ticket Life Ring Button Behavior.** Specifies how the life-ring icon () in the **Event Console** will behave. Choices are:
 - *Create/View EM7 Ticket.* When you click the life-ring icon () for an event in the **Event Console**, SL1 will display the **Ticket Editor** page, where you can define a ticket and automatically associate it with the selected event. This is the default behavior.
 - *Create/View External Ticket.* If an external ticket is aligned with an event, when you click the life-ring icon () for that event (from the **Event Console**), SL1 spawns a new window and displays the external ticket (as specified in the **force_ticket_uri** field). If an external ticket is not yet aligned with an event, when you click the life-ring icon () for that event, SL1 sets a "request" flag for the ticket and displays an acknowledgment that a new ticket has been requested. You can then use the "request" in run book logic, to create the ticket on the external system.

NOTE: PowerFlow integrations do not use this field.

CAUTION: If you select *Create/View External Ticket* in the **Event Console Ticket Life Ring Button Behavior** field, you can no longer create tickets from the **Event Console**.

- **Automatic Ticketing Emails.** Specifies whether ticket watchers will automatically receive email notification when a ticket is created or changes status. Choices are:
 - *Enabled.* This is the default value. When you select this option, SL1 automatically sends email notifications to all watchers when a ticket is created, assigned, or updated.
 - *Disabled.* When you select this option, SL1 does not automatically send email notifications to all watchers when a ticket is created, assigned, or updated.
- **Prevent Browser Saved Credentials.** This checkbox specifies whether or not the user interface will allow the browser to cache login credentials and perform auto-complete in the login page. By default, the user interface will allow browsers to cache login credentials. Choices are:
 - *Selected.* The user interface will not allow browsers to cache credentials and use auto-complete in the login page. Use this setting to comply with PCI DSS and other security protocols.
 - *Not Selected.* This is the default setting. The user interface will allow browsers to cache credentials and use auto-complete in the login page. The implementation of this functionality varies between browsers.
- **Prevent Loading Interface in External Frames.** If you select this checkbox, other pages cannot be loaded in external frames in the same browser session that includes SL1. This is a security measure, to prevent clickjacking attacks.
- **Hide Perpetual License Count.** Specifies whether to display the device count graph in the **System Usage** page (System > Monitor > System Usage). The default behavior is to hide the graph in the **System Usage** page. Users might find this graph useful to troubleshoot licensing issues. For a description of the **System Usage** page, see the [Monitoring Overall System Usage and Statistics](#) section.
- **Hide "New" button on the Ticket Editor.** If you select this checkbox, the **Ticket Editor** page will not display the **[New]** button. This field is unselected by default.
- **Hide "other" filesystem types.** If you select this checkbox, file systems of type "other" (which includes XFS file systems) will not be discovered and monitored. This checkbox is selected by default.
- **Display Previous Login In Footer.** If you select this checkbox, the user interface will display information about the last successful login to the user interface and the last failed login (if applicable). The user interface will display the following in the lower right of the page:

Previous Login: *yyyy-mm-dd hh-mm-ss from user's IP address.*
Failed Login: *yyyy-mm-dd hh-mm-ss from user's IP address.*
- **Ignore trap agent-addr varbind.** If you select this checkbox, SL1 will align incoming SNMP trap messages with the forwarding device (last hop) instead of searching for the IP address of the originator of the trap.
- **Enable Selective PowerPack Field Protection.** If you select this checkbox, the following fields will **not** be updated when you update a PowerPack:
 - Event Policy > **Operational State**
 - Event Policy > **Event Severity**
 - Event Policy > **Event Message**

- Event Policy > **Occurrence Count**
 - Event Policy > **Occurrence Time**
 - Event Policy > **Expiry Delay**
 - Event Policy > **Detection Weight**
 - Event Policy > **External Event ID**
 - Event Policy > **External Category**
 - Event Policy > **Use multi-match**
 - Event Policy > **Use message-match**
 - Event Policy > **Topology Suppression**
 - Dynamic Application > Properties > **Operational State**
 - Dynamic Application > Properties > **Poll Frequency**
 - Dynamic Application > Properties > **Disable Data Rollup**
 - Dynamic Application > Collection > **Custom Attribute**
 - Dynamic Application > Collection > **Asset / Formlink**
 - Dynamic Application > Collection > **Change Alerting**
 - Dynamic Application > Collection > **Hide Object**
 - Dynamic Application > Presentation > **Active State**
 - Dynamic Application > Threshold > **Override Threshold Value**
 - Dynamic Application > Threshold > **Numeric Range: High**
 - Dynamic Application > Threshold > **Numeric Range: Low**
 - Dynamic Application > Threshold > **Threshold Value**
 - Device Class > **Device Dashboard**
- **Hide "Create a Ticket" in Toolbox menu.** If you select this checkbox, the **Toolbox** menu (three stacked horizontal lines in the upper-left corner) will not display the *Create a Ticket* option. This field is unselected by default.
 - **Enable CDP Topology.** If selected, SL1 will use Cisco Discovery Protocol (CDP) for each device that supports CDP. SL1 will then generate topology maps from the discovered CDP relationships.

NOTE: CDP is a proprietary protocol developed by Cisco and is not supported by all network hardware. If your network includes both CDP enabled and non-CDP network switches and routers, the topology data reported by the CDP enabled devices might not be accurate. In SL1, if a conflict exists between the collected CDP topology data and the collected layer-2 topology data, the CDP topology data takes precedence. In some cases, the ScienceLogic layer-2 data might be more accurate. Therefore, if your network includes both CDP enabled and non-CDP network switches and routers, you might want to disable CDP topology collection. For details, see the **Views** manual.

- **Enable LLDP Topology.** If selected, SL1 will use Link Layer Discovery Protocol (LLDP) for each device that supports LLDP. SL1 will then generate topology maps from the discovered LLDP relationships.
- **Enable Community String Indexing (VLAN Topology).** If selected, SL1 will perform discovery of VLANs during topology collection. By default, this option is not selected because the SNMP requests used to discover VLANs might cause some types of hardware to erroneously reboot.
- **Default Country.** Specifies the country that will be selected by default in each page where the user specifies a country. The user can override this default value in each page.
- **System Timezone.** Specifies the default timezone for SL1. In each page where the user can select a timezone, this value will be selected by default. The user can override this default value in each page. SL1 also uses this default value to perform timezone conversions when no user timezone setting is available. For example, if SL1 sends an email to an address not associated with a user, any timestamps contained in the email will use the value from the **System Timezone** field. You can select from a list of all timezones. The default value is "UTC".
- **NFS Detection Disable.** If selected, this checkbox prevents SL1 from monitoring and reporting on NFS "shared" file systems. SL1 will monitor and report only on local file systems.
- **Port Polling Type.** Specifies how SL1 should poll devices to discover open ports. The choices are:
 - *Half Open.* Uses a faster TCP/IP connection method and does not appear on the device's logs.
 - *Full Connect.* Uses the standard TCP/IP connection to detect open ports.
- **Initial Discovery Scan Level.** Specifies the data to be gathered during the initial discovery session. The options are:
 - *0. Model Device Only.* Discover if device is up and running and if so, discover device's make and model.
 - *1. Discover Dynamic Apps.* Discovery tool will search for Dynamic Applications associated with the device. Discovery will also perform *0. Model Device Only* discovery.
 - *2. Initial Population of Apps.* Discovery tool will retrieve subset of data from Dynamic Applications, to save time. Discovery tool will later retrieve full sets of data from each Dynamic Application. Discovery tool will also perform *1. Discover Dynamic Apps* and *0. Model Device Only*.
 - *3. Discover SSL Certificates.* Discovery tool will search for SSL certificates and retrieve SSL data. Discovery tool will also perform *2. Initial Population of Apps*, *1. Discover Dynamic Apps*, and *0. Model Device Only*.
 - *4. Discover Open Ports.* Discovery tool will search for open ports. Discovery tool will also perform *3. Discover SSL Certificates*, *2. Initial Population of Apps*, *1. Discover Dynamic Apps*, and *0. Model Device Only*.

NOTE: If your system includes a firewall and you select option 4: *Discover Open Ports*, discovery may be blocked and/or may be taxing to your network.

- *5. Advanced Port Discovery.* Discovery tool will search for open ports, using a faster TCP/IP connection method. Discovery tool will also perform *3. Discover SSL Certificates*, *2. Initial Population of Apps*, *1. Discover Dynamic Apps*, and *0. Model Device Only*.

NOTE: If your system includes a firewall and you select option 5: *Advanced Port Discovery*, some auto-discovered devices may remain in a pending state for some time after discovery. These devices will achieve a healthy status, but this might take several hours.

- **Rediscovery Scan Level (Nightly).** Specifies the data to be gathered/updated each day during the nightly discovery process. The nightly discovery process will find any changes to previously discovered devices. The **Rediscovery Scan Level (Nightly)** field contains the same options as the **Initial Discovery Scan Level** field.
- **Discovery Scan Throttle.** Specifies the amount of time a discovery process should pause between each IP address in a discovery session. Pausing discovery processes between IP addresses spreads the amount of network traffic generated by discovery over a longer period of time. The choices are:
 - *Disabled.* Discovery processes will not pause.
 - *1000 Msec to 10000 Msec.* A discovery process will pause for a random amount of time between half the selected value and the selected value.

NOTE: The **Discovery Scan Throttle** setting does not affect nightly auto discovery.

- **Port Scan All IPs.** Specifies whether SL1 should scan all IP addresses on a device for open ports. The choices are:
 - *0. Disabled.* SL1 will scan only the Admin Primary IP address (the IP address SL1 uses to communicate with the device) for open ports.
 - *1. Enabled.* SL1 will scan all discovered IP addresses for open ports.

NOTE: The **Port Scan All IPs** setting affects initial discovery, nightly auto discovery, and re-discovery.

- **Port Scan Timeout.** Length of time, in milliseconds, after which SL1 should stop trying to scan an IP address for open ports and begin scanning the next IP address (if applicable). Choices are between 60,000 and 1,800,000 milliseconds.

NOTE: The **Port Scan Timeout** setting affects initial discovery, nightly auto discovery, and re-discovery.

- **Restart Windows Services (Agent required)**. Specifies whether SL1 should automatically restart failed Windows services that have been defined on the device with a startup type of "automatic". The choices are:
 - *0. Disabled*. SL1 will not automatically restart failed Windows services that have been defined on the device with a startup type of "automatic".
 - *1. Enabled*. SL1 will automatically restart failed Windows services that have been defined on the device with a startup type of "automatic".

NOTE: To use this feature, the managed device must be running the agent SNMP Informant, WMI Edition. For assistance or information on purchasing and installing this agent, please contact ScienceLogic. Users must also supply a value in the **SNMP Write** field in the **Device Properties** page for the device.

- **Hostname Precedence**. Specifies which name SL1 will use for each discovered device. Choices are:
 - *SNMP System Name*. Use the device name specified in the device's SNMP System MIB.
 - *DNS Reverse Lookup*. Use the device name specified in the device's reverse-lookup record.

NOTE: If *SNMP System Name* is selected, and SL1 cannot find an SNMP name for the device, SL1 will assign the name returned by the DNS Reverse Lookup. If SL1 cannot find a DNS Reverse Lookup name for the device, SL1 will use the device's Admin Primary IP address as the device name in SL1.

- **Event Interface Name Format**. Specifies the format of the network interface name that you want to appear in events. If you selected *Interface Alias* for the deprecated **Interface Name Precedence** field in a previous release of SL1, the format for existing interfaces is set to {alias}. If you selected *Interface Name* for the deprecated **Interface Name Precedence** field in a previous release of SL1, the format for existing interfaces is set to {name}. The default format is {name}. You can use a combination of string text and the following tokens to define the interface name format for events, such as string_{name}, string_{alias}, {name}{alias}, or {ifdescr}:
 - {alias}
 - {name}
 - {state}
 - {ifdescr}
 - {if_id}
 - {did}
 - {ifindex}
 - {ifphysaddress}
 - {iftype}
 - {ifspeed}

- {ifhighspeed}
- {ifoperstatus}
- {ifadminstatus}
- **DNS Hostnames.** If SL1 will use the DNS Reverse Lookup name as the device name (see the description of the field **Hostname Precedence**), this field specifies whether SL1 will use the fully-qualified domain name or only the hostname for each discovered device. Choices are:
 - *Strip Device Name (Hostname).* SL1 will use only the device name as the DNS hostname for each device.
 - *Use Full Domain Name (FQDN).* SL1 will use the fully-qualified domain name as the device name for each device.
- **Event Clearing Mode.** Describes how clearing an event will affect correlated events. Choices are:
 - *Clear Selected Only.* Clear only the selected events. If a parent event is cleared, the previously suppressed child events will appear in the **Event Console**.
 - *Clear All in Group.* When parent event is cleared, all child events correlated with parent event will be cleared. This is the default behavior.
- **Maintenance Minimum Severity.** Specifies the minimum severity required for an event to be suppressed during device maintenance and user maintenance for devices. The default value is *Healthy*, which causes all events to be suppressed. Choices are *Healthy*, *Notice*, *Minor*, *Major*, or *Critical*.
- **Patch Maintenance Minimum Severity.** If you schedule Device Maintenance and have defined a **Patch Window** within the larger maintenance interval, this field allows you to specify the event severity that will trigger the beginning of the **Patch Window**. The first event that both matches the severity in this field and occurs within the larger maintenance window triggers the start of the **Patch Window**. Choices are *Healthy*, *Notice*, *Minor*, *Major*, or *Critical*.
- **SSL Certificate Expiry Soon.** Specifies, in number of days, when SL1 should generate an event for an SSL Certificate that is about to expire. The choices range from 1 day to 9 months.
- **SSL Certificate Expiry Imminent.** Specifies, in number of days, when SL1 should generate a more urgent event for an SSL Certificate that is about to expire. The choices range from 1 day to 9 months.
- **Asset Warranty Expiry.** Specifies, in number of days, when SL1 should generate an event for an asset warranty that is about to expire. The choices range from 1 day to 9 months.
- **Domain Name Expiry.** Specifies, in number of days, when SL1 should generate an event for a domain's registration that is about to expire. The choices range from 1 day to 9 months.
- **Validate Phone Number.** Specifies whether or not phone numbers entered into the user interface must be in US format. Choices are:
 - *Disabled.* Phone numbers are not required to be in US format.
 - *Enabled.* Phone numbers must be in US format.

- **Dashboard Maximum Series Count Per Widget.** This field allows you to select the maximum number of time-series lines that can appear in a single **Multi-series Performance** widget. Choices are 8–25. Increasing this setting might cause longer load times in the **[Dashboards tab]** page.
- **Responder API Base URL.** This field lets you update the Responder API Base URL, which is required if you want to align PowerShell Dynamic Applications to the agent.
- **Component Device Map Update Mode.** This field specifies how SL1 rebuilds relationships between component devices that are created by Dynamic Applications (DCM-R). Choices are:
 - *[Periodic].* (Default). A rebuild of the component device map occurs at a set interval, which is defined in the **DCM+R Rebuild** process (System > Settings > Processes). By default, the process runs every five minutes. Note that the Operating State for the **DCM+R Rebuild** process must be set to "Enabled" before periodic component device map updates will work. For more information, see [Viewing Information About ScienceLogic Processes](#).
 - *DCM-R Triggers.* A rebuild of the component device map occurs immediately after topology changes are registered.

CAUTION: Setting the **Component Device Map Update Mode** to "DCM-R Triggers" might impact your system if your environment has large topology trees or if the environment experiences frequent simultaneous topology changes.

- **Prefer Global Device Summary Dashboard Over Category/Class.** If you select this checkbox, the global default device dashboard will be displayed as the default in the **Device Summary** page instead of the device dashboard assigned to the device category or device class of the device. For more information about device dashboards, see the **Dashboards** manual.
- **Enable CBQoS Collection.** If selected, SL1 will collect configuration data about Class-Based Quality-of-Service (CBQoS) from interfaces that are configured for CBQoS. If selected, you can enable collection of CBQoS metrics per-interface. The collected CBQoS metrics are displayed in Device Performance reports associated with the device that contains those interfaces. This setting is disabled by default. (For more information about Device Performance reports, see the manual **Monitoring Device Infrastructure Health.**)
- **Enable Variable Rate Interface Counters.** If selected, enables more accurate collection of data from interfaces. If enabled, when SL1 retrieves data from an interface, that data is stored in the ScienceLogic database along with the timestamp associated with the exact collection time. Before normalization occurs, SL1 applies an interpolation function that spaces the data at regular time intervals. For example, suppose you have specified that SL1 should collect interface data every five minutes. However, due to network traffic across the Data Collectors, SL1 might collect data from an interface at 13:01 and then 13:05. Because the ScienceLogic normalization process expects data that has been collected every five minutes, SL1 first applies an interpolation to the data to prepare the data for normalization.

- **Enhanced OID Translation.** If selected, ensures that varbind OIDs that use multi-dimensional indexes are translated correctly. The symbolic translation of the known portion of the OID is included in the log message associated with the trap.

NOTE: Enabling the **Enhanced OID Translation** option might affect performance on large environments with a large number of traps.

- **Enable Concurrent SNMP Collection.** If selected, enables Concurrent SNMP Collection for all SNMP collection. Concurrent SNMP Collection allows multiple collection tasks to run at the same time with a reduced load on Data Collectors. Concurrent SNMP Collection also prevents missed polls and data gaps because collection will execute more quickly. For details see the manual **SNMP Dynamic Application Development**.
- **Enable Concurrent PowerShell Collection.** If selected, enables concurrent PowerShell collection for all PowerShell collection, which allows multiple collection tasks to run at the same time with a reduced load on Data Collectors.
- **Enable Concurrent Network Interface Collection.** If selected, enables asynchronous concurrent SNMP collection for all network interfaces. This provides better scalability for large networks by allowing multiple collection tasks to run at the same time with a reduced load on Data Collectors.
- **Report Size Estimation.** If selected, enables the **Row Count Estimate** field for custom reports on the Run Report page (Reports > Run Report). This field provides an estimate of the number of rows that will appear in the report before SL1 generates the report. The estimate changes based on the selections you make for the report. You can use this field to manage the size of the generated report by adding or removing items from the report as needed.
- **New UI Default.** Starting with SL1 11.1.0, the new SL1 user interface ("AP2") is the default user interface. If you want to make the classic user interface the default interface, de-select this option. If your 11.1.0 SL1 system was installing using an ISO, the SL1 user interface is set as the default, but if your SL1 system was upgraded with a patch, the classic user interface will still be set as the default user interface.
- **Include PowerPack Sensitive Fields.** If selected, lets you include sensitive fields when sharing a PowerPack. These sensitive fields include passwords and SSH keys.

3. Click the **[Save]** button to save changes in this page.

Configuring Single Instance Login for AP2

The **Single Instance Login** fields on the **Behavior Settings** page enable you to specify whether more than one instance of a single username can be logged in to the user interface at the same time.

In the classic SL1 user interface, you can configure single instance login using just those fields. However, for the current SL1 user interface ("AP2"), you must complete several additional steps.

To configure single instance login in AP2:

1. Go to the **Behavior Settings** page (System > Settings > Behavior).
2. Make the appropriate selections in the **Single Instance Login (Admins)** and **Single Instance Login (Users)** fields, and then click **[Save]**.
3. Either go to the console of the SL1 Database Server or use SSH to access the SL1 All-In-One Appliance.
4. Log in as user **em7admin**.
5. At the command line, open the nextui.env file in the vi editor:

```
sudo vi /opt/em7/nextui/nextui.env
```

6. Un-set the environment variable `AUTH_CACHE=300000` by adding `#` as a prefix to that line.
7. Save and exit the nextui.env file.
8. Restart the nextui server:

```
sudo systemctl restart nextui
```

Global Settings for Data Retention

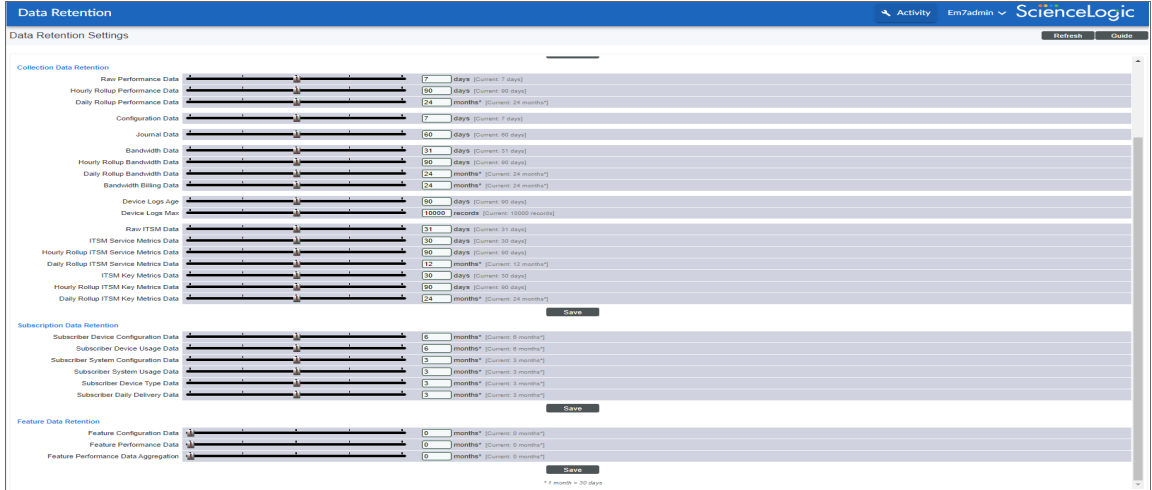
The **Data Retention Settings** page (System > Settings > Data Retention) allows you to define parameters for log and data retention.

These settings apply to all logs and all collected data. However, you can override these system settings on a case-by-case basis. For example, you can define data-retention thresholds for a device in the **Device Thresholds** page. The settings you define for the specific device override the settings in the **Data Retention Settings** page.

NOTE: For details on data roll-up and data normalization, see [Normalization and Roll-Up of Performance Data](#).

From the **Data Retention Settings** page, you can edit how long the platform stores log entries and collected data. To edit the settings for data retention:

1. Go to the **Data Retention Settings** page (System > Settings > Data Retention).



2. On the **Data Retention Settings** page, you can drag sliders to change the value of each field or manually enter values in the fields to the right of the sliders. You can edit the value for one or more of the following fields:

- **Audit Logs.** Number of months to retain log entries in the **Audit Logs** page (System > Monitor > Audit Logs). Log entries that are older than the specified number of months are automatically deleted. The default value is 3 months.
- **Event Logs.** Number of days to retain event logs. Event history data is used to generate the **Event Overview** page (System > Monitor > Event Overview). Log entries that are older than the specified number of months are automatically deleted. The default value is 3 months.
- **Access Logs.** Number of months to retain log entries in the **Access Sessions** page (System > Monitor > Access Logs). Log entries that are older than the specified number of months are automatically deleted. The default value is 12 months.
- **System Logs.** Number of days to retain log entries in the **System Logs** page (System > Monitor > System Logs). Log entries that are older than the specified number of days are automatically deleted. The default value is 31 days.
- **Collection Unit Data Buffer.** Number of days each Data Collector and Message Collector should store collected data. Choices are 1-10 days. Data that has been retrieved by the Database Server will be stored on the Data Collector(s) and optional Message Collector(s) for the specified number of days and then automatically deleted from the server(s). This setting does not apply to All-In-One Appliances. The default value is 2 days.
- **Ad-hoc and Scheduled Reports.** Number of days SL1 will retain Quick Reports and Scheduled Reports in the **Scheduled Report Archive** page (Scheduled Job > Report Archive > Archived Job button). Possible values are 0 - 365, in days. If you use the default value of 0, SL1 will remove files older than 30 days from the populated directory: `/opt/em7/gui/ap/www/em7/libs/od_templates/populated`.

- **Raw Performance Data.** Number of days to retain performance data collected from devices. This setting applies to all performance data types, except for bandwidth data. Performance data that is older than the specified number of days is automatically deleted. This is the default system-wide value. The value in the **Device Thresholds** page for each device can override this value. The default value is 7 days.
- **Hourly Rollup Performance Data.** Number of days to retain hourly normalized performance data for devices. This setting applies to all performance data types, except for bandwidth data. Hourly normalized performance data that is older than the specified number of days is automatically deleted. This is the default system-wide value. The value in the **Device Thresholds** page for each device can override this value. The default value is 120 days.
- **Daily Rollup Performance Data.** Number of months to retain daily normalized performance data for devices. This setting applies to all performance data types, except for bandwidth data. Daily normalized performance data that is older than the specified number of months is automatically deleted. This is the default system-wide value. The value in the **Device Thresholds** page for each device can override this value. The default value is 24 months.
- **Configuration Data.** Number of days to retain data from Dynamic Applications of type "configuration". The value in the **Device Thresholds** page for each device can override this value. The default value is 7 days.
- **Journal Data.** Number of days to retain collected data from Dynamic Applications of type "journal". The value in the **Device Thresholds** page for each device can override this value. The default value is 60 days.
- **Bandwidth Data.** Number of days to retain bandwidth data and CBQoS data collected from each interface on a device. Bandwidth data that is older than the specified number of days is automatically deleted. The value in the **Device Thresholds** page for each device can override this value. The default value is 31 days.
- **Hourly Rollup Bandwidth Data.** Number of days to retain hourly normalized data and hourly normalized CBQoS data for each interface on a device. Hourly normalized data that is older than the specified number of days is automatically deleted. The value in the **Device Thresholds** page for each device can override this value. The default value is 90 days.
- **Daily Rollup Bandwidth Data.** Number of months to retain daily normalized data and daily normalized CBQoS data for each interface on a device. Daily normalized data that is older than the specified number of months is automatically deleted. The value in the **Device Thresholds** page for each device can override this value. The default value is 24 months.
- **Bandwidth Billing Data.** Number of months to retain data collected by each bandwidth billing policy. Bandwidth billing data that is older than the specified number of months is automatically deleted. The default value is 24 months.
- **Device Logs Age.** Number of days to retain each device log. Log records that are older than the specified number of days are automatically deleted. The value in the **Device Thresholds** page for each device can override this value. The default value is 90 days.
- **Device Logs Max.** Maximum number of records to store in each device log. When this number is exceeded, the oldest entries will be deleted. The value in the **Device Thresholds** page for each device can override this value. The default value is 10,000 records.

- **Raw ITSM Data.** Before the value for a metric in an IT Service policy is calculated, a copy of all the device data that will be aggregated is saved. This setting is the number of days to retain the un-aggregated copies of device data associated with each IT Service. The default value is 31 days.
- **ITSM Service Metrics Data.** Number of days to retain values for metrics in IT Service policies. The default value is 30 days, with a maximum of 30 days.
- **Hourly Rollup ITSM Service Metrics Data.** Number of days to retain hourly normalized values for metrics in IT Service policies. The default value is 90 days, with a maximum of 90 days.
- **Daily Rollup ITSM Service Metrics Data.** Number of months to retain daily normalized values for metrics in IT Service policies. The default value is 12 months.
- **ITSM Key Metrics Data.** Number of days to retain values for key metrics in IT Service policies (Health, Availability, and Risk). The default value is 30 days, with a maximum of 30 days.
- **Hourly Rollup ITSM Key Metrics Data.** Number of days to retain hourly normalized values for key metrics in IT Service policies (Health, Availability, and Risk). The default value is 90 days, with a maximum of 180 days.
- **Daily Rollup ITSM Key Metrics Data.** Number of months to retain daily normalized values for key metrics in IT Service policies (Health, Availability, and Risk). The default value is 24 months.
- **Subscriber Device Configuration Data.** For users with a subscriber license. Number of months to retain the files and database tables that contain configuration information for a device. Default value is 6 months.
- **Subscriber Device Usage Data.** For users with a subscriber license. Number of months to retain the files and database tables that contain usage information for a device. Default value is 6 months.
- **Subscriber System Configuration Data.** For users with a subscriber license. Number of months to retain the files and database tables that contain configuration information for the SL1 system. Default value is 3 months.
- **Subscriber System Usage Data.** For users with a subscriber license. Number of months to retain the files and database tables that contain usage information for the SL1 system. Default value is 3 months.
- **Subscriber Device Type Data.** For users with a subscriber license. Number of months to retain the files and database tables that map each device to a device category, as per your subscriber license. Default value is 3 months.
- **Subscriber Daily Delivery Data.** For users with a subscriber license. Number of months to retain the "crunched" license usage data that is calculated each day using the Subscriber Device Configuration Data, Subscriber System Configuration Data, Subscriber System Usage Data, and Subscriber Device Type Data. SL1 will not prune data that has not yet been delivered to the ScienceLogic Licensing and Billing server. Default value is 3 months.

3. Click the **[Save]** button to save any changes to the data-retention settings.

NOTE: In SL1, normalized data does not include polling sessions that were missed or skipped. So for normalized data, null values are not included when calculating maximum values, minimum values, or average values.


TIP: You might want to retain normalized data for longer periods of time and non-normalized data for shorter periods of time. This allows you to save space and still create historical reports.



Normalization and Roll-Up of Performance Data

Normalization and *roll-up* are the ways in which SL1 processes collected performance data for display and storage. Note the following important distinctions:

- **Raw data** is the data exactly as it was collected from a device or application.
- **Normalized and rolled up data** is data for which SL1 has calculated summary statistics (sample size, count, maximum value, minimum value, mean value, average value, sum, and standard deviation) over a period of time.

Collection of Raw Data

Collector	Collected Data and Intervals
<p>Dynamic Applications</p>	<p>Collects raw performance data from a device at the following intervals:</p> <ul style="list-style-type: none"> • 1 minute • 2 minutes • 3 minutes • 5 minutes • 10 minutes • 15 minutes • 30 minutes • 1 hour • 2 hours • 6 hours • 12 hours • 24 hours <p>For performance Dynamic Applications, you specify this interval in the Poll Frequency field, in the Properties Editor page (System > Manage > Applications > Create or use the ).</p>
<p>IT Services</p>	<p><i>IT Service policies</i> can generate raw performance data for an IT service by aggregating raw performance data from devices in the policy at the following intervals:</p> <ul style="list-style-type: none"> • 1 minute • 2 minutes

Collector	Collected Data and Intervals
	<ul style="list-style-type: none"> • 3 minutes • 5 minutes • 10 minutes • 15 minutes • 30 minutes • 1 hour • 2 hours • 6 hours • 12 hours • 24 hours <p>You can specify the interval at which the IT Service policy collects and aggregates data in the Aggregation Frequency field, in the IT Service Editor page (Registry > IT Services > IT Service Manager > Create or use the ).</p>
Bandwidth	<p>Collects raw bandwidth data from a network interface at the following intervals:</p> <ul style="list-style-type: none"> • 1 minute • 5 minutes • 10 minutes • 15 minutes • 30 minutes • 60 minutes • 120 minutes <p>You can specify the frequency at which SL1 collects raw data for a specific interface by selecting the interval in the Frequency field, in the Interface Properties page (Registry > Networks > Interfaces > interface wrench icon and select the  for the given interface).</p>
Additional Performance Data	<p>SL1 collects additional raw performance data about availability, latency, file systems, and statistics generated by monitoring policies for DNS availability, Email round-trip time, system processes, system services, port availability, web-content availability, and SOAP/XML transactions. By default, SL1 collects this data every 5 minutes.</p>

Data Normalization and Rollup

SL1 rolls up performance data so that reports with a larger timespan do not become difficult to view and to save storage space in the database. When SL1 rolls up data, SL1 groups data into larger sets and calculates the average value for the larger set.

SL1 supports two types of rollup:

- **Hourly.** Groups and averages data that is collected at intervals of 60 minutes or less. SL1 rolls up data and calculates an average hourly value for each metric. Hourly samples include samples from the top of the hour to the end of the hour. For example, for an hourly rollup of data collected at 1 minute intervals between 1:00 and 2:00, the first data point would be the one collected at 01:00:00 and the last would end at 01:59:00.
- **Daily.** Daily rollup groups and averages all collected data. SL1 rolls up data and calculates an average daily value for each metric. Daily samples include samples from the beginning of the day until the end of the day. For example, for a daily rollup of data collected at 1 minute intervals, the first data point would be the one collected at 00:00:00 and the last data point would be the one collected at 23:59:00.

SL1 rolls up raw performance data as follows:

Frequency of Raw Collection	Rollup
Every 1 minute	60 minutes, 24 hours
Every 2 minutes	60 minutes, 24 hours
Every 3 minutes	60 minutes, 24 hours
Every 5 minutes	60 minutes, 24 hours
Every 10 minutes	60 minutes, 24 hours
Every 15 minutes	60 minutes, 24 hours
Every 30 minutes	60 minutes, 24 hours
Every 60 minutes	60 minutes, 24 hours
Every 120 or longer	24 hours

Before SL1 normalizes data, SL1 transforms the data. To transform the data, SL1 does the following:

- For bandwidth data and data from Dynamic Applications of type "Performance", SL1 derives rates from counter metrics. The rate from counter metrics are expressed in units-per-polling_interval. For example, rates for 5 minute collections are expressed as units-per-5-minutes.
- For data from Dynamic Applications of type "Performance", SL1 evaluates presentation formulas. Counter metrics are first transformed into rates before evaluation.

NOTE: During the data transform steps, SL1 does not directly rollup the raw data in the database tables.

When SL1 rolls up data, SL1 must normalize that data, as follows:

NOTE: As a new piece of data is collected by SL1, the hourly normalization and daily normalization is calculated. SL1 does not wait for the end of an hour or the end of a day to calculate the hourly and daily normalization.

- Groups and orders the data
- Determines the sample size
- Calculates the count
- Determines the maximum value
- Determines the minimum value
- Calculates the mean value
- Calculates the average value
- Calculates the sum
- Determines the standard deviation

NOTE: In SL1, normalized data does not include polling sessions that were missed or skipped. For normalized data, null values are not included when calculating sample size, maximum values, minimum values, or average values.

Example

Suppose that every five minutes, SL1 collects data about file system usage on the device named *my_device*. As each raw data point is collected, SL1 normalizes and rolls up the collected data for file system usage for *my_device*. SL1 does the following:

1. Apply any necessary data transforms (as discussed in the previous section).
2. Repeat the following for both hourly normalization and daily normalization:
 - a. If this is the first data point for an hourly normalization or a daily normalization, insert summary statistics for that one data point
 - Sample size = 1
 - Average = value of new data point
 - Max = value of new data point
 - Min = value of new data point
 - Sum = value of new data point
 - Standard Deviation = 0
 - b. For all subsequent data points for an hourly normalization or a daily normalization, update the summary statistics of the existing rollup bucket
3. If there no gaps in collection, the summary statistics for hourly normalization will represent 12 data points and the summary statistics for daily normalization will represent 288 data points.

Storage of Raw and Rolled Up Data

There are two ways you can define how long SL1 should store raw data and rolled up and normalized data:

- You can define system-wide, default settings in the **Data Retention Settings** page (System > Settings > Data Retention). These settings apply to all collected data. However, you can override these system settings in the **Device Thresholds** page (Registry > Devices > Device Manager > wrench icon > Thresholds).
- For IT Service policies, aggregated device data is saved to a new database table specifically for the IT service policy. For each IT Service policy, data is normalized and rolled up. You define the data retention settings for an individual IT Service policy in the **IT Service Editor** page (Registry > IT Services > IT Service Manager > Create or 🛠️). These settings override the data retention settings in the **Data Retention Settings** page (System > Settings > Data Retention).

Global Settings for Inbound Email and Outbound Email

The **Email Settings** page (System > Settings > Email) allows you to define how SL1 will send and receive email. SL1 automatically sends email when tickets are updated, when automation actions are triggered, and to monitor email round-trip time. Email can be sent to the platform to create tickets and/or events.

From the **Email Settings** page, you can edit the global email parameters. To do so:

1. Go to the **Email Settings** page (System > Settings > Email).

2. In the **Email Settings** page, you can edit the value for one or more of the following fields:
 - **Authorized Email Domains.** One or more SMTP domains that will be used by SL1. SL1 will use these domains to receive incoming email. This list of domains should include:
 - All domains used for loopback addresses in email round-trip monitoring policies.
 - All domains used to generate tickets from emails.
 - All domains used to receive event messages from third-party monitoring systems.
 - Each entry in this field must be a fully-qualified email domain and cannot exceed 64 characters. If you include a list of domains, separate the list with commas.
 - Each domain in this field must be managed by the Database Server. This means that a DNS MX record must already exist or be created for each domain specified in this field. Each DNS MX record must map the domain to the Database Server. When creating the DNS MX record, use the fully-qualified name of the Database Server as the name of the email server.

- **System From Email Address.** The email address from which SL1 will send all outbound email.

NOTE: Some outbound email servers, such as Gmail, might overwrite the **System From Email Address** value and instead use the email address of the authenticated user.

- **Email Formal Name.** Name that will appear in the "from" field in email messages sent from SL1. This value can be any alphanumeric value, up to 64 characters in length.
- **Email Gateway.** IP address or fully-qualified name of SL1's SMTP Relay server. If SL1 is to send outgoing messages, this field must be defined. Examples of when SL1 sends outgoing email messages are:
 - Automatically in response to Tickets from Email policies.
 - Automatically in response to changes in a ticket (ticket is assigned, edited, or resolved).
 - Automatically based on Ticket Escalation policies.
 - Automatically when executing Email Round-Trip Monitoring policies.
 - Automatically when executing Run Book policies that include email actions.
 - Automatically based on Report Jobs policies.
 - Manually, when a user selects the **Send Message** page from the ticket panel pages.

Each Database Server and All-In-One Appliance includes a built-in SMTP Relay server. The fully-qualified name of SL1 SMTP Relay server is the same as the fully-qualified name of the Database Server or All-In-One Appliance.

If SL1 cannot use its built-in SMTP relay server to route email messages directly to their destination server (for example, due to firewall rules or DNS limitations), SL1 can use another relay server. You can specify the IP address or fully-qualified name of the relay server in this field. Make sure you have configured your network to allow the Database Server or All-In-One Appliance to access this SMTP Relay server.

NOTE: The **Email Gateway** field must be configured to use the appropriate port number to use, which is designated by a preceding colon. When no port number is specified, SL1 uses the default SMTP port (25).

- **Email Gateway Alt.** IP address or fully-qualified name of the secondary SMTP Relay server. If the SMTP Relay server specified in the previous field fails or is unavailable, SL1 will use the secondary SMTP Relay server. Make sure you have configured your network to allow the Database Server or All-In-One Appliance to access this SMTP Relay server.
- **Escalation Notify Subject.** Default "Subject" text in emails generated by Ticket Escalation policies. This field can include any combination of variables and text. The field can include up to 64 characters, including one or more variables:

The **Escalation Notify Subject** field can include one or more of the following variables:

Variable	Source	Description
%1 (one)	Event	Entity type.
%2	Event	Sub-entity type.
%3	Event Policy	Event policy ID.
%4	Event	Text string of the user name that cleared the event.
%5	Event	Timestamp of when event was deleted.
%6	Event	Timestamp for event becoming active.
%7	Event	Event severity (1-5), for compatibility with previous versions of the platform. 1=critical, 2=major, 3=minor, 4=notify, 5=healthy.
%A	Account	Username.
%a	Entity	IP address.
%B	Organization	Organization billing ID.
%b	Organization	Impacted organization.
%C	Organization	Organization CRM ID.
%c	Event	Event counter.
%D	Event	Timestamp of first event occurrence.
%d	Event	Timestamp of last event occurrence.
%E	Event Policy	External ID from event policy.
%e	Event	Event ID.
%F	Dynamic Alert	Dynamic Application alert id.
%f	Event Policy	Specifies whether event is stateful, that is, has an associated event that will clear the current event. 1 (one) = stateful; 0 (zero) = not stateful.
%G	Event Policy	Event Category.
%g	Asset	Asset serial.
%H	Event	URL link to event.
%h	Asset	Device ID associated with the asset.
%l (uppercase "eye")	Dynamic Alert	Table index for a Dynamic Application.
%i (lowercase "eye")	Asset	Asset Location.
%7	Ticket	Ticket subject.
%K	Asset	Asset Floor.
%k	Asset	Asset Room.
%M	Event	Event message.
%m	Automation	Automation policy note.
%N	Action	Automation action name.
%n	Automation	Automation policy name.
%O (uppercase "oh")	Organization	Organization name.

Variable	Source	Description
%o (lowercase "oh")	Organization	Organization ID.
%P	Asset	Asset plate.
%p	Asset	Asset panel.
%Q	Asset	Asset punch.
%q	Asset	Asset zone.
%R	Event Policy	Event policy cause/action text.
%r	System	Unique ID / name for the current SL1 system.
%S	Event	Severity (Healthy - Critical).
%s	Event	Severity (0 - 4). 0=healthy, 1=notify, 2=minor, 3=major, 4=critical.
%T	Dynamic Alert	Dynamic Application alert threshold value.
%t	Ticket	Ticket ID.
%U	Asset	Asset rack.
%u	Asset	Asset shelf.
%V	Dynamic Alert	Dynamic Application alert result value.
%v	Asset	Asset tag.
%W	Asset	Asset make.
%w	Asset	Asset model.
%X	Event	Entity name.
%x	Event	Entity ID.
%Y	Event	Sub-entity name.
%y	Event	Sub-entity ID.
%Z	Event	Event source (1 - 8).
%z	Event	Event source (Syslog - Group).

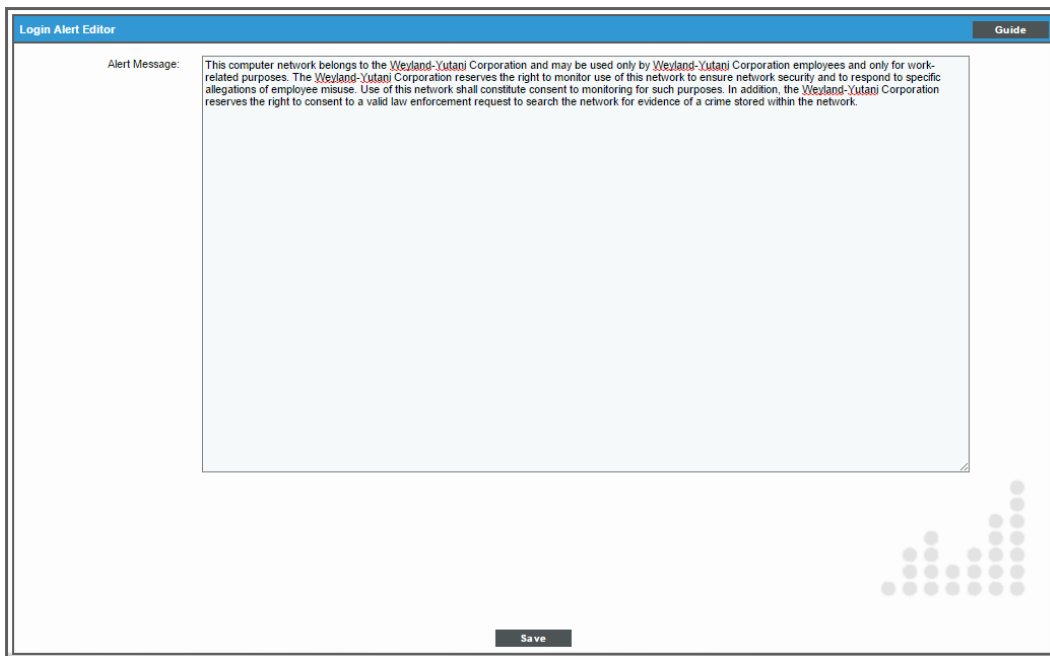
Global Settings for Login Alert Messages

In SL1, administrators can add a customizable click-through alert message as a security measure at logon. Users will not be able to access the system until the user click the **[OK]** button to agree to the terms and conditions of use for that system.

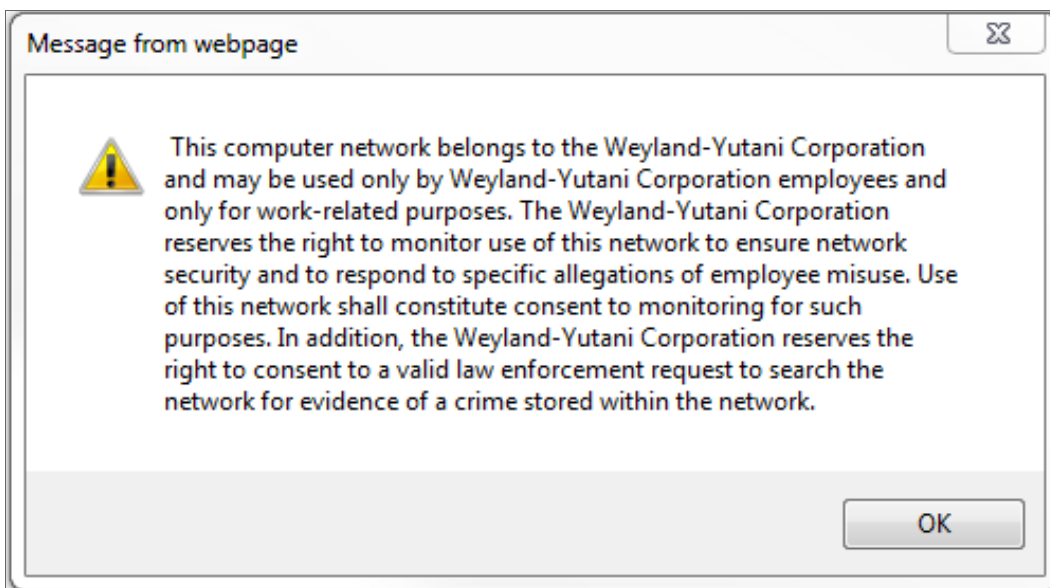
To add a custom login alert message to SL1 :

1. Go to the **Login Alert Editor** page (System > Settings > Login Alert Message).

2. In the **Alert Message** field, type the text of your login alert message:



3. After entering the login alert text, click the **[Save]** button.
4. When a user logs in, the alert message will display:



Global Settings for Password Reset Emails

The **Password Reset Email Editor** page (Password Reset Email Editor) allows ScienceLogic administrators to define the email message that is sent to ScienceLogic users who select the "I forgot my password" option from the **Login** page.

If the user enters a valid ScienceLogic username in the **Login** page and then selects the *I forgot my password* option, SL1 will check the account information for that user. If the user's account information includes an email address, SL1 will send the user an email message. The email message will include a link that allows the user to redefine their ScienceLogic password. The new password must meet the requirements defined in the **Password Strength** field and the **Password Shadowing** field for the user account. SL1 will prompt the user to meet these requirements and display a description of those requirements.

The user can select the *I forgot my password* option up to ten times without responding to the sent email (using the link in the email to reset the password). After ten times, SL1 will no longer send another email message to the user's email address. The user can continue to select the *I forgot my password* option, but SL1 will not resend an email.

If the user's account information does not include an email address, SL1 displays the message "Password recovery is not available for your account, please contact your system administrator".

If the user does not enter a valid ScienceLogic username in the **Login** page, the *I forgot my password* option is still displayed, but SL1 does not send an email. This prevents intruders from guessing ScienceLogic account names.

If the user exceeds the number of login tries (defined in the **Behavior Settings** page), the "I forgot my password" option is not displayed in the **Login** page.

Defining the Email Message for "I forgot my password"

In the **Password Reset Email Editor** page (System > Settings > Password Reset Email), you can define the email that is sent from SL1 when an end user selects the *I forgot my password* option from the **Login** page.

To define the email message sent by SL1 :

1. Go to the **Password Reset Email Editor** page (System > Settings > Password Reset Email).

The screenshot shows the 'Password Reset Email Editor' interface. It features a blue header bar with the title 'Password Reset Email Editor' and a 'Guide' button. Below the header, there are three main fields: 'Priority' with a dropdown menu set to '[High]', 'Subject' with the text 'EM7 | %O [automated message]', and 'Message' with a text area containing 'Hello %fn %n, Your password for account %A has been reset. Use the following link to log-in and choose a new password: %L'. A 'Save' button is located at the bottom center of the form.

2. Supply a value in each of the following fields:

- **Priority**. This will be the priority of the email message. Choices are:
 - *High*. Emails will be marked as high priority.
 - *Normal*. Emails will be marked as normal priority.
 - *Low*. Emails will be marked as low priority.
- **Subject**. This will be the subject of the email message.
- **Message**. This will be the body of the email message. **The body must include the variable %L**. This variable inserts the link to the page that allows the user to reset their ScienceLogic password.

3. You can include the following variables in the **Subject** field and the **Message** field:

- **%L (uppercase "e")**. The link to the page that allows the user to reset their password.
- **%O (uppercase "oh")**. The user's primary organization, as defined in the **Account Permissions** page for the user.

- **%fn** (lowercase "eff" "en"). The user's first name, as defined in the **Account Permissions** page for the user.
- **%ln** (lowercase "el" "en"). The user's last name, as defined in the **Account Permissions** page for the user.

4. Click the **[Save]** button to save the email template.
5. When a user follows the link in the email, SL1 displays the **Login** page, with the message "Your account has been reset. Please create a new password." The user must then enter their new password twice. The new password is recorded in SL1 and replaces the previous (forgotten) password.

For example, you could define the following:

Subject. ScienceLogic | %O (automated message)

Message. Hello %fn %ln,

Your password for account %A has been reset.

Please use the following link to log in and choose a new password:

%L.

For the user "Keyser Soze", who is a member of the System organization, the following email would be sent:

Subject: ScienceLogic | System (automated message).

Hello Keyser Soze,

Your password for account ksoze has been reset.

Please use the following link to login and choose a new password:

https://name_or_IP_of_EM7_Administration_Portal/login.em7?prs=hash

Global Settings for System Thresholds

The **System Threshold Defaults** page (System > Settings > Thresholds > System) allows you to define global thresholds for system latency, file system usage, counter rollovers, ICMP availability, number of component devices, interface inventory, and inbound messages.

These settings apply to all devices. However, you can override these system settings on a case-by-case basis. For example, you can define thresholds for a device's file systems in the **[Thresholds]** tab of the **Device Investigator** (or the **Device Thresholds** page in the classic SL1 user interface). The settings you define for the specific device override the settings in the **System Threshold Defaults** page.

To edit the global settings for system thresholds:

1. Go to the **System Threshold Defaults** page (System > Settings > Thresholds > System).

The screenshot shows the 'System Threshold Defaults' configuration page. The page has a blue header with 'System' on the left and 'Help', 'Activity', 'Em7admin', and 'ScienceLogic' on the right. Below the header, there are 'Reset' and 'Guide' buttons. The main content area is divided into several sections, each with a title and a list of settings:

- Operating System Thresholds**
 - System Latency: 100 ms [Default: 100]
 - Filesystem Major: 85 % [Default: 85]
 - System Availability: 99 % [Default: 99]
 - Filesystem Critical: 95 % [Default: 95]
- Counter Rollover Thresholds**
 - Rollover Percent: 20 % [Default: 20]
 - Out-of-order Percent: 50 % [Default: 50]
- ICMP Availability Thresholds**
 - Availability Ping Count: 1 [Default: 1]
 - Process Runtime Threshold Low: 80 % [Default: 80]
 - Avail Required Ping Percentage: 100 % [Default: 100]
 - Process Runtime Threshold High: 100 % [Default: 100]
- Component Device Thresholds**
 - Component Purge Timeout: 0 hours [Default: 0]
 - Component Vanish Timeout Mins: 0 minutes [Default: 0]
- Interface Inventory Thresholds**
 - Interface Inventory Timeout: 600000 ms [Default: 600000]
 - Maximum Allowed Interfaces: 10000 interfaces [Default: 10000]
- Inbound Message Throttle Thresholds**
 - Syslog per-IP: 25 messages/s [Default: 25]
 - Dynamic Alert per-device: 25 messages/s [Default: 25]
 - SNMP Trap per-IP: 25 messages/s [Default: 25]

At the bottom center of the page, there is a 'Save' button.

2. In the **System Threshold Defaults** page, you can drag sliders to change to value of each field or edit a field manually. You can edit the value for one or more of the following fields:

- **System Latency.** During polling, the platform initially pings monitored devices. The value in this field is the maximum number of milliseconds for the device to respond to SL1's ping (round-trip time divided by 2). The default value is 100 ms. When the latency threshold is exceeded, SL1 generates an event for that device.
- **System Availability.** During polling, SL1 monitors devices for availability. Availability means the device's ability to accept connections and data from the network. The value in this field is the percent availability required of each device. The default value is 99%. When a device falls below this level of availability, SL1 generates an event for that device.

During polling, a device has two possible availability values:

- 100%. Device is up and running.
- 0%. Device is not accepting connections and data from the network.

NOTE: Component devices use a Dynamic Application collection object to measure availability. SL1 polls component devices for availability at the frequency defined in the Dynamic Application. For details, see the chapter on *Monitoring Device Availability and Latency* in the **Monitoring Device Infrastructure Health** manual.

NOTE: The **Ping & Poll Timeout (Msec)** setting in the **Behavior Settings** page (System > Settings > Behavior) affects how SL1 monitors device availability. This field specifies the number of milliseconds the discovery tool and availability polls will wait for a response after pinging a device. After the specified number of milliseconds have elapsed, the poll will timeout.

- **File System Major.** Threshold that will trigger a "low disk space" event. The default threshold is 85%. When a device has used more disk space than the specified percentage, SL1 will generate a "file system usage exceeded threshold" event with a status of "major".
- **File System Critical.** Threshold that will trigger a "low disk space" event. The default threshold is 95%. When a device has used more disk-space than the specified percentage, SL1 will generate a "file system usage exceeded threshold" event with a status of "critical".

NOTE: If you hide a file system in the **Device Hardware** page (Devices > Hardware), SL1 does not generate events for that file system.

- **Rollover Percent.** For any collected data that uses a 32-bit counter, you can specify how SL1 determines that the counter has "rolled over", that is, has reached its maximum value, is reset to zero, and restarts counting. When this happens, the collected values go from the maximum value to a lower value. However, there are multiple circumstances under which a counter value can go from a higher value to a lower value:
 - Maximum value has been exceeded and counter was reset to zero.
 - Retrieved value was manually reset to zero on the external device.
 - Data was collected out-of-order, that is, due to a slowdown somewhere in the network, two counter values were stored out of sequence.

NOTE: For 64-bit counters, when the counter values go from a higher value to a lower value, SL1 assumes that the counter has been manually reset or that the two values were collected out of order. SL1 does not assume that the counter has rolled over.

The **Rollover Percent** field allows you to specify a threshold that indicates that a 32-bit counter has reached its maximum value and restarted counting. The default value is 20%. When SL1 records a counter value that is lower than the previously collected value, the platform:

- Calculates the difference between the two counter values (the delta):
$$2^{32} - \text{Last Collected Value} + \text{Current Collected Value}$$
- Examines the value of the **Rollover Percent** threshold. If the delta is less than the specified percentage of the maximum possible value (2^{32}), SL1 concludes that the 32-bit counter rolled over.

- For example, if you specified "25" in this field, SL1 would determine if the delta is less than 25% of the maximum possible value. If the delta is less than 25% of the maximum possible value, SL1 concludes that the 32-bit counter rolled over.
- When SL1 determines a counter has rolled over, SL1 uses the delta value when displaying the data point for this poll period.

NOTE: The **Rollover Percent** field applies only to 32-bit counters. If a 64-bit counter value goes from a higher value to a lower value, the change is treated as either a manual reset or an out-of-order collection.

- **Out-of-order Percent.** For any collected data that uses a counter, you can specify how SL1 determines that data has been collected out of order. When this data is collected out of order, the collected values go from a higher value to a lower value. However, there are multiple circumstances under which a counter value can go from a higher value to a lower value:
 - Maximum value has been exceeded and counter was reset to zero (for 32-bit counters only).
 - Data was collected out-of-order, that is, due to a slowdown somewhere in the network, two counter values were stored out of sequence.
 - Retrieved value was manually reset to zero on the external device.

The **Out-of-order Percent** field allows you to specify a threshold that indicates that data has been collected out of order. The default value is 50%. When SL1 records a counter value that is lower than the previously collected value and the platform has determined that the value is not a rollover, SL1:

- Compares the current value to the last collected value:
current value / last collected value
- If the ratio of current value / last collected value is greater than the percent specified in the **Out-of-order Percent** field, SL1 concludes that the data was collected out of order.
- When SL1 determines a data point has been collected out of order, SL1 uses the following value as the current value of the data point:
last collected value - current collected value

NOTE: If a 32-bit counter value goes from the maximum value to a lower value, and the current collected value does not meet the criteria for a rollover AND the current collected value does not meet the criteria for out-of-order, SL1 concludes that the 32-bit counter was manually reset to zero (0). SL1 uses the current collected value for this data point.

NOTE: If a 64-bit counter value goes from a higher value to a lower value, and the current collected value does not meet the criteria for out-of-order, SL1 concludes that the 64-bit counter was manually reset to zero (0). SL1 uses the current collected value for this data point.



- **Availability Ping Count.** If you select *ICMP* in the **Availability Port** field in the **Device Properties** page (Devices > Device Manager > wrench icon) for a device, this field specifies the number of packets that should be sent during each availability check. The default value is "1".
- **Avail Required Ping Percentage.** If you select *ICMP* in the **Availability Port** field in the **Device Properties** page (Devices > Device Manager > wrench icon) for a device, this field specifies the percentage of packets that must be returned during an availability check for SL1 to consider the device available. The default value is "100%".
- **Process Runtime Threshold Low.** Threshold that will trigger a "process time exceeded" event. The default threshold is 80%. When a process has used more than 80% of its allowed **Run Length**, SL1 will generate a "process time exceeded threshold" event with a status of "minor".
- **Process Runtime Threshold High.** Threshold that will trigger a "process time exceeded" event. The default threshold is 100%. When a process has used 100% of its allowed **Run Length**, SL1 will generate a "process time exceeded threshold" event with a status of "major".

NOTE: *Run Length* is defined in the **Process Manager** page (System > Settings > Admin Processes).

- **Component Purge Timeout.** This field specifies the number of hours a device can be set to "vanished" before SL1 purges the component device. When a device is purged, SL1 stops trying to collect data about the component device. The purged device will not appear in reports or views on in any pages in the user interface. When a device is purged, all of its configuration data and collected data is deleted from the Database Server. If you set this value to "0", component devices are never purged. You can override this threshold for a specific device in the **[Thresholds]** tab of the **Device Investigator** (or the **Device Thresholds** page in the classic SL1 user interface) for the device.

NOTE: When a device is set to "vanished", all children of that device are also set to "vanished". When a device is purged, all children of that device are also purged.

- **Component Vanish Timeout Mins.** If SL1 cannot retrieve information from a root device about a component device, this field specifies how many minutes to wait until putting the component device into "vanish" mode. When a device is set to "vanished", SL1 stops trying to collect data about the component device. The vanished device will not appear in reports or views. The vanished device will appear in the **Vanished Device Manager** page. If you set this value to "0", component devices are never set to "vanished". You can override this threshold for a specific device in the **[Thresholds]** tab of the **Device Investigator** (or the **Device Thresholds** page in the classic SL1 user interface) for the device.
- **Interface Inventory Timeout.** Specifies the maximum amount of time that the discovery processes will spend polling a device for the list of interfaces. After the specified time, SL1 will stop polling the device, will not model the device, and will continue with discovery. The default value is 600,000 ms (10 minutes).

- During *initial discovery*, initiated from the Discovery Session Editor page (System > Manage > Classic Discovery > Create), SL1 uses the value in this field if there is no differing value specified in the **Discovery Session Editor** page.
 - During *re-discovery* (clicking the binocular icon  in the Device Properties page), SL1 will use the value in this field if there no value is specified in the **[Thresholds]** tab of the **Device Investigator** (or the **Device Thresholds** page in the classic SL1 user interface) for the device.
 - During *nightly auto-discovery* (run automatically by SL1 every night, to update device information), SL1 uses the value in this field if no differing value is specified in the **[Thresholds]** tab of the **Device Investigator** (or the **Device Thresholds** page in the classic SL1 user interface) for a device.
- **Maximum Allowed Interfaces.** Specifies the maximum number of interfaces per device. If a device exceeds this number of interfaces, SL1 will stop scanning the device, will not model the device, and will continue with discovery. The default value is 10,000.
 - During *initial discovery*, initiated from the **Discovery Session Editor** page (System > Manage > Classic Discovery > Create), SL1 uses the value in this field if there is no differing value specified in the **Discovery Session Editor** page.
 - During *re-discovery* (clicking the binocular icon  in the Device Properties page), SL1 will use the value in this field if there is no differing value is specified in the **[Thresholds]** tab of the **Device Investigator** (or the **Device Thresholds** page in the classic SL1 user interface) for the device.
 - During *nightly auto-discovery* (run automatically by SL1 every night, to update device information), SL1 uses the value in this field if no differing value is specified in the **[Thresholds]** tab of the **Device Investigator** (or the **Device Thresholds** page in the classic SL1 user interface) for a device.
 - **Inbound Message Throttle Thresholds.** Specifies the maximum number of messages that can be received before SL1 will notify the system administrator and discard the current batch of messages. The default message threshold is 25.
 - *Syslog per-IP.* Specifies the threshold for incoming syslog messages from a given IP address.
 - *Dynamic Alert per-device.* Specifies the threshold for incoming alerts for a Dynamic Application on a given device.
 - *SNMP Trap per-IP.* Specifies the threshold for incoming SNMP traps from a given IP address.
 - **SSL Certificate Purge Timeout.** Specifies the number of days after which SSL certificate data will be purged. The default value is 0 days.
 - **Schedules Purge Timeout.** Specifies the number of days after which expired schedules will be deleted. The default value is 730 days.
3. Click the **[Save]** button to save changes in this page.
 4. All changes to this page are logged in the audit logs.

Global Settings for Interface Thresholds

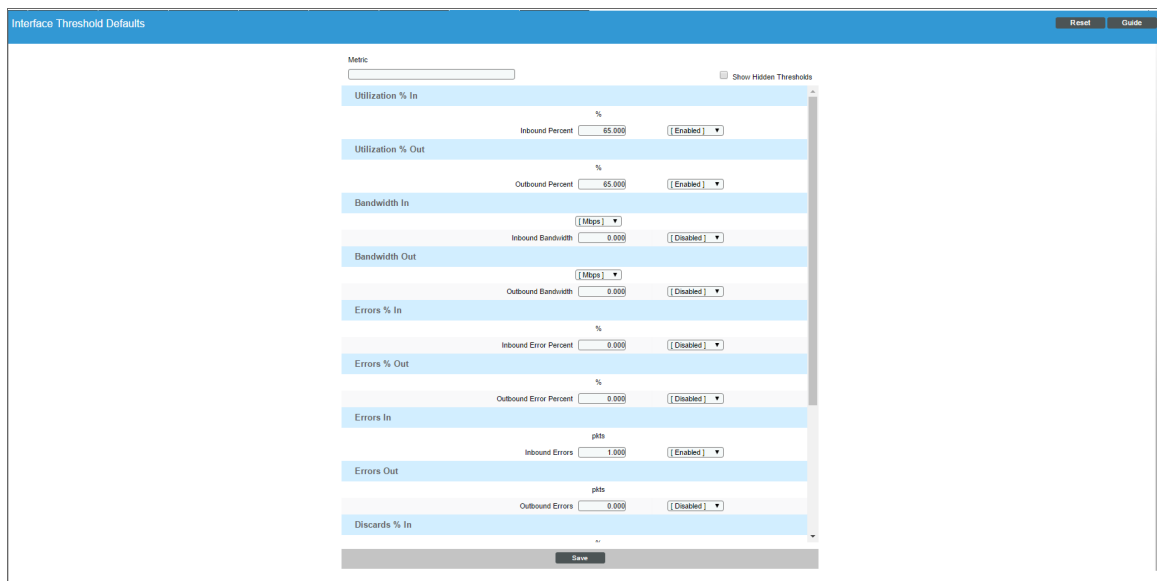
The **Interface Thresholds Defaults** page (System > Settings > Thresholds > Interface) allows you to define global thresholds for interfaces.

The settings in the **Interface Thresholds Defaults** page apply to all interfaces. However, you can override these system settings on a case-by-case basis for each interface in the **Thresholds** tab on the **Interface Properties** page (Registry > Networks > Interfaces > interface wrench icon).

If you have specified that SL1 should monitor an interface, SL1 will collect data about the interface and also monitor performance thresholds for the interface. SL1 will use either the default thresholds defined in the **Interface Thresholds Defaults** page (System > Settings > Thresholds > Interface or the custom threshold you define in the **Thresholds** tab on the **Interface Properties** page (Registry > Networks > Interfaces > interface wrench icon). When the values for an interface exceed one or more thresholds, SL1 will generate an event.

To define global thresholds for interfaces:

1. Go to **Interface Thresholds Defaults** page (System > Settings > Thresholds > Interface).



2. The following global thresholds are defined by default in the **Interface Thresholds Defaults** page:

NOTE: You can specify the unit of measure for all the metrics in **Bandwidth In** and **Bandwidth Out**. You can select **bps**, **kbps**, **Mbps** (the default), or **Gbps**.

Threshold	Default Value	Default Status
Utilization % In > Inbound Percent	65.000	Enabled
Utilization % Out > Outbound Percent	65.000	Enabled
Bandwidth In > Inbound Bandwidth	0.000	Disabled
Bandwidth Out > Outbound Bandwidth	0.000	Disabled
Errors % In > Inbound Error Percent	1.000	Enabled
Errors % Out > Outbound Error Percent	1.000	Enabled
Errors In > Inbound Errors	1000.000	Enabled
Errors Out > Outbound Errors	1000.000	Enabled
Discard % In > Inbound Discard Percent	1.000	Enabled
Discards % Out > Outbound Discard Percent	1.000	Enabled
Discards In > Inbound Discards	1000.000	Enabled
Discards Out > Outbound Discards	1000.000	Enabled
Multicast % In > Rising Medium	30.000	Disabled
Multicast % In > Rising Low	20.000	Disabled
Broadcast % Out > Rising Medium	30.000	Disabled
Broadcast % Out > Rising Low	20.000	Disabled

3. Selecting the **Show Hidden Thresholds** checkbox displays the following default thresholds:

NOTE: You can specify the unit of measure for all the metrics in **Bandwidth In** and **Bandwidth Out**. You can select **bps**, **kbps**, **Mbps** (the default), or **Gbps**.

Threshold	Default Value	Default Status
Utilization % In > Rising High	0.000	Hidden
Utilization % In > Rising Medium	0.000	Hidden
Utilization % In > Rising Low	0.000	Hidden
Utilization % In > Falling Low	0.000	Hidden
Utilization % In > Falling Medium	0.000	Hidden
Utilization % In > Falling High	0.000	Hidden
Utilization % In > Inbound Percent	65.000	Enabled
Utilization % Out > Rising High	0.000	Hidden

Threshold	Default Value	Default Status
Utilization % Out > Rising Medium	0.000	Hidden
Utilization % Out > Rising Low	0.000	Hidden
Utilization % Out > Falling Low	0.000	Hidden
Utilization % Out > Falling Medium	0.000	Hidden
Utilization % Out > Falling High	0.000	Hidden
Utilization % Out > Outbound Percent	65.000	Enabled
Bandwidth In > Rising High	0.000	Hidden
Bandwidth In > Rising Medium	0.000	Hidden
Bandwidth In > Rising Low	0.000	Hidden
Bandwidth In > Falling Low	0.000	Hidden
Bandwidth In > Falling Medium	0.000	Hidden
Bandwidth In > Falling High	0.000	Hidden
Bandwidth In > Inbound Bandwidth	0.000	Disabled
Bandwidth Out > Rising High	0.000	Hidden
Bandwidth Out > Rising Medium	0.000	Hidden
Bandwidth Out > Rising Low	0.000	Hidden
Bandwidth Out > Falling Low	0.000	Hidden
Bandwidth Out > Falling Medium	0.000	Hidden
Bandwidth Out > Falling High	0.000	Hidden
Bandwidth Out > Outbound Bandwidth	0.000	Disabled
Errors % In > Rising High	0.000	Hidden
Errors % In > Rising Medium	0.000	Hidden
Errors % In > Rising Low	0.000	Hidden
Errors % In > Falling Low	0.000	Hidden
Errors % In > Falling Medium	0.000	Hidden
Errors % In > Falling High	0.000	Hidden
Errors % In > Inbound Error Percent	1.000	Enabled
Errors % Out > Rising High	0.000	Hidden
Errors % Out > Rising Medium	0.000	Hidden

Threshold	Default Value	Default Status
Errors % Out > Rising Low	0.000	Hidden
Errors % Out > Falling Low	0.000	Hidden
Errors % Out > Falling Medium	0.000	Hidden
Errors % Out > Falling High	0.000	Hidden
Errors % Out > Outbound Error Percent	1.000	Enabled
Errors In > Rising High	0.000	Hidden
Errors In > Rising Medium	0.000	Hidden
Errors In > Rising Low	0.000	Hidden
Errors In > Falling Low	0.000	Hidden
Errors In > Falling Medium	0.000	Hidden
Errors In > Falling High	0.000	Hidden
Errors In > Inbound Errors	1000.000	Enabled
Errors Out > Rising High	0.000	Hidden
Errors Out > Rising Medium	0.000	Hidden
Errors Out > Rising Low	0.000	Hidden
Errors Out > Falling Low	0.000	Hidden
Errors Out > Falling Medium	0.000	Hidden
Errors Out > Falling High	0.000	Hidden
Errors Out > Outbound Errors	1000.000	Enabled
Discards % In > Rising High	0.000	Hidden
Discards % In > Rising Medium	0.000	Hidden
Discards % In > Rising Low	0.000	Hidden
Discards % In > Falling Low	0.000	Hidden
Discards % In > Falling Medium	0.000	Hidden
Discards % In > Falling High	0.000	Hidden
Discards % In > Inbound Discard Percent	1.000	Enabled
Discards % Out > Rising High	0.000	Hidden
Discards % Out > Rising Medium	0.000	Hidden
Discards % Out > Rising Low	0.000	Hidden

Threshold	Default Value	Default Status
Discards % Out > Falling Low	0.000	Hidden
Discards % Out > Falling Medium	0.000	Hidden
Discards % Out > Falling High	0.000	Hidden
Discards % Out > Outbound Discard Percent	1.000	Enabled
Discards In > Rising High	0.000	Hidden
Discards In > Rising Medium	0.000	Hidden
Discards In > Rising Low	0.000	Hidden
Discards In > Falling Low	0.000	Hidden
Discards In > Falling Medium	0.000	Hidden
Discards In > Falling High	0.000	Hidden
Discards In > Inbound Discards	1000.000	Enabled
Discards Out > Rising High	0.000	Hidden
Discards Out > Rising Medium	0.000	Hidden
Discards Out > Rising Low	0.000	Hidden
Discards Out > Falling Low	0.000	Hidden
Discards Out > Falling Medium	0.000	Hidden
Discards Out > Falling High	0.000	Hidden
Discards Out > Outbound Discards	1000.000	Enabled
Broadcast % In > Rising High	0.000	Hidden
Broadcast % In > Rising Medium	30.000	Disabled
Broadcast % In > Rising Low	20.000	Disabled
Broadcast % In > Falling Low	0.000	Hidden
Broadcast % In > Falling Medium	0.000	Hidden
Broadcast % In > Falling High	0.000	Hidden
Broadcast % Out > Rising High	0.000	Hidden
Broadcast % Out > Rising Medium	30.000	Disabled
Broadcast % Out > Rising Low	20.000	Disabled
Broadcast % Out > Falling Low	0.000	Hidden
Broadcast % Out > Falling Medium	0.000	Hidden

Threshold	Default Value	Default Status
Broadcast % Out > Falling High	0.000	Hidden
Broadcast In > Rising High	0.000	Hidden
Broadcast In > Rising Medium	0.000	Hidden
Broadcast In > Rising Low	0.000	Hidden
Broadcast In > Falling Low	0.000	Hidden
Broadcast In > Falling Medium	0.000	Hidden
Broadcast In > Falling High	0.000	Hidden
Broadcast Out > Rising High	0.000	Hidden
Broadcast Out > Rising Medium	0.000	Hidden
Broadcast Out > Rising Low	0.000	Hidden
Broadcast Out > Falling Low	0.000	Hidden
Broadcast Out > Falling Medium	0.000	Hidden
Broadcast Out > Falling High	0.000	Hidden
Multicast % In > Rising High	0.000	Hidden
Multicast % In > Rising Medium	00.000	Hidden
Multicast % In > Rising Low	00.000	Hidden
Multicast % In > Falling Low	0.000	Hidden
Multicast % In > Falling Medium	0.000	Hidden
Multicast % In > Falling High	0.000	Hidden
Multicast % Out > Rising High	0.000	Hidden
Multicast % Out > Rising Medium	00.000	Hidden
Multicast % Out > Rising Low	00.000	Hidden
Multicast % Out > Falling Low	0.000	Hidden
Multicast % Out > Falling Medium	0.000	Hidden
Multicast % Out > Falling High	0.000	Hidden
Multicast In > Rising High	0.000	Hidden
Multicast In > Rising Medium	0.000	Hidden
Multicast In > Rising Low	0.000	Hidden
Multicast In > Falling Low	0.000	Hidden

Threshold	Default Value	Default Status
Multicast In > Falling Medium	0.000	Hidden
Multicast In > Falling High	0.000	Hidden
Multicast Out > Rising High	0.000	Hidden
Multicast Out > Rising Medium	0.000	Hidden
Multicast Out > Rising Low	0.000	Hidden
Multicast Out > Falling Low	0.000	Hidden
Multicast Out > Falling Medium	0.000	Hidden
Multicast Out > Falling High	0.000	Hidden
Unicast % In > Rising High	0.000	Hidden
Unicast % In > Rising Medium	00.000	Hidden
Unicast % In > Rising Low	00.000	Hidden
Unicast % In > Falling Low	0.000	Hidden
Unicast % In > Falling Medium	0.000	Hidden
Unicast % In > Falling High	0.000	Hidden
Unicast % Out > Rising High	0.000	Hidden
Unicast % Out > Rising Medium	00.000	Hidden
Unicast % Out > Rising Low	00.000	Hidden
Unicast % Out > Falling Low	0.000	Hidden
Unicast % Out > Falling Medium	0.000	Hidden
Unicast % Out > Falling High	0.000	Hidden
Unicast In > Rising High	0.000	Hidden
Unicast In > Rising Medium	0.000	Hidden
Unicast In > Rising Low	0.000	Hidden
Unicast In > Falling Low	0.000	Hidden
Unicast In > Falling Medium	0.000	Hidden
Unicast In > Falling High	0.000	Hidden
Unicast Out > Rising High	0.000	Hidden
Unicast Out > Rising Medium	0.000	Hidden
Unicast Out > Rising Low	0.000	Hidden

Threshold	Default Value	Default Status
Unicast Out > Falling Low	0.000	Hidden
Unicast Out > Falling Medium	0.000	Hidden
Unicast Out > Falling High	0.000	Hidden

4. For each threshold, you can edit the following:

- **Value.** The value at which the threshold will trigger an event.
 - For thresholds that include the word *Rising*, when a value exceeds the specified value, SL1 triggers an event.
 - For thresholds that include the word *Falling*, when a value falls below the specified value, SL1 triggers an event.
 - For thresholds that do not include the word *Rising* or *Falling*, when a value exceeds the specified value, SL1 triggers an event.
- **Status.** Specifies whether the threshold is active and whether the threshold will appear in the **Thresholds** tab on the **Interface Properties** page (Registry > Networks > Interfaces > interface wrench icon). Choices are:
 - *Enabled.* The threshold is applied to all interfaces and is monitored by SL1. The threshold appears in the **Thresholds** tab on the **Interface Properties** page (Registry > Networks > Interfaces > interface wrench icon). Users can edit the **Value** and **Status** of the threshold.
 - *Disabled.* The threshold is applied to all interfaces but is not monitored by SL1. The threshold appears in the **Thresholds** tab on the **Interface Properties** page (Registry > Networks > Interfaces > interface wrench icon) with a status of *Disabled*. In the **Thresholds** tab on the **Interface Properties** page, users can edit the **Value** and **Status** of the threshold.
 - *Hidden.* The threshold is not applied to all interfaces, and is not monitored by SL1. The threshold does not appear in the **Thresholds** tab on the **Interface Properties** page (Registry > Networks > Interfaces > interface wrench icon).
- **Unit of Measure.** For all the metrics under **Bandwidth In** and **Bandwidth Out**, you can select the unit of measure. Choices are:
 - kbps
 - Mbps
 - Gbps

Settings in Silo.Conf

Every SL1 appliance has a configuration file called **silo.conf**, which contains configuration information about the appliance itself, such as the IP address, licensing information, and directory locations. The default settings in **silo.conf** are configured automatically when the appliance is installed. The following section describes how you can add additional, non-default settings to **silo.conf**.

CAUTION: ScienceLogic recommends that you do not edit the values in these files without first consulting ScienceLogic. Incorrect values can severely disrupt platform operations.

From the **Device Settings** page of the Web Configuration Utility, you can edit the **silو.conf** file and the following files:

- **chrony.conf.** This configuration file contains settings related to the time server (chrony.d) used by SL1.
- **chrony.d/servers.conf.** This configuration file contains additional settings for the various chrony time servers.

NOTE: All settings in these .conf files are case-sensitive.

To edit the silو.conf file:

1. Either go to the console of the SL1 appliance or use SSH to access the SL1 appliance.

2. Open a shell session on the server.

3. Type the following at the command line:

```
sudo visilo
```

4. For ISO installs of 10.1.0, the value for dbpassword is encrypted in the silو.conf file.

- To manually unencrypt this password:

- Log in to the console of the Database Server or SSH to the Database Server.

- Enter the following at the shell prompt:

```
/opt/em7/share/scripts/encrypt_decrypt_password.py --action decrypt
```

- To manually encrypt the password:

- Log in to the console of the Database Server or SSH to the Database Server.

- Enter the following at the shell prompt:

```
/opt/em7/share/scripts/encrypt_decrypt_password.py --action encrypt
```

5. You can add or edit one or more of the following settings:

- **store_timeout.** You can edit this setting in the `silos.conf` file on each Database Server. When the Database Server pulls collected data back from Data Collectors and Message Collectors, each piece of data (called a storage object) must be stored within a set amount of time. The default timeout for a storage object is ten seconds.

To change the timeout for all storage objects, add the following line to the `silos.conf` file on the Database Server:

```
store_timeout=xx
```

where

- `xx` is the timeout in seconds.

If you change this setting (for example, change the value to 30 seconds), you must stop and restart the high frequency, medium frequency, and low frequency data pull processes for the change to be applied.

NOTE: The `store_timeout` setting does not apply to All-In-One Appliances.

- **eventmanager.** You can edit this setting in the `silos.conf` file on each SL1 appliance. You can modify this default setting to allow API events to be processed on a Data Collector. The default configuration is:

```
eventmanager = internal,dynamic,syslog,trap
```

To allow a Data Collector to process API events, change this line to

```
eventmanager = internal,dynamic,syslog,trap,api
```

WARNING: Do not make any other changes to this setting or modify this setting on a Database Server or Data Collector.

- **report_memory_limit.** You can edit this setting in the silo.conf file on each SL1 appliance that provides the user interface (an Administration Portal, Database Server, or All-In-One Appliance). If *report_memory_limit* is not defined in silo.conf, the default value is three gigabytes (3G). If reports are failing to be generated due to a lack of memory, you can increase this value.

To increase report memory, add the following line to the [LOCAL] section of silo.conf on each SL1 appliance that provides the user interface for your system. In most cases, this will be the Administration Portal (for distributed system) or the All-In-One Appliance:

```
report_memory_limit=XY
```

Where:

- *X* is a positive integer
- *Y* represents units. Value can be **K** (kilobytes), **M** (megabytes), or **G** (gigabytes),

For example, if reports are failing to be generated due to a lack of memory, you could add the following line to silo.conf:

```
report_memory_limit=4G
```

NOTE: You should add the *report_memory_limit* option to the silo.conf file on a Database Server only if there are no Administration Portals configured in your system.

NOTE: You must add the same *report_memory_limit* setting to every Administration Portal configured in your system.

- **use_v1trap_envelope_addr.** You can edit this setting in the silo.conf file on each Data Collectors, Data Collectors that perform message collection, and All-In-One Appliances. In environments where Network Address Translation is performed on SNMP v1 trap messages sent to SL1, you can configure the platform to read the envelope address (the address of the host sending the trap) instead of the agent address (the IP address variable sent as part of the trap). If *use_v1trap_envelope_addr* is not defined in silo.conf, SL1 will use the agent address for SNMP v1 trap messages.

- To use the envelope address instead of the agent address for SNMP v1 trap messages, add the following line to the [LOCAL] section of silo.conf on Data Collectors, Data Collectors that perform message collection, and All-In-One Appliances

```
use_v1trap_envelope_addr=1
```

- To use the agent address for SNMP v1 trap messages, you can either omit the *use_v1_trap_envelope_addr* setting or add the following line to the [LOCAL] section of silo.conf on Data Collectors, Data Collectors that perform message collection, and All-In-One Appliances

```
use_v1trap_envelope_addr=0
```

- **disable_itil_compliance.** You can edit this setting in the silo.conf file on each If you enable this setting on an appliance that provides the user interface (an Administration Portal, Database Server, or All-In-One Appliance), the **Ticket Console** page on that appliance will include an option to delete tickets. The option to delete tickets will appear only to users that have been granted the Ticket: Delete access hook and users of type "administrator".

To enable this setting, add the following line to the [LOCAL] section of silo.conf on the appliance that provides the user interface (Administration Portal, Database Server, or All-In-One Appliance):

```
disable_itil_compliance=1
```

- **suppress_ticket_link.** You can edit this setting in the silo.conf file on each SL1 appliance that provides the user interface (an Administration Portal, Database Server, or All-In-One Appliance). If you enable this setting, automatic notifications that are generated when a ticket is created or updated will not include a hyperlink to the ticket.

To enable this setting, add the following line to the [LOCAL] section of silo.conf on SL1 appliance that provides the user interface (Administration Portal, Database Server, or All-In-One Appliance):

```
suppress_ticket_link=1
```

- **mailparse_interval.** You can edit this setting in the silo.conf file on each Database Server or All-In-One Appliance. The **mailparse_interval** setting defines how frequently the mail parsing process reads email messages from the mailbox. If the mailparse_interval setting is not defined in silo.conf, the default value is 60 seconds. When an email is received by SL1, the mail parsing process on the primary Database Server or All-In-One Appliance reads the email message from the mailbox file and sends it to one of the three processes responsible for acting on that email: the event engine (for events from email), the tickets from email process, or the round-trip email collection process.

To enable this setting, add the following line to the [LOCAL] section of silo.conf on each Database Server or All-In-One Appliance:

```
mailparse_interval=X
```

where:

- X is the frequency at which the mailbox will be read, in seconds. Valid values are 15 seconds to 60 seconds.

- **dynamic_collect_num_chunk_workers.** You can edit this setting in the silo.conf file on each Database Server or All-In-One Appliance. This setting represents the number of workers that handle collection requests. SL1 first sorts collection requests into groups by execution environment and sends each group of collection requests (called a chunk) to a worker process. This worker process is called a chunk worker. For each chunk, a chunk worker creates the execution environment and creates a pool of request workers to process the collection requests. The number of chunk workers generally represents the number of PowerPacks that can be processed in parallel. The default value for this parameter is "2".

To change this setting, add the following line to the [LOCAL] section of silo.conf on each Database Server or All-In-One Appliance:

```
dynamic_collect_num_chunk_workers = [X]
```

where:

- X is the number of chunk workers

NOTE: For more information about using **dynamic_collect_num_chunk_workers**, see the section on [Tuning the Collector Load Balancing Process in the Silo.Conf File](#).

- **dynamic_collect_num_request_workers.** You can edit this setting in the silo.conf file on each Database Server or All-In-One Appliance. This setting represents the maximum number of request workers in each worker pool and generally represents the number of collections within a PowerPack that can be processed in parallel. The default value for this parameter is "2" or the number of cores on the Data Collector, whichever is greater.

To change this setting, add the following line to the [LOCAL] section of silo.conf on each Database Server or All-In-One Appliance:

```
dynamic_collect_num_request_workers = [X]
```

where:

- X is the maximum number of request workers in each worker pool.

NOTE: For more information about using **dynamic_collect_num_request_workers**, see the section on [Tuning the Collector Load Balancing Process in the Silo.Conf File](#).

- **dynamic_collect_request_chunk_size.** You can edit this setting in the silo.conf file on each Database Server or All-In-One Appliance. This setting represents the maximum number of collection requests in a chunk and controls how many collections are processed by a single pool or request workers. The default value for this parameter is "200".

To change this setting, add the following line to the [LOCAL] section of silo.conf on each Database Server or All-In-One Appliance:

```
dynamic_collect_request_chunk_size = [X]
```

where:

- X is the maximum number of collection requests in a chunk.

NOTE: For more information about using **dynamic_collect_request_chunk_size**, see the section on [Tuning the Collector Load Balancing Process in the Silo.Conf File](#).

- **read_timeout.** You can edit this setting in the silo.conf file on each Database Server. This setting controls the client read timeout for database connections to the collectors. This setting applies only to the **Enterprise Database: Collector Config Push** process (config_push.py) that runs on the primary Database Server.

WARNING: Change this value only if you are instructed to do so by ScienceLogic.

To change this setting, add the following line to the [CONFIG_PUSH] section of silo.conf on all Database Servers in your system.

```
read_timeout=X
```

where:

- X is the read timeout, in seconds.

- **wait_timeout.** You can edit this setting in the silo.conf file on each Database Server. This setting controls the server wait timeout for database connections to the collectors. This setting applies only to the **Enterprise Database: Collector Config Push** process (config_push.py) that runs on the primary Database Server.

WARNING: Change this value only if you are instructed to do so by ScienceLogic.

To change this setting, add the following line to the [CONFIG_PUSH] section of silo.conf on all Database Servers in your system.

```
wait_timeout=X
```

where:

- *X* is the write timeout, in seconds.
- **write_timeout**. You can edit this setting in the `silو.conf` file on each Database Server. This setting controls the client write timeout for database connections to the collectors. This setting applies only to the **Enterprise Database: Collector Config Push** process (`config_push.py`) that runs on the primary Database Server.

WARNING: Change this value only if you are instructed to do so by ScienceLogic.

```
write_timeout=X
```

where:

- *X* is the write timeout, in seconds.
- **memory_limit**. You can edit this setting in the `silو.conf` file on each Database Server. This setting controls the memory limit for the **Enterprise Database: Collector Config Push** process. This setting applies only to the **Enterprise Database: Collector Config Push** process (`config_push.py`) that runs on the primary Database Server.

WARNING: Change this value only if you are instructed to do so by ScienceLogic.

To change this setting, add the following line to the `[CONFIG_PUSH]` section of `silو.conf` on all Database Servers in your system.

```
memory_limit=XY
```

where:

- *X* is a positive integer.
- *Y* represents units. Value can be **KB** (kilobytes), **MB** (megabytes), or **GB** (gigabytes).

- **message_timeout**. You can edit this setting in the silo.conf file on each Database Server. This setting controls the amount of time the parent **Enterprise Database: Collector Config Push** process will wait for a message from a child process before abandoning that process. This setting applies only to the **Enterprise Database: Collector Config Push** process (config_push.py) that runs on the primary Database Server

WARNING: Change this value only if you are instructed to do so by ScienceLogic.

To change this setting, add the following line to the [CONFIG_PUSH] section of silo.conf on all Database Servers in your system.

```
message_timeout=X
```

where:

- X is the write timeout, in seconds.

- **shutdown_timeout**. You can edit this setting in the silo.conf file on each Database Server. If the **Enterprise Database: Collector Config Push** process is terminated, this setting controls the amount of time the parent configuration process will wait for its child processes to stop before terminating itself and allowing the child processes to be inherited by init. This setting applies only to the **Enterprise Database: Collector Config Push** process (config_push.py) that runs on the primary Database Server.

WARNING: Change this value only if you are instructed to do so by ScienceLogic.

To change this setting, add the following line to the [CONFIG_PUSH] section of silo.conf on all Database Servers in your system.

```
shutdown_timeout=X
```

where:

- X is the write timeout, in seconds.

- **[PROC_VIRTUAL_MEM_LIMIT]**. By default, processes in SL1 have a virtual memory limit of 1 GB. You can edit this section in the silo.conf file to overwrite the existing virtual memory limit for a given process in SL1 to ensure that it does not fail by crossing its virtual memory limit.

To change this setting, add the [PROC_VIRTUAL_MEM_LIMIT] section to the silo.conf file. Below that section heading, specify the process you want to update and the new virtual memory limit for that process. Use the following format for each setting:

```
[process ID]=X
```

where:

- *[process ID]* is the ID of the process you want to update, as found in `master.system_settings_procs.aid`
- *X* is the new virtual memory limit, in bytes

For example, if you wanted to update a process with an ID of "12" with a new 2 GB memory limit, you would write the following under `[PROC_VIRTUAL_MEM_LIMIT]`:

```
12=2147483648
```

- **[ADHOC_REPORT_IN_BATCH]**. ad hoc reports are processed in a batch process. You can edit this section in the `silو.conf` file to overwrite the default timing values for certain ad hoc reporting settings.

To change these settings, under the `[ADHOC_REPORT_IN_BATCH]` section heading in the `silو.conf` file, specify the time value (in seconds) for each setting. The following settings are included in the `[ADHOC_REPORT_IN_BATCH]` section:

- *report_execution_delay*. This setting controls the amount of time between when a report is scheduled to start running and when it actually begins running. Its default value is 10.
- *ajax_start_delay*. This setting controls the amount of time elapsed before jQuery triggers the `ajaxStart` event. Its default value is 20.
- *ajax_stop_time*. This setting controls the amount of time elapsed before jQuery triggers the `ajaxStop` event after all AJAX requests have completed. Its default value is 1800.
- *ajax_frequency*. This setting controls the frequency with which jQuery fires AJAX requests. Its default value is 10.
- *ajax_frequency_decreased_after*. This setting controls the amount of time elapsed after which jQuery will fire AJAX requests less frequently than in the *ajax_frequency* setting. Its default value is 300.
- *ajax_decreased_frequency*. This setting controls the decreased frequency with which jQuery fires AJAX requests after the amount of time listed in the *ajax_frequency_decreased_after* setting has elapsed. Its default value is 60.
- *report_fail_check_time*. This setting controls the amount of time elapsed after which a running report will be considered to have failed. Its default value is 10800.
- *auto_page_refresh*. This setting controls the amount of time elapsed after which the **Scheduled Report Jobs** page (Report > Create Report > Scheduled Job / Report Archive) automatically refreshes. Its default value is 10.
- *about_to_start_time_check*. This setting controls the amount of time before a report job is scheduled to start that it will be labeled as "About to start" on the **Scheduled Report Jobs** page (Report > Create Report > Scheduled Job / Report Archive). Its default value is 30.
- *time_unit*. This setting controls the unit of time measurement for the ad hoc report settings. Its default value is "second".
- *ui_php_timeout*. This setting controls the amount of time elapsed after which an inactive SL1 reports session will time out. Its default value is 1800.

6. To save your changes, click **Save** and then close the modal window.

NOTE: All changes to the `silو.conf` file are logged in the SL1 Database Server.

Disabling the User Interface on a Database Server

Database Servers are automatically configured to provide the user interface. If your SL1 system includes an Administration Portal, you might want to disable the user interface capability on your Database Server(s). Perform the following steps to disable the user interface capability on a Database Server:

NOTE: To complete these steps, you must be familiar with how to edit a file using the vi text editor. If you need assistance with these steps, please contact ScienceLogic Support.

1. Log in to the console of the Database Server or use SSH to access the server as the **em7admin** user with the appropriate password.
2. Execute the following command to open the firewall rules file:

```
sudo vifirewalld
```

3. Add following lines:

```
rule port port="443" protocol="tcp" reject
rule port port="80" protocol="tcp" reject
```

4. Save the file and exit the vi editor.
5. Execute the following commands to update and restart the firewall:

```
sudo /opt/em7/share/scripts/update-firewalld-conf.py
```

Chapter

3

Collector Groups

Overview

A **Collector Group** is a group of SL1 Data Collectors. Data Collectors retrieve data from managed devices and applications. This collection occurs during initial discovery, during nightly updates, and in response to policies defined for each managed device. The collected data is used to trigger events, display data in the user interface, and generate graphs and reports.

You can group multiple Data Collectors into a Collector Group. Depending on the number of Data Collectors in your SL1 system, you can define one or more Collector Groups. Each Collector Group must include at least one Data Collector.

On the **Collector Group Management** page (System > Settings > Collector Groups), you can view a list of existing Collector Groups, add a Collector Group, and edit a Collector Group.



NOTE: System upgrades will only consider Data Collectors and Message Collectors that are members of a Collector Group.

Grouping multiple Data Collectors allows you to:

- Create a load-balanced collection system, where you can manage more devices without loss of performance. At any given time, the Data Collector with the lightest load manages the next discovered device.
- Optionally, create a redundant, high-availability system that minimizes downtime should a failure occur. If a Data Collector fails, one or more Collection servers in the Collector Group will handle collection until the problem is solved.

NOTE: If you are using a SL1 All-In-One Appliance, most of the sections in this chapter do not apply to your system. For an All-In-One Appliance, a single, default Collector Group is included with the appliance; you cannot create any additional Collector Groups. However, you can [view information about the default Collector Group](#). You can also [create a virtual Collector Group](#), for data storage only. However, the other tasks described in this section do not apply to an All-In-One Appliance.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon ().
- To view a page containing all the menu options, click the Advanced menu icon (.

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Installing, Configuring, and Licensing Data Collectors

Before you can create a Collector Group, you must install and license at least one Data Collector. For details on installation and licensing of a Data Collector, see the *Installation* manual.

After you have successfully installed, configured, and licensed a Data Collector, the platform automatically adds information about the Data Collector to the Database Server.

Technical Information About Data Collectors

You might find the following technical information about Data Collectors helpful when creating Collector Groups.

Duplicate IP Addresses

A single Collector Group **cannot** include multiple devices that use the same Admin Primary IP Address (this is the IP address the platform uses to communicate with a device). If a single Collector Group includes multiple devices that use the same Primary IP Address or use the same Secondary IP Address, the platform will generate an event. Best practice is to ensure that within a single Collector Group, all IP addresses on all devices are unique.

- During initial discovery, if a device is discovered with the same Admin Primary IP Address as a previously discovered device in the Collector Group, the later discovered device will appear in the discovery log, but will not be modeled in the platform. That is, the device will not be assigned a device ID and will not be created in the platform. The platform will generate an event specifying that a duplicate Admin Primary IP was discovered within the Collector Group.
- If you try to assign a device to a Collector Group, and the device's Admin Primary IP Address already exists in the Collector Group, the platform will display an error message, and the device will not be aligned with the Collector Group.

Open Ports

By default, Data Collectors accept connections only to the following ports:

- TCP 22 (SSH)
- TCP 53 (DNS)
- TCP 123 (NTP)
- UDP 161 (SNMP)
- UDP 162 (Inbound SNMP Trap)
- UDP 514 (Inbound Syslog)
- TCP 7700 (Web Configuration Utility)
- TCP 7707 (one-way communication from the Database Server)

For increased security, all other ports are closed.

Viewing the List of Collector Groups

To view the list of Collector Groups:

1. Go to the **Collector Group Management** page (System > Settings > Collector Groups).

The screenshot displays the 'Collector Group Management | Creating New Group' interface. It features a form with several sections: 'Collector Group Name', 'Collector Follower' (with a dropdown for 'Off (Maximize Manageable Devices)'), 'Generate Alert On Collector Outage' (with a dropdown for 'Yes'), 'Enable Concurrent SNMP Collection (BETA)' (with a dropdown for 'Use systemwide default'), 'Collector Selection' (a list box containing '10-64-171-216-MC'), 'Collectors Available For Follower' (a dropdown for 'N/A'), 'Fallback Mode' (a dropdown for 'Automatic'), 'Fallback Delay (minutes)' (two input fields, both set to '5'), and a 'Save' button.

Below the form is the 'Collector Group Registry | Found 9 collector groups' table:

	Name *	ID	# Collectors	Msg Collectors	# Devices	Edit User	Edit Date	
1.	CUIG-Benedict	7	1		16	em7admin	2020-06-25 16:09:51	
2.	CUIG-MOSS	1	2	10-64-171-216-MC	0	em7admin	2020-06-25 16:09:50	
3.	CUIG-RaceCondition	8	3		1	em7admin	2020-06-25 16:50:19	
4.	CUIG-SAC	3	1		0	em7admin	2020-06-25 16:09:50	
5.	CUIG-Shared	6	2		125	em7admin	2020-06-25 16:09:51	
6.	CUIG-Solutions1	5	2		956	em7admin	2020-06-25 16:39:04	
7.	CUIG-Solutions2	4	1		0	em7admin	2020-06-26 15:09:49	
8.	CUIG-Solutions3	9	1		89	em7admin	2020-06-26 15:10:15	
9.	CUIG-UxualSuspects	2	2		0	em7admin	2020-06-25 16:09:50	

2. The **Collector Group Registry** pane displays a list of all Collector Groups in your SL1 system. For each Collector Group, the **Collector Group Management** page displays the following:

- **Name.** Name of the Collector Group.
- **ID.** Unique numeric identifier automatically assigned by SL1 to each Collector Group.
- **# Collectors.** Number of Data Collectors in the Collector Group.
- **Msg Collector.** Name of the Message Collector(s) (if any) associated with the Collector Group.

- **# Devices.** Number of devices currently using the Collector Group for data collection.
- **Edit User.** User who created or last edited the Collector Group.
- **Edit Date.** Date and time the Collector Group was created or last edited.

Creating a Collector Group

You can group multiple Data Collectors into a Collector Group. Depending on the number of Data Collectors in your SL1 system, you can define one or more Collector Groups. Each Collector Group must include at least one Data Collector.

Pre-Deployment Questions for a Collector Group

Consider the following questions before creating a new Collector Group. Your responses to these questions will help you determine how to create and name your new Collector Group:

- Will your Collector Group span regionally close data centers and be configured for maximum resilience?
- Will your users be required to know your Collector Group naming scheme, or will you provide a general Collector Group for them to use as a default (and use specialized Collector Groups for distinct use cases only)?
- Will your Collector Group be structured for minimum latency to the monitored endpoints?
- Consider the following questions about the resilience of your deployment:
 - What happens to the ability to monitor if a data center hosting an entire Collector Group goes offline?
 - Is the deployment resilient and will it perform well?
 - What is your failure mode? 100% > 0% or 100% > 50% > 0%?

Capacity Planning for a Collector Group

In addition to deciding on your resiliency strategy, look at your failure mode and determine if you are allocating sufficient capacity to achieve a 100% > 50% capacity degradation on a data center failure before failing completely at 0%.

Consider the number of devices in your Collector Group and the number of Data Collectors in your Collector Group to determine if you have overloaded Data Collectors or underpowered Data Collectors.

Defining a Collector Group

To define a new Collector Group in the classic SL1 user interface:

1. Go to the **Collector Group Management** page (System > Settings > Collector Groups).
2. In the **Collector Group Management** page, click the **[Reset]** button to clear the values from the fields in the top pane.

The screenshot shows the 'Collector Group Management | Creating New Group' interface. The top pane contains a form with the following fields:

- Collector Group Name:** A text input field.
- Collector Follower:** A dropdown menu with options: 'Off (Maximize Manageable Devices)', 'On (Maximize Reliability)', and 'Generate Alert on Collector Outage' (set to 'Yes').
- Enable Concurrent SNMP Collection [BETA]:** A dropdown menu with options: 'Use systemwide default' and 'No'.
- Collector Selection:** A dropdown menu.
- Message Collector:** A dropdown menu with the value '10-64-171-216-MC'.
- Collectors Available For Follower:** A dropdown menu with the value 'N/A'.
- Fallback Mode:** A dropdown menu with the value 'Automatic'.
- Follower Delay (minutes):** A text input field with the value '5'.
- Fallback Delay (minutes):** A text input field with the value '5'.
- Save:** A button.

The bottom pane shows the 'Collector Group Registry | Found 9 collector groups' table:

ID	Name	# Collectors	Mtu Collectors	# Devices	Exit User	Exit Date
1	CUG-Benedict	7	1	16	em7admin	2020-06-25 16:09:51
2	CUG-MOBS	1	2	0	em7admin	2020-06-25 16:09:50
3	CUG-RaceCondition	8	3	1	em7admin	2020-06-25 16:50:19
4	CUG-SAG	3	1	0	em7admin	2020-06-25 16:09:50
5	CUG-Shared	6	2	125	em7admin	2020-06-25 16:09:51
6	CUG-Solutions1	5	2	956	em7admin	2020-06-25 18:39:04
7	CUG-Solutions2	4	1	0	em7admin	2020-06-26 15:09:49
8	CUG-Solutions3	9	1	89	em7admin	2020-06-26 15:10:15
9	CUG-UsualSuspects	2	2	0	em7admin	2020-06-25 16:09:50

3. Go to the top pane and enter values in the following fields:

- **Collector Group Name.** Name of the Collector Group.
- **Collector Follower.** Specifies whether you want to maximize the number of devices to be managed or whether you want to maximize reliability. Your choices are:
 - *Off (Maximize Manageable Devices).* The Collector Group will be load-balanced only. At any given time, the Data Collector with the lightest load handles the next discovered device. If a Data Collector fails, no data will be collected from the devices aligned with the failed Data Collector until the failure is fixed.
 - *On (Maximize Reliability).* The Collector Group will be load-balanced and configured as a high-availability system that minimizes downtime. If one or more Data Collectors should fail, the tasks from the failed Data Collector will be distributed among the other Data Collectors in the Collector Group.
- **Generate Alert on Collector Outage.** Specifies whether or not the platform should generate an event if a Data Collector has an outage.
- **Enable Concurrent SNMP Collection.** Specifies whether you want to enable Concurrent SNMP Collection. Concurrent SNMP Collection uses asynchronous I/O for massive concurrency with lower system resource requirements. This means that Data Collectors can collect more data using fewer system resources. Concurrent SNMP Collection also prevents missed polls and data gaps because collection will execute more quickly. For the selected Collector Group, this field overrides the value in the **Behavior Settings** page (System > Settings > Behavior). Your choices are:
 - *Use systemwide default.* The Collector Group will use the global settings for Concurrent SNMP Collection configured in the **Behavior Settings** page (System > Settings > Behavior).
 - *No.* Concurrent SNMP Collection is disabled on this Collector Group regardless of the global setting on the **Behavior Settings** page.

- Yes. Concurrent SNMP Collection is enabled on this Collector Group regardless of the global setting on the **Behavior Settings** page.
- **Enable Concurrent PowerShell Collection.** Specifies whether you want to enable Concurrent PowerShell Collection for this collector group. If you make no selection, the default behavior is to "Use systemwide default", which uses the global setting specified on the **Behavior Settings** page (System > Settings > Behavior). Your choices are:
 - *Use systemwide default.* The Collector Group will use the global setting for Concurrent PowerShell Collection as it is configured on the **Behavior Settings** page (System > Settings > Behavior).
 - No. Concurrent PowerShell Collection is disabled on this Collector Group regardless of the global setting on the **Behavior Settings** page.
 - Yes. Concurrent PowerShell Collection is enabled on this Collector Group regardless of the global setting on the **Behavior Settings** page.
- **Enable Concurrent Network Interface Collection.** Specifies whether you want to enable or disable Concurrent Network Interface Collection for this collector group. If you make no selection, the default behavior is to "Use systemwide default", which uses the global setting specified on the **Behavior Settings** page (System > Settings > Behavior). Your choices are:
 - *Use systemwide default.* The Collector Group will use the global setting for Concurrent Network Interface Collection as it is configured in the **Behavior Settings** page (System > Settings > Behavior).
 - No. Concurrent Network Interface Collection is disabled on this Collector Group regardless of the global setting on the **Behavior Settings** page.
 - Yes. Concurrent Network Interface Collection is enabled on this Collector Group regardless of the global setting on the **Behavior Settings** page.
- **Collector Selection.** Displays a list of available Data Collectors.
 - To assign an available Data Collector server to the Collector Group, simply highlight it. You can assign one or more Data Collectors to a Collector Group.
 - To assign multiple Data Collectors to the Collector Group, hold down the **<Ctrl>** key and click multiple Data Collectors.
- **Message Collector.** Displays a list of available Message Collectors.
 - To assign an available Message Collector to the Collector Group, simply highlight it. You can assign one or more Message Collectors to a Collector Group.
 - To assign multiple Message Collectors to the Collector Group, hold down the **<Ctrl>** key and click multiple Message Collectors.
 - Note that a single Message Collector can be used by multiple Collector Groups.

NOTE: When you align a single Message Collector with multiple Collector Groups, the single Message Collector might then be aligned with two devices (each in a separate Collector Group) that use the same primary IP address or the same secondary IP address. If this happens, SL1 will generate an event.

- **Collectors Available for Failover.** Applies only if you selected "On (Maximize Reliability)" in the **Collector Failover** field. Specifies the minimum number of Data Collectors that must be available (i.e. with a status of "Available [0]") before a Data Collector failover may occur.
 - For collector groups with only two Data Collectors, this field will contain the value "1 collector".
 - For collector groups with more than two Data Collectors, the field will contain values from a minimum of one half of the total number of Data Collectors up to a maximum of one less than the total number of Data Collectors.
 - For example, for a collector group with eight Data Collectors, the possible values in this field would be 4, 5, 6, and 7.
 - SL1 will never automatically increase the maximum number of Data Collectors that can fail in a Collector Group. For example, suppose you have a collector group with three Data Collectors. Suppose **Collectors Available For Failover** field is set to "2". If you add a fourth Data Collector to the collector group, SL1 will automatically set the **Collectors Available For Failover** field to "3" to maintain the maximum number of Data Collectors that can fail as "one". However, you can override this automatic setting by manually changing the value in the **Collectors Available For Failover** field.

NOTE: If you set this to half of your available Data Collectors and a 50% Data Collector outage occurs and the remaining Data Collectors are down by one, no rebalance will occur. If you specify one-third of the total number of Data Collectors, then a rebalance will be attempted until your overall capacity falls below one-third of your Data Collectors, thereby maximizing your resiliency but minimizing the opportunity for your system to enter an unproductive rebalancing loop.

CAUTION: If the number of available Data Collectors is less than the value in the **Collectors Available For Failover** field, SL1 will not failover within the Collector Group. **SL1 will not collect any data from the devices aligned with the failed Data Collector(s) until the failure is fixed on enough Data Collector(s) to equal the value in the Collectors Available For Failover field.** EM7 will generate a critical event.

- **Failback Mode.** Applies only if you selected *On (Maximize Reliability)* in the **Collector Failover** field. Specifies how you want collection to behave when the outage is fixed. You can specify one of the following:
 - *Automatic.* After the failed Data Collector is restored, SL1 will automatically redistribute data-collection tasks among the Collector Group, including the previously failed Data Collector.
 - *Manual.* After the failed Data Collector is restored, you will manually prompt Data Collector to redistribute data-collection tasks by clicking the lightning bolt icon (⚡) for the Collector Group.
 - **Failover Delay (minutes).** Applies only if you selected *On (Maximize Reliability)* in the **Collector Failover** field. Specifies the number of minutes SL1 should wait after the outage of a Data Collector before redistributing the data-collection tasks among the other Data Collectors in the group. During this time, data will not be collected from the devices aligned with the failed Data Collector(s). The default minimum value for this field is 5 minutes.
 - **Failback Delay (minutes).** Applies only if you selected *On (Maximize Reliability)* in the **Collector Failover** field and *Automatic* in the **Failback Mode** field. Specifies the number of minutes SL1 should wait after the failed Data Collector is restored before redistributing data-collection tasks among the Collector Group, including the previously failed Data Collector. The default minimum value for this field is 5 minutes.
4. Click the **[Save]** button to save the new Collector Group.
 5. To assign devices to the Collector Group, see the section on [aligning single devices with a Collector Group in the Classic SL1 User Interface](#) and the section on [aligning a device group with a Collector Group](#).

Editing a Collector Group

From the **Collector Group Management** page, you can edit an existing Collector Group. You can add or remove Data Collectors and change the configuration from load-balanced to failover (high availability).

To edit a Collector Group in the classic SL1 user interface:

1. Go to the **Collector Group Management** page (System > Settings > Collector Groups).

- In the **Collector Group Management** page, go to the **Collector Group Registry** pane at the bottom of the page.

The screenshot shows the 'Collector Group Management | Creating New Group' interface. The top pane contains a form with the following fields:

- Collector Group Name (text input)
- Collector Follower (dropdown menu with '(Off (Maximum Manageable Devices))' selected)
- Generate Alert On Collector Outage (dropdown menu with '[Yes]' selected)
- Enable Concurrent SHARP Collection (BETA) (checkbox, currently unchecked)
- Collector Selection (dropdown menu)
- Message Collector (dropdown menu with '10-64-171-216-MC' selected)
- Collectors Available For Follower (dropdown menu with '(N/A)' selected)
- Fallback Mode (dropdown menu with '(Automatic)' selected)
- Follower Delay (minutes) (text input)
- Fallback Delay (minutes) (text input)
- Save button

The bottom pane shows the 'Collector Group Registry | Found 9 collector groups' table:

Name	ID	# Collectors	My Collectors	# Devices	Edit User	Edit Date
CUG-Benedict	7	1		16	em7admin	2020-06-25 16:09:51
CUG-MOSS	1	2	10-64-171-216-MC	0	em7admin	2020-06-25 16:09:50
CUG-RaceCondition	8	3		1	em7admin	2020-06-25 16:50:19
CUG-SAC	3	1		0	em7admin	2020-06-25 16:09:50
CUG-Shared	5	2		125	em7admin	2020-06-25 16:09:51
CUG-Solutions1	5	2		956	em7admin	2020-06-25 16:39:04
CUG-Solutions2	4	1		0	em7admin	2020-06-26 15:09:49
CUG-Solutions3	9	1		89	em7admin	2020-06-26 15:10:15
CUG-UsualSuspects	2	2		0	em7admin	2020-06-25 16:09:50

- Find the Collector Group you want to edit. Click its wrench icon (🔧).
- The fields in the top pane are populated with values from the selected Collector Group. You can edit one or more of the fields. For a description of each field, see the section on [Defining a Collector Group](#).
- Click the **[Save]** button to save any changes to the Collector Group.

Collector Groups and Load Balancing

To perform initial discovery, SL1 uses a single, selected Data Collector from the Collector Group. This allows you to troubleshoot discovery if there are any problems.

After each discovered device is modeled (that is, after SL1 assigns a device ID and creates the device in the database), SL1 distributes devices among the Data Collectors in the Collector Group. The newest device is assigned to the Data Collector currently managing the lightest load.

This process is known as **Collector load balancing**, and it ensures that the work performed by the Dynamic Applications aligned to the devices is evenly distributed across the Data Collectors in the Collector Group.

SL1 performs Collector load balancing in the following circumstances:

- A new Data Collector is added to a Collector Group
- New devices are discovered
- Failover or failback occurs within a Collector Group (if failover is enabled)
- A user clicks the lightning bolt icon (⚡) for a Collector Group to manually force redistribution
- Devices in DCM or DCM-R trees will be loaded on the Data Collector currently assigned to the DCM or DCM-R tree rather than being distributed across the Collector Group. DCM or DCM-R trees will be rebalanced as an aggregate when rebalancing occurs to an available Data Collector with sufficient capacity to sustain the load.

NOTE: The lightning bolt icon (⚡) appears only for Collector Groups that contain more than one Data Collector. For Collector Groups with only one Data Collector, this icon is grayed out. This icon does not appear for All-In-One Appliances.

When all of the devices in a Collector Group are redistributed, SL1 will assign the devices to Data Collectors so that all Data Collectors in the collector group will spend approximately the same amount of time collecting data from devices.

Collector load balancing uses two metrics:

- **Device Rating.** A device's rating is the total elapsed time consumed by either 1) all of the Dynamic Applications aligned to the device, or 2) collecting metrics from the device's interfaces, whichever is greater. A Collector's load is the sum of the ratings of the devices assigned to the Collector. The balancer tries to evenly divide the work performed by Collectors by assigning devices to Collectors using the device ratings and Collector loads.
- **Collector Load.** The sum of the device ratings for all of the devices assigned to a collector.

SL1 performs the following steps during Collector load balancing:

1. Searches for all devices that are not yet assigned to a Collector Group.
2. Determines the load on each Data Collector by calculating the device rating for each device on a Data Collector and then summing the device ratings.
3. Determines the number of new devices (less than one day old) and old devices on each Data Collector.
4. On each Data Collector, calculates the average device rating for old devices (sum of the device ratings for all old devices divided by the number of old devices). If there are no old devices, sets the average device rating to "1" (one).
5. On each Data Collector, assigns the average device rating to all new devices (devices less than one day old).
6. Assigns each unassigned device (either devices that are not yet assigned or devices on a failed Data Collector) to the Data Collector with the lightest load. Add each newly assigned device rating to the total load for the Data Collector.

For more information about collector load and sizing, watch the video at <https://www.youtube.com/watch?v=SR3zaswwkLE>.

Tuning Collector Groups in the silo.conf File

With the addition of execution environments to SL1, SL1 sorts data collections in to a two-process-pool model.

SL1 sorts collection requests into groups by execution environment. These groups of collection requests are called "chunks". Each chunk contains a maximum of 200 collection requests, all of which use the same execution environment. SL1 sends each chunk to a chunk worker.

The chunk worker determines the appropriate execution environment for the chunk, deploys the execution environment, and starts a pool of request workers in the execution environment.

The request workers then process the actual collection requests contained in the chunks and perform the actual data collection.

NOTE: For more information about ScienceLogic Libraries and execution environments, see the manual *ScienceLogic Libraries and Execution Environments*.

The following settings are available in the master.system_settings_core database table for tuning globally in a stack, or *in the Silo.Conf file* for tuning locally on a single Data Collector:

Parameter Name	Description	Runtime Default
dynamic_collect_num_chunk_workers	The number of chunk workers. In general, this value controls the number of PowerPacks that can be processed in parallel.	2
dynamic_collect_num_request_workers	The maximum number of request workers in each worker pool. In general, this value controls the number of collections within a PowerPack that can be processed in parallel.	"2" or the number of cores on the Data Collector, whichever is greater
dynamic_collect_request_chunk_size	The maximum number of collection requests in a chunk. This value controls how many collections are processed by each pool of requests workers.	200

NOTE: The database values for these parameters are "Null" by default, which specifies that SL1 should use the runtime defaults.

The maximum total number of worker processes used during a scheduled collection is generally `dynamic_collect_num_chunk_workers X dynamic_collect_num_request_workers`.

There might be circumstances where adjustment is necessary to improve the performance of collection.

Example 1: Additional Environments Required

You might need to adjust the values of the collection processes when scheduled collection requires more than two environments.

Because the default number of chunk workers is "2", SL1 can simultaneously process chunks of collection requests for a maximum of two virtual environments. If the collection requests require more than two virtual environments, you can increase parallelism by setting `dynamic_collect_num_chunk_workers` to match the number of environments.

If you increase `dynamic_collect_num_chunk_workers`, you might want to decrease `dynamic_collect_num_request_workers` to avoid performance problems caused by too many request workers.

If you cannot increase `dynamic_collect_num_chunk_workers` because doing so would result in too many request workers, you can decrease `dynamic_collect_request_chunk_size` to give collection requests for each environment a "fairer share" of the chunk workers.

NOTE: Smaller chunk sizes require more resources to establish the virtual environments and establish more polls of request workers to process the chunks. Conversely, if you want to use fewer resources for establishing virtual environments and creating pools of request worker pools, and you want to use more resources for collection itself, increasing `dynamic_collect_request_chunk_size` allows more collection requests to be processed by each pool of request workers.

Example 2: Input/Output Bound Collections

You might need to adjust the values of the collection processes when collection requests are input/output (I/O) bound with relatively large latencies.

In this scenario, you can increase `dynamic_collect_num_request_workers` to improve parallelism. If you increase `dynamic_collect_num_request_workers`, you might want to decrease `dynamic_collect_num_chunk_workers` to avoid performance problems caused by too many request workers.

CAUTION: Increasing the number of collection processes will increase CPU and memory utilization on the Data Collector, so be careful when increasing the values dramatically.

Before adjusting `dynamic_collect_num_request_workers`, you need to know the following information:

- The number of CPU cores in the Data Collector
- The current CPU utilization of Data Collector
- The current memory utilization of Data Collector

Start by setting `dynamic_collect_num_request_workers` to equal the number of CPUs plus 50%. For example: with 8 cores, start by setting `dynamic_collect_num_request_workers` to 12. If that is insufficient, you can then try 16, 20, 24, and so forth.

If data collections are terminating early, it means that collections are not completed within the 15-minute limit. If this is the case, wait 30 minutes to see results after adjusting the collection values.

Collector Affinity

Collector Affinity specifies the Data Collectors that are allowed to run collection for Dynamic Applications aligned to component devices. You can define Collector Affinity for each Dynamic Application. Choices are:

- **Default.** If the Dynamic Application is auto-aligned to a component device during discovery, then the Data Collector assigned to the root device will collect data for this Dynamic Application as well. For devices that are not component devices, the Data Collector assigned to the device running the Dynamic Application will collect data for the Dynamic Application.
- **Root Device Collector.** The Data Collector assigned to the root device will collect data for the Dynamic Application. This guarantees that Dynamic Applications for an entire DCM tree will be collected by a single Data Collector. You might select this option if:
 - The Dynamic Application has a cache dependency with one or more other Dynamic Applications.
 - You are unable to collect data for devices and Dynamic Applications within the same Device Component Map on multiple Data Collectors in a collector group.
 - If the Dynamic Application will consume cache produced by a Dynamic Application aligned to a non-root device (for instance, a cluster device).
- **Assigned Collector.** The Dynamic Application will use the Data Collector assigned to the device running the Dynamic Application. This allows Dynamic Applications that are auto-aligned to component devices during discovery to run on multiple Data Collectors. This is the default setting. You might select this option if:
 - The Dynamic Application has no cache dependencies with any other Dynamic Applications.
 - You want the Dynamic Application to be able to make parallel data requests across multiple Data Collectors in a collector group.
 - The Dynamic Application can be aligned using mechanisms other than auto-alignment during discovery (for instance, manual alignment or alignment via Device Class Templates or Run Book Actions).

Failover for Collector Groups for Component Devices

If you specified **Default** or **Root Device Collector** for Dynamic Applications, and the single Data Collector in the Collector Group for component devices fails, users must create a new Collector Group with a single Data Collector and manually move the devices from the failed Collector Group to the new Collector Group. For details on manually moving devices to a new Collector Group, see the section on [Changing the Collector Group for One or More Devices](#).

Collector Groups for Merged Devices

You can merge a physical device and a component device. There are two ways to do this:

- From the Actions menu in the **Device Properties** page (Devices > Device Manager > wrench icon) for either the physical device or the component device.
- From the **Actions** menu in the **Device Manager** page (Devices > Device Manager), select *Merge Devices* to merge devices in bulk.

You can unmerge a component device from a physical device. You can do this in two ways:

- From the **Actions** menu in the **Device Properties** page (Devices > Device Manager > wrench icon) for either the physical device or the component device, select *Unmerge Devices* to unmerge devices.
- From the **Actions** menu in the **Device Manager** page (Devices > Device Manager), select *Unmerge Devices* to unmerge devices in bulk.

When you merge a physical device and a component device, the device record for the component device is no longer displayed in the user interface; the device record for the physical device is displayed in user interface pages that previously displayed the component device. For example, the physical device is displayed instead of the component device in the **Device Components** page (Devices > Device Components) and the **Component Map** page (Device Component Map). All existing and future data for both devices will be associated with the physical device.

If you manually merge a component device with a physical device, SL1 allows data for the merged component device and data from the physical device to be collected on different Data Collectors. Data that was aligned with the component device can be collected by the Collector Group for its root device. Data aligned with the physical device can be collected by a different Collector Group.

NOTE: You can merge a component device with only one physical device.

Creating a Collector Group for Data Storage Only

From the **Collector Group Management** page, you can create a **Virtual Collector Group** that serves as a storage area for all historical data from decommissioned devices.

The Virtual Collector Group will store all existing historical data from all aligned devices, but will not perform collection on those devices. The Virtual Collector Group will not contain any Data Collectors or any Message Collectors. **SL1 will stop collecting data from devices aligned with a Virtual Collector Group.**

To define a Virtual Collector Group:

1. Go to the **Collector Group Management** page (System > Settings > Collector Groups).

The screenshot shows the 'Collector Group Management | Creating New Group' interface. The top pane contains a form with the following fields:

- Collector Group Name:** A text input field.
- Collector Follower:** A dropdown menu with the option '[Off (Maximum Manageable Devices)]'.
- Generate Alert On Collector Outage:** A dropdown menu with the option '[Yes]'.
- Enable Concurrent SNMP Collection [BETA]:** A dropdown menu with the option '[Use systemwide default]'.
- Collector Selection:** A dropdown menu.
- Message Collector:** A dropdown menu with the value '10-64-171-216-MC'.
- Collectors Available For Failover:** A dropdown menu with the value 'N/A'.
- Failback Mode:** A dropdown menu with the option '[Automatic]'.
- Failover Delay (minutes):** A text input field with the value '5'.
- Failback Delay (minutes):** A text input field with the value '5'.
- Save:** A button.

The bottom pane shows the 'Collector Group Registry | Found 9 collector groups' table:

	Name	ID	# Collectors	Mtu Collectors	# Devices	Exit User	Exit Date	
1.	CUG-Benedict	7	1		16	em7admin	2020-06-25 16:09:51	
2.	CUG-MOBS	1	2	10-64-171-216-MC	0	em7admin	2020-06-25 16:09:50	
3.	CUG-RaceCondition	8	3		1	em7admin	2020-06-25 16:50:19	
4.	CUG-SAC	3	1		0	em7admin	2020-06-25 16:09:50	
5.	CUG-Shared	6	2		125	em7admin	2020-06-25 16:09:51	
6.	CUG-Solutions1	5	2		956	em7admin	2020-06-25 16:39:04	
7.	CUG-Solutions2	4	1		0	em7admin	2020-06-25 15:09:49	
8.	CUG-Solutions3	9	1		89	em7admin	2020-06-26 15:10:15	
9.	CUG-UsualSuspects	2	2		0	em7admin	2020-06-25 16:09:50	

2. In the **Collector Group Management** page, click the **[Reset]** button to clear values from the fields in the top pane.
3. Go to the top pane and enter a name for the virtual Collector Group in the **Collector Group Name** field.
4. Leave all other fields set to the default values. Do not include any Data Collectors or Message Collectors in the Collector Group.
5. Click the **[Save]** button to save the new Collector Group.
6. To assign devices to the virtual Collector Group, see the section on [aligning single devices with a Collector Group](#) and the section on [aligning a device group with a Collector Group](#).

Deleting a Collector Group

From the **Collector Group Management** page, you can delete a Collector Group. When you delete a Collector Group, those Data Collectors become available for use in other Collector Groups.

NOTE: Before you can delete a Collector Group, you must move all aligned devices to another Collector Group. For details on how to do this, see the section [Changing the Collector Group for One or More Devices](#).

To delete a Collector Group:

1. Go to the **Collector Group Management** page (System > Settings > Collector Groups).

The screenshot shows the 'Collector Group Management | Creating New Group' interface. It features a form with several sections: 'Collector Group Name', 'Collector Follower', 'Collector Selection', 'Message Collector', 'Collectors Available For Failover', 'Failback Mode', 'Failover Delay (minutes)', and 'Failback Delay (minutes)'. Below the form is a table titled 'Collector Group Registry | Found 9 collector groups' with columns for Name, ID, # Collectors, Msg Collectors, # Devices, Edit User, and Edit Date. The table lists 9 collector groups, including CUG-Benedict, CUG-MOSS, CUG-RaceCondition, CUG-SAC, CUG-Shared, CUG-Solutions1, CUG-Solutions2, CUG-Solutions3, and CUG-UsualSuspects.

Name	ID	# Collectors	Msg Collectors	# Devices	Edit User	Edit Date
CUG-Benedict	7	1		16	em7admin	2020-06-25 16:09:51
CUG-MOSS	1	2	10-64-171-216-MC	0	em7admin	2020-06-25 16:09:50
CUG-RaceCondition	8	3		1	em7admin	2020-06-25 16:50:19
CUG-SAC	3	1		0	em7admin	2020-06-25 16:09:50
CUG-Shared	6	2		125	em7admin	2020-06-25 16:09:51
CUG-Solutions1	5	2		956	em7admin	2020-06-25 16:39:04
CUG-Solutions2	4	1		0	em7admin	2020-06-25 15:09:49
CUG-Solutions3	9	1		89	em7admin	2020-06-26 15:10:15
CUG-UsualSuspects	2	2		0	em7admin	2020-06-25 16:09:50

2. In the **Collector Group Management** page, go to the **Collector Group Registry** pane at the bottom of the page.
3. Find the Collector Group you want to delete. Click its bomb icon (💣).

Assigning a Collector Group for a Single Device

After you have defined a Collector Group, you can align devices with that Collector Group.

To assign a Collector Group to a device:

1. From the **Devices** page, click the name of the device that you want to assign to a Collector Group. The **Device Investigator** page opens for that device.
2. Of the **Device Investigator** page, click the **[Settings]** tab.
3. Click the **[Edit]** button. This enables you to change your device settings.
4. In the **Collection Poller** field, select the name of Collector Group you want to use for collection on the device.
5. Click **[Save]**.

Assigning a Collector Group for a Single Device in the Classic SL1 User Interface

After you have defined a Collector Group, you can align devices with that Collector Group.

To assign a Collector Group to a device in the classic SL1 user interface:

1. Go to the **Device Manager** page (Devices > Device Manager).
2. In the **Device Manager** page, find the device you want to edit. Click its wrench icon (🔧). The **Device Properties** page appears:

Close	Properties	Thresholds	Collections	Monitors			
Schedule	Logs	Toolbox	Interfaces	Relationships	Tickets	Redirects	Notes
Device Name	MAILSRV	Managed Type	Physical Device				
IP Address / ID	10.20.0.185 21	Category	Servers				
Class	Microsoft	Sub-Class	Windows 2000 Server				
Organization	System	Uptime	0 days, 00:00:00				
Collection Mode	Active	Collection Time	2014-06-18 14:15:00				
Description	Hardware: x86 Family 6 Model 11 Stepping 1 AT/AT COMPATIBLE - So	Group / Collector	CUG em7_a0_205				
Device Hostname							

Device Properties Organization Asset

Actions Reset Guide

Identification

Device Name: MAILSRV IP Address: [10.20.0.185 - verified] Organization: [System]

Monitoring & Management

Device Class: Microsoft Windows 2000 Server

SNMP Read/Write: [Cisco SNMPv2 - Example] [None]

Availability Port: [JUDP] [161 - SNMP]

Latency Port: [ICMP] [ICMP]

Avail+Latency Alert: [Disable]

User Maintenance: [Disabled] [Maintenance Collection Enabled]

Collection: [Enabled] [CUG]

Coll. Type: [Standard]

Critical Ping: [Disabled]

Dashboard: [None]

Event Mask: [Group in blocks every 10 minutes]

Save

Preferences

Auto-Clear Events

Accept All Logs

Daily Port Scans

Auto-Update

Scan All IPs

Dynamic Discovery

Preserve Hostname

Disable Asset Update

3. In the **Device Properties** page, you can select a Collector Group from the **Collection** fields.
4. Click the **[Save]** button to save the change to the device.

Aligning the Collector Group in a Device Template

You can specify a Collector Group in a device template. Then, when you apply the device template to a device, either through discovery or when you apply the device template to a device group or selection of devices, the specified Collector Group is automatically associated with the device(s). Optionally, you can later edit the Collector Group for each device.

For more details on device templates and device groups, see the manual **Device Groups and Device Templates**.

Changing the Collector Group for One or More Devices

You can change the Collector Group for multiple devices simultaneously. This is helpful if you want to reorganize devices or Collector Groups. If you want to delete a Collector Group, you first must first move each aligned device to another Collector Group. In this situation, you might want to change the Collector Group for multiple devices simultaneously.

To change the Collector Group for multiple device simultaneously:

1. Go to the **Device Manager** page (Devices > Device Manager).

Device Name	IP Address	Device Category	Device Class Sub-class	DID	Organisation	Current State	Collection Group	Collection Status	SNMP Credentials	SNMP Access
10 Forward	10.20.0.195	Servers	NET-SNMP FreeBSD	54	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.108	10.20.0.108	Network Router	Cisco Systems 2501	72	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.123	10.20.0.123	Network Router	Cisco Systems 7206VXR	112	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.13	10.20.0.13	Unknown	Generic SNMP	107	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.135	10.20.0.135	Network Switches	Cisco Systems Catalyst 3509G-XL	131	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.141	10.20.0.141	Network Switches	Cisco Systems Catalyst WS-C6009-CatOS	118	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.146	10.20.0.146	Network Broadbar	Netopia Netopia 3346 v8 2r1	2	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.147	10.20.0.147	Network Broadbar	Netopia Netopia 3381 v8 0.10	175	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.148	10.20.0.148	Network Broadbar	Netopia Netopia (R3100, R4500, R7x00, R9	165	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.149	10.20.0.149	Network Broadbar	Netopia R7200-T	162	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.151	10.20.0.151	Unknown	Generic SNMP	141	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.160	10.20.0.160	Unknown	Generic SNMP	165	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.163	10.20.0.163	Unknown	Generic SNMP	184	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.175	10.20.0.175	Unknown	Generic SNMP	44	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.176	10.20.0.176	Unknown	Konica Corporation OEM	41	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.190	10.20.0.190	Unknown	Generic SNMP	56	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.191	10.20.0.191	Office Printers	Konica Minolta Fiery X3e Z2C-KM	57	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.201	10.20.0.201	Unknown	Generic SNMP	48	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.203	10.20.0.203	Unknown	Generic SNMP	52	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.209	10.20.0.209	Telephony	Quintum Tenor	53	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.222	10.20.0.222	Unknown	Generic SNMP	138	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.26	10.20.0.26	Unknown	Generic SNMP	171	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.52	10.20.0.52	Unknown	ASKEY Computer Corp. OEM	5	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.59	10.20.0.59	Unknown	Generic SNMP	3	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	
10.20.0.61	10.20.0.61	Unknown	Generic SNMP	84	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2	

2. In the **Device Manager** page, click on the heading for the **Collection Group** column to sort the list of devices by Collector Group.
3. Select the checkbox for each device that you want to move to a different Collector Group.
4. In the **Select Action** field (in the lower right), go to **Change Collector Group** and select a Collector Group.
5. Click the **[Go]** button. The selected devices will now be aligned with the selected Collector Group.

Managing the Host Files for a Collector Group

The **Host File Entry Manager** page allows you to edit and manage host files for all of your Data Collectors from a single page in the SL1 system. When you create or edit an entry in the **Host File Entry Manager** page, SL1 automatically sends an update to every Data Collector in the specified Collector Group.

The **Host File Entry Manager** page is helpful when:

- The SL1 system does not reside in the end-customer's domain
- The SL1 system does not have line-of-sight to an end-customer's DNS service
- A customer's DNS service cannot resolve a host name for a device that the SL1 system monitors

For details, see the section on [Managing Host Files](#).

Processes for Collector Groups

For troubleshooting and debugging purposes, you might find it helpful to understand the ScienceLogic processes that affect a Collector Group.

NOTE: You can view the list of all processes and details for each process in the **Process Manager** page (System > Settings > Admin Processes).

- The **Enterprise Database: Collector Task Manager process (em7_ctaskman)** process distributes devices between Data Collectors in a Collector Group, to load-balance the collection tasks. The process runs every 60 seconds and also checks the license on each Data Collector. The Enterprise Database: Collector Task Manager process (em7_ctaskman.py) redistributes devices between collectors when:
 - A Collector Group is created.
 - A new Data Collector is added to a Collector Group.
 - Failover or failback occurs within a Collector Group.
 - A user clicks on the lightning bolt icon (⚡) for a Collector Group, to manually force redistribution.
- **The Enterprise Database: Collector Data Pull processes** retrieves information from each Data Collector in a Collector Group. The process pulls data from the in_storage tables on each Data Collector. The retrieved information is stored in the Database Server.
 - *Enterprise Database: Collector Data Pull, High F (em7_hfpulld)*. Retrieves data from each Data Collector every 15 seconds (configurable).
 - *Enterprise Database: Collector Data Pull, Low F (em7_lfpulld)*. Retrieves data from each Data Collector every five minutes.
 - *Enterprise Database: Collector Data Pull, Medium (em7_mfpulld)*. Retrieves data from each Data Collector every 60 seconds.
- **The Enterprise Database: Collector Config Push process (config_push.py)** updates each Data Collector with information on system configuration, configuration of Dynamic Applications, and any new or changed policies. This process runs once every 60 seconds and checks for differences between the configuration tables on the Database Server and the configuration tables on each Data Collector. The list of tables to be synchronized is stored in master.definitions_collector_config_tables on the Database Server.
- **Asynchronous Processes** (for example, discovery or programs run from the **Device Toolbox** page). Asynchronous processes need to be run immediately and cannot wait until the Enterprise Database: Collector Config Push process (config_push.py) runs and tells the Data Collector to run the asynchronous process. Therefore, SL1 uses a stored procedure and the EM7 Core: Task Manager process (em7) to trigger asynchronous processes on both the Database Server and Data Collector.

- If a user requests an asynchronous process, a stored procedure on the Database Server inserts a new row in the table `master_logs.spool_process` on the Database Server.
- Every three seconds, the EM7 Core: Task Manager process (`proc_mgr.py`) checks the table `master_logs.spool_process` on the Database Server for new rows.
- If the asynchronous process needs to be started on a Data Collector, a stored procedure on the Database Server inserts the same row into the table `master_logs.spool_process` on the Data Collector.
- Every three seconds, the EM7 Core: Task Manager process (`em7`) checks the table `master_logs.spool_process` on the Data Collector for new rows.
- If the EM7 Core: Task Manager process (`em7`) on the Data Collector finds a new row, the specified asynchronous process is executed on the Data Collector.

Enabling and Disabling Concurrent PowerShell for Collector Groups

To improve the process of collecting data via PowerShell, you can enable Concurrent PowerShell Collection. Concurrent PowerShell Collection allows multiple collection tasks to run at the same time with a reduced load on Data Collectors. Concurrent PowerShell Collection also prevents missed polls and data gaps because collection will execute more quickly. As a result, Data Collectors can collect more data using fewer system resources.

When you use the PowerShell Collector for Concurrent PowerShell Collection, the collection process can bypass failed or paused collections, reduce collection time, and reduce the number of early terminations (sigterms) that occur with data collection. The PowerShell Collector is an independent service running as a container on a Data Collector.

You can enable one or more Collector Groups to use concurrent PowerShell collection, and you can collect metrics for concurrent PowerShell collection.

NOTE: Concurrent PowerShell Collection is for PowerShell Performance and Performance Configuration Dynamic Application types and does not include Snippet Dynamic Applications which happen to run PowerShell commands.

For more details on concurrent PowerShell collection, see the manual *Monitoring Windows Systems with PowerShell*, the chapter on *Concurrent PowerShell*.

Enabling Concurrent PowerShell on All Collector Groups

To enable concurrent PowerShell collection service for all collector groups:

1. Go to the **Database Tool** page (System > Tools > DB Tool).

NOTE: The **Database Tool** page does not display for users that do not have sufficient permissions for that page.

2. Enter the following in the **SQL Query** field:

```
INSERT INTO master.system_custom_config (`field`, `field_value`) VALUES ('enable_powershell_service', '1');
```

Disabling Concurrent PowerShell on All Collector Groups

To disable concurrent PowerShell collection service for all collector groups:

1. Go to the **Database Tool** page (System > Tools > DB Tool).

NOTE: The **Database Tool** page does not display for users that do not have sufficient permissions for that page.

2. Enter the following in the **SQL Query** field:

```
UPDATE master.system_custom_config SET field_value=0 where field='enable_powershell_service';
```

Enabling Concurrent PowerShell on a Specific Collector Group

To enable concurrent PowerShell collection for a specific collector group:

1. Go to the **Database Tool** page (System > Tools > DB Tool).

NOTE: The **Database Tool** page does not display for users that do not have sufficient permissions for that page.

2. Enter the following in the **SQL Query** field:

```
INSERT INTO master.system_custom_config (`field`, `field_value`, `cug_filter`) VALUES ('enable_powershell_service_CUGx', '1', 'collector_group_ID');
```

where:

collector_group_ID is the collector group ID. You can find this value in the **Collector Group Management** page (System > Settings > Collector Groups).

Disabling Concurrent PowerShell on a Specific Collector Group

To disable concurrent PowerShell collection for a specific collector group:

1. Go to the **Database Tool** page (System > Tools > DB Tool).

NOTE: The **Database Tool** page does not display for users that do not have sufficient permissions for that page.

2. Enter the following in the **SQL Query** field:

```
UPDATE master.system_custom_config SET field_value=0 where field='enable_
powershell_service_CUGx';
```

where:

collector_group_ID is the collector group ID. You can find this value in the **Collector Group Management** page (System > Settings > Collector Groups).

Enabling and Disabling Concurrent SNMP for Collector Groups

To increase the scale for SNMP collection, you can enable **Concurrent SNMP Collection**. Concurrent SNMP Collection uses the standalone container called the SL1 SNMP Collector.

The SNMP Collector is an independent service that runs as a container on a Data Collector. When you enable Concurrent SNMP Collection, each Data Collector will contain four (4) SNMP Collector containers.

NOTE: On each Data Collector, SL1 will restart each of the SNMP Collector containers periodically to ensure that each container remains healthy. When one SNMP Collector container is restarted, the other three SNMP Collector containers continue to handle the workload.

With Concurrent SNMP Collection, SNMP collection tasks can run in parallel. A single failed task will not prevent other tasks from completing.

Concurrent SNMP Collection provides:

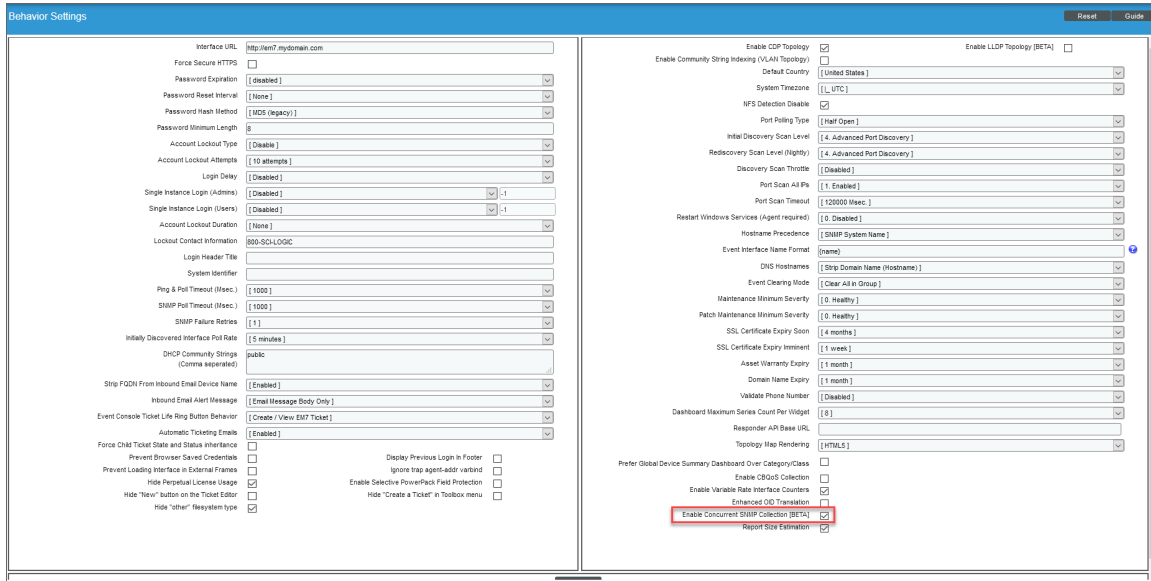
- Improved throughput for SNMP Dynamic Applications
- Reduced use of resources on each Data Collector
- More dependable collection from high-latency Devices

Enabling and Disabling Concurrent SNMP for All Collector Groups

This feature is disabled by default.

To enable Concurrent SNMP Collection in SL1:

1. Go to the **Behavior Settings** page (System > Settings > Behavior):



2. Check the **Enable Concurrent SNMP Collection** field.
3. Click **[Save]**.

TIP: If you do not want all of your SL1 Collectors to use Concurrent SNMP Collection, you can specify which Collector Units should use it in [Enabling a Collector Group to Use Concurrent SNMP Collection](#).

Enabling and Disabling Concurrent SNMP for Collector Groups

Depending on the needs of your SL1 environment, you can enable or prevent a Collector Group from using concurrent SNMP collection.

To enable Concurrent SNMP Collection with a SL1 Collector Group:

1. Go to the **Collector Group Management** Page (System > Settings > Collector Groups):

Collector Group Management | Editing Group "CUG1"

Collector Group Name: CUG1

Collector Selection: [Asimov-Sandbox-CUI (Devices)]

Collectors Available For Failover: N/A

Collector Failover: [Off (Maximize Managable Devices)]

Fallback Mode: [Automatic]

Generate Alert On Collector Outage: [Yes]

Failover Delay (minutes): 5

Fallback Delay (minutes): 5

Enable Concurrent SNMP Collection: [Use systemwide default]

Message Collector: None available

Save

Collector Group Registry | Found 1 collector group

Name	ID	# Collectors	Map Collectors	# Devices	Edit User	Edit Date
1. CUG1	1	1		48	em7admin	2020-05-08 18:01:53

2. Click the wrench icon (🔧) for the Collector Group you want to edit. The fields at the top of the page are updated with the data for that Collector Group.
3. Select an option in the **Enable Concurrent SNMP Collection** dropdown:
 - **Use system-wide default.** Select this option if you want this Collector Group to use or not use Concurrent SNMP Collection based on the **Enable Concurrent SNMP Collection** field on the **Behavior Settings** page. This is the default.
 - **Yes.** Select this option to enable Concurrent SNMP Collection for this Collector Group, even if you did not enable it on the **Behavior Settings** page.
 - **No.** Select this option to prevent this Collector Group from using Concurrent SNMP Collection, even if you did enable it on the **Behavior Settings** page.
4. Update the remaining fields as needed, and then click **[Save]**.

Chapter

4



Daily Health Tasks

Overview

The tasks in this chapter help you monitor the health of your SL1 system. You should perform these tasks daily (or more frequently, if you require) to gather information about the overall status of your SL1 system and to maintain operational stability.

For more information about the daily maintenance process and how to troubleshoot common issues related to that process, watch this video: https://www.youtube.com/watch?v=mtwe_2HvOio.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon (.
- To view a page containing all the menu options, click the Advanced menu icon (.

This chapter includes the following topics:

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What is a Healthy SL1 System?

The following table presents a broad list of focus areas for SL1 health that are important to track for all SL1 systems. Where a specific automated check is available, it is included in the table.

Focus Area	Check	Background	Specific Operation	Result
Patch level	Version has been updated within last 12 months	Software updates are released at least quarterly and include security and stability improvements.	Quarterly manual review of available and planned software updates from ScienceLogic	Plan to keep all SL1 platforms updated within 12 months of the latest release.
Response time	API response times for standard requests are within five seconds	API response times are highly dependent on the size of the response, however all SL1 systems should respond to a simple request without delay.	<code>/api/organization/0</code>	Returns a response set for the "system" organization (id 0).
Central storage capacity	At least 20% of local database storage is free and available for new data	The InnoDB database file will auto-expand but never shrink. When data is removed from	Support PowerPack - Support: InnoDB Size	Built-in alerts for the Support PowerPack default to 80% used for major and 90% for critical.

Focus Area	Check	Background	Specific Operation	Result
		the database, space is made available for future use.		
CPU Consumption	System CPU utilization and load average	Both Collectors and Databases can become CPU constrained, leading to unhealthy performance characteristics.	Operating system measures of CPU utilization and load average	Load average should be at or below the system's available core count. CPU utilization of a 5 min collection should not be above 80%, 70% if hyperthreading is enabled.
Memory Consumption	Avoid swap usage	The MariaDB database will make use of available memory for caching purposes over time, but no SL1 system should require regular swapping, which can lead to extremely poor performance.	Operating system measure of swap usage	Swap usage < 50%
Performance Data Processing	The central system is keeping up with all collection processing.	It is normal to have some backlog of "MF" data, a busy system may normally have 10,000 rows or more between each processing cycle, but they should be completely processed within each cycle (backlog should not build).	Built-in MF rows-behind compared with MF object processing rate	Backlog time < 1 processing cycle

Focus Area	Check	Background	Specific Operation	Result
Event Processing	The central system is keeping up with all event processing.	It is normal to have some backlog of "HF" data. A busy system may normally have 10,000 rows or more between each processing cycle, but these rows should be completely processed within each cycle (backlog should not build)	Built-in HF rows-behind compared with HF object processing rate	Backlog time < 1 processing cycle
Run Book Automation (RBA)	The central system is keeping up with all RBA processing.	The built-in RBA engine supports parallel execution and queuing of operations. This can be critical for time-sensitive notification and integration with external systems.	Built-in alerting in the RBA scheduler will notify if the system is falling behind.	No critical events starting with the following phrase: "The automation engine is still processing..."
Performance Data Collection	Collection of data is completing as scheduled.	Collection that is unbalanced or overloaded, or target devices that are misconfigured or unresponsive can result in collection not completing successfully.	SL1 Operational Insights PowerPack	Check for occurrences of "sigterming" collection. The Operational Insights PowerPack makes this easy to navigate using a dashboard.
Asynchronous Message Processing	Message collection is keeping up with asynchronous syslog and	Data Collectors, Message Collectors, and All-in-One	Built-in alert for suppressing of messages from "spamming" devices	By default SL1 will suppress messages from devices generating at a rate of > 25/sec/device with a built-in alert.

Focus Area	Check	Background	Specific Operation	Result
	SNMP trap messages.	appliances receive		
System Maintenance	Daily maintenance tasks are completing normally	The primary daily maintenance task (scheduled nightly outside of core business hours) is to prune old data from the SL1 database, which is an essential activity for long term health.	Regular check of the system log	Daily maintenance tasks not being terminated due to an incomplete status.
System Backup	Backups completing per schedule.	SL1 supports both configuration-only and full backups. Both should be used since they support different recovery models	Regular check of the system log	The system log will show reports of backup completion and duration.

SL1 Self-Healing

For the SL1 classic User Interface, SL1 provides three self-healing jobs that are performed on the Database Server or All-In-One Appliance. These jobs:

- automatically set "s-em7-core:s-em7-core" as the owner and group for the file "silo.log"
- automatically restart the process em7_patch_manager if it is stuck in deactivating mode
- automatically kill queries that have run for longer than 1 hour and logs each query

SL1 Self-Monitoring

SL1 includes a self-monitoring PowerPack that is included by default with SL1 releases. This PowerPack is called the *ScienceLogic Support Pack* PowerPack.

This self-monitoring PowerPack:

- ensures that all SL1 appliances are monitored and running the same version of SL1
- ensures that all SL1 appliances appear in the Device Manager page (Registry > Devices > Device Manager)
- ensures that configuration files on SL1 appliances are kept in sync
- ensures that configuration files on SL1 clusters are kept in sync
- monitors the health and configuration of MariaDB
- generates alerts when system resources like disk-space are approaching capacity
- monitors DNS entries for Database Servers and All-In-One appliances
- monitors long-running processes and queries
- monitors out-of-memory conditions
- ensures that CRM and corosync configurations are up to date
- ensures that configuration files match among HA Database Servers
- monitors crucial SL1 processes like datapull and config_push
- monitors "rows behind" situations and generates alerts
- monitors and fixes backlogs of email messages
- generates alerts if any of the following files differ:
 - /etc/my.cnf.d/silo_mysql.cnf
 - /etc/silo.conf
 - /etc/siteconfig/mysql.siteconfig
 - /etc/siteconfig/siloconf.siteconfig

Monitoring System Events

To view the entries in the **System Logs**:

1. Go to the **System Logs** page (System > Monitor > System Logs).

System Logs Messages Found [1,317,344]				Purge	Reset	Guide	
				Search Message		Search	
Date	Module	Severity	Message				
1. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-19: Non-digits in oid with object id: 8303, did:1336 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
2. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-19: Non-digits in oid with object id: 8305, did:1336 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
3. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-19: Non-digits in oid with object id: 8307, did:1336 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
4. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-19: Non-digits in oid with object id: 8308, did:1336 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
5. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-29: Non-digits in oid with object id: 8303, did:1331 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
6. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-29: Non-digits in oid with object id: 8307, did:1331 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
7. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8303, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
8. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-20: Non-digits in oid with object id: 8331, did:1338 in dynamic app:1158 when updating performance value (val:None)				<input type="checkbox"/>
9. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8303, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
10. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-20: Non-digits in oid with object id: 8332, did:1338 in dynamic app:1158 when updating performance value (val:None)				<input type="checkbox"/>
11. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-3: Non-digits in oid with object id: 8303, did:1325 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
12. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8305, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
13. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8307, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
14. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8307, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
15. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8308, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
16. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-1: Non-digits in oid with object id: 8310, did:1330 in dynamic app:1148 when updating performance value (val:2.666666666666667E-5)				<input type="checkbox"/>
17. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-1: Non-digits in oid with object id: 8331, did:1328 in dynamic app:1158 when updating performance value (val:None)				<input type="checkbox"/>
18. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-3: Non-digits in oid with object id: 8307, did:1325 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
19. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-3: Non-digits in oid with object id: 8310, did:1325 in dynamic app:1148 when updating performance value (val:2.666666666666667E-5)				<input type="checkbox"/>
20. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-1: Non-digits in oid with object id: 8332, did:1328 in dynamic app:1158 when updating performance value (val:None)				<input type="checkbox"/>
21. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-17: Non-digits in oid with object id: 8303, did:1337 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
22. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-17: Non-digits in oid with object id: 8307, did:1337 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
23. 2012-03-19 11:12:43	em7_ao	Minor	11.PoolWorker-17: Non-digits in oid with object id: 8310, did:1337 in dynamic app:1148 when updating performance value (val:2.666666666666667E-5)				<input type="checkbox"/>
24. 2012-03-19 11:11:58	em7_ao	Minor	11.PoolWorker-12: Non-digits in oid with object id: 8348, did:1312 in dynamic app:1163 when updating performance value (val:None)				<input type="checkbox"/>
25. 2012-03-19 11:11:58	em7_ao	Minor	11.PoolWorker-12: Non-digits in oid with object id: 8349, did:1312 in dynamic app:1163 when updating performance value (val:None)				<input type="checkbox"/>

[Viewing Page: 300] Delete

2. On the **System Logs** page, pay special attention to any log entry tagged as *Critical* or *Major*. These entries might require additional diagnostics.
3. For each log entry, the **System Logs** page displays:
 - **Date**. Date and time the log entry was generated.
 - **Module**. Name of the appliance that generated the log entry.
 - **Severity**. Specifies the severity assigned to the log entry. The choices are:
 - Healthy
 - Notice
 - Minor
 - Major
 - Critical
 - **Message**. Descriptive text included in the log entry.

Searching the System Logs

When viewing the **System Logs**, you might want to sort the entries by date or by log message. This is helpful when you want to view information about a specific occurrence of a system event.

To search the system logs:

1. Go to the **System Logs** page (System > Monitor > System Logs).

System Logs Messages Found [1,317,344]				Purge	Reset	Guide	
				Search Message		Search	
Date	Module	Severity	Message				
1.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-19: Non-digits in oid with object id: 8303, did:1336 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
2.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-19: Non-digits in oid with object id: 8305, did:1336 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
3.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-19: Non-digits in oid with object id: 8307, did:1336 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
4.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-19: Non-digits in oid with object id: 8308, did:1336 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
5.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-29: Non-digits in oid with object id: 8303, did:1331 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
6.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-29: Non-digits in oid with object id: 8307, did:1331 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
7.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8303, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
8.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-20: Non-digits in oid with object id: 8331, did:1338 in dynamic app:1158 when updating performance value (val:None)				<input type="checkbox"/>
9.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8303, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
10.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-20: Non-digits in oid with object id: 8332, did:1338 in dynamic app:1158 when updating performance value (val:None)				<input type="checkbox"/>
11.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-3: Non-digits in oid with object id: 8303, did:1325 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
12.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8305, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
13.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8307, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
14.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8307, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
15.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-22: Non-digits in oid with object id: 8308, did:1330 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
16.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-1: Non-digits in oid with object id: 8310, did:1330 in dynamic app:1148 when updating performance value (val:2.666666666666667E-5)				<input type="checkbox"/>
17.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-1: Non-digits in oid with object id: 8331, did:1328 in dynamic app:1158 when updating performance value (val:None)				<input type="checkbox"/>
18.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-3: Non-digits in oid with object id: 8307, did:1325 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
19.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-3: Non-digits in oid with object id: 8310, did:1325 in dynamic app:1148 when updating performance value (val:2.666666666666667E-5)				<input type="checkbox"/>
20.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-1: Non-digits in oid with object id: 8332, did:1328 in dynamic app:1158 when updating performance value (val:None)				<input type="checkbox"/>
21.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-17: Non-digits in oid with object id: 8303, did:1337 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
22.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-17: Non-digits in oid with object id: 8307, did:1337 in dynamic app:1148 when updating performance value (val:None)				<input type="checkbox"/>
23.	2012-03-19 11:12:43 am7_ao	Minor	11.PoolWorker-17: Non-digits in oid with object id: 8310, did:1337 in dynamic app:1148 when updating performance value (val:2.666666666666667E-5)				<input type="checkbox"/>
24.	2012-03-19 11:11:58 am7_ao	Minor	11.PoolWorker-12: Non-digits in oid with object id: 8348, did:1312 in dynamic app:1163 when updating performance value (val:None)				<input type="checkbox"/>
25.	2012-03-19 11:11:58 am7_ao	Minor	11.PoolWorker-12: Non-digits in oid with object id: 8349, did:1312 in dynamic app:1163 when updating performance value (val:None)				<input type="checkbox"/>

[Viewing Page: 300] [Delete]

2. The search fields at the top of the **System Logs** page allow you to search for log entries by message, date, or module.

- **Search where.** Specifies the parameter you want to search by. You can select from the following:
 - *Search Message.* Searches all log entries for those that match the text that you enter in the regular expression field.
 - *Search Module ID.* Searches all log entries for those that have the same module ID text as that entered in the regular expression field.
 - *Search Date = (Y-m-d H:i:s).* Searches all log entries for those that have a date and time that is equal to the date entered in the regular expression field.
 - *Search Date > (Y-m-d H:i:s).* Searches all log entries for those that have a date and time that is later than the date entered in the regular expression field.
 - *Search Date Like (Y-m-d H:i:s).* Searches all log entries for those that have a date and time that is similar to the date entered in the regular expression field.
 - *Search Date Like != (Y-m-d H:i:s).* Searches all log entries for those that have a date and time that is **not** similar to the date entered in the regular expression field.
- **regular expression.** In this field you manually enter the text to search for. You can use the following special characters in this field:
 - * Match zero or more characters preceding the asterisk. For example:
 - "dell*" would match "dell", "dell2650", "dell7250" and "dell1700N".
 - "*dell*" would match "mydell", "dell", "dell2650", "dell7250" and "dell1700N".
 - % Match zero or more characters preceding the asterisk. This special character behaves in the same way as the asterisk.

5. When you click the **[Search]** button, the **System Logs** page will be refreshed and will display only the log entries that match the search parameters.

Deleting Entries from the System Logs

To save space, you might want to remove some or all log entries from the system log.

There are two ways to delete entries from the **System Logs** page:

1. Go to the **System Logs** page (System > Monitor > System Logs).
2. In the **System Logs** page, click the **[Purge]** button to delete all entries from the System Logs.

Or:

1. Go to the **System Logs** page (System > Monitor > System Logs).
2. In the **System Logs** page, highlight each entry you want to delete. To select multiple entries, right-click while holding down the [**<Ctrl>**] key.
3. Click the **[Delete]** button to delete all the selected entries from the System Logs.

Monitoring System Processes

The **System Processes** page (System > Monitor > Admin System Processes or System > Monitor > System Processes in the classic user interface) allows you to view read-only information about the execution of SL1's system processes. System Processes gather, manipulate, and publish the data used in SL1. These system processes can be configured and debugged in the **Process Manager** page (System > Settings > Admin Processes).

NOTE: If you work frequently with ScienceLogic Support, ensure that you verify periodically which processes are running in debug mode, and disable debug mode as soon as is reasonable. This will reduce the noise generated to your log files and will reduce load on the /var/log/em7 partition on the central database.

Viewing the List of System Processes

To view the list of system processes for all appliances:

1. Go to the **System Processes** page (System > Monitor > Admin System Processes).
2. The **System Processes** page displays the following for each process:
 - **Appliance.** The appliance where the process ran or is currently running. This field will contain the device name of the appliance.
 - **Process.** Name of the process.
 - **ID.** Unique numeric ID automatically assigned to the process by SL1.

- **Start Time.** Date and time at which the process started running.
- **End Time.** Date and time at which the process stopped running.
- **Duration.** Amount of time, in hours, minutes, and seconds, for which the process ran.
- **Frequency.** Frequency with which SL1 launches the process. Possible values are:
 - *Asynchronous.* The process is launched in response to a system event or user request. Asynchronous events display a value of "-1" (negative one) in this column.
 - *Always.* The process always runs while SL1 is running. Always running processes display a value of "0" (zero) in this column.
 - The process runs at intervals in minutes ranging from *1 Minute* to *1440 Minutes (Daily)*.
- **Percent.** Percent of **Run Length** (defined in the **Process Manager** page) currently in use by the process.
- **Instances.** This field is not currently in use.
- **Max Instances.** Maximum number of instances of the process that have run in parallel.
- **Processed.** Number of records processed by this run of the process.
- **Errors.** Number of errors encountered by this run of the process.

Recommended System Maintenance

ScienceLogic recommends that you take the following actions on a regular basis to reduce outages as much as possible.

Daily:

- Review "SL1 Operational Insights: Database Performance" classic dashboard
- Review "SL1 Operational Insights: Collector Performance" classic dashboard
- Review "SL1 Operational Insights: System Log Summary" classic dashboard
- Review "SL1 Operational Insights: Backup History" classic dashboard

Weekly:

- Run the System Status Script and review
 - Address every error item in the report
 - Read Knowledge Base articles
 - Open tickets for issues when help from SL1 Support is needed

Monthly:

- Review capacity items
 - You must understand License Usage and how to project future capacity

Quarterly:

- Audit User Profile access to verify that it meets expected needs
- Audit DNS servers and Timeservers on all collectors

Searching and Filtering the List of System Processes

The **System Processes** page includes ten filters. You can filter the list of processes by one or multiple of the following parameters: appliance, process name, start time, end time, duration, frequency, percent, max instances, processed, and errors. Only processes that meet all the filter criteria will be displayed in the **System Processes** page.

You can filter by one or more of the following parameters. The list of system processes is dynamically updated as you select each filter.

- For eight of the filters, you must enter text to match against. The user interface will search for processes that match the text, including partial matches. Text matches are not case sensitive. You can use the following special characters in each filter:
 - `,` Specifies an "or" operation. For example:
 - "dell, micro" would match all values that contain the string "dell" OR the string "micro".
 - `!` Specifies a "not" operation. For example:
 - "!dell" would match all values that do not contain the string "dell".
- **Appliance.** You can enter text to match, including special characters, and the **System Processes** page will display only processes that have a matching appliance name.
- **Process.** You can enter text to match, including special characters, and the **System Processes** page will display only processes that have a matching process name.
- **ID.** You can enter text to match, and the **System Processes** page will display only processes that have a matching ID.
- **Start Time.** Only those processes that match all the previously selected fields and have the specified start date and time will be displayed. The choices are:
 - *All.* Display processes with all start dates and times.
 - *Last Minute.* Display only processes that started within the last minute.
 - *Last Hour.* Display only processes that started within the last hour.
 - *Last Day.* Display only processes that started within the last day.
 - *Last Week.* Display only processes that started within the last week.
 - *Last Month.* Display only processes that started within the last month.
 - *Last Year.* Display only processes that started within the last year.
- **End Time.** Only those processes that match all the previously selected fields and have the specified end date and time will be displayed. The choices are:
 - *All.* Display processes with all end dates and times.
 - *Last Minute.* Display only processes that ended within the last minute.

- *Last Hour*. Display only processes that ended within the last hour.
 - *Last Day*. Display only processes that ended within the last day.
 - *Last Week*. Display only processes that ended within the last week.
 - *Last Month*. Display only processes that ended within the last month.
 - *Last Year*. Display only processes that ended within the last year.
- **Duration**. You can enter text to match, including special characters, and the **System Processes** page will display only processes that have a matching duration.
 - **Frequency**. You can enter text to match, including special characters, and the **System Processes** page will display only processes that have a matching frequency.
 - **Percent**. You can enter text to match, including special characters, and the **System Processes** page will display only processes that have a matching percent.
 - **Instances**. This field is not currently in use. It is not recommended to filter the System Processes by this field.
 - **Max Instances**. You can enter text to match, including special characters, and the **System Processes** page will display only processes that have a matching number of Max Instances.
 - **Processed**. You can enter text to match, including special characters, and the **System Processes** page will display only processes that have a matching number of records processed.
 - **Errors**. You can enter text to match, including special characters, and the **System Processes** page will display only processes that have a matching number of errors.

Monitoring the Status of Each Appliance

The **Appliance Manager** page (System > Settings > Appliances) provides for global appliance configuration and management for your entire system or stack. This includes collector group and load distribution, version information, license status, and other items that are important when you upgrade.

The screenshot shows the 'Appliance Manager | Editing Appliance [4]' interface. At the top, there are buttons for 'System Status Output', 'Reset', and 'Guide'. Below these are two configuration panels. The left panel has fields for 'Host Name' (vweek-test), 'IP Address' (127.0.0.1), 'DB User' (root), and 'DB Password' (*****). The right panel has a 'Model type' dropdown (Data Collection Unit), a 'Description' field (delete later), and 'Save' and 'Save As' buttons.

Name	IP Address	Module Type	Collector Group	Description	Build	MatiaDB	Capacity	Allocation	ID	Validated	Endpoint	Needs Reboot?	Task Manager Paused?	Edit Date	Edit User	Create Date
1. wuikami-01-22	10.64.229.22	Database	n/a	Database: 10.64.229.22	11.2.0 (3368)	10.4.22	7,000	n/a	1	Yes	--	No	No	2022-05-09 16:27:31	em7admin	2022-03-25 13:59:17
2. vweek-cu-109422823	127.0.0.3	Data Collection Unit	vweek-cug	vweek-cu-10.64.229.23	11.2.0 (3368)	10.4.22	n/a	34	3	Yes	--	No	No	2022-03-25 15:13:15	em7admin	2022-03-25 15:09:55
3. vweek-test	1.2.2.3	Data Collection Unit	--	delete later	Unknown	n/a	n/a	0	4	Yes	--	No	No	2022-03-30 13:12:27	em7admin	2022-03-30 13:12:27
4. vweek-test	5	Data Collection Unit	SMA GQL Test	delete later	Unknown	n/a	n/a	0	5	Yes	--	No	No	2022-03-30 13:12:27	em7admin	2022-03-30 13:12:27
5. vweek-test	5	Data Collection Unit	SMA GQL Test	delete later	Unknown	n/a	n/a	0	6	Yes	--	No	No	2022-03-30 13:12:27	em7admin	2022-03-30 13:12:27

At the bottom right, there is a '[Select Action]' dropdown menu and a 'Go' button.

From the **Appliance Manager** page, you can also access the Web Configuration Utility for each ScienceLogic appliance by clicking the toolbox icon (🔧), or you can access the database administration tool for each Database Server or All-In-One Appliance by clicking the gear icon (⚙️).

For each Database Server, Data Collector, and Message Collector, you can click on the magnifying-glass icon (🔍) to view the output of the system status script for that appliance.

During upgrade, table cells will highlight known, pending action items that must be done to successfully complete an upgrade.

This page is useful for ensuring that every Data Collector is assigned to a Collector Group before you begin an upgrade. In some cases, the Data Collector might be assigned to an empty Collector Group, if the collector is new.

You can also use this page to ensure that Data Collector load is near or below the system requirements for each collector.

To edit and view information about an SL1 appliance:

1. Go to the **Appliance Manager** page (System > Settings > Appliances).
2. Locate the SL1 appliance you want to edit. Click its wrench icon (🔧). The fields in the top pane are populated with values from the selected SL1 appliance.
3. You can edit one or more of the following fields:
 - **Host Name**. Name of the appliance.
 - **IP Address**. Primary IP address for the appliance.
 - **Model Type/Module Type**. Type of appliance:
 - *All In One Server*
 - *Database*
 - *Administration Portal*
 - *Data Collection Unit*
 - *Message Collection Unit*

NOTE: The combination appliance with a Database Server and an Administration Portal on a single appliance will appear with **Module Type** of *Database*. The combination appliance with a Message Collection Unit and a Data Collection Unit will appear with **Module Type** of *Data Collection Unit*.





- *Integration Server (SL1 PowerFlow)*
4. You can edit two optional fields for Data Collector or Message Collector.


- **DB User.** User name that can access the MariaDB database on the Data Collector or Message Collector.
- **DB Password.** Password that allows access the MariaDB database on the Data Collector or Message Collector.
If you are using AWS RDS with your SL1 System, you must define the **DB User** and **DB Password** for each Data Collector or Message Collector.

NOTE: ScienceLogic recommends that you vary the Data Collector and Message Collector database credentials for enhanced per-appliance security. This greatly enhances the security of your central database by disallowing a successful attack to go unnoticed on your Data Collector and then succeed without failure on the central database.

The Appliance Manager page also displays the following columns:

- **Collector Group.** For Data Collectors and All-In-One Appliances, specifies the Collector Group associated with the appliance.
 - **Build.** Specifies the latest build installed on the appliance.
 - **MariaDB.** Specifies the version of MariaDB running on the All-In-One Appliance, Database Server, Data Collector, or Message Collector.
 - **Capacity.** For Database Servers, specifies the licensed capacity of the appliance.
 - **Allocation.** For Data Collectors, specifies the number of devices aligned with the appliance.
 - **ID.** Unique numeric ID, automatically assigned by the platform to each appliance in the **Appliance Manager** page.
 - **Validated.** Specifies whether the license is valid.
 - **Endpoint.** SL1 Agent endpoint for the Gen 1 Agent.
 - **Needs Reboot?.** Specifies whether the appliance requires reboot to add latest kernel or security updates. This column is updated every 30 minutes. Hover your mouse to determine why the reboot is required and information about kernel version, packages, and last reboot.
 - **Task Manager Paused? .** Specifies whether the task manager service (em7) is paused. This value is updated every two minutes.
 - **Edit Date.** Date the appliance's information was discovered or last edited.
 - **Edit User.** User who last edited the appliance's information.
 - **Create Date.** Date and time the appliance was registered and licensed.
5. To view the Web Configuration Utility for an appliance, where you can track license data, interfaces, and other device settings, click the Appliance Manager icon (🔧). Use the same login credentials that you used to log into SL1, and close the pop-up window for the Utility when you are done.
 6. If an SL1 appliance is running a different version of SL1 than the Database Server, that appliance is highlighted in the **Appliance Manager** page. The version number, if known, is listed in the **Build** column.

7. For all SL1 appliances, SL1 runs the system status script every 15 minutes. You can click the logs icon () to view the results of the latest system status script.
8. If you are logging in to the "sl1admin" account on an appliance, you can click the padlock () icon for that appliance to get a one-time password. For more information, see "Using the sl1admin Account" in the *Role-Based User Accounts* chapter of the **Organizations and Users** manual.
9. For Database Servers, you can click the gear icon () to access the phpMyAdmin interface for the Database Server. In this interface, you can view all the database tables on the Database Server.
10. For Data Collectors and Message Collectors, you can click the lightning bolt icon () to manually force the Database Server to send the latest configuration information.

NOTE: The bomb icon () does not appear for Database Servers that are not configured for High Availability or Disaster Recovery. The bomb icon does not appear for Database Servers that are configured as the primary database in a High Availability or Disaster Recovery configuration.

11. Click the **[Save]** button to save any changes. Click the **[Save As]** button to save your changes to a new appliance name.

Monitoring User Actions and Events

The **Audit Logs** page (System > Monitor > Audit) provides an audit trail for SL1. The **Audit Logs** page displays a record of actions in SL1 that are generated by **users** or by **managed elements**. These actions are organized by organization.

Some of the actions that are logged in the **Audit Logs** page include:

- User logins to SL1
- The sl1admin user requests a one-time password
- Organization name changes
- The addition, editing, or deletion of elements in SL1

NOTE: Entries for the addition, editing, and deletion of elements includes the affected device ID, when applicable.

- The installation, editing, or uninstallation of PowerPacks, including when a PowerPack is imported or installed from Global Manager to a Stack
- Manually triggered discovery sessions
- Events and cleared events
- Devices being set to maintenance mode or devices no longer being in maintenance mode

- The unalignment of Dynamic Applications from devices and the deletion of that data
- The creation, editing, or deletion of Dynamic Applications
- The creation, editing, or deletion of Run Book Automation policies
- The addition or deletion of Reports
- The situation where a user gets an "Access Denied" page as a result of attempting to access a page for which he or she does not have permission
- Asset Record changes
- User-defined changes to settings on the **Data Retention Settings** page (System > Settings > Data Retention)
- Changes to settings on the **System Threshold Defaults** page (System > Settings > Thresholds > System)
- API requests that use a PUT, POST, or DELETE method

NOTE: By default, the **Audit Logs** page displays a list of actions associated with all organizations.

Viewing the List of Audit Logs

To view the list of log entries in the **Audit Logs** page:

1. Go to the **Audit Logs** page (System > Monitor > Audit Logs).

	Date/Time	Source	Organization	Message
1.	2017-05-18 15:48:20	API Server	System	User 'em7admin' Performed a POST request to resource /api/organization [result.CREATED: "/organization /api/orga
2.	2017-05-18 15:48:20	API Server	System	User 'em7admin' Performed a POST request to resource /api/account [result.CREATED: "/account /api/account/2 acc
3.	2017-05-18 15:48:20	API Server	System	User 'em7admin' Performed a POST request to resource /api/credentialapp [result.CREATED: "/credential /api/cred
4.	2017-05-18 15:48:20	API Server	System	User 'em7admin' Performed a POST request to resource /api/account_policy [result.CREATED: "/user Policy /api/acc
5.	2017-05-18 16:21:20	Login	System	User 'em7admin' Successfully Logged-In from IP address: 10.64.34.43/54021.
6.	2017-05-18 16:22:32	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
7.	2017-05-18 16:22:32	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
8.	2017-05-18 16:22:33	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
9.	2017-05-18 16:22:33	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
10.	2017-05-18 16:22:33	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
11.	2017-05-18 16:22:33	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
12.	2017-05-18 16:22:33	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
13.	2017-05-18 16:22:33	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
14.	2017-05-18 16:22:33	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
15.	2017-05-18 16:22:33	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
16.	2017-05-18 16:22:34	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
17.	2017-05-18 16:22:34	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
18.	2017-05-18 16:22:34	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
19.	2017-05-18 16:22:34	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
20.	2017-05-18 16:22:34	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
21.	2017-05-18 16:22:34	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
22.	2017-05-18 16:22:34	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
23.	2017-05-18 16:22:35	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
24.	2017-05-18 16:22:36	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
25.	2017-05-18 16:22:36	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
26.	2017-05-18 16:22:36	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
27.	2017-05-18 16:22:36	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
28.	2017-05-18 16:22:36	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
29.	2017-05-18 16:22:36	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8
30.	2017-05-18 16:22:36	API Server	System	User 'em7admin' Performed a PUT request to resource /api/filestore/system_patch/EM7_v8.4.1.jenkins_EM7_G3_8

2. The **Audit Logs** page displays all actions that are performed by users or managed elements in SL1. For each action, the **Audit Logs** page displays:

- **Date/Time.** Date and time the action occurred and the log entry was created.
- **Source.** Source of the log entry. This usually describes where the action took place. For example, if you change the contact information for your account, an entry will be made in the audit log, and the source will be "Contact Information."
- **Organization.** Organization associated with the action.
- **Message.** Text of the log entry.

Searching and Filtering the List of Audit Logs

The Filter-While-You-Type fields appear as a row of blank fields at the top of the list. These fields let you filter the items that appear in the list.

The list is dynamically updated as you select each filter. For each filter, you must make a selection from a drop-down menu or type text to match against. SL1 will search for entries that match the text, including partial matches. Text matches are not case-sensitive, and you can use special characters in each text field.

By default, the cursor is placed in the first Filter-While-You-Type field. You can use the <Tab> key or your mouse to move your cursor through the fields.

You can filter by one or more of the following parameters. Only items that meet all of the filter criteria are displayed on the page.

The following describes each filter on the **Audit Logs** page:

- **Date/Time.** Only those audit logs that have the specified creation date will be displayed. The choices are:
 - *All.* Display all audit logs that match the other filters.
 - *Last Minute.* Display only audit logs that have been created within the last minute.
 - *Last Hour.* Display only audit logs that have been created within the last hour.
 - *Last Day.* Display only audit logs that have been created within the last day.
 - *Last Week.* Display only audit logs that have been created within the last week.
 - *Last Month.* Display only audit logs that have been created within the last month.
 - *Last Year.* Display only audit logs that have been created within the last year.
- **Source.** You can enter text to match, including special characters, and the Audit Logs page will display only audit logs that have a matching source.
- **Organization.** You can enter text to match, including special characters, and the Audit Logs page will display only audit logs that have a matching organization.
- **Message.** You can enter text to match, including special characters, and the Audit Logs page will display only audit logs that have a matching message.

Special Characters

You can include the following special characters to filter by each column except those that display date and time:

NOTE: When searching for a string, SL1 will match substrings by default, even if you do not include any special characters. For example, searching for "hel" will match both "hello" and "helicopter". When searching for a numeric value, SL1 will not match a substring unless you use a special character.

String and Numeric

- , (comma). Specifies an "OR" operation. Works for string and numeric values. For example:
"dell, micro" matches all values that contain the string "dell" OR the string "micro".
- & (ampersand). Specifies an "AND" operation. Works for string and numeric values. For example:
"dell & micro" matches all values that contain both the string "dell" AND the string "micro", in any order.
- ! (exclamation point). Specifies a "not" operation. Works for string and numeric values. For example:

NOTE: You can also use the "!" character in combination with the arithmetical special characters (min-max, >, <, >=, <=, =) described below.

- * (asterisk). Specifies a "match zero or more" operation. Works for string and numeric values. For a string, matches any string that matches the text before and after the asterisk. For a number, matches any number that contains the text. For example:
"hel*er" would match "helpers" and "helicopter" but not "hello".
"325*" would match "325", "32561", and "325000".
"*000" would match "1000", "25000", and "10500000".
- ? (question mark). Specifies "match any one character". Works for string and numeric values. For example:
"!?ver" would match the strings "oliver", "levers", and "lover", but not "believer".
"135?" would match the numbers "1350", "1354", and "1359", but not "135" or "13502"

String

- `^` (caret). For strings only. Specifies "match the beginning". Matches any string that begins with the specified string. For example:

`^sci` would match "scientific" and "sciencelogic", but not "conscious".

`^happy$` would match only the string "happy", with no characters before or after.

`!^micro` would match all values that do not start with "micro".

`!^$` would match all values that are not null.

`!^` would match null values.

- `$` (dollar sign). For strings only. Specifies "match the ending". Matches any string that ends with the specified string. For example:

`ter$` would match the string "renter" but not the string "terrific".

`^happy$` would match only the string "happy", with no characters before or after.

`!fer$` would match all values that do not end with "fer".

`!^$` would match all values that are not null.

`!$` would match null values.

NOTE: You can use both `^` and `$` if you want to match an entire string and only that string. For example, `^tern$` would match the strings "tern" or "Tern" or "TERN"; it would not match the strings "terne" or "cistern".

Numeric

- `min-max`. Matches numeric values only. Specifies any value between the minimum value and the maximum value, including the minimum and the maximum. For example:

`1-5` would match 1, 2, 3, 4, and 5.

- `-` (dash). Matches numeric values only. A "half open" range. Specifies values including the minimum and greater or including the maximum and lesser. For example:

`1-` matches 1 and greater. So would match 1, 2, 6, 345, etc.

`-5` matches 5 and less. So would match 5, 3, 1, 0, etc.

- `>` (greater than). Matches numeric values only. Specifies any value "greater than". For example:

`>7` would match all values greater than 7.

- < (less than). Matches numeric values only. Specifies any value "less than". For example:
 "<12" would match all values less than 12.
- >= (greater than or equal to). Matches numeric values only. Specifies any value "greater than or equal to". For example:
 "=>7" would match all values 7 and greater.
- <= (less than or equal to). Matches numeric values only. Specifies any value "less than or equal to". For example:
 "=<12" would match all values 12 and less.
- = (equal). Matches numeric values only. For numeric values, allows you to match a negative value. For example:
 "=-5" would match "-5" instead of being evaluated as the "half open range" as described above.

Examples

- "!dell" matches all values that do not contain the string "dell".
- "! ^ micro" would match all values that do not start with "micro".
- "!fer\$" would match all values that do not end with "fer".
- "! ^ \$" would match all values that are not null.
- "! ^ " would match null values.
- "! \$" would match null values.
- "!*" would match null values.
- "happy, !dell" would match values that contain "happy" OR values that do not contain "dell".
- "aio\$". Matches only text that ends with "aio".
- "^ shu". Matches only text that begins with "shu".
- "^ silo\$". Matches only the text "silo", with no characters before or after.
- "!silo". Matches only text that does not contain the characters "silo".
- "! ^ silo". Matches only text that does not start with "silo".
- "!0\$". Matches only text that does not end with "0".
- "! ^ silo\$". Matches only text that is not the exact text "silo", with no characters before or after.
- "! ^ ". Matches null values, typically represented as "--" in most pages.
- "! \$". Matches null values, typically represented as "--" in most pages.
- "! ^ \$". Matches all text that is not null.
- silo, !aggr". Matches text that contains the characters "silo" and also text that does not contain "aggr".
- "silo, 02, !aggr". Matches text that contains "silo" and also text that contains "02" and also text that does not contain "aggr".

- "silo, 02, !aggr, !01". Matches text that contains "silo" and also text that contains "02" and also text that does not contain "aggr" and also text that does not contain "01".
- "^s*i!*o\$". Matches text that contains the letter "s", "i", "l", "o", in that order. Other letters might lie between these letters. For example "sXiXlXo" would match.
- "!^s*i!*o\$". Matches all text that does not that contains the letter "s", "i", "l", "o", in that order. Other letters might lie between these letters. For example "sXiXlXo" would not match.
- "!vol&!silo". Matches text that does not contain "vol" AND also does not contain "silo". For example, "volume" would match, because it contains "vol" but not "silo".
- "!vol&02". Matches text that does not contain "vol" AND also contains "02". For example, "happy02" would match, because it does not contain "vol" and it does contain "02".
- "aggr,!vol&02". Matches text that contains "aggr" OR text that does not contain "vol" AND also contains "02".
- "aggr,!vol&!infra". Matches text that contains "aggr" OR text that does not contain "vol" AND does not contain "infra".
- "*". Matches all text.
- "!*". Matches null values, typically represented as "--" in most pages.
- "silo". Matches text that contains "silo".
- "!silo". Matches text that does not contain "silo".
- "!^silo\$". Matches all text except the text "silo", with no characters before or after.
- "-3,7-8,11,24,50-". Matches numbers 1, 2, 3, 7, 8, 11, 24, 50, and all numbers greater than 50.
- "-3,7-8,11,24,50-,a". Matches numbers 1, 2, 3, 7, 8, 11, 24, 50, and all numbers greater than 50, and text that includes "a".
- "?n". Matches text that contains any single character and the character "n". For example, this string would match "an", "bn", "cn", "1n", and "2n".
- "n*SAN". Matches text the contains "n", zero or any number of any characters and then "SAN". For example, the string would match "nSAN", and "nhamburgerSAN".
- "^?n*SAN\$". Matches text that begins with any single character, is following by "n", and then zero or any number of any characters, and ends in "SAN".

Generating Reports on Audit Logs

You can export the entries on the **Audit Logs** page as one of the following report types:

- Acrobat document (.pdf)
- Web page (.html)
- Excel spreadsheet (.xlsx)
- OpenDocument Spreadsheet (.ods)
- Comma-separated values (.csv)

When you create a report in the **Audit Logs** page, SL1 includes only those logs that appear in the current view of the page. If you filter the entries on the **Audit Logs** page, only those logs that meet the filter criteria and currently appear on the page will appear in the report.

To generate an audit logs report:

1. From the **Audit Logs** page, click the **[Report]** button. The **Export current view as a report** window appears.
2. In the **Output Format** field, select the report format type.
3. Click **[Generate]**.

Using auditd to Monitor Sensitive Files

As an additional security measure, the ScienceLogic Security team monitors the SL1 SaaS environment with the Linux Auditing System (**auditd**). The auditd system provides enhanced logging that identifies when changes are made to specific files and directories in SL1 that contain sensitive data. Starting with SL1 version 11.1.0, you can send audit logs externally to a security information and event management (SIEM) tool when needed.

The auditd logging at **/var/log/audit/audit** provides logging based on the configured rules that are shipped with SL1 version 11.1.0 or later. You can send syslog messages to a syslog server or a SIEM tool.

SL1 monitors specific files and directories for changes. The topics below describe what is logged by default, how to modify what is logged, and how to send logs externally.

Files Logged by Default

Starting in SL1 version 11.1.0, a file called **rules.d/70_silo_watchlist.rules** is created and added to the **/etc/audit** directory.

The following files are monitored:

```
-w /etc/silo.conf -p war -k silowatch
-w /etc/php.ini -p wa -k silowatch
-w /etc/yum.conf -p wa -k silowatch
-w /etc/postfix/main.cf -p wa -k silowatch
-w /etc/postfix/master.cf -p wa -k silowatch
-w /etc/nginx/nginx.conf -p wa -k silowatch
-w /etc/yum.conf -p wa -k silowatch
-w /etc/ntp.conf -p wa -k silowatch
-w /etc/my.cnf -p wa -k silowatch
-w /etc/my.cnf.d/ -p wa -k silowatch
-w /etc/php.d/ -p wa -k silowatch
-w /etc/skel/ -p wa -k silowatch
-w /etc/yum/ -p wa -k silowatch
-w /etc/yum.repos.d/ -p wa -k silowatch
```



```
-w /etc/ntp/ -p wa -k silowatch
-w /etc/chrony.d/ -p wa -k silowatch
-w /etc/chrony.keys -p wa -k silowatch
-w /etc/chrony.conf -p wa -k silowatch
```

Modifying the List of Files to be Logged

To add or change files that are monitored:

1. Log in to the SL1 appliance with the admin account and sudo to the root user.
2. Edit the file called `/etc/audit/rules.d/70_silo_watchlist.rules`. Add the following line to the file.

```
-w /etc/.custom_alignment.conf -p wa -k silowatch
```

NOTE: This file is not included in SL1 version 11.1.0 by default.

3. Run the following command to load the files into the `audit.rules` file:

```
[root@server ~]# augenrules --load
```

NOTE: You can add or remove specific files that you want to monitor from this list. Including the slash at the end of the monitored path (such as `/etc/ntp/`) will monitor the entire directory and everything stored within it.

Sending Logs via Syslog to a Remote Server

To send logs to a syslog server or a security information and event management (SIEM) tool:

1. Edit the file `/etc/rsyslog.conf` and include the following text to send the `audit.log` to rsyslog:

```
#audit log
$ModLoad imfile
$InputFileName /var/log/audit/audit.log
$InputFileTag tag_audit_log:
$InputFileStateFile audit_log
$InputFileSeverity info
$InputFileFacility local6
$InputRunFileMonitor
```

2. If rsyslog is not already configured to send to a remote server, configure the remote server at this time.
3. Restart rsyslog for the changes to take effect:

```
[root@server ~]# systemctl restart rsyslog
```

Monitoring the Status of Data Collectors

The **Collector Status** page displays the status of each Data Collector and Message Collector in your system.

NOTE: This page does not appear in All-In-One Appliances.

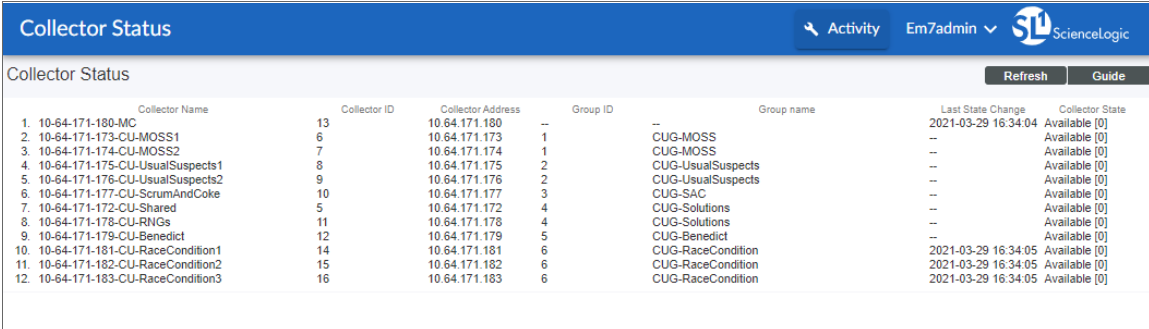
Data Collectors retrieve data from managed devices and applications. This collection occurs during initial discovery, during nightly updates, and in response to policies defined for each managed device. The collected data is used to trigger events, display data in the user interface, and generate graphs and reports.

Message Collectors receive and process inbound, asynchronous syslog and trap messages from monitored devices. In most distributed systems, dedicated **Message Collector** appliances perform message collection. A single **Message Collector** can handle syslog and trap messages from devices that are monitored by multiple **Data Collectors**.

To perform collection, you must define a Collector Group and align it with at least one Data Collector. If your Collector Group includes multiple Data Collectors, you can configure the Collector Group for high-availability. For details, see the section on [Collector Groups](#).

To ensure the health of your system, you should periodically check on the status of the Data Collectors and Message Collectors. To access the **Collector Status** page:

1. Go to the **Collector Status** page (System > Monitor > Collector Status).



Collector Name	Collector ID	Collector Address	Group ID	Group name	Last State Change	Collector State
1. 10-64-171-180-MC	13	10.64.171.180	--	--	2021-03-29 16:34:04	Available [0]
2. 10-64-171-173-CU-MOSS1	6	10.64.171.173	1	CUG-MOSS	--	Available [0]
3. 10-64-171-174-CU-MOSS2	7	10.64.171.174	1	CUG-MOSS	--	Available [0]
4. 10-64-171-175-CU-UsualSuspects1	8	10.64.171.175	2	CUG-UsualSuspects	--	Available [0]
5. 10-64-171-176-CU-UsualSuspects2	9	10.64.171.176	2	CUG-UsualSuspects	--	Available [0]
6. 10-64-171-177-CU-ScrumAndCoke	10	10.64.171.177	3	CUG-SAC	--	Available [0]
7. 10-64-171-172-CU-Shared	5	10.64.171.172	4	CUG-Solutions	--	Available [0]
8. 10-64-171-178-CU-RNGs	11	10.64.171.178	4	CUG-Solutions	--	Available [0]
9. 10-64-171-179-CU-Benedict	12	10.64.171.179	5	CUG-Benedict	--	Available [0]
10. 10-64-171-181-CU-RaceCondition1	14	10.64.171.181	6	CUG-RaceCondition	2021-03-29 16:34:05	Available [0]
11. 10-64-171-182-CU-RaceCondition2	15	10.64.171.182	6	CUG-RaceCondition	2021-03-29 16:34:05	Available [0]
12. 10-64-171-183-CU-RaceCondition3	16	10.64.171.183	6	CUG-RaceCondition	2021-03-29 16:34:05	Available [0]

2. For each Data Collector in your system, the **Collector Status** page displays the following:

- **Collector Name.** Name of the Data Collector or Message Collector.
- **Collector ID.** Unique numeric ID automatically assigned to the Data Collector or Message Collector by SL1.
- **Collector Address.** IP address of the Data Collector or Message Collector.
- **Group ID.** Unique numeric ID of the [Collector Group](#) associated with the Data Collector or Message Collector.

- **Group Name.** Name of the *Collector Group* associated with the Data Collector or Message Collector.
- **Last State Change.** Date and time the platform last polled the status of the Data Collector or Message Collector.
- **Collector State.** Operating state of the Data Collector or Message Collector.

Chapter



5

Upgrading SL1

Overview

This chapter provides an overview of the **System Updates** page, detailed steps for performing an SL1 upgrade, and detailed steps on upgrading MariaDB, upgrading PowerPacks, and performing reboots.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon (.
- To view a page containing all the menu options, click the Advanced menu icon ().

For more information about the improvements to upgrading to the latest version of SL1, watch the video at <https://www.youtube.com/watch?v=QVmlDQenro4>.

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Reference: The System Updates Page

The **System Updates** page (System > Tools > Updates) allows you to update the software on your SL1 appliances.

You must first download the update file to the local computer.

You can then import the software update through the user interface.

After you import a software update to your SL1 system, the SL1 system can automatically **stage** the software update. Staging is when the software is copied to each ScienceLogic appliance. Staging allows SL1 to simultaneously apply the software changes to each ScienceLogic appliance, regardless of the speed of the connection to each ScienceLogic appliance.

You can allow the SL1 system to automatically stage the software or you can manually stage the software.

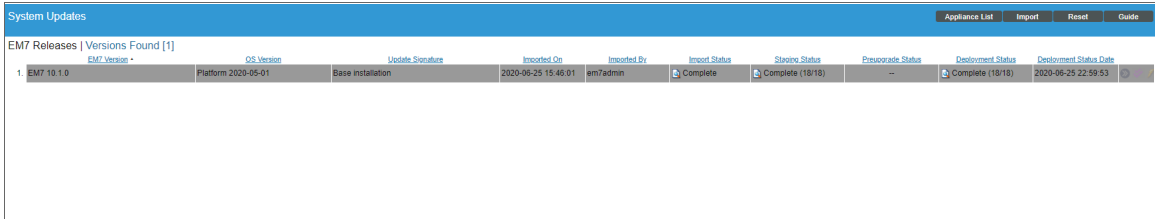
After the software update is staged, you can deploy the software.

WARNING: To apply updates to an existing Data Collector, that Data Collector must be a member of a Collector Group. In some SL1 systems, users might have to create a Collector Group for a single Data Collector before applying updates.

NOTE: To conserve disk space on Data Collectors and Message Collectors, after an update, SL1 removes previous Docker images.

Reference: Viewing the List of Updates

The **System Updates** page (System > Tools > Updates) displays the following about each update:





EM7 Releases	OS Version	Update Signature	Imported On	Imported By	Import Status	Staging Status	Prepopulate Status	Deployment Status	Deployment Status Date
1. EM7 10.1.0	Platform 2020-05-01	Base installation	2020-05-25 15:46:01	em7admin	Complete	Complete (10/16)	--	Complete (10/16)	2020-05-25 22:59:53

TIP: To sort the list of update files, click on a column heading. The list will be sorted by the column value, in ascending order. To sort by descending order, click the column heading again. The **Deployed Status Date** column sorts by descending order on the first click; to sort by ascending order, click the column heading again.

- **EM7 Version.** Name and version number for the software update.
- **OS Version.** Name and number of the platform OS update.
- **Update Signature.** Name of the entity that released the update and type of update. Usually "ScienceLogic Official Release".
- **Imported On.** Date and time the software update was loaded onto the SL1 system.
- **Imported By.** Name of the ScienceLogic user who loaded the software update onto the SL1 system.
- **Import Status.** Status of the import process. Clicking on the log icon displays the log file associated with importing the selected software. Possible values are:
 - *In Progress.* Software is currently being imported by the SL1 system.
 - *Complete.* Software has been imported successfully.
 - *Failed.* Software import has failed due to an unexpected condition. Contact ScienceLogic Support for assistance.
 - *Missing Base.* The SL1 system cannot import this software until another software package has been imported. The dependency is for compression purposes. Check the log for a message stating which software package needs to be imported.
- **Staging Status.** Status of the staging process. Clicking on the log icon displays the log file associated with staging the selected software. Possible values are:
 - *--.* No staging request is active and software has not been staged on any SL1 appliances.
 - *Scheduled.* The SL1 system is aware of the staging request and is preparing for staging.
 - *In Progress.* Staging is in progress but has not completed.


- *Complete*. Staging has completed, and all appliances are ready to deploy the software.
- *Incomplete*. Staging has completed, and one or more appliances are ready to deploy the software.
- *Canceled*. User manually canceled the staging process.
- *Outdated*. The current update is not the latest or has already been installed.
- *Failed*. An unexpected error occurred in the staging process. Contact ScienceLogic Support.

NOTE: If you did not select **Auto Stage** during import, the **Staging Status** column will include an asterisk (*) until you manually stage the update.

- **Preupgrade Status**. You can run the pre-upgrade check after importing and staging an update but before deploying the update. The pre-upgrade check will ensure that all criteria are met before deploying.
 - If you want to run the pre-upgrade check, select the purple checkmark for the selected row.
 - The possible values in this field are *In Progress* or *Complete*.
 - Clicking on the magnifying-glass icon () in this column displays the output of the pre-upgrade check.
 - If a pre-upgrade criterion fails, the **[Deploy]** button will be disabled for the selected row.
 - If an appliance fails the pre-upgrade criteria, you can view the output from the system status script for each failed appliance. Go to the Appliance Manager page (System > Settings > Appliances), find the appliance that failed, and click on the magnifying-glass icon ().
 - For details see [the section on the Pre-Upgrade Check](#).
- **Deployment Status**. Specifies the current deployment state. Possible values are:
 - *--*. No deployment request is active, and software has not been deployed on any SL1 appliances.
 - *Scheduled*. The SL1 system is aware of the deployment request and is preparing for deployment.
 - *In Progress*. Deployment is in progress but has not completed.
 - *Complete*. Deployment has completed, and all appliances are updated.
 - *Incomplete*. Deployment has completed, and one or more appliances are updated.
 - *Canceled*. User manually canceled the deployment.
 - *Outdated*. The current update is not the latest or has already been installed.
 - *Failed*. An unexpected error occurred in the deployment process. Contact ScienceLogic Support.
- **Deployment Status Date**. Specifies the date and time the software update was last deployed.

Reference: Viewing the Log Files for Updates

From the **System Updates** page, you can view a log file that displays the history of the software update. To view this log file:

1. Go to the **System Updates** page (System > Tools > Updates).
2. In the **System Updates** page, find the software update for which you want to view the log files. Go to its **Import Status** column, **Staging Status** column, or **Deployment Status** column and click the log icon ().
3. The appropriate log page appears. In this modal page, each log entry displays:
 - Information about the status of the software update and its related actions.
 - For each action, the name and IP address of the appliance where the action occurred
 - The date and time each action occurred.

Workflow

The following sections describe the steps to plan and deploy an SL1 update.

If you would like assistance planning an upgrade path that minimizes downtime, please contact your Customer Success Manager.

The workflow for upgrading SL1 is:

1. [Planning](#)
2. [Scheduling maintenance windows](#)
3. (If necessary) [updating SL1 Appliances to a versions of SL1 that uses RedHat Linux \(SL1 8.1.1 and later\)](#).
4. [Pre-upgrade best practices for SL1](#)
5. [Backing Up Custom Settings in the NextUI](#)
6. [Backing Up SSL Certificates](#)
7. [Setting the Timeout for PhoneHome Watchdog](#)
8. [Adjusting Timeout for slow connections](#)
9. [Running the system status script](#) on the Database Server or All-In-One before upgrading.
10. (If necessary) [Upgrading the SL1 Distributed Architecture on SL1 Versions 8.5.0 and Earlier](#) using the System Update tool (System > Tools > Updates).
11. [Upgrading the SL1 Distributed Architecture on SL1 Versions 8.6.0 and Later](#) using the System Update tool (System > Tools > Updates).
12. [Removing SL1 Appliances from Maintenance Mode](#)

13. (As needed) [Manual updates for systems upgrading from 8.4.x and earlier](#)
14. (As needed) [Upgrading MariaDB](#)

CAUTION: Refer to the release notes for your current release to determine if you must upgrade MariaDB.

15. (As needed) [Rebooting SL1 Appliances](#)

CAUTION: Refer to the release notes for your current release to determine if you must reboot all SL1 appliances after upgrading.

16. [Restoring Custom Settings in the NextUI](#)
17. [Restoring SSL Certificates](#)
18. [Resetting the Timeout for PhoneHome Watchdog](#)
19. [Updating PowerPacks](#)
20. (One-time) [Configure Subscription Billing](#). For details, see the **Subscription Billing** manual.

Planning

Before upgrading SL1, perform the following steps that are specific to your organization:

1. Read the release notes to determine:
 - What is fixed?
 - What is new?
 - What has changed?
 - What has been deprecated?
2. Read the Known Issues for the release at <https://support.sciencelogic.com/s/topic/0TO0z000000E6w7GAC>
3. Identify all integrations and third-party applications that access the SL1 database or manipulate data on SL1. Determine how to disable these integrations during the deployment and re-enable after deployment.
4. Identify activities and customers that will be affected by maintenance windows and schedule and inform appropriately.
5. Identify custom work (PowerPacks, Run Book Automations, Event policies, Dashboard widgets) and ensure that it is backed up so you can restore it if necessary.

NOTE: Ensure that each SL1 appliance has 3GB of free space in the /var partition to allow you stage the upgrade. Ensure that each SL1 appliance has 1GB of free space in / (the root partition) to allow you to deploy the upgrade.

Scheduling Maintenance Windows

Upgrading SL1 includes a minimum of two and possibly four maintenance windows:

- **Import and stage update and run the pre-upgrade script.** These steps can take place prior to the day of upgrade and **do not affect SL1 functionality**. ScienceLogic suggest you perform these steps at least three days before the planned upgrade and ideally a week before the planned upgrade.
- **Deploy update.** On the day of the upgrade, put all SL1 appliances in maintenance mode. The SL1 system will not be available during this procedure. Update the SL1 Distributed systems.

CAUTION: If you are upgrading from a version of SL1 prior to 8.6.0, you will have to perform the first two bullets twice, once to upgrade to 8.6.0 and then again to upgrade to the latest update. You will need an additional maintenance window for the extra deploy step.

- **Update MariaDB (if required).** The SL1 system will not be available during this procedure.

CAUTION: Refer to the release notes for your current release to determine if you must upgrade MariaDB.

- **Reboot Appliances (if required).** Individual SL1 appliances will not be available during these procedures.

CAUTION: Refer to the release notes for your current release to determine if you must reboot all SL1 appliances after upgrading.

- Identify activities and customers that will be affected by maintenance windows and schedule and inform appropriately.

Updating SL1 Appliances to Oracle Linux

SL1 Release Prior to 8.1.1

SL1 8.1.1 included a complete update of the operating system for each SL1 appliance, from CentOS 5.11 to Oracle Linux. Major operating system components, including the database, web server, and High Availability/Disaster Recovery packages have been updated or replaced by new industry-standard packages.

When upgrading from a version prior to 8.1.1, each appliance must be migrated to 8.9.0 and the Oracle Linux 7.5 operating system.

ScienceLogic strongly suggests that you contact Customer Support or your Customer Success Manager to plan your migration from CentOS (versions of SL1 prior to 8.1.1) to the latest release.

SL1 Releases Prior to 8.10.0

Please note that SL1 8.10.0 and later versions do not support "mixed-mode", where the Database Servers and Administration Portals are running Oracle Linux (SL1 versions 8.1.1 and later) and the Data Collectors and Message Collectors are running CentOS (SL1 version prior to 8.1.1). If your system uses "mixed-mode", you must reinstall the Data Collectors and Message Collectors with an SL1 ISO that matches the SL1 version running on the Database Servers or Administration Portals before upgrading to the current versions of SL1.

ScienceLogic strongly suggests that you contact Customer Support or your Customer Success Manager to plan your migration from mixed mode to SL1 versions 8.10.0 and later

Pre-Upgrade Best Practices

Before you upgrade, check the following:

- Before you install an SL1 upgrade, ScienceLogic recommends reviewing the hardware specifications of all the appliances in your system to ensure they meet the requirements for the current usage of your system. For more details about sizing and capacity for your specific environment, contact your Customer Success Manager and see <https://support.sciencelogic.com/s/system-requirements>.
- Before installing an SL1 upgrade, ScienceLogic recommends that you verify that recent backups are available for your system.
- Ensure that each SL1 appliance has a valid license.
- To apply updates to an existing Data Collector, that Data Collector must be a member of a Collector Group. In some SL1 systems, users might have to create a Collector Group for a single Data Collector.
- Ensure that each Data Collector is "available" to the Database Server. To check, see the **Collector Status** page (System > Monitor > Collector Status).

Backing Up Settings in the NextUI

To save any custom settings in the NextUI:

1. Login to the console of the Database Server or SSH to the Database Server.
2. Open a shell session.
3. Enter the following at the shell prompt:

```
cp /opt/em7/nextui/nextui.env /opt/em7/nextui/nextui.env.backup
```

Backing Up SSL Certificates

To back up your SSL Certificates:

1. Log in to the console of the Database Server or SSH to the Database Server.
2. Open a shell session.
3. Enter the following at the shell prompt:

```
cp /etc/nginx/siloss1.key /etc/nginx/siloss1.key.bak
cp /etc/nginx/siloss1.pem /etc/nginx/siloss1.pem.bak
```

4. Repeat these steps on each Database Server in your SL1 system.

Setting the Timeout for PhoneHome Watchdog

You can manually adjust the settings for the PhoneHome Watchdog server, to reduce CPU consumption during the upgrade process. To do this:

1. Log in to the console of the Data Collector as the root user or open an SSH session on the Data Collector.
2. At the command line, type the following:

```
phonehome watchdog view
```

3. You should see something like the following:

```
Current settings:
autosync: yes
interval: 20
state: enabled
autoreconnect: yes
timeoutcount: 2
check: default
```

4. Note the settings for **interval** and **timeoutcount**, so you can restore them after the upgrade.

5. To change the settings for SL1 upgrade, type the following at the command line:

```
sudo phonehome watchdog set interval=120;
sudo phonehome watchdog set timeoutcount=2;
systemctl stop em7_ph_watchdog;
systemctl start em7_ph_watchdog;
```

6. Repeat the steps in this section on each Data Collector.
7. Repeat the steps in this section on each Message Collector.
8. Repeat the steps in this section on each Database Server.

Adjusting the Timeout for Staging and Deploying

If you have slow connections between SL1 appliances, you can adjust the timeout values for staging and deploying upgrades.

SL1 8.14 and Later Releases

To do this on an SL1 system running 8.14.0 or later:

1. Log in to the console of the Database Server or SSH to the Database Server.
2. Open a shell session.
3. Enter the following at the shell prompt:

```
sudo pcli set-patcher-param staging_wait_time <timeout_in_seconds>
```

where:

<timeout_in_seconds> is the timeout value, in seconds, for staging for each SL1 appliance. The default value is 1800 seconds (30 minutes). You can increase this value for slow connections.

4. Enter the following at the shell prompt:

```
sudo pcli set-patcher-param deploy_wait_time <timeout_in_seconds>
```

where:

<timeout_in_seconds> is the timeout value, in seconds, for deploying to each SL1 appliance. The default value is 3600 seconds (1 hour). You can increase this value for slow connections

SL1 8.12 and Prior Releases

To do this on SL1 systems running versions prior to 8.14.0:

1. Log in to the console of the Database Server or SSH to the Database Server.
2. Open a shell session.

3. Enter the following at the shell prompt:

```
silo_mysql -e "UPDATE master.system_settings_patcher SET value=<timeout_in_seconds> WHERE param='staging_wait_time'"
```

where:

<timeout_in_seconds> is the timeout value, in seconds, for staging for each SL1 appliance. The default value is 1800 seconds (30 minutes). You can increase this value for slow connections.

4. Enter the following at the shell prompt:

```
silo_mysql -e "UPDATE master.system_settings_patcher SET value=<timeout_in_seconds> WHERE param='deploy_wait_time'"
```

where:

<timeout_in_seconds> is the timeout value, in seconds, for deploying to each SL1 appliance. The default value is 3600 seconds (1 hour). You can increase this value for slow connections.

Running the System Status Script Before Upgrading

SL1 includes a script, `system_status.sh`, that provides diagnostic data for each appliance in your SL1 system.


NOTE: On SL1 Systems prior to 10.2.0, after running the system status script, you must ensure that the file `/var/lob/em7/silo.log` has the owner and group "s-em7-core".

For more information about the features and benefits of the system status script, watch the video at https://www.youtube.com/watch?v=AHBTi_zj_iY.

Running the System Status Script on SL1 8.14.0 and Later Releases

If you are running SL1 version SL 8.14.0 or later, SL1 automatically runs the system status script every 15 minutes on each appliance in your SL1 system.

For SL1 systems running 8.14.0 or later, ScienceLogic recommends that you view the output from the system status script before upgrading:

1. In SL1, go to the **Appliance Manager** page (System > Settings > Appliances).
2. Locate the SL1 appliance that you want to view diagnostic information about.
3. Click on its magnifying-glass icon () to view the output of the system status script for that appliance.
4. If the output includes errors and you need help fixing them, contact ScienceLogic Customer Support to fix the errors before upgrading.
5. Repeat for each appliance in your SL1 system.
6. To get the very latest status before upgrading, *manually run the system status script* on each Database Server or All-In-One Appliance.

Running the System Status Script on SL1 8.12.x Releases

If you are running an SL1 version in the 8.12.x line of releases, SL1 includes the system status script already installed in the `/opt/em7/bin` directory. However, there is no user interface option in the **Appliance Manager** page (System > Settings > Appliances) until SL1 version 8.14.0.

Before upgrading from any 8.12.x or later version, ScienceLogic recommends that you manually run the system status script on each Database Server or All-In-One Appliance, to get the latest results.

To run the system status script on each SL1 appliance:

1. Either go to the console of the SL1 appliance or use SSH to access the SL1 appliance.
2. Open a shell session on the server.
3. Navigate to `/opt/em7/bin`:

```
cd /opt/em7/bin
```

4. At the shell prompt, enter the following:

```
sudo system_status.sh > /tmp/status
```

5. Enter the root password.
6. Navigate to `/tmp/status` to view the results.

```
cd /tmp  
cat status
```

7. If the output includes errors and you need help fixing them, contact ScienceLogic Customer Support to fix the errors before upgrading.
8. After fixing any errors and running the `system_status.sh` script again, check the ownership of `/var/log/em7/silo.log`:

```
ls -l /var/log/em7/silo.log
```

9. Ensure that the file has owner "s-em7-core" and "group s-em7-core":

```
chown s-em7-core:s-em7-core /var/log/em7/silo.log
```

NOTE: : SL1 Systems 10.2.0 and later will automatically reset the ownership of `/var/log/em7/silo.log` if necessary before upgrade.

10. Repeat these steps on each SL1 appliance in your SL1 system.

Running the System Status Script on SL1 8.10 and Prior Releases

If you are running an SL1 release prior to 8.12.0, you can download and run the system status script before upgrading. You should run this script on each SL1 appliance.

To download and run the `system_status.sh` script:

1. Go to https://docs.sciencelogic.com/system_status/system_status.sh to download the system status script. Save the file to a local computer.
2. Using WinSCP or another file-transfer utility, copy the file `system_status.sh` to a directory on the SL1 appliance.
3. Go to the console of the SL1 appliance or use SSH to access the SL1 appliance.
4. Navigate to the directory that includes the `system_status.sh` file.
5. Enter the following to make the script executable:

```
chmod +x system_status.sh
```
6. To execute the script with the default options:

```
sudo ./system_status.sh
```


7. You can use the help option to view all the options:

```
./system_status.sh --help
```

You should see something like this:

```
-l [--logcollect] = gather logs into a single file
-c [--crmreport] = create CRM report for HA/DR issues
-f [--fix] = fix mode (fix anything marked [fixable])
-m [--mysql-tuning] = a MySQL configuration tuning script (formerly known as
"Gold Changes")
-n [--no-upgrade] = Do not upgrade or prompt to upgrade, even if an upgrade is
available
-o [--outage] = outage investigator
-p [--ptstalk] = run pt-stalk
-h [--help] = help message (what you're reading now)
-u [--autoupdate] = if an update is available, upgrade without prompting
-v [--version] = show version number
```

Here is a sample output of the script run without options:

```
System Status v3.11
Tue Jul 17 15:39:43 UTC 2019
Using latest revision
Results marked with [KB #####] refer to a KB article number you can reference at
https://support.sciencelogic.com/s/article/#####
Database Specs:
SL1 Architecture: AIO
SL1 Specs:
SL1 Release: EM7 8.10.0 [build 1023]
ISO Release: 8.1.1
Managed Devices: 2 (2 active)
Managed Components: 0 (0 active)
Managed Interfaces: 14 (3 active)
OS Specs:
OS Release: Oracle Linux Server release 7.5
Hostname: ha2
Active IPs:
- 192.168.##.##/22
Licensed IP: 192.168.##.##
Appliance Model: AIO
Appliance Type: Virtual - VMware Virtual Platform
MySQL Version: 10.1.36
Number of Cores: 2
Total RAM: 6GB
Disk Size: 60GB
- Disk size below minimum for 2 active devices, should be a minimum of 80GB
/data.local/db size: 27G
5 Minute Load Avg: 2.74
Memory Utilization: 65%
Other Information:
Disabled Processes [KB 1277]:
- Enterprise Database: Asset Record Maintenance
- Enterprise Database: Subscription Usage Crunch
Checking for errors...
- Devlogging ON [KB 1049]
- More than three kernels installed. [KB 1294]
```

```
- DRBD active, but DRBD SNMP extensions for monitoring not found [KB 1278]
[fixable]
All Done!
```

8. If the output includes errors and you need help fixing them, contact ScienceLogic Customer Support to fix the errors before upgrading.

9. After fixing any errors and running the `system_status.sh` script again, check the ownership of `/var/log/em7/silo.log`:

```
ls -l /var/log/em7/silo.log
```

10. Ensure that the file has owner "s-em7-core" and "group s-em7-core":

```
chown s-em7-core:s-em7-core /var/log/em7/silo.log
```

NOTE: : SL1 Systems 10.2.0 and later will automatically reset the ownership of `/var/log/em7/silo.log` if necessary before upgrade.

11. Repeat these steps on each SL1 appliance in your SL1 system.

Upgrading the SL1 Distributed Architecture on SL1 Versions 8.5.0 and Earlier

To use the steps in this section, you must be running SL1 version 8.1.1 or later. If you are running a previous version, **ScienceLogic strongly suggests that you contact Customer Support or your Customer Success Manager to plan your migration from CentOS (versions of SL1 prior to 8.1.1) to the latest release.**

NOTE: The upgrade process might include importing multiple upgrade files. You must wait until an update file has imported successfully (i.e. the Import Status column displays Complete) before importing the next update file.

Any distributed system running 8.6.0 or later can be upgraded by importing, staging, and deploying a single update file. After you upgrade to 8.6.0, you can use the delta-less upgrade feature.

NOTE: The 8.4.2 release changed the firewall on all appliances from iptables to firewalld. If you have added a custom firewall rule, such as a non-standard port for Phone Home Collectors, these rules must be migrated before upgrading to an 8.4.2 or later release. Please contact ScienceLogic Support for more information.

Upgrading the Distributed Stack for SL1 includes the following steps:

- [Disabling automatic staging](#)
- [Downloading the Updates](#)

- [Importing the Updates](#)
- [Staging the Updates](#)
- [Running the Pre-Upgrade Check](#)
- [Putting All SL1 Appliances in Maintenance Mode](#)
- [Deploying the Update](#)
- [Putting All SL1 Appliances Out of Maintenance Mode](#)

CAUTION: SL1 versions 8.10.0 and later do not support Data Collectors and Message Collectors running the CentOS operating system. If your system includes Data Collectors and Message Collectors running the CentOS operating system, contact your Customer Success Manager for details on upgrading Data Collectors and Message Collectors to Oracle Linux before upgrading.

Disabling Automatic Staging

For systems running an SL1 version prior to 8.12.0, go to the **System Updates** page and disable automatic staging (System > Tools > Updates > Actions > Disable automatic staging).

If you have previously used manual staging, perform these additional steps:

1. Select all updates in the EM7 Releases pane and select all updates in the ScienceLogic OS pane.
2. In the **Select Action** menu, select *Unstage Update (remove staging policy override)*. Click **[Go]**.
3. For software that was previously staged with automatic staging, *Unstage Update (remove staging policy override)* does not affect staging.

Downloading the Updates

NOTE: These steps do not affect the performance of SL1. ScienceLogic recommends that you perform these steps at least 3 days before upgrading.

To download updates for previous SL1 software versions that have reached their End of Life date and are no longer supported by ScienceLogic, contact ScienceLogic Support or a designated Customer Success Manager to get the update files.

Store the update files in a location that you can use to upload files to the SL1 system

Importing the Updates

NOTE: These steps do not affect the performance of SL1. ScienceLogic recommends that you perform these steps at least 3 days before upgrading.

If your system is not currently running a recent release, the upgrade process includes importing multiple update files. You must wait until an update file has imported successfully (i.e. the **Import Status** column displays *Complete* in both the **EM7 Releases** pane and the **ScienceLogic OS** pane) before importing the next update file.

Although you must import all the update files between your current release and SL1 8.6.0, you must stage only the final update.

To import an update:

1. Go to the **System Updates** page (System > Tools > Updates)

System Updates									
Installation mode: [Upgrade only]									
Actions: Import Reset Guide									
EM7 Releases Versions Found [2]									
Release Version	Update Signature	Imported On	Imported By	Import Status	Stage Status	Deployment	Deployment Status	Deployment Status Date	
1. EM7 8.2.0 jenkins_EM7_03_8.2.0_r4269	ScienceLogic Internal QA Build	2016-12-04 16:39:35	em7admin	Missing Key	N/A	--	New/Unscheduled	--	
2. EM7 8.2.0	Base installation	2016-11-14 16:43:54	em7admin	Complete	N/A	Full (1/1)	New/Unscheduled	--	
ScienceLogic OS Updates Found [2]									
Release Version	Update Signature	Imported On	Imported By	Import Status	Stage Status	Deployment	Deployment Status	Deployment Status Date	
1. Platform 2016-12-01	ScienceLogic Internal QA Build	2016-12-04 16:39:35	em7admin	Missing Key	N/A	--	New/Unscheduled	--	
2. Platform 2016-11-11	Base installation	2016-11-14 16:43:54	em7admin	Complete	N/A	Outdated	New/Unscheduled	--	

2. Select the **[Import]** button.
3. In the **Import a new update** modal page, navigate to the software file for the update and select it. Select the **[Import]** button.
4. The **Import Status** column displays the status of the import. Possible values are:
 - *Processing*. Software update is currently being imported by the SL1 system.
 - *Complete*. Software update has been imported successfully.
 - *Failed*. Import has failed due to an unexpected condition. Contact ScienceLogic Support for assistance.
 - *Missing Base*. The SL1 system cannot import this software update until another software package has been imported. Check the log for a message stating which software package needs to be imported.
5. The update file will load an update in both the **EM7 Releases** pane and the **ScienceLogic OS** pane. You must wait until the update file has imported successfully (i.e. the **Import Status** column displays *Complete*) before importing the next update file.
6. For more detailed information about importing, in the **Import Status** column, select the log icon (📄).
7. Repeat these steps for each update file between your current version and 8.6.0

Staging the Update

NOTE: These steps do not affect the performance of SL1. ScienceLogic recommends that you perform these steps at least 3 days before upgrading.

When you manually stage a software update, SL1 checks the status of the software on each SL1 appliance. The platform then stages the software update only to those SL1 appliances that have not yet been staged for this software update.


You must stage only the latest update. For example, if you downloaded updates for 8.4.0, 8.5.0, and 8.6.0, you must stage only the update for 8.6.0.

To manually stage a software update:

1. Go to the **System Updates** page (System > Tools > Updates)

System Updates									
Installation mode: [Upgrade only]									
Actions Import Reset Guide									
EM7 Releases Versions Found [2]									
Release Version	Update Signature	Imported On	Imported By	Import Status	Staging Status	Deployment	Deployment Status	Deployment Status Date	
1. EM7 8.2.0 jenkins_EM7_03_8.2.0 (4269)	ScienceLogic Internal QA Build	2016-12-04 16:39:35	em7admin	Missing Key	N/A	--	New/Unscheduled	--	
2. EM7 8.2.0	Base installation	2016-11-14 16:43:54	em7admin	Complete	N/A	Full (1/1)	New/Unscheduled	--	
ScienceLogic OS Updates Found [2]									
Release Version	Update Signature	Imported On	Imported By	Import Status	Staging Status	Deployment	Deployment Status	Deployment Status Date	
1. Platform 2016-12-01	ScienceLogic Internal QA Build	2016-12-04 16:39:35	em7admin	Missing Key	N/A	--	New/Unscheduled	--	
2. Platform 2016-11-11	Base installation	2016-11-14 16:43:54	em7admin	Complete	N/A	Outdated	New/Unscheduled	--	

2. In the **EM7 Releases** pane, find the software update for EM7 8.6.0. Select its checkbox.
3. In the **ScienceLogic OS** pane, find the latest OS update. Select its checkbox.
4. In the **Select Actions** field in the lower right, select *Stage Update (prepare for installation)*. Click the **[Go]** button.
5. The **Staging Status** column displays the status of the staging process. Possible values are:
 - -- Software is not currently being staged, but one or more SL1 appliances can install it.
 - N/A. This update cannot be installed in the current Installation mode.

- *Obsolete*. The current update is not the latest or has already been installed. If the Installation Mode is set to Upgrade Only, you cannot install an obsolete update.
 - *Failed*. An unexpected error occurred in the staging process. Contact ScienceLogic Support.
 - *In progress*. Staging is in progress but has not completed.
 - *Complete*. Staging has completed and all appliances are ready to deploy the software.
6. For more detailed information about staging, in the **Staging Status** column, select the log icon ().
 7. SL1 will copy the software update to each SL1 appliance that has not yet been staged.

Running the Pre-Upgrade Check

NOTE: These steps do not affect the performance of SL1. ScienceLogic recommends that you perform these steps at least 3 days before upgrading.

The pre-upgrade check examines the following:

All SL1 Appliances:

The pre-upgrade-checkv2.sh script checks the following on all SL1 appliances:

- Hostname and hosts file
- Uptime and average CPU load
- SL1 version
- OS versions
- MariaDB version
- Current disk utilization
- Is post update running?
- Checks yum config for configured proxy
- Check for packages installed outside of official SL1 update
- Filters out unsupported appliance types
- Gathers system status

Active Database Server:

The pre-upgrade-checkv2.sh script checks the following on all active Database Servers:

- Identifies Data Collectors that are not members of a Collector Group
- Lists all active SL1 appliances
- Lists all SL1 appliances that are disabled or ineligible for upgrade
- Checks for active staging schedules

- Check for active deployment schedules
- Are backups configured and successful?
- Checks pruner status
- Checks SIGTERMs for past 24 hours
- Compares number of tables on disk to the table definition cache
- Lists the largest 10 databases by size
- Searches for long running queries
- Shows status of used mysql connections and variables
- Lists mysql config files
- Gathers pt-diststats at 15 second interval three times
- Checks for system status wrapper bug
- Ensure that silo.log ownership is correct

All Database Servers:

The pre-upgrade-checkv2.sh script checks the following on all Database Servers:

- Checks for a minimum of 300 MB disk space on /var partition
- Checks HA/DR status
- Checks for CRM bans
- Checks for old CRM templates in HA/DR setups
- Fixes the missing SysVinit script for the MariaDB service
- Are custom SSL certs named silo default?
- Gathers output of top
- Is this SL1 Appliance memory swapping?

Administration Portal:

The pre-upgrade-checkv2.sh script checks the following on all Administration Portals:

- Checks web processes
- Are custom SSL certs named silo default?

Data Collectors and Message Collectors:

The pre-upgrade-checkv2.sh script checks the following on all active Data Collectors and Message Collectors

- Checks running Python processes

Downloading and Running the Pre-Upgrade Check

To download and run the pre-upgrade check:

1. Contact ScienceLogic Customer Support to get the file. Save the file to a local computer.
2. Use WinSCP or another file-transfer utility to copy the file `pre-upgrade-check-v2.sh` to the directory `/home/em7admin` of each SL1 appliance.
3. Go to the console of each SL1 appliance or open a SSH session to each SL1 appliance.
4. Navigate to the directory `/home/em7admin`.
5. At the shell prompt, enter the following to make the script executable:

```
chmod +x pre-upgrade-check-v2.sh
```

6. To execute the script with the default options:

```
sudo ./pre-upgrade-check-v2.sh -<appliance_type> > /tmp/preupgrade-check-v2-  
`hostname -s`. `date "+%Y%m%d" ` 2>&1
```

where:

appliance_type is one of the following:

- -d = Database Appliance
- -o = All-In-One
- -c = Data Collector
- -m = Message Collector
- -a = Admin Portal

7. To view the output from the script, view the file `/tmp/pre-upgrade-check-v2-<current hostname>.<today's date>`
8. If the output includes errors and you need help fixing them, contact ScienceLogic Customer Support to fix the errors before upgrading.
9. Perform these steps on each SL1 appliance.

Putting All SL1 Appliances into Maintenance Mode

NOTE: ScienceLogic recommends that you perform these steps during a maintenance window.

Immediately before deploying a software update, ScienceLogic recommends that you put all SL1 appliances in maintenance mode. This will prevent spurious error messages and events during the deployment.

To enable user maintenance mode for all the SL1 appliances in your SL1 system:

1. Go to the Appliance Manager page (System > Settings > Appliances). Note the list of SL1 appliances in your system.
2. Go to the **Device Manager** page (Registry > Devices > Device Manager):

Device Manager Devices Found (176)										Actions	Report	Reset	Guide	
Device Name	IP Address	Device Category	Device Class / Subclass	OID	Organization	Current State	Collection State	Collection State	SNMP Credential	SNMP Version				
1. 10-Forward	10.20.0.195	Servers	NET-SNMP FreeBSD	54	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
2. 10.20.0.108	10.20.0.108	Network Router	Cisco Systems 2501	72	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
3. 10.20.0.123	10.20.0.123	Network Router	Cisco Systems 7206VXR	112	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2					
4. 10.20.0.13	10.20.0.13	Unknown	Generic SNMP	107	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
5. 10.20.0.135	10.20.0.135	Network Switches Cisco Systems	Catalyst 3560G-XL	131	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
6. 10.20.0.141	10.20.0.141	Network Switches Cisco Systems	Catalyst WS-C6509-CatOS	110	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
7. 10.20.0.146	10.20.0.146	Network Broadbar Netopia	Netopia 3346 v8.2f1	2	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
8. 10.20.0.147	10.20.0.147	Network Broadbar Netopia	Netopia 3381 v8.0.10	175	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
9. 10.20.0.148	10.20.0.148	Network Broadbar Netopia	Netopia (R)3100, R450x, R700x, R9	163	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
10. 10.20.0.149	10.20.0.149	Network Broadbar Netopia	RT220CT	162	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
11. 10.20.0.151	10.20.0.151	Unknown	Generic SNMP	141	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
12. 10.20.0.160	10.20.0.160	Unknown	Generic SNMP	165	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
13. 10.20.0.163	10.20.0.163	Unknown	Generic SNMP	164	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
14. 10.20.0.175	10.20.0.175	Unknown	Generic SNMP	44	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
15. 10.20.0.176	10.20.0.176	Unknown	Konica Corporation OEM	41	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2					
16. 10.20.0.190	10.20.0.190	Unknown	Generic SNMP	56	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2					
17. 10.20.0.191	10.20.0.191	Office Printers	Konica Minolta Fiery X3e 22C-KM	57	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2					
18. 10.20.0.201	10.20.0.201	Unknown	Generic SNMP	48	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
19. 10.20.0.208	10.20.0.208	Unknown	Generic SNMP	52	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
20. 10.20.0.209	10.20.0.209	Telephony	Quantum Tenor	53	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
21. 10.20.0.222	10.20.0.222	Unknown	Generic SNMP	138	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
22. 10.20.0.26	10.20.0.26	Unknown	Generic SNMP	171	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
23. 10.20.0.52	10.20.0.52	Unknown	ASKEY Computer Corp. OEM	6	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
24. 10.20.0.59	10.20.0.59	Unknown	Generic SNMP	3	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
25. 10.20.0.61	10.20.0.61	Unknown	Generic SNMP	84	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					

- In the **Device Manager** page, select the checkbox for each SL1 appliance in your SL1 system. This includes both primary and secondary Database Servers.
- In the **Select Action** drop-down list, select the following:
 - Change User Maintenance Mode: Enabled without Collection*. This option puts the selected devices into user maintenance mode with collection disabled. The devices will remain in this state until you or another user disables user maintenance mode.
- Click the **[Go]** button.

Deploying the Update

NOTE: ScienceLogic recommends that you perform these steps during a maintenance window.

When you deploy a software update, SL1 checks the status of the software on each SL1 appliance. SL1 can deploy the software update to those SL1 appliances that have been successfully staged.

If SL1 is still staging the software update when you select the lightning bolt icon (⚡), SL1 will wait until staging has completed before deploying the updates to each SL1 appliance.

You must deploy only the latest update. For example, if you downloaded updates for 8.4.0, 8.5.0, and 8.6.0, you must deploy only the update for 8.6.0.

To deploy a software update:

1. Go to the **System Updates** page (System > Tools > Updates)

System Updates									
Installation mode: [Upgrade only]									
Actions Import Reset Guide									
EM7 Releases Versions Found [2]									
Release Version	Update Signature	Imported On	Imported By	Import Status	Staging Status	Deployment	Deployment Status	Deployment Status Date	
1. EM7 8.2.0 jenkins_EM7_G3_8.2.0 r4269	ScienceLogic Internal QA Build	2016-12-04 16:39:35	em7admin	Missing Key	N/A	--	New/Unscheduled	--	
2. EM7 8.2.0	Base installation	2016-11-14 16:43:54	em7admin	Complete	N/A	Full (1/1)	New/Unscheduled	--	
ScienceLogic OS Updates Found [2]									
Release Version	Update Signature	Imported On	Imported By	Import Status	Staging Status	Deployment	Deployment Status	Deployment Status Date	
1. Platform 2016-12-01	ScienceLogic Internal QA Build	2016-12-04 16:39:35	em7admin	Missing Key	N/A	--	New/Unscheduled	--	
2. Platform 2016-11-11	Base installation	2016-11-14 16:43:54	em7admin	Complete	N/A	Outdated	New/Unscheduled	--	

2. Ensure that the software update for EM7 8.6.0 has a **Staging Status** of *Complete*.
3. In the **EM7 Releases** pane, find the software update for EM7 8.6.0 . Select its lightning bolt icon (⚡).
4. In the **ScienceLogic OS** pane, find the latest OS update. Select its lightning bolt icon (⚡).
5. The software update will be deployed to those SL1 appliances in your system that have been successfully staged.
6. The **Deployment Status** column displays the status of the deployment. Possible values are:
 - *Full*. Software was fully deployed to all SL1 appliances.
 - *Partial*. Software was deployed to some but not all SL1 appliances.
 - *Outdated*. Software is not the latest version. A later version has been deployed.
 - *--*. Software has not been deployed on any SL1 appliances.
7. For more detailed information about deployment, in the **Deployment Status** column, select the log icon (📄).
8. SL1 will install the software update on each SL1 appliance .

Taking All SL1 Appliances Out of Maintenance Mode

To disable user maintenance mode for all the SL1 appliances in your SL1 system:

1. Go to the **Appliance Manager** page. Note the list of SL1 appliances in your system.
2. Go to the **Device Manager** page (Registry > Devices > Device Manager):

Device Manager Devices Found (176)										Actions	Report	Reset	Guide	
Device Name	IP Address	Device Category	Device Class / Subclass	OID	Organization	Current State	Collection Group	Collection State	SNMP Credential	SNMP Version				
1. 10-Forward	10.20.0.195	Servers	NET-SNMP FreeBSD	54	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
2. 10.20.0.108	10.20.0.108	Network Router	Cisco Systems 2501	72	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
3. 10.20.0.123	10.20.0.123	Network Router	Cisco Systems 7206VXR	112	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2					
4. 10.20.0.13	10.20.0.13	Unknown	Generic SNMP	107	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
5. 10.20.0.135	10.20.0.135	Network Switches Cisco Systems	Catalyst 3560G-XL	131	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
6. 10.20.0.141	10.20.0.141	Network Switches Cisco Systems	Catalyst WS-C6509-CatOS	110	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
7. 10.20.0.146	10.20.0.146	Network Broadbat Netopia	Netopia 3346 v8.2f1	2	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
8. 10.20.0.147	10.20.0.147	Network Broadbat Netopia	Netopia 3381 v8.0.10	175	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
9. 10.20.0.148	10.20.0.148	Network Broadbat Netopia	Netopia (R)100, R450x, R70x0, R9	163	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
10. 10.20.0.149	10.20.0.149	Network Broadbat Netopia	Netopia R720C-T	162	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
11. 10.20.0.151	10.20.0.151	Unknown	Generic SNMP	141	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
12. 10.20.0.160	10.20.0.160	Unknown	Generic SNMP	165	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
13. 10.20.0.163	10.20.0.163	Unknown	Generic SNMP	164	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
14. 10.20.0.175	10.20.0.175	Unknown	Generic SNMP	44	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
15. 10.20.0.176	10.20.0.176	Unknown	Konica Corporation OEM	41	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2					
16. 10.20.0.190	10.20.0.190	Unknown	Generic SNMP	56	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2					
17. 10.20.0.191	10.20.0.191	Office Printers	Konica Minolta Fiery X3e 22C-KM	57	System	Minor	CUG1	Active	Cisco SNMPv2 - Exa V2					
18. 10.20.0.201	10.20.0.201	Unknown	Generic SNMP	48	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
19. 10.20.0.208	10.20.0.208	Unknown	Generic SNMP	52	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
20. 10.20.0.209	10.20.0.209	Telephony	Quantum Tenor	53	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
21. 10.20.0.222	10.20.0.222	Unknown	Generic SNMP	138	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
22. 10.20.0.26	10.20.0.26	Unknown	Generic SNMP	171	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
23. 10.20.0.52	10.20.0.52	Unknown	ASKEY Computer Corp. OEM	6	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
24. 10.20.0.59	10.20.0.59	Unknown	Generic SNMP	3	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					
25. 10.20.0.61	10.20.0.61	Unknown	Generic SNMP	84	System	Healthy	CUG1	Active	Cisco SNMPv2 - Exa V2					

- In the **Device Manager** page, select the checkbox for each SL1 appliance in your SL1 system.
- In the **Select Action** drop-down list, select the following:
 - Change User Maintenance Mode: Disabled*. This option disables user maintenance mode for the selected devices.
- Click the **[Go]** button.

Performing Deltaless Upgrades

After performing the steps to upgrade to SL1 8.6.0, continue to the [Upgrading the SL1 Distributed Architecture on SL1 versions 8.6.0 and Later](#) to upgrade to the latest SL1 release.

Upgrading the SL1 Distributed Architecture on SL1 versions 8.6.0 and Later

As of 8.12.0, SL1 uses an improved System Updates tool (System > Tools > Updates).

Version 8.12.1.3 introduced delta-less upgrades, meaning that you can import a single file and upgrade to the latest version. Delta-less upgrades can upgrade the SL1 system from any SL1 release 8.6.0 or later to the current release, using only a single update.

NOTE: You must be running SL1 8.6.0 or later to use delta-less updates.

NOTE: Ensure that the each SL1 appliance has 3GB of free space in the /var partition to allow you stage the upgrade. Ensure that each SL1 appliance has 1GB of free space in / (the root partition) to allow you to deploy the upgrade.

Any distributed system running 8.6.0 or later can be upgraded by importing, staging, and deploying a single update file.

Upgrading the Distributed Stack for SL1 includes the following steps:

- For systems prior to 8.12.0, [disabling automatic staging](#)
- [Downloading the Update](#)
- [Importing the Update](#)
- [Staging the Update](#)
- [Monitoring Staging](#)
- [Running the Pre-Upgrade Check](#)
- [Putting All SL1 Appliances in Maintenance Mode](#)
- [Deploying the Update](#)
- [Monitoring Deployment](#)
- [Putting All SL1 Appliances Out of Maintenance Mode](#)

Special Steps for SL1 8.12.0 and Earlier

For systems running an SL1 version prior to 8.12.0, go to the **System Updates** page and disable automatic staging (System > Tools > Updates > Actions > Disable automatic staging).

If you have previously used manual staging, perform these additional steps:

1. Select all updates in the EM7 Releases pane and select all updates in the ScienceLogic OS pane.
2. In the **Select Action** menu, select *Unstage Update (remove staging policy override)*. Click **[Go]**.
3. For software that was previously staged with automatic staging, *Unstage Update (remove staging policy override)* does not affect staging.

Downloading the Update

NOTE: To download updates for previous SL1 system software versions that have reached their End of Life date and are no longer supported by ScienceLogic, contact ScienceLogic Support or a designated Customer Success Manager to get the update files.

Before you can load a patch or update onto your instance of the SL1 system, you must first download the patch or update to your local computer.

NOTE: The following steps do not affect the performance of the SL1 system. ScienceLogic recommends that you perform these steps at least 3 days before upgrading.

To download the patch or update:

1. Log in to <https://support.sciencelogic.com>. Use your ScienceLogic customer account and password to access this site.
2. Select the [**Product Downloads**] button, select the **Product Downloads** menu, and choose *Platform*.
3. Find the release you are interested in and click its name.

Release Version
SL1 Big Ben 8.12.0

Edit Delete

Release Version Name SL1 Big Ben 8.12.0	Version 8.12.0
End of Maintenance 10/31/2020	End of Life 4/30/2021
Online Documentation	Allow Customers to View on Community <input type="checkbox"/>
Number of Files 2	

Release Files (2) New

FILE NAME	COMMENTS	RECORD TYPE	RELEASE DATE
8.12.0	System running 8.10.0+ or System has 8.10.0 siloupdat...	Product Update	4/24/2019
8.12.0		Image	4/24/2019

View All

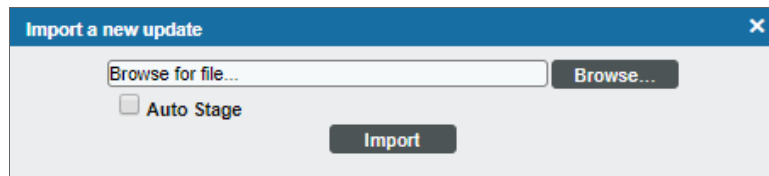
4. In the **Release Version** article, click on the link for the release image or release patch you want to download. Scroll to the bottom of the page.
5. Under **Files**, select the link for the file you want to download. The file is then downloaded to your local computer.

Importing the Update

To import a product update on to your SL1 system:

NOTE: These steps do not affect the performance of the SL1 system. ScienceLogic recommends that you perform these steps at least 3 days before upgrading.

1. Make sure that you can navigate to the patch file.
2. In the SL1 system, go to the **System Updates** page (System > Tools > Updates).
3. In the **System Updates** page, click the **[Import]** button.



4. In the **Import a new update** modal page, browse to the product update file and select it.
 - If you select the **Auto Stage** button, the SL1 system will begin staging as soon as the import is completed.
 - If you do not select the **Auto Stage** button, you must click the staging button (▶) after import is completed. You can do so at any time after import has completed.
 - For more information on automatic staging and manual staging, see the section on "Staging" in the **System Administration** manual.
5. Click the **[Import]** button.
6. In the **System Updates** page, the *Import Status* column can have one of the following statuses:
 - *In Progress*. Software is currently being imported by the SL1 system.
 - *Complete*. Software has been imported successfully.
 - *Failed*. Software import has failed due to an unexpected condition. Contact ScienceLogic Support for assistance.
 - *Missing Base*. The SL1 system cannot import this software until another software package has been imported. The dependency is for compression purposes. Check the log for a message stating which software package needs to be imported.
7. The update file or patch file is imported to SL1 system and appears in the **System Updates** page.

NOTE: For details on the import process, go to the **System Updates** page, find the entry for the software you are interested in, go to its **Import Status** column, and click the log icon (📄).

Staging the Update

After you import a software update to your SL1 system, you must **stage** the software update. During staging, the SL1 system copies the software update to each SL1 appliance. Staging allows SL1 to simultaneously apply the software changes to each SL1 appliance, regardless of the speed of the connection to each SL1 appliance. The SL1 system stages updates per import. You can choose to automatically stage imports or manually stage import.

For easiest troubleshooting, ScienceLogic recommends that you manually stage imports.

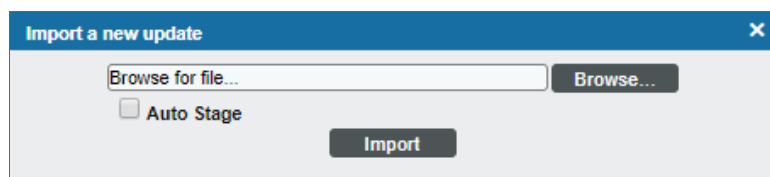
NOTE: These steps do not affect the performance of the SL1 system. ScienceLogic recommends that you perform these steps at least 3 days before upgrading.

After the software update is imported and staged, you can deploy the software.

Automatic Staging

To enable automatic staging:

1. In SL1, go to the **System Updates** page (System > Tools > Updates).
2. In the **System Updates** page, click the **[Import]** button.



3. In the **Import a new update** modal page, browse to the product update file and select it.
 - If you select the **Auto Stage** button, the SL1 system will begin staging as soon as the import is completed.
4. After import, in the **System Updates** page, the *Staging Status* column will display the number of ScienceLogic appliances that have been successfully stage compared to the total number of ScienceLogic appliances.

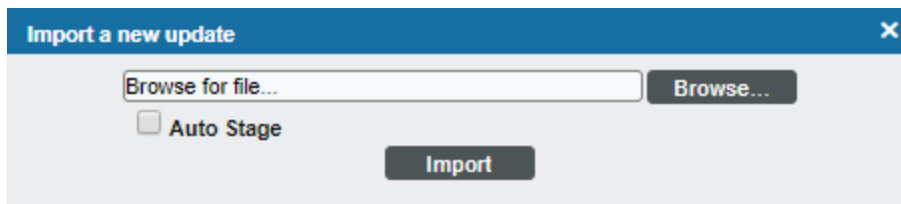
NOTE: For details on the staging process, go to the **System Updates** page, find the entry for the software you are interested in, go to its **Staging Status** column, and click the log icon (📄).

5. The *Staging Status* column can have one of the following statuses:

- --. No staging request is active and software has not been staged on any SL1 appliances.
- *Scheduled*. The SL1 system is aware of the staging request and is preparing for staging.
- *In Progress*. Staging is in progress but has not completed. The page displays the percentage complete as staging progresses.
- *Complete*. Staging has completed, and all appliances are ready to deploy the software.
- *Incomplete*. Staging has completed, and one or more appliances are ready to deploy the software.
- *Canceled*. User manually canceled the staging process.
- *Outdated*. The current update is not the latest or has already been installed.
- *Failed*. An unexpected error occurred in the staging process. Contact ScienceLogic Support.

To disable automatic staging:

1. In SL1, go to the **System Updates** page (System > Tools > Updates).
2. In the **System Updates** page, click the **[Import]** button.



3. In the **Import a new update** modal page, browse to the product update file and select it.
 - If you **do not select** the **Auto Stage** button, you must click the staging button (▶) after import is completed. You can do so at any time after import has completed.

NOTE: For details on the staging process, go to the **System Updates** page, find the entry for the software you are interested in, go to its **Staging Status** column, and click the log icon (📄).

Manually Staging an Update

You can manually stage a software update to one or more SL1 appliances.

For example, you can manually stage a software update:

- If you imported an update but do not want to stage it immediately.
- If you add another ScienceLogic appliance to your SL1 system and need to apply software updates.
- If staging failed on one or more ScienceLogic appliances.
- If you want to ensure that a previous staging process was successful.

When you manually stage a software update, SL1 checks the status of the software updated on each ScienceLogic appliance. SL1 then stages the software update **only to those SL1 appliances that have not yet been staged** for this software update.

To manually stage a software update:

1. In SL1, go to the **System Updates** page (System > Tools > Updates).

EM7 Releases Versions Found [2]	OS Version	Update Signature	Imported On	Imported By	Import Status	Staging Status	Deployment Status	Deployment Status Date
1. EM7 8.12.0	Platform 2019-04-09	ScienceLogic Official Release	2019-04-19 05:13:55	em7admin	Complete	Complete (4/4)	Complete (4/4)	2019-04-19 09:44:10
2. EM7 8.10.0	Platform 2018-11-27	Base installation	2018-12-17 23:42:02	em7admin	Complete	Outdated	Outdated	2019-04-19 09:15:45

2. In the **System Updates** page, find the software update you want to stage. Select its staging icon (👉).
3. The software update will be copied to each ScienceLogic appliance that has not yet been staged.
4. The *Staging Status* column will display the number of ScienceLogic appliances that have been successfully stage compared to the total number of ScienceLogic appliances.

NOTE: For details on the staging process, go to the **System Updates** page, find the entry for the software you are interested in, go to its **Staging Status** column, and click the log icon (📄).

5. The *Staging Status* column can have one of the following statuses:
 - --. No staging request is active and software has not been staged on any SL1 appliances.
 - *Scheduled*. The SL1 system is aware of the staging request and is preparing for staging.

- *In Progress*. Staging is in progress but has not completed.
- *Complete*. Staging has completed, and all appliances are ready to deploy the software.
- *Incomplete*. Staging has completed, and one or more appliances are ready to deploy the software.
- *Canceled*. User manually canceled the staging process.
- *Outdated*. The current update is not the latest or has already been installed.
- *Failed*. An unexpected error occurred in the staging process. Contact ScienceLogic Support.

Monitoring Staging

For SL1 versions 8.12.0 and later, you can monitor staging. To do so:

1. Either go to the console of the Database Server or use SSH to access the Database Server.
2. Enter the following at the shell prompt:

```
monitor_stage
```

3. You should see something like the following image:

```
Every 1.0s: bash -c monitor_stage Thu Apr 25 22:08:30 2019

#####
##          Monitor Staging Process for  DB          ##
#####

System Update Vitals
=====
| Service Name | Status | RunTime | HealthCheck |
=====
| em7_patch_manager | active(running) | 3days | Good |
| silouupdate-spool | active(running) | 3days | Good |
| silouupdate-pkgserver | active(running) | 3days | Good |
| mariadb | active(running) | 3days | Good |
| Disk Availability | - | - | Good |
=====

Staging Process Stats
Staging Schedule ID : 2
Staging Status : Completed
Number of Staging processes : 0
Patch Hook Completion Summary : [Total = 201, Installed = 201, Failed = 0]
Staging Started at : 2019-04-22 19:49:52
Staging Completed at : 2019-04-22 20:52:42
Staging Run Time : 01:02:50
Staging Summary : [Eligible=202, Complete=202, Failed=0, TimedOut=0]
 \ Completed mid(s) : [978,1,523,23,6,51,1031,46,14,563,955,518,537,1024,548,940,2,34,22,553,513,528,
533,39,541,7,24,56,64,582,573,588,109,73,598,606,88,99,103,72,633,622,80,613,856,114,599,113,578,60,92,617,122,638,
643,647,139,140,672,662,154,158,134,671,148,166,177,123,173,683,657,693,165,891,653,667,684,185,189,703,716,709,217
,210,200,199,227,195,241,727,216,736,237,732,723,228,708,744,737,757,246,1014,763,252,257,262,771,782,267,273,813,8
99,293,778,804,788,792,803,301,279,278,796,294,277,904,818,307,311,824,322,965,825,823,844,343,861,568,848,356,838,
875,361,330,366,371,626,334,860,339,344,862,887,378,377,387,391,558,392,402,920,916,930,416,410,433,944,906,905,753
,428,422,438,403,948,995,447,443,961,453,463,697,452,464,972,982,477,979,981,592,484,980,473,934,483,1000,764,498,1
015,502,999,508,491]

Press CTRL-C to exit
```

- **System Update Vitals.** Displays the current status of the services that are required for System Update.
- **Staging Process Stats.** Displays status of staging on all SL1 appliances.

Running the Pre-Upgrade Check for SL1 10.1 and Later

After importing and staging an update, you can run a pre-upgrade check before deploying. The pre-upgrade check will ensure that all criteria are met before deploying.

NOTE: These steps do not affect the performance of SL1. ScienceLogic recommends that you perform these steps at least 3 days before upgrading.

The pre-upgrade check examines the following:


- Is each SL1 Appliance eligible to be updated?
- Are updates enable on each SL1 Appliance?
- Are any of the SL1 Appliances running CentOS 5?
- Is this hostfile on each SL1 Appliance correctly configured?
- Is each Data Collector and Message Collector in a Collector Group?
- Is there enough free space on the disk to perform the upgrade?
- Is the RPM database corrupted?
- Are the RPM packages corrupted?
- Does the patch hook directory have the correct owner assigned?
- Detect out-of-date CRM templates on High Availability and Disaster Recovery systems
- If /etc/init.d/mysql does not exist, creates the file
- Skips SL1 appliances that have been deleted since the last upgrade

Running the Pre-Upgrade Check

To run a pre-upgrade check:

1. Go to the **System Updates** page (System > Tools > Updates).

EM7 Releases	OS Version	Update Signature	Imported On	Imported By	Import Status	Staging Status	Preupgrade Status	Deployment Status	Deployment Status Date
1. EM7 10.1.0	Platform: 2020-05-01	Base installation	2020-06-25 15:46:01	em7admin	Complete	Complete (18/18)	--	Complete (18/18)	2020-06-25 22:59:53

2. Find the upgrade that you want to deploy.
3. Click the purple checkmark at the end of the row. The pre-upgrade check will run.
4. If a pre-upgrade criterion fails, the **[Deploy]** button will be disabled for the selected row.
5. To view the output from the pre-upgrade check, click on the on the magnifying-glass icon () in the selected row.
6. If the pre-upgrade check finds a failure, see the list below for possible causes.
7. Fix all failures before deploying the update.

CentOS 5 Failure

CentOS 5 is no longer supported by System Update. If one or more Data Collectors are running CentOS5, the pre-upgrade check will fail. Contact your Customer Success Manager to determine how to upgrade your Data Collectors.

Collector Group Membership

This test checks that each Data Collector and Message Collector is a member of a Collector Group.

If a Data Collector or Message Collector is not a member of a Collector Group, the pre-upgrade test will define the appliance as "not eligible for patching."

To fix this error, add the Data Collector or Message Collector to a Collector Group.

Eligibility Failure

The most common reasons for eligibility failure are:

- The SL1 appliance is not licensed or the license has expired
- The SL1 appliance cannot be reached over the network
- The Data Collector has failed over
- The SL1 appliance is not configured
- The Data Collector is waiting to be returned to service
- The Data Collector is not assigned to a Collector Group

Enabled Failure

By default, all SL1 appliances are enabled for patching.

However, if you have used a command-line tool to exclude an SL1 appliance from updates, the pre-upgrade check will fail. To fix this error, include the SL1 appliance for updates.

Free Disk-Space Failure

This test checks the root partition and requires 1 GB of free disk space. If the root partition does not have 1 GB of free disk space, the pre-upgrade check will fail.

If the root partition does not have 1 GB of free disk space, you must archive or delete files that are no longer required or add a new empty disk and resize the filesystem.

Host File Failure

This test validates the `/etc/hosts` file for the presence of an IPv6 entry for localhost, which is required by System Update.

If `/etc/hosts` does not include an IPv6 entry for localhost, the pre-upgrade test automatically adds the required entry.

Check for following in case of failure:

- The `/etc/hosts` file exists
- The `/etc/hosts` can be edited by root

Patch-Hook Ownership Failure

If the owner of the patch hook directory (`/var/lib/em7/patch_hook`) is incorrect, the pre-upgrade test automatically fixes the ownership. However, if this error occurs, check for the following:

- The patch hook directory (`/var/lib/em7/patch_hook`) does not exist
- The `s-em7-core` user or the `s-em7-core` group does not exist

RPM Database Failure

If the RPM database fails the pre-upgrade test, the RPM database is corrupted.

Follow these steps on this page to recover the RPM database:

1. Either go to the console of the Database Server or use SSH to access the Database Server. Log in with the credentials you defined when you installed the Database Server.
2. At the shell prompt, enter the following:

```
mkdir -p /tmp/rpm.bak
cp /var/lib/rpm/* /tmp/rpm.bak
rm -f /var/lib/rpm/__.db*
rpm --rebuilddb -vv
rpm -q kernel
```

3. If the last command returns a value, you can delete the backup directory using the following command.

```
rm -Rf /tmp/rpm.bak
```

RPM Package Failure

If one or more RPM packages failed the pre-upgrade test, possible causes are:

- Packages are not staged, and hence some files are missing. This can be caused due to a failed staging or a timeout during staging. You can try to stage again. You can also [adjust the timeout for staging](#).
- Duplicate packages
- Conflicting packages
- Unmet dependencies

Duplicate Packages:

1. Either go to the console of the Database Server or use SSH to access the Database Server. Log in with the credentials you defined when you installed the Database Server.

2. At the shell prompt, enter the following command:

```
sudo package-cleanup --dupes
```

3. If there are duplicate packages, use the following command to remove them:

```
sudo package-cleanup --cleandupes --removenewestdupes
```

Conflicting Packages

1. Look for conflicting packages in the staging log

2. Verify that the package is a part of SL1 ISO or patch bundle

3. If the package is not part of the SL1 ISO or patch bundle, uninstall the package.

Unmet dependencies

You'll have to reset the staging status of the appliance and stage it again. Contact ScienceLogic Customer Success for help in resetting the staging status.

Running the Pre-Upgrade Check for SL1 8.14 and Earlier

NOTE: These steps do not affect the performance of SL1. ScienceLogic recommends that you perform these steps at least 3 days before upgrading.

The pre-upgrade check examines the following:

All SL1 Appliances:

The pre-upgrade-checkv2.sh script checks the following on all SL1 appliances:

- Hostname and hosts file
- Uptime and average CPU load
- SL1 version
- OS versions
- MariaDB version
- Current disk utilization
- Is post update running?
- Checks yum config for configured proxy
- Check for packages installed outside of official SL1 update

- Filters out unsupported appliance types
- Gathers system status

Active Database Server:

The pre-upgrade-checkv2.sh script checks the following on all active Database Servers:

- Identifies Data Collectors that are not members of a Collector Group
- Lists all active SL1 appliances
- Lists all SL1 appliances that are disabled or ineligible for upgrade
- Checks for active staging schedules
- Check for active deployment schedules
- Are backups configured and successful?
- Checks pruner status
- Checks SIGTERMs for past 24 hours
- Compares number of tables on disk to the table definition cache
- Lists the largest 10 databases by size
- Searches for long running queries
- Shows status of used mysql connections and variables
- Lists mysql config files
- Gathers pt-diststats at 15 second interval three times
- Checks for system status wrapper bug
- Ensure that silo.log ownership is correct

All Database Servers:

The pre-upgrade-checkv2.sh script checks the following on all Database Servers:

- Checks for a minimum of 300 MB disk space on /var partition
- Checks HA/DR status
- Checks for CRM bans
- Checks for old CRM templates in HA/DR setups
- Fixes the missing SysVInit script for the MariaDB service
- Are custom SSL certs named silo default?
- Gathers output of top
- Is this SL1 Appliance memory swapping?

Administration Portal:

The pre-upgrade-checkv2.sh script checks the following on all Administration Portals:

- Checks web processes
- Are custom SSL certs named silo default?

Data Collectors and Message Collectors:

The pre-upgrade-checkv2.sh script checks the following on all active Data Collectors and Message Collectors

- Checks running Python processes

Downloading and Running the Pre-Upgrade Check

To download and run the pre-upgrade check:

1. Contact ScienceLogic Customer Support to get the file. Save the file to a local computer.
2. Use WinSCP or another file-transfer utility to copy the file pre-upgrade-check-v2.sh to the directory /home/em7admin of each SL1 appliance.
3. Go to the console of each SL1 appliance or open a SSH session to each SL1 appliance.
4. Navigate to the directory /home/em7admin.
5. At the shell prompt, enter the following to make the script executable:

```
chmod +x pre-upgrade-check-v2.sh
```

6. To execute the script with the default options:

```
sudo ./pre-upgrade-check-v2.sh -<appliance_type> > /tmp/preupgrade-check-v2-  
`hostname -s`.`date "+%Y%m%d"` 2>&1
```

where:

appliance_type is one of the following:

- -d = Database Appliance
- -o = All-In-One
- -c = Data Collector
- -m = Message Collector
- -a = Admin Portal

7. To view the output from the script, view the file /tmp/pre-upgrade-check-v2- <current hostname>.<today's date>
8. If the output includes errors and you need help fixing them, contact ScienceLogic Customer Support to fix the errors before upgrading.
9. Perform these steps on each SL1 appliance.

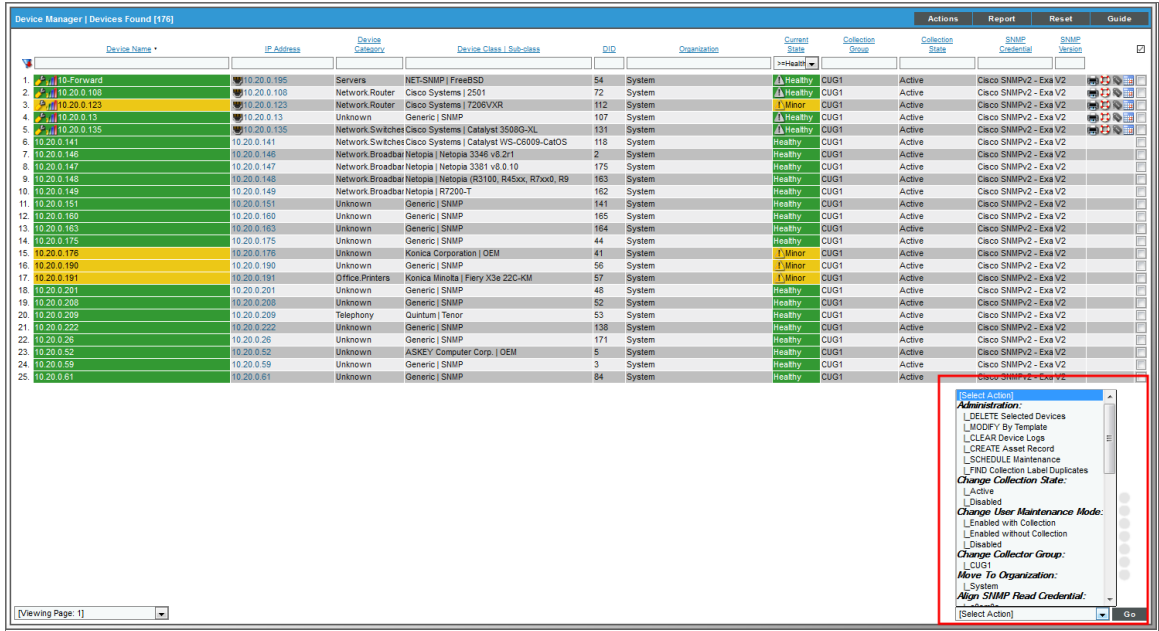
Putting All SL1 Appliances into Maintenance Mode

NOTE: ScienceLogic recommends that you perform these steps during a maintenance window.

Immediately before deploying a software update, ScienceLogic recommends that you put all SL1 appliances in maintenance mode. This will prevent spurious error messages and events during the deployment.

To enable user maintenance mode for all the SL1 appliances in your SL1 system:

1. Go to the Appliance Manager page (System > Settings > Appliances). Note the list of SL1 appliances in your system.
2. Go to the **Device Manager** page (Registry > Devices > Device Manager):



3. In the **Device Manager** page, select the checkbox for each SL1 appliance in your SL1 system. This includes both primary and secondary Database Servers.
4. In the **Select Action** drop-down list, select the following:
 - *Change User Maintenance Mode: Enabled without Collection*. This option puts the selected devices into user maintenance mode with collection disabled. The devices will remain in this state until you or another user disables user maintenance mode.
5. Click the **[Go]** button.

Deploying the Update

During deployment, avoid the following tasks:

- Running integrations and third-party applications that access the SL1 database or manipulate data on SL1
- Running discovery sessions
- Running nightly discovery
- Bringing HA/DR out of maintenance mode


- Adding new SL1 Appliances
- Importing a new patch
- Adding Data Collectors to a Collector Group
- Removing Data Collectors from a Collector Group
- Rebalancing a Collector Group
- Killing processes related to patching and upgrading
- Run reporting jobs
- Unpausing the proc_mgr process


After you have imported and staged an update to SL1, run the pre-upgrade check, and fixed all errors found by the pre-upgrade check, you can either immediately deploy the update or deploy the update at a later time.

When you deploy an update, the update is installed on all appliances that have already been staged.

NOTE: When you deploy an update, SL1 checks to ensure that you have already deployed all required updates. If you have not, SL1 will generate an error message specifying the updates you must deploy before continuing with the current update.


To deploy a software update on your appliances:

1. Make sure that you have imported and staged the update file.
2. Go to the **System Updates** page (System > Tools > Updates).
3. In the **System Updates** page, find the software update you want to deploy. Click the lightning bolt icon () to deploy the software.

NOTE: If SL1 is still staging the patch when you click the lightning-bolt icon (), SL1 will wait until staging has completed before deploying the updates to each ScienceLogic appliance.

4. The software update will be deployed to all appliances in your SL1 system that have already been staged. If one or more appliances in your SL1 system have been successfully staged, SL1 will deploy the update to those appliances.
5. During deployment, the Deployment Status column can have one of the following statuses:
 - *--*. No deployment request is active, and software has not been deployed on any SL1 appliances.
 - *Scheduled*. The SL1 system is aware of the deployment request and is preparing for deployment.
 - *In Progress*. Deployment is in progress but has not completed.
 - *Complete*. Deployment has completed, and all appliances are updated.
 - *Incomplete*. Deployment has completed, and one or more, but not all, appliances are updated.
 - *Canceled*. User manually canceled the deployment.

- *Outdated*. The current update is not the latest or has already been installed.
- *Failed*. An unexpected error occurred in the deployment process. Contact ScienceLogic Support.

NOTE: For details on the deployment process, go to the **System Updates** page, find the entry for the software you are interested in, go to its **Deployment Status** column, and click the log icon ()

Troubleshooting System Update

The troubleshooting tool for System Update provides diagnostics. These can be useful when System Update does not work as expected.

To use the troubleshooting tool:

1. Either go to the console of any SL1 appliance or use SSH to access the appliance
2. Enter the following at the shell prompt:

```
sudo sysuptb -h
```
3. For more information about each argument, enter the following at the shell prompt:

```
sudo sysuptb <argument> -h
```

Available Commands

- The following command executes all troubleshooting tests for System Update.

```
sudo sysuptb all <optionally -x name_of_test_to_exclude>
```

- Example:

```
sudo sysuptb all

Executing filestore tests
912 / 912 [-----] 100.00% 14
p/s
Filestore test summary: [Total: 912, Intact: 912, Incomplete: 0, Corrupt: 0]
Executing test for deleted appliances in patch history
No deleted appliances were found in the patch history
Executing test for invalid file id in patch schedules
No patch schedules were found to have invalid file id
Executing test for RPM database corruption
RPM database is intact
Executing test to check if filestore is empty
Filestore has 1026 files
Executing test for deactivating services
Service test summary: [Total: 1, Active: 1, Inactive: 0, Healed: 0, Skipped:
0, Failed (to heal): 0]
Executing test for free disk space
Free disk space test summary: [Total: 2, Pass: 2, Failed: 0]
Executing test for service errors
Service error test summary: [Total: 2, Without Errors: 2, Restarted: 0,
Failed: 0]
Executing hosts file check for IPV6 entry (::1) for localhost
An entry for ::1 is already present in the hosts file
Proxy is not configured for yum.
Executing test for hung yum process
No yum processes found
Yum process summary: [Total: 0, Hung: 0]
```

- The following command searches for and lists any non-SL1 packages installed via yum and rpm. This can help identify a root cause for failures related to package dependency issues.

```
sysuptb check-extra-pkgs
```

- The following command searches the logs for errors that match a service name and restarts services if any errors are found.

```
sudo sysuptb check-service-error <optionally -s name_of_service>
```

If you do not provide the name of a service, the command searches the logs for errors for siloupdate-pkgserver.service and siloupdate-spool.service.

- Example:

```
sudo sysuptb check-service-error

Executing test for service errors
Service error test summary: [Total: 2, Without Errors: 2, Restarted: 0,
Failed: 0]
```

- The following command removes deleted SL1 appliances from the history of system updates so that they SL1 does not search for them during update.

```
sudo sysuptb clear-mids
```

- Example:

```
sudo sysuptb clear-mids

Executing test for deleted appliances in patch history
No deleted appliances were found in the patch history
```

- The following command cancels all schedule updates that include an invalid ID for the patch file.

```
sudo sysuptb clear-schedule
```

- Example:

```
sudo sysuptb clear-schedule

Executing test for invalid file id in patch schedules
No patch schedules were found to have invalid file id
```

- The following command checks the filestore of downloaded packages for corrupt files and marks the corrupt files as incomplete.

```
sudo sysuptb filestore
```

- Example:

```
sudo sysuptb filestore

Executing filestore tests
912 / 912 [-----]
-----]
100.00% 14 p/s
Filestore test summary: [Total: 912, Intact: 912, Incomplete: 0, Corrupt: 0]
```

- The following command checks the file system for available free space.

```
sudo sysuptb free-space <optionally, -d path_for_drive = minimum_size>
```

If you do not provide the path and minimum size of the directory, the command examines /var to make sure it has 300MB of free space and / to make sure it has 1GB of free space.

- Example:

```
sudo sysuptb free-space --disk /var=300MB

Executing test for free disk space
Free disk space test summary: [Total: 1, Pass: 1, Failed: 0]
```

- The command checks for update services that are stuck in a deactivating state and then heals them.

```
sudo sysuptb heal-service <optionally -s service_name>
```

If you do not specify a service, the command examines the service em7_patch_manager.service.

- Example:

```
sudo sysuptb heal-service

Executing test for deactivating services
Service test summary: [Total: 1, Active: 1, Inactive: 0, Healed: 0,
Skipped: 0, Failed (to heal): 0]
```

- The following command checks the /etc/hosts file for an entry for IPv6 for the current server (like a loopback address). If no entry exists, the command adds ::1 to the /etc/hosts file.

```
sudo sysuptb hosts
```

- Example:

```
sudo sysuptb hosts
```

```
Executing hosts file check for IPV6 entry (::1) for localhost
An entry for ::1 is already present in the hosts file
```

- The following command check is the filestore that holds the upgrade packages is empty.

```
sudo sysuptb is-filestore-empty
```

- Example:

```
sudo sysuptb is-filestore-empty
```

```
Executing test to check if filestore is empty
Filestore has 1026 files
```

- The following command checks the RPM database on /var/lib/rpm for corruption. If the command detects corruption, the output includes steps for remediation.

```
sudo sysuptb rpmdb
```

- Example:

```
sudo sysuptb rpmdb
```

```
Executing test for RPM database corruption
RPM database is intact
```

- The following command checks for a yum process which is hung.

```
sudo sysuptb yum-proc <optionally, -t timeout_in_minutes>
```

If you do not specify a running time, in minutes, the command searches for yum processes that have been running for more than 120 minutes.

- Example:

```
sudo sysuptb yum-proc
```

```
Executing test for hung yum process
No yum processes found
Yum process summary: [Total: 0, Hung: 0]
```

- The following command checks if yum is configured with proxy. If so, the command removes the proxy configuration.

```
sudo sysuptb yum-proxy
```

- Example:

```
sudo sysuptb yum-proxy
```

```
Proxy is not configured for yum.
```

Monitoring Deployment

For SL1 versions 8.12.0 and later, you can monitor deployment. To do so:

1. Either go to the console of the Database Server or use SSH to access the Database Server.
2. Enter the following command at the shell prompt:
`monitor_deploy`
3. You should see something like the following figure:

```
root@dw-sm-db1-patch-10-2-12-113:/tmp
Every 1.0s: bash -c monitor_deploy

#####
##          Monitor Deploy Process for DB          ##
#####

System Update Vitals
=====
| Service Name | Status | RunTime | HealthCheck |
=====
| em7_patch_manager | active(running) | 2h18min | Good |
| silouupdate-spool | active(running) | 2h28min | Good |
| silouupdate-pkgserver | active(running) | 2h27min | Good |
| mariadb | active(running) | 21h | Good |
=====

Deployment Process Stats
Deployment Schedule ID : 4
Deployment Status : Completed
No. Of system_patcher processes : 0
No. Of deploy-module processes : 0
Deployment Started at : 2019-04-25 16:06:30
Deployment Completed at : 2019-04-25 16:18:54
Deployment Run Time : 00:12:24
Version Updated Count : 4 [8.13.0.smailappan_EM_26803_stop_building_e15_throwawayr428]
Deployment Summary : [Eligible=4, Complete=2, Failed=1, TimedOut=1]
  \ Completed mid(s) : [2,1]
  \ Failed mid(s) : [6]
  \ TimedOut mid(s) : [5]

Module Level Status
proc_mgr Status : Unpaused
deploy-module Status : Completed
deploy-module Completed at : 2019-04-25 16:16:35

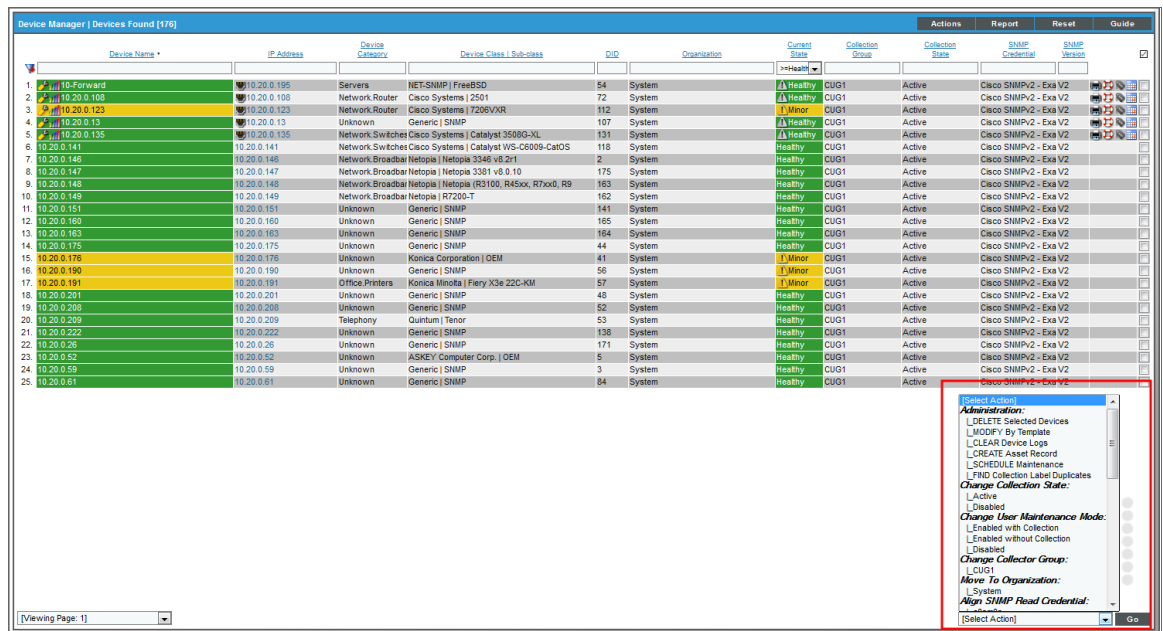
Press CTRL-C to exit
```

- **System Update Vitals.** Displays the current status of the services that are required for System Update.
- **Deployment Process Stats.** Displays status of deployment on all SL1 appliances.
- **Module Level Status.** Displays the status of the three deployment steps.

Taking All SL1 Appliances Out of Maintenance Mode

To disable user maintenance mode for all the SL1 appliances in your SL1 system:

1. Go to the **Appliance Manager** page. Note the list of SL1 appliances in your system.
2. Go to the **Device Manager** page (Registry > Devices > Device Manager):



3. In the **Device Manager** page, select the checkbox for each SL1 appliance in your SL1 system.
4. In the **Select Action** drop-down list, select the following:
 - **Change User Maintenance Mode: Disabled**. This option disables user maintenance mode for the selected devices.
5. Click the **[Go]** button.

CAUTION: Refer to the release notes for your current release to determine if you must **upgrade MariaDB** after upgrading.

CAUTION: Refer to the release notes for your current release to determine if you must **reboot all SL1 appliances** after upgrading.

Upgrading SL1 Extended Architecture

As of January 1, 2021, new installations of SL1 Extended Architecture are available only on SaaS deployments.

For existing on-premises deployments of SL1 Extended Architecture, please contact ScienceLogic Customer Support for upgrade documentation and help with technical issues.

Manual Steps for Updates to 8.4.x and Earlier Systems

If you upgraded from an 8.4.x system or earlier, you must manually apply the following changes to every Message Collector and All-In-One Appliance in your SL1 system:

1. Either go to the console or use SSH to access the SL1 appliance.
2. Log in as user **em7admin** with the appropriate password.
3. Enter the following at the command line:

```
sudo visilo
```

4. Locate the following line:

```
eventmanager = syslog,trap,internal
```

NOTE: On an All-In-One Appliance, this line will include additional entries in the comma-delimited list.

5. Add ",agent" to the end of the line. The line should now look like this:

```
eventmanager = syslog,trap,internal,agent
```

6. Save the file and exit vi (:wq).

8.4.2 included a new feature for Ticketing. The Note Editor for tickets includes a drop-down menu where the user can specify that the note be saved as Plain Text or HTML. Ticket notes created in the API can also be saved as Plain Text or HTML. HTML is the default format for ticket notes in both the Note Editor and the API.

This new feature required a change to the database schema that will be performed immediately after a system is upgraded to 8.4.2 or later for the first time. If your system has not been upgraded to 8.4.2 or later, this schema change will be performed after upgrading to 8.6.0.

During the post-patch process, all existing ticket notes will be migrated to the new schema in batches. During the migration, all ticket notes will be unavailable. The user interface and API will not display ticket notes. Ticket notes cannot be viewed or updated during the post-patch process. On a system that included 2,000,000 ticket notes, this process took approximately 6 hours.

If you require access to all ticket notes immediately after installing an 8.4.2 or later release, contact ScienceLogic Customer Support for details on manually updating the database schema before you upgrade to 8.4.2 or later.

Automatically Upgrading MariaDB with a Script

TIP: To reduce spurious events, you can put the Database Server in maintenance mode while you upgrade MariaDB. For details, see the chapter on [Putting the Database Server into Maintenance Mode](#)

NOTE: Refer to the release notes for your current release to determine if you must upgrade MariaDB. Not every SL1 update requires an upgrade of for MariaDB.

SL1 will automatically update MariaDB-client, MariaDB-common, and MariaDB-shared RPMs but will not update the MariaDB Server RPM. You must update the MariaDB Server RPM.

SL1 10.1.0 and later releases include the `module_upgrade_mariadb` script to automatically upgrade MariaDB server.

CAUTION: You should store all custom configuration settings for each MariaDB database in the file `/etc/siteconfig/mysql.siteconfig`. If you have added custom settings to the file `/etc/my.cnf.d/silo_mysql.cnf`, those changes will be overwritten each time you upgrade MariaDB. Before upgrading, copy any custom settings to the file `/etc/siteconfig/mysql.siteconfig`. SL1 will save these custom settings and apply them after you upgrade MariaDB.

The `module_upgrade_mariadb` script:

- Upgrades the following SL1 appliances:
 - All Database Servers
 - All-In-One Appliances
 - Data Collectors
 - Message Collectors
- Upgrades High Availability (HA) and Disaster Recovery (DR) systems
- Includes a "test only" option before executing upgrade
- Enforces upgrading the primary Database Server before upgrading secondary Database Server and the Data Collectors.
- Will skip SL1 appliances that have already been updated
- Logs entire sequence of commands and output for later analysis
- Stores log files in `/data/logs/module_upgrade_mariadb.log` and `/data/logs/.upgrade_mariadb.log`
- Checks for differences between current configuration and version you are about to install and spawns an alert. To skip this check, use the `-s -s` option

To upgrade MariaDB, perform the following:

1. Either go to the console of the Database Server or use SSH to access the Database Server.

2. At the shell prompt, enter the following command:

```
sudo /opt/em7/bin/module_upgrade_mariadb -m all
```

3. To see all the options for the **module_upgrade_mariadb** script, enter the following command at the shell prompt:

```
/opt/em7/bin/module_upgrade_mariadb -h
```

Usage:

```
module_upgrade_mariadb -m <module_id> [-t|--test] [-y|--assume-yes] [-s|--skip_
conf_file_error] [-p|--pool size <number_of_modules>] [-h|--help]
```

4. The script includes these options:

- -m parameter specifies the SL1 appliances that you want to upgrade. You can specify:
 - -m <mid1, mid2...midN> provides a comma-separated module IDs.
 - -m *all* : upgrade all appliances (Database Servers, All-In-One Appliances, Data Collectors, and Message Collectors).
 - -m *all-db* : upgrade all Database Servers.
 - -m *all-cu* : upgrade all Data Collectors and Message Collectors.
- -t parameter specifies not to upgrade but instead to run a test of the upgrade script.
- -y parameter specifies to automatically enter "yes" at all prompts.
- -s parameter specifies to ignore errors in the MySQL configuration files and proceed with the upgrade.
- -p parameter specifies the number of Data Collectors that you want to upgrade simultaneously. Database Servers will be upgraded one at a time. Possible values are 1 - 20. The default value is 1.
 - -p <number_of_modules> is the number of Data Collectors to upgrade simultaneously. Values are 1 - 20. The default value is 1.

5. To view the status of the automatic upgrade, enter the following command:

```
monitor_upgrade_mariadb
```

Additional Steps for MariaDB Upgrades in 10.1.x

SL1 10.1.x includes an upgrade to MariaDB. The upgrade did not include a tool, jemalloc, that helps manage memory usage.

NOTE: This section applies only to the following releases:

- 10.1.0
- 10.1.1
- 10.1.2
- 10.1.3
- 10.1.4
- 10.1.4.1
- 10.1.4.2
- 10.1.5
- 10.1.5.1

For SL1 versions later than 10.1.5.1, jemalloc is included with the platform. For SL1 versions prior to 10.1.0, jemalloc is included with the platform.

To avoid problems with memory usage on Database Servers, perform the following steps after upgrading MariaDB for 10.1.x.

NOTE: Perform these steps first on the active Database Server and then on each additional Database Server in your SL1 System.

1. Open an SSH session to the Database Server.
2. To verify that the Database Server is not currently running jemalloc, enter the following command at the shell prompt:

```
silosql -e 'show global variables like "version_malloc_library"'
```

If the Database Server is not currently running jemalloc, the shell will display the following:

Variable Name	Value
version_malloc_library	system

3. Search for the file `/usr/lib64/libjemalloc.so.1`.

If the file does not exist, contact ScienceLogic Customer Support to request the file `jemalloc-3.6.0-1.el7.x86_64.rpm`.

To install the RPM, use a file-transfer utility, copy the file to a directory on the SL1 appliance. Then enter the following commands at the shell prompt:

```
cd /usr/lib64
sudo yum install jemalloc-3.6.0-1.el7.x86_64.rpm
```

4. Create the file `/etc/systemd/system/mariadb.service.d/jemalloc.conf`, as follows:

```
vi /etc/systemd/system/mariadb.service.d/jemalloc.conf
```

5. Add the following lines to the file:

```
[Service]
Environment="LD_PRELOAD=/usr/lib64/libjemalloc.so.1"
```

6. Save and close the file.
7. Reload the systemd config files with the following command:

```
sudo systemctl daemon-reload
```

8. Restart the Database Server:

To restart the **standalone Database Server** or the **primary Database Server in a cluster**, enter the following:

```
sudo systemctl restart mariadb
```

To restart each **secondary Database Server in a cluster**:

- a. Open an SSH session to the secondary Database Server. At the shell prompt, enter:

```
coro_config
```

- b. Select **1**.
- c. When prompted to put the Database Server into maintenance, select **y**.

- d. Open an SSH session to the primary Database Server. To pause SL1, enter the following command at the shell prompt:

```
sudo touch /tmp/.proc_mgr_pause
```

- e. In the SSH session for the secondary Database Server, restart MariaDB:

```
crm resource restart mysql
```

- f. After MariaDB has restarted successfully on the secondary Database Server, return to the SSH session on the primary Database Server. Remove the pause file for SL1 using the following command:

```
sudo rm /tmp/.proc_mgr_pause
```

- g. In the SSH session on the secondary Database Server, take the Database Server out of maintenance. At the shell prompt, enter:

```
coro_config
```

- h. Select **1**.
- i. When prompted to take the Database Server out of maintenance, select **y**.

9. To verify that jemalloc is running on the Database Server, enter the following command at the shell prompt:

```
silosql -e 'show global variables like "version_malloc_library"'
```

If the Database Server is currently running jemalloc, the shell will display something like the following:

Variable Name	Value
version_malloc_library	jemalloc 3.6.0-0-g46c0af68bd248b04df75e4f92d5fb804c3d75340

10. Perform these steps on each Database Server in your SL1 system.

Manually Upgrading MariaDB

NOTE: Refer to the release notes for your current release to determine if you must upgrade MariaDB. Not every SL1 update requires an upgrade of MariaDB.

CAUTION: ScienceLogic strongly recommends that you upgrade MariaDB using the script described in [Automatically Upgrading MariaDB with a Script](#).

TIP: To reduce spurious events, you can put the Database Server in maintenance mode while you upgrade MariaDB. For details, see the chapter on [Putting the Database Server into Maintenance Mode](#)

If you prefer to upgrade MariaDB manually, the following sections describe how to upgrade the MariaDB server for different SL1 appliance types and architectures.

When you update MariaDB, you must update the following SL1 appliances:

- All Database Servers
- All-In-One Appliances
- Data Collectors
- Message Collectors

CAUTION: You should store all custom configuration settings for each MariaDB database in the file `/etc/siteconfig/mysql.siteconfig`. If you have added custom settings to the file `/etc/my.cnf.d/silo_mysql.cnf`, those changes will be overwritten each time you upgrade MariaDB. Before upgrading, copy any custom settings to the file `/etc/siteconfig/mysql.siteconfig`. SL1 will save these custom settings and apply them after you upgrade MariaDB.

Download RPMs to SL1 Appliances

Before upgrading MariaDB, you must copy the RPMs from the primary Database Server to the Database Servers, All-In-One Appliances, Data Collectors, and Message Collectors in your SL1 system. To do this.

1. Open an SSH session to the Database Server.
2. To download the latest RPMs from the Database Server, enter the following at the shell prompt:

For SL1 version 10.1.0 to 10.1.5:

```
wget --output-document /tmp/MariaDB-server-10.4.12-1.el7.centos.x86_64.rpm
http://localhost:10080/MariaDB-server.rpm
```

```
wget --output-document /tmp/galera-4-26.4.3-1.rhel7.el7.centos.x86_64.rpm
http://localhost:10080/galera-4.rpm
```

For SL1 version 10.1.6 and higher, download all of the packages listed when you enter the command:

```
cat /opt/em7/share/db_packages
```

```
wget --output-document /tmp/MariaDB-server.rpm http://localhost:10080/<mariadb-
server-pkg-from-db_packages>
```

```
wget --output-document /tmp/galera-4.rpm http://localhost:10080/<galera-4-pkg-
from-db_packages>
```

```
wget --output-document /tmp/socat.rpm http://localhost:10080/<socat-pkg-from-db_
packages>
```

3. Verify if the downloaded packages are valid (not corrupt or incomplete downloads) by entering the following commands:

```
rpm -qip /tmp/MariaDB-server.rpm
```

```
rpm -qip /tmp/galera-4.rpm
```

```
rpm -qip /tmp/socat.rpm
```

If any errors are reported, try restarting siloupdate-pkgserver, using the following command, and retry downloading and verifying the RPM files again.

```
systemctl restart siloupdate-pkgserver
```

4. Use SCP or another secure copy program to copy these files to the /tmp directory on each Database Server, All-In-One Appliance, Data Collector, and Message Collector:

- MariaDDB-server.rpm
- galera-4.rpm

CAUTION: : To conserve disk space, ScienceLogic recommends you delete the RPMs from the /tmp directory on the Database Servers, All-In-One Appliances, Data Collectors, and Message Collectors in your SL1 system after you successfully upgrade MariaDB.

Manually Upgrade Two Database Servers Configured for High Availability or Disaster Recovery

To upgrade a High Availability or Disaster Recovery cluster, perform the following steps:

WARNING: The system will be unavailable when performing these steps.

Step 1: On the Secondary Database Server

You must put the secondary Database Server in maintenance mode. To do this:

1. Open an SSH session to the Database Server.
2. At the shell prompt, assume root privileges:

```
sudo -s
```

3. When prompted, enter the administrator password.
4. At the shell prompt, enter the following command:

```
coro config
```

The following menu appears:

```
1) Enable Maintenance
2) Option Disabled
3) Promote DRBD
4) Stop Pacemaker
5) Resource Status
6) Quit
```

5. Enter "1".

Step 2: On the Primary Database Server

1. To determine the current installed version of the RPMs, enter the following command:

```
sudo rpm -qa ^MariaDB-*
```

2. To stop SL1 and MariaDB, enter the following commands at the shell prompt:

```
sudo systemctl stop em7
sudo systemctl stop mariadb.service
```

3. To stop the MySQL resource, enter the following command:

```
sudo crm resource stop mysql
```

4. To save the current enabled state for mariadb.service, enter the following command:

```
export MSRVR=`sudo systemctl is-enabled mariadb.service`
```

5. Check the version of MariaDB-server that you are running.

```
rpm -q MariaDB-server
```

WARNING: You **must** follow the steps below that correspond to your version of MariaDB. Step 6 is specific to MariaDB-server version 10.1.x, while Step 7 is specific to MariaDB-server versions 10.4.12 and higher.

6. **MariaDB-server version 10.1.x.** If you are running **MariaDB-server version 10.1.x:**

WARNING: Do these steps in order. Doing the steps in any other order will result in unintended consequences.

- a. Remove MariaDB-server by using the following commands:

```
sudo rpm --nodeps -ev MariaDB-server
```

- b. Replace the Galera package and install the new MariaDB-server package by using the following commands:

```
sudo yum --disablerepo=* swap -- remove galera -- install /tmp/galera-4.rpm  
sudo yum --disablerepo=* install /tmp/MariaDB-server.rpm
```

7. **MariaDB-server version 10.4.12 and higher.** If you are running **MariaDB-server version 10.4.12 or higher**, upgrade the MariaDB-server package and dependent packages (galera-4 and socat) by using the following commands:

```
sudo yum --disablerepo=* install /tmp/galera-4.rpm /tmp/socat.rpm  
sudo yum --disablerepo=* upgrade /tmp/MariaDB-server.rpm
```

8. To remove incompatible backup packages, enter the following command:

```
sudo yum remove percona-xtrabackup
```

NOTE: If the "yum remove" command fails, it means that the package does not exist on the SL1 appliance. You can ignore the error message.

9. To regenerate the configuration file for MariaDB, enter the following command:

```
sudo /opt/em7/share/scripts/generate-my-conf.py -f -o /etc/my.cnf.d/silo_  
mysql.cnf
```

10. To re-start MariaDB, enter the following command:

```
sudo systemctl daemon-reload  
sudo systemctl start mariadb
```

11. To restart the MySQL resource, enter the following command:

```
sudo crm resource start mysql
```

12. To restore the mariadb.service enabled state, enter the following command:

```
sudo systemctl ${MSRV::-1} mariadb.service
```

13. To upgrade the internal configuration for the database, enter the following:

```
sudo mysql_upgrade -u root -p
```

14. To restart the em7 service, enter the following commands:

```
sudo systemctl start em7  
sudo rpm -qa ^MariaDB-*
```

Step 3: On the Secondary Database Server

1. Determine the current installed version of the RPMs using the following command:

```
sudo rpm -qa ^MariaDB-*
```

2. To save the current enabled state for mariadb.service, enter the following:

```
export MSRV=`sudo systemctl is-enabled mariadb.service`
```

3. Check the version of MariaDB-server that you are running.

```
rpm -q MariaDB-server
```

WARNING: You **must** follow the steps that correspond to your version of MariaDB. Step 4 is specific to MariaDB-server version 10.1.x, while Step 5 is specific to MariaDB-server versions 10.4.12 and higher.

4. **MariaDB-server 10.1.x:** If you are running *MariaDB-server version 10.1.x*:

WARNING: Do these steps in order. Doing the steps in any other order will result in unintended consequences.

- a. Remove MariaDB-server by using the following command:

```
sudo rpm --nodeps -ev MariaDB-server
```

- b. Replace the Galera package and install the new MariaDB-server package by using the following commands:

```
sudo yum --disablerepo=* swap -- remove galera -- install /tmp/galera-4.rpm  
sudo yum --disablerepo=* install /tmp/MariaDB-server.rpm
```

5. **MariaDB-server 10.4.12 or higher:** If you are running *MariaDB-server version 10.4.12 or higher*, upgrade the MariaDB-server package and dependent packages (galera-4 and socat) by using the following commands:

```
sudo yum --disablerepo=* install /tmp/galera-4.rpm /tmp/socat.rpm  
sudo yum --disablerepo=* upgrade /tmp/MariaDB-server.rpm
```

6. To remove incompatible backup packages, enter the following command:

```
sudo yum remove percona-xtrabackup
```

NOTE: If the "yum remove" command fails, it means that the package does not exist on the SL1 appliance. You can ignore the error message.

7. To regenerate the configuration file for MariaDB, enter the following command:

```
sudo /opt/em7/share/scripts/generate-my-conf.py -f -o /etc/my.cnf.d/silo_
mysql.cnf
```

8. To restore the mariadb.service enabled state, enter the following command:

```
sudo systemctl ${MSRV::-1} mariadb.service
```

9. To take the secondary Database Server out of maintenance mode, enter the following command at the shell prompt:

```
sudo -s
```

10. When prompted, enter the administrator password.

11. At the shell prompt, enter the following command:

```
coro config
```

The following prompt appears:

```
1) Disable Maintenance
2) Option Disabled
3) Promote DRBD
4) Stop Pacemaker
5) Resource Status
6) Quit
```

12. Enter "1".

Manually Upgrade Three Database Servers Configured for High Availability and Disaster Recovery

To upgrade a High Availability/Disaster Recovery cluster, perform the following steps:

WARNING: The system will be unavailable when performing these steps.

Step 1: On the Secondary Database Server

You must put the secondary Database Server in maintenance mode. To do this:

1. Open an SSH session to the Database Server.
2. At the shell prompt, assume root privileges:

```
sudo -s
```

3. When prompted, enter the administrator password.
4. At the shell prompt, enter the following command:

```
coro config
```

5. The following prompt appears:

- 1) Disable Maintenance
- 2) Option Disabled
- 3) Promote DRBD
- 4) Stop Pacemaker
- 5) Resource Status
- 6) Quit

6. Enter "1".

Step 2: On the Primary Database Server

1. Determine the current installed version of the RPMs:

```
sudo rpm -qa ^MariaDB-*
```

2. Stop SL1 and MariaDB using the following commands:

```
sudo systemctl stop em7
sudo systemctl stop mariadb.service
```

3. Stop the MySQL resource:

```
sudo crm resource stop mysql
```

4. Save the current enabled state for the mariadb.service:

```
export MSRV=`sudo systemctl is-enabled mariadb.service`
```

5. Check the version of MariaDB-server that you are running:

```
rpm -q MariaDB-server
```

WARNING: You **must** follow the steps that correspond to your version of MariaDB.

6. **MariaDB-server version 10.1.x.** If you are running **MariaDB-server version 10.1.x:**

WARNING: Do these steps in order. Doing the steps in any other order will result in unintended consequences.

a. Remove MariaDB-server by using the following command:

```
sudo rpm --nodeps -ev MariaDB-server
```

b. Replace the Galera package and install the new MariaDB-server package by using the following commands:

```
sudo yum --disablerepo=* swap -- remove galera -- install /tmp/galera-4.rpm
sudo yum --disablerepo=* install /tmp/MariaDB-server.rpm
```

7. **MariaDB-server version 10.4.12 and higher.** If you are running MariaDB-version 10.4.12 or higher, upgrade the MariaDB-server package and dependent packages (galera-4 and socat) by using the following commands:

```
sudo yum --disablerepo=* install /tmp/galera-4.rpm /tmp/socat.rpm
sudo yum --disablerepo=* upgrade /tmp/MariaDB-server.rpm
```

8. Remove incompatible backup packages:

```
sudo yum remove percona-xtrabackup
```

NOTE: If the "yum remove" command fails, it means that the package does not exist on the SL1 appliance. You can ignore the error message.

9. Regenerate the configuration file for MariaDB:

```
sudo /opt/em7/share/scripts/generate-my-conf.py -o -f /etc/my.cnf.d/silo_
mysql.cnf
```

10. Restart MariaDB:

```
sudo systemctl daemon-reload
sudo systemctl start mariadb
```

11. Restart the MySQL resource:

```
sudo crm resource start mysql
```

12. Restore the mariadb.service enabled state:

```
sudo systemctl ${MSRV::-1} mariadb.service
```

13. Upgrade the internal configuration for the database:

```
sudo mysql_upgrade -u root -p
```

14. Restart the em7 service:

```
sudo systemctl start em7
```

Step 3: On the Secondary Database Server

1. Save the current enabled state for the mariadb.service:

```
export MSRV=`sudo systemctl is-enabled mariadb.service`
```

2. Check the version of MariaDB-server that you are running:

```
rpm -q MariaDB-server
```

WARNING: You **must** follow the steps that correspond to your version of MariaDB.

3. **MariaDB-server version 10.1.x.** If you are running **MariaDB-server version 10.1.x:**

WARNING: Do these steps in order. Doing the steps in any other order will result in unintended consequences.

- a. Remove MariaDB-server:

```
sudo rpm --nodeps -ev MariaDB-server
```

- b. Replace the Galera package and install the new MariaDB-server package by using the following commands:

```
sudo yum --disablerepo=* swap -- remove galera -- install /tmp/galera-4.rpm  
sudo yum --disablerepo=* install /tmp/MariaDB-server.rpm
```

4. **MariaDB-server version 10.4.12 and higher.** If you are running MariaDB-version 10.4.12 or higher, upgrade the MariaDB-server package and dependent packages (galera-4 and socat) by using the following commands:

```
sudo yum --disablerepo=* install /tmp/galera-4.rpm /tmp/socat.rpm  
sudo yum --disablerepo=* upgrade /tmp/MariaDB-server.rpm
```

5. Remove incompatible backup packages:

```
sudo yum remove percona-xtrabackup
```

NOTE: If the "yum remove" command fails, it means that the package does not exist on the SL1 appliance. You can ignore the error message.

6. Regenerate the configuration file for MariaDB:

```
sudo /opt/em7/share/scripts/generate-my-conf.py -o -f /etc/my.cnf.d/silo_  
mysql.cnf
```

7. Restore the mariadb.service enabled state:

```
sudo systemctl ${MSRV::-1} mariadb.service
```

8. Assume root privileges:

```
sudo -s
```

9. When prompted, enter the administrator password.

10. At the shell prompt, enter the following command:

```
coro config
```

11. The following prompt appears:

```
1) Disable Maintenance  
2) Option Disabled  
3) Promote DRBD  
4) Stop Pacemaker  
5) Resource Status  
6) Quit
```

12. Enter "1".

Step 4: On the Disaster Recovery Database Server

1. Open an SSH session to the Disaster Recovery Database Server.

2. Assume root privileges:

```
sudo -s
```

3. When prompted, enter the administrator password.

4. Save the current enabled state for the mariadb.service:

```
export MSRV=`sudo systemctl is-enabled mariadb.service`
```

5. Check the version of MariaDB-server that you are running:

```
rpm -q MariaDB-server
```

WARNING: You **must** follow the steps that correspond to your version of MariaDB.

6. **MariaDB-server version 10.1.x.** If you are running **MariaDB-server version 10.1.x:**

WARNING: Do these steps in order. Doing the steps in any other order will result in unintended consequences.

a. Remove MariaDB-server:

```
sudo rpm --nodeps -ev MariaDB-server
```

b. Replace the Galera package and install the new MariaDB-server package by using the following commands:

```
sudo yum --disablerepo=* swap -- remove galera -- install /tmp/galera-4.rpm  
sudo yum --disablerepo=* install /tmp/MariaDB-server.rpm
```

7. **MariaDB-server version 10.4.12 and higher.** If you are running MariaDB-version 10.4.12 or higher, upgrade the MariaDB-server package and dependent packages (galera-4 and socat) by using the following commands:

```
sudo yum --disablerepo=* install /tmp/galera-4.rpm /tmp/socat.rpm  
sudo yum --disablerepo=* upgrade /tmp/MariaDB-server.rpm
```

8. Remove incompatible backup packages:

```
sudo yum remove percona-xtrabackup
```

NOTE: If the "yum remove" command fails, it means that the package does not exist on the SL1 appliance. You can ignore the error message.

9. Regenerate the configuration file for MariaDB:

```
sudo /opt/em7/share/scripts/generate-my-conf.py -o -f /etc/my.cnf.d/silo_
mysql.cnf
```

10. Restore the mariadb.service enabled state:

```
sudo systemctl ${MSRV::-1} mariadb.service
```

Manually Upgrading Standalone Database Servers, All-In-One Appliances, Data Collectors, and Message Collectors

To upgrade MariaDB on one or more Database Servers that are not configured for high availability or disaster recovery, a single All-In-One Appliance, one or more Data Collectors, or one or more Message Collectors, perform the following steps:

WARNING: The Database Server, All-In-One Appliance, Data Collector, or Message Collector will be unavailable when performing these steps.

1. Go to the console or open an SSH session to the SL1 appliance.
2. Stop SL1 and mariadb:

```
sudo systemctl stop em7
sudo systemctl stop mariadb.service
```

3. Save the current enabled state for the mariadb.service:

```
export MSRV=`sudo systemctl is-enabled mariadb.service`
```

4. Check the version of MariaDB-server that you are running:

```
rpm -q MariaDB-server
```

WARNING: You **must** follow the steps that correspond to your version of MariaDB.

5. **MariaDB-server version 10.1.x.** If you are running **MariaDB-server version 10.1.x:**

WARNING: Do these steps in order. Doing the steps in any other order will result in unintended consequences.

- a. Remove MariaDB-server:

```
sudo rpm --nodeps -ev MariaDB-server
```


- b. Replace the Galera package and install the new MariaDB-server package by using the following commands:

```
sudo yum --disablerepo=* swap -- remove galera -- install /tmp/galera-4.rpm
sudo yum --disablerepo=* install /tmp/MariaDB-server.rpm
```

6. **MariaDB-server version 10.4.12 and higher.** If you are running MariaDB-version 10.4.12 or higher, upgrade the MariaDB-server package and dependent packages (galera-4 and socat) by using the following commands:

```
sudo yum --disablerepo=* install /tmp/galera-4.rpm /tmp/socat.rpm
sudo yum --disablerepo=* upgrade /tmp/MariaDB-server.rpm
```

7. Remove incompatible backup packages:

```
sudo yum remove percona-xtrabackup
```

NOTE: If the "yum remove" command fails, it means that the package does not exist on the SL1 appliance. You can ignore the error message.

8. Regenerate the configuration file for MariaDB:

```
sudo /opt/em7/share/scripts/generate-my-conf.py -o -f /etc/my.cnf.d/silo_
mysql.cnf
```

9. Restart MariaDB:

```
sudo systemctl daemon-reload
sudo systemctl start mariadb
```

10. Restore the mariadb.service enabled state:

```
sudo systemctl ${MSRV::-1} mariadb.service
```

11. Upgrade the internal configuration for the database:

```
sudo mysql_upgrade -u root -p
```

12. Restart the em7 service:

```
sudo systemctl start em7
```

13. Repeat all the steps in this section on each non-HA/DR Database Server, All-In-One Appliance, Data Collector, and Message Collector.

Additional Steps for MariaDB Upgrades in 10.1.x

SL1 10.1.x includes an upgrade to MariaDB. The upgrade did not include a tool, jemalloc, that helps manage memory usage.

NOTE: This section applies only to the following releases:

- 10.1.0
- 10.1.1
- 10.1.2
- 10.1.3
- 10.1.4
- 10.1.4.1
- 10.1.4.2
- 10.1.5
- 10.1.5.1

For SL1 versions later than 10.1.5.1, jemalloc is included with the platform. For SL1 versions prior to 10.1.0, jemalloc is included with the platform.

To avoid problems with memory usage on Database Servers, perform the following steps after upgrading MariaDB for 10.1.x.

NOTE: Perform these steps first on the active Database Server and then on each additional Database Server in your SL1 System.

1. Open an SSH session to the Database Server.
2. To verify that the Database Server is not currently running jemalloc, enter the following command at the shell prompt:

```
silosql -e 'show global variables like "version_malloc_library"'
```

If the Database Server is not currently running jemalloc, the shell will display the following:

Variable Name	Value
version_malloc_library	system

3. Search for the file `/usr/lib64/libjemalloc.so.1`.

If the file does not exist, contact ScienceLogic Customer Support to request the file `jemalloc-3.6.0-1.el7.x86_64.rpm`.

To install the RPM, use a file-transfer utility, copy the file to a directory on the SL1 appliance. Then enter the following commands at the shell prompt:

```
cd /usr/lib64
sudo yum install jemalloc-3.6.0-1.el7.x86_64.rpm
```

4. Create the file `/etc/systemd/system/mariadb.service.d/jemalloc.conf`, as follows:

```
vi /etc/systemd/system/mariadb.service.d/jemalloc.conf
```

5. Add the following lines to the file:

```
[Service]
Environment="LD_PRELOAD=/usr/lib64/libjemalloc.so.1"
```

6. Save and close the file.
7. Reload the systemd config files with the following command:

```
sudo systemctl daemon-reload
```

8. Restart the Database Server:

To restart the **standalone Database Server** or the **primary Database Server in a cluster**, enter the following:

```
sudo systemctl restart mariadb
```

To restart each **secondary Database Server in a cluster**:

- a. Open an SSH session to the secondary Database Server. At the shell prompt, enter:

```
coro_config
```

- b. Select **1**.
- c. When prompted to put the Database Server into maintenance, select **y**.

- d. Open an SSH session to the primary Database Server. To pause SL1, enter the following command at the shell prompt:

```
sudo touch /tmp/.proc_mgr_pause
```

- e. In the SSH session for the secondary Database Server, restart MariaDB:

```
crm resource restart mysql
```

- f. After MariaDB has restarted successfully on the secondary Database Server, return to the SSH session on the primary Database Server. Remove the pause file for SL1 using the following command:

```
sudo rm /tmp/.proc_mgr_pause
```

- g. In the SSH session on the secondary Database Server, take the Database Server out of maintenance. At the shell prompt, enter:

```
coro_config
```

- h. Select **1**.

- i. When prompted to take the Database Server out of maintenance, select **y**.

9. To verify that jemalloc is running on the Database Server, enter the following command at the shell prompt:

```
silosql -e 'show global variables like "version_malloc_library"'
```

If the Database Server is currently running jemalloc, the shell will display something like the following:

Variable Name	Value
version_malloc_library	jemalloc 3.6.0-0-g46c0af68bd248b04df75e4f92d5fb804c3d75340

10. Perform these steps on each Database Server in your SL1 system.

Rebooting Appliances in the SL1 Distributed Stack

NOTE: Refer to the release notes for your current release to determine if you must reboot all SL1 appliances. Not every SL1 update requires rebooting.

When an upgrade requires a reboot, use the steps listed in this section to reboot all SL1 appliances in the Distributed stack.

Rebooting the Administration Portal

You can reboot Administration Portals either from the user interface or from the command line.

Rebooting Multiple Administration Portals

If your SL1 system includes multiple Administration Portals, you can remotely reboot Administration Portals from another Administration Portal. To do so:

1. Go to the **Appliance Manager** page (System > Settings > Appliances).
2. Select the checkboxes for the SL1 appliances you want to reboot.
3. In the **[Select Action]** menu, select **Reboot** and click the **[Go]** button.
4. Click the **[OK]** button when the "Are you sure you want to reboot the selected appliances?" message is displayed.
5. During the reboot, the user interface for the affected Administration Portal unavailable.
6. When the reboot has completed, the **Audit Logs** page (System > Monitor > Audit Logs) will include an entry for each appliance that was rebooted.

Rebooting a Single Administration Portal

If your SL1 system include only a single Administration Portal, perform the following steps to reboot that Administration Portal:

1. Either go to the console of the Database Server or use SSH to access the Database Server.
2. Log in as **em7admin** with the appropriate password.
3. At the shell prompt, execute the following:

```
python -m silo_common.admin_toolbox <appliance_ID> "/usr/bin/sudo /usr/sbin/shutdown -r +1"
```

where:

- *appliance_ID* is the appliance ID for the Data Collector, Message Collector, or Administration Portal.

Rebooting Data Collectors and Message Collectors

You can reboot Data Collectors and Message Collectors either from the user interface or from the command line.

Rebooting Data Collectors and Message Collectors from the Appliance Manager page

From the SL1 user interface, perform the following steps to reboot a Data Collector or a Message Collector:

1. Go to the **Appliance Manager** page (Appliance Manager).
2. Select the checkbox for each SL1 appliance you want to reboot.
3. In the **[Select Action]** menu, select **Reboot** and click the **[Go]** button.
4. Click the **[OK]** button when the "Are you sure you want to reboot the selected appliances?" message is displayed.
5. During the reboot, go to the **System Logs** page (System > Monitor > System Logs). You should see this message:

```
Major: Could not connect to module (5) database USING SSL=TRUE: Error attempting to connect to database with SSL enabled True: (2003, 'Can't connect to MySQL server on '10.2.12.77' (113 "No route to host")')
```

6. When the reboot has completed, the **Audit Logs** page (System > Monitor > Audit Logs) will include an entry for each appliance that was rebooted.

Rebooting Data Collectors and Message Collectors from the Command Line

From the console of the Database Server or SSH to the Database Server, perform the following steps to reboot Data Collector or Message Collector:

1. Either go to the console of a Database Server or SSH to access the Database Server.
2. Log in as **em7admin** with the appropriate password.
3. At the shell prompt, execute the following:

```
python -m silo_common.admin_toolbox <appliance_ID> "/usr/bin/sudo /usr/sbin/shutdown -r +1"
```

where:

- *appliance_ID* is the appliance ID for the Data Collector, Message Collector, or Administration Portal.

Rebooting Standalone All-In-One Appliance and Standalone Database Server

Perform the following steps to reboot a standalone All-In-One Appliance or a standalone Database Server:

1. Either go to the console or use SSH to access the SL1 appliance.
2. Log in as **em7admin** with the appropriate password.

3. On the SL1 appliance, pause the system and shutdown MariaDB.

```
sudo touch /tmp/.proc_mgr_pause
sudo systemctl stop mariadb
```

4. Reboot the SL1 appliance:

```
sudo reboot
```

5. After the SL1 appliance has rebooted, either go to the console or use SSH to access the SL1 appliance.

6. Log in as **em7admin** with the appropriate password.

7. Un-pause the SL1 Appliance:

```
sudo rm /tmp/.proc_mgr_pause
```

Rebooting Two Database Servers Configured for Disaster Recovery

Perform the following steps to reboot two Database Servers configured for Disaster Recovery:

1. Either go to the console of the **primary** Database Server or use SSH to access the primary Database Server.
2. Log in as **em7admin** with the appropriate password.
3. Check the status of both Database Servers. To do this, enter the following at the shell prompt:

```
cat /proc/drbd
```

Your output will look like this:

```
1: cs:Connected ro:Primary/Secondary ds:UpToDate/UpToDate C r----
ns:17567744 al:0 bm:1072 lo:0 pe:0 ua:0 ap:0 ep:1 wo:b oos:12521012
```

4. Pause the system and shutdown MariaDB on the **primary** Database Server. Enter the password for the em7admin user when prompted:

```
sudo touch /tmp/.proc_mgr_pause
sudo systemctl stop pacemaker
sudo systemctl stop mariadb
```

5. Reboot the **primary** Database Server:

```
sudo reboot
```

6. After the primary appliance has rebooted, log in to the console of the **primary** Database Server again.

7. Execute the following commands on the **primary** Database Server:

```
sudo rm /tmp/.proc_mgr_pause
```

8. Enter the password for the em7admin user and confirm the command when prompted.

9. Log in to the **secondary** Database Server as the em7admin user using the console or SSH.

10. Execute the following command on the **secondary** Database Server to reboot the appliance:

```
sudo reboot
```

11. Enter the password for the em7admin user when prompted.

Rebooting Two Database Servers in a High Availability Cluster

Perform the following steps to reboot two Database Servers in a high availability cluster:

1. Either go to the console of the **secondary** Database Server or use SSH to access the **secondary** Database Server.
2. Log in as **em7admin** with the appropriate password.
3. Check the status of both Database Servers. To do this, enter the following at the shell prompt:

```
cat /proc/drbd
```

Your output will look like this:

```
1: cs:Connected ro:Secondary/Primary ds:UpToDate/UpToDate C r----  
ns:17567744 al:0 bm:1072 lo:0 pe:0 ua:0 ap:0 ep:1 wo:b oos:12521012
```

NOTE: If your output includes "ro:Secondary/Primary", but does not include "UpToDate/UpToDate", data is being synchronized between the two appliances. You must wait until data synchronization has finished before rebooting.

4. Stop the cluster service on the **secondary** Database Server:

```
sudo systemctl stop pacemaker
```
5. Enter the password for the em7admin user when prompted.
6. Either go to the console of the **primary** Database Server or use SSH to access the **primary** Database Server.
7. Log in as **em7admin** with the appropriate password.
8. Pause the system and stop the cluster service on the **primary** Database Server. Enter the password for the em7admin user when prompted:

```
sudo touch /tmp/.proc_mgr_pause  
sudo systemctl stop pacemaker  
sudo systemctl stop mariadb
```
9. Reboot the **primary** Database Server:

```
sudo reboot
```
10. After the **primary** Database Server has rebooted, either go to the console of the **primary** Database Server or use SSH to access the **primary** Database Server.
11. Log in as **em7admin** with the appropriate password.
12. Execute the following command on the **primary** Database Server:

```
sudo rm /tmp/.proc_mgr_pause
```
13. Enter the password for the em7admin user and confirm the command when prompted.
14. Either go to the console of the **secondary** Database Server or use SSH to access the **secondary** Database Server.

15. Log in as **em7admin** with the appropriate password.
16. Reboot the **secondary** Database Server:

```
sudo reboot
```
17. Enter the password for the em7admin user when prompted.

Rebooting Three Database Servers Configured for High Availability and Disaster Recovery

Perform the following steps to reboot three Database Servers configured for high availability and disaster recovery. In this configuration, two Database Servers are configured as a High Availability cluster and one Database Server is configured for Disaster Recovery.

1. Either go to the console of the **secondary** Database Server in the HA cluster or use SSH to access the **secondary** Database Server in the HA cluster,
2. Log in as **em7admin** with the appropriate password.
3. Check the status of both Database Servers in the HA cluster. To do this, enter the following at the shell prompt:

```
cat /proc/drbd
```

Your output will look like this:

```
10: cs:Connected ro:Secondary/Primary ds:UpToDate/UpToDate C r----  
ns:17567744 al:0 bm:1072 lo:0 pe:0 ua:0 ap:0 ep:1 wo:b oos:12521012
```

NOTE: If your output includes "ro:Secondary/Primary", but does not include "UpToDate/UpToDate", data is being synchronized between the two appliances. You must wait until data synchronization has finished before rebooting.

4. Stop the cluster service with the following command on the **secondary** Database Server in the HA cluster:

```
sudo systemctl stop pacemaker
```
5. Enter the password for the em7admin user when prompted.
6. Either go to the console of the **primary** Database Server in the HA cluster or use SSH to access the **primary** Database Server in the HA cluster.
7. Log in as **em7admin** with the appropriate password.
8. Pause the system and stop the cluster service on the **primary** Database Server in the HA cluster :

```
sudo touch /tmp/.proc_mgr_pause  
sudo systemctl stop pacemaker  
sudo systemctl stop mariadb
```
9. Enter the password for the em7admin user when prompted
10. Reboot the **primary** Database Server in the HA cluster:

```
sudo reboot
```


11. After the **primary** Database Server in the HA cluster has rebooted, either go to the console of the **primary** Database Server in the HA cluster or use SSH to access the **primary** Database Server in the HA cluster.
12. Execute the following command on the **primary** Database Server in the HA cluster:

```
sudo rm /tmp/.proc_mgr_pause
```
13. Enter the password for the em7admin user and confirm the command when prompted.
14. Either go to the console of the **secondary** Database Server in the HA cluster or use SSH to access the **secondary** Database Server in the HA cluster.
15. Log in as **em7admin** with the appropriate password.
16. Reboot the **secondary** Database Server in the HA cluster:

```
sudo reboot
```
17. Enter the password for the em7admin user when prompted.
18. Either go to the console of the Database Server for Disaster Recovery or use SSH to access the Database Server for Disaster Recovery.
19. Log in as **em7admin** with the appropriate password.
20. Reboot the Database Server for Disaster Recovery:

```
sudo reboot
```
21. Enter the password for the em7admin user when prompted.

Restoring Settings for NextUI

To restore the backup of the custom settings in the NextUI:

1. Login to the console of the Database Server or SSH to the Database Server.
2. Open a shell session.
3. Enter the following at the shell prompt:

```
cp /opt/em7/nextui/nextui.env.backup /opt/em7/nextui/nextui.env
```

Restoring the SSL Certificate

To restore your SSL Certificates:

1. Login to the console of the Database Server or SSH to the Database Server.
2. Open a shell session.
3. Enter the following at the shell prompt:

```
cp /etc/nginx/siloss1.key.bak /etc/nginx/siloss1.key
cp /etc/nginx/siloss1.pem.bak /etc/nginx/siloss1.pem
```

4. Repeat these steps on each Database Server in your SL1 system.

Resetting the Timeout for PhoneHome Watchdog

You can manually reset the settings for the PhoneHome Watchdog server back to the settings you used before the upgrade.

To edit the settings for the watchdog service:

1. Log in to the console of the Data Collector as the root user or open an SSH session on the Data Collector.
2. View your PhoneHome Watchdog settings:

```
phonehome watchdog view
```

Your output will look like the following:

```
Current settings:
autosync: yes
interval: 120
state: enabled
autoreconnect: yes
timeoutcount: 1
check: default
```

Note the settings for *interval* and *timeoutcount*, so you can restore them after the upgrade.

3. To change the settings for SL1 upgrade, type the following at the command line:

```
sudo phonehome watchdog set interval=<previous setting>;
sudo phonehome watchdog set timeoutcount=<previous setting>;
systemctl stop em7_ph_watchdog;
systemctl start em7_ph_watchdog;
```

4. Repeat these steps on each Data Collector.
5. Repeat these steps on each Message Collector.
6. Repeat these steps on each Database Server.

Updating Default PowerPacks

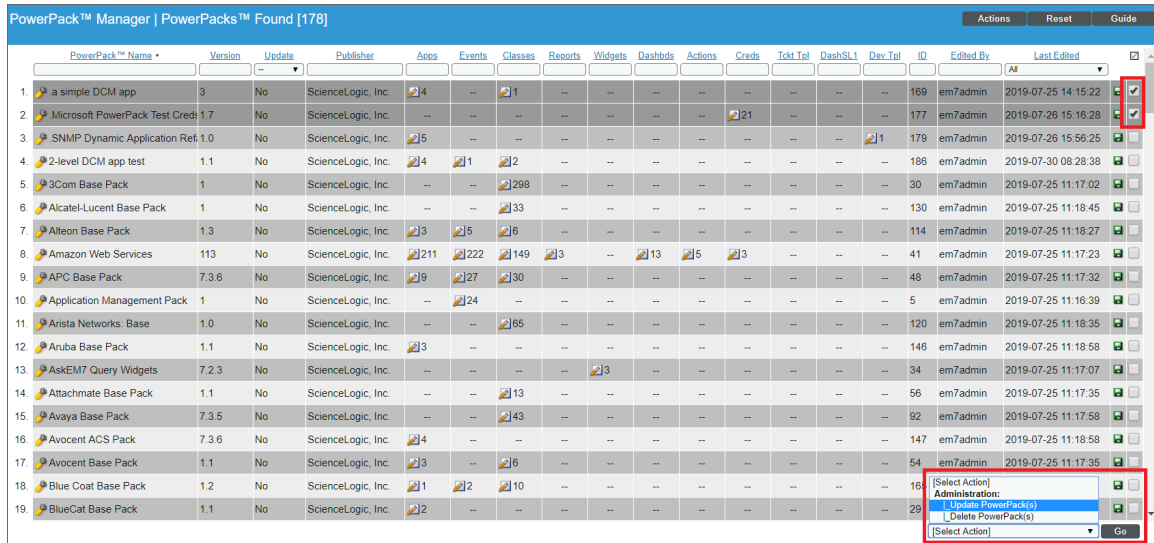
Every time you install a software update on your appliances, ScienceLogic recommends that you also install the updates for all the PowerPacks that were included in the software update.

ScienceLogic includes multiple PowerPacks in the default installation of SL1. When you apply an update to your system, new versions of the default PowerPacks will be automatically imported in to your system. If a PowerPack is included in an update and is not currently installed on your system, SL1 will automatically install the PowerPack. If a PowerPack is included in an update and is currently installed on your system, SL1 will automatically import (but not install) the PowerPack.

If PowerPacks have been imported into your system but have not been installed, the **Update** column appears in the **PowerPack Manager** page (System > Manage > PowerPacks). For each PowerPack that has been imported to your system but has not been installed, the lightning bolt icon (⚡) appears in the **Update** field on the **PowerPack Manager** page.

To install the updates for multiple PowerPacks:

1. Go to the **PowerPack Manager** page (System > Manage > PowerPacks).



2. In the **PowerPack Manager** page, select the checkbox for each PowerPack you want to install.
3. In the **Select Action** drop-down field (in the lower right), choose **Update PowerPack(s)**.
4. SL1 will display the following message before updating the PowerPack(s):

Update the selected PowerPacks?

NOTE: Any customizations to items contained in updated PowerPacks will be overwritten by the version contained within the more recently imported PowerPack file.

Click the **[OK]** button to continue the installation. Click the **[Cancel]** button to quit the update.

5. Click the **[Go]** button. If you completed the update, updated information about the PowerPack will appear in the **PowerPack Manager** page. All the items in the PowerPack will be automatically installed in your SL1 system.

NOTE: You can install multiple PowerPacks with the **Select Action** drop-down list only if each selected PowerPack includes an embedded Installation Key. PowerPacks that do not include embedded Installation Keys will fail to install.

NOTE: The **Enable Selective PowerPack Field Protection** field on the **Behavior Settings** page (System > Settings > Behavior) affects how updates behave. If the **Enable Selective PowerPack Field Protection** checkbox is selected, certain fields in Event Policies, Dynamic Applications, and Device Classes will **not** be updated.

Configuring Subscription Billing

If your SL1 system is configured to communicate with the ScienceLogic billing server, usage data will be sent automatically from your SL1 system to the ScienceLogic billing server once a day. After the ScienceLogic billing server receives the usage data, SL1 will automatically mark the license usage file as delivered.

Sending usage data to the ScienceLogic billing server ensures that your bill is accurate and that ScienceLogic can continue making improvements to the SL1 products.

To determine if you have correctly configured Subscription Billing:

- Go to the **System Usage** page (System > Monitor > System Usage) or (Manage > Subscription Usage). Click the **[Subscription]** button and choose **License Data Delivery Status**.
- For air-gapped SL1 systems, the value of **Summary Date** should be within the past 48 hours.
- For SL1 systems that connect to ScienceLogic, the value of **Summary Date** should be within the past 48 hours and the value of **Delivery Status** is 1.



For details on configuring subscription billing, see the **Subscription Billing** manual.

Monitoring and Maintaining SL1

Overview

This chapter describes how to manage user access, manage scheduled tasks, and more.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon ().
- To view a page containing all the menu options, click the Advanced menu icon ().

This chapter includes the following topics:

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<i>Managing Scheduled Tasks</i>	201
<i>Putting the Database Server into Maintenance Mode</i>	205
<i>Monitoring Overall System Usage and Statistics</i>	206
<i>Viewing an Overview of All Events</i>	207
<i>Viewing Events by Appliance and Event Source</i>	208

Monitoring and Managing User Access

The **Access Sessions** page allows administrators to monitor user logins and logouts to the user interface.

From this page, you can also:

- End a user's session.
- View a list of accounts that are locked out of the user interface due to invalid username and password.
- Unlock accounts that are locked out of the user interface.

Viewing Information about Each Access Session

The **Access Sessions** page displays a list of recent logins to the user interface. To view the **Access Sessions** page:

1. Go to the **Access Sessions** page (System > Monitor > Access Logs).

The screenshot shows the 'Access Sessions | Log Entries Found [125]' page. The table has the following columns: User Account, Last Address, State, Login Time, Last Hit Time, Logout Time, Session Duration, and Session ID. The table contains 26 rows of data, each representing a session for the user 'em7admin' from the IP address '10.128.38.60'. The sessions show various states such as 'Logged In', 'Expired', and 'Logged Out' with corresponding timestamps and session IDs.

User Account	Last Address	State	Login Time	Last Hit Time	Logout Time	Session Duration	Session ID
em7admin	10.128.38.60	Logged In	2017-05-02 16:27:15	2017-05-02 16:27:15	--	14 secs	640mr9faqab20aigkiorc7
em7admin	10.128.38.59	Logged In	2017-05-02 12:12:53	2017-05-02 12:12:53	--	4 hrs 14 mins 36 secs	2dd1euomq805bz2k275dk35
em7admin	10.128.38.67	Logged Out	2017-05-01 13:13:11	2017-05-01 16:55:55	2017-05-01 16:55:55	3 hrs 37 mins 44 secs	qg3rd490g3fnaamig7aif3d6
em7admin	10.128.38.67	Logged Out	2017-05-01 10:30:09	2017-05-01 11:44:24	2017-05-01 11:44:24	1 hr 14 mins 15 secs	bfmfp2sio6o6h63f08og168u6
em7admin	10.128.38.68	Expired	2017-04-28 15:17:59	2017-04-28 15:17:59	2017-04-28 15:17:59	0 secs	g0e641fmbaa2fue3bhoqan4
em7admin	10.128.39.251	Expired	2017-04-26 15:47:57	2017-04-26 15:47:57	2017-04-26 15:47:57	0 secs	jrn23accr05o8fman9h6k538g2
em7admin	10.128.38.102	Expired	2017-04-25 09:03:21	2017-04-25 09:03:21	2017-04-25 09:03:21	0 secs	r9qas0jhqkhd9d9fppb1
em7admin	10.128.39.224	Logged Out	2017-04-21 12:48:52	2017-04-21 15:10:40	2017-04-21 15:10:40	2 hrs 21 mins 48 secs	j6cuc3np3burda7f9fadm9d0
em7admin	10.128.39.216	Expired	2017-04-21 13:02:34	2017-04-21 13:02:34	2017-04-21 13:02:34	0 secs	50k0t6ca7o75a0t9fom2b1
em7admin	10.128.38.68	Logged Out	2017-04-20 11:46:49	2017-04-20 16:02:13	2017-04-20 16:02:13	4 hrs 15 mins 24 secs	98b0pupqunca88bpg7g4a0
em7admin	10.128.38.182	Expired	2017-04-20 15:31:21	2017-04-20 15:31:21	2017-04-20 15:31:21	0 secs	0q0p0h4f4qg2v04thqf6f81
em7admin	10.128.38.68	Expired	2017-04-20 11:46:48	2017-04-20 11:46:48	2017-04-20 11:46:48	0 secs	ja0n1a7455c5sash1a9muc0533
em7admin	10.128.38.91	Expired	2017-04-19 12:56:38	2017-04-19 12:56:38	2017-04-19 12:56:38	0 secs	780ns7cm9h238gbofmpno12
em7admin	10.128.38.43	Logged Out	2017-04-18 09:59:26	2017-04-18 16:17:04	2017-04-18 16:17:04	6 hrs 17 mins 38 secs	ahm0g70320m3mu5opiggh6
em7admin	10.128.38.53	Expired	2017-04-18 15:22:25	2017-04-18 15:22:25	2017-04-18 15:22:25	0 secs	kk2k11qpp1qdg7u0c95pp15
em7admin	10.128.38.53	Expired	2017-04-18 13:45:34	2017-04-18 15:22:25	2017-04-18 15:22:25	1 hr 36 mins 51 secs	kk2k11qpp1qdg7u0c95pp15
em7admin	10.128.38.53	Expired	2017-04-18 11:40:16	2017-04-18 13:45:34	2017-04-18 13:45:34	1 hr 56 mins 18 secs	kk2k11qpp1qdg7u0c95pp15
em7admin	10.128.39.235	Expired	2017-04-17 12:57:57	2017-04-18 11:49:16	2017-04-18 11:49:16	22 hrs 51 mins 19 secs	kk2k11qpp1qdg7u0c95pp15
em7admin	10.128.39.231	Logged Out	2017-04-17 16:28:25	2017-04-17 17:19:34	2017-04-17 17:19:34	51 mins 9 secs	08ua2zsr1uctqhh9k43o5
em7admin	10.128.39.219	Expired	2017-04-14 16:13:11	2017-04-14 16:13:11	2017-04-14 16:13:11	0 secs	gib0h904o5o5m0gkko2u2gm3
em7admin	10.128.39.228	Expired	2017-04-14 10:26:50	2017-04-14 11:30:54	2017-04-14 11:30:54	1 hr 4 mins 4 secs	gk0q5fms8m0oub7363no261
em7admin	10.128.39.228	Expired	2017-04-14 11:30:54	2017-04-14 11:30:54	2017-04-14 11:30:54	0 secs	gk0q5fms8m0oub7363no261
em7admin	10.128.39.219	Expired	2017-04-14 10:43:12	2017-04-14 10:43:12	2017-04-14 10:43:12	0 secs	u7hg4p6fvr1f5jg4k3aba0
em7admin	10.128.38.43	Logged Out	2017-04-13 16:28:48	2017-04-13 16:41:18	2017-04-13 16:41:18	12 mins 30 secs	7nb23nc06boho34hesp03o1
em7admin	10.128.39.142	Expired	2017-04-13 12:22:58	2017-04-13 12:22:58	2017-04-13 12:22:58	0 secs	cgf0p0p0h4f4qg2v04thqf6f81
em7admin	10.128.39.175	Logged Out	2017-04-12 10:29:16	2017-04-12 16:58:43	2017-04-12 16:58:43	6 hrs 29 mins 27 secs	o8f0mcaazavqrmjs1c7jron4

2. For each session, the **Access Sessions** page displays:

- **User Account.** Username of person logging in to the user interface.
- **Last Address.** IP address from which the user accessed the user interface.
- **State.** Current status of the user. The choices are:
 - *Active.* User is currently logged in to the user interface.
 - *Expired.* User's session in the user interface was killed.
 - *Logged Out.* User logged out of the user interface.

- *Never Used*. User logged in to the user interface and did not perform any tasks before the session was killed.

- **Login Time**. Date and time at which the user logged in.
- **Last-Hit Time**. Date and time at which the user last loaded a page in the user interface.
- **Logout Time**. Date and time at which the user logged out.
- **Session Duration**. Length of time between login and logout.
- **Session ID**. Unique numeric ID assigned to each user session.

Deleting a User's Session

From the **Access Sessions** page, you can end a user's session in the user interface. The user must log in again to access the user interface. The status of the session will be "expired".

To end a user's session:

1. Go to the **Access Sessions** page (System > Monitor > Access Logs).

Access Sessions Log Entries Found [125]										Lockouts	Reset	Guide
User Account	Last Address	Status	State	Login Time	Last-Hit Time	Logout Time	Session Duration	Session ID				
em7admin	10.128.38.60	Logged In		2017-05-02 16:27:15	2017-05-02 16:27:15	--	14 secs	64d9f98a2b020a90keor7	<input type="checkbox"/>			
em7admin	10.128.38.59	Logged In		2017-05-02 12:12:53	2017-05-02 12:12:53	--	4 hrs 14 mins 36 secs	2d91eumog80bz2k2757d35	<input type="checkbox"/>			
em7admin	10.128.38.67	Logged Out		2017-05-01 13:13:11	2017-05-01 16:50:55	2017-05-01 16:50:55	3 hrs 37 mins 44 secs	qg3rd490g3fnaanmg7af3d5	<input type="checkbox"/>			
em7admin	10.128.38.67	Logged Out		2017-05-01 10:30:09	2017-05-01 11:44:24	2017-05-01 11:44:24	1 hr 14 mins 15 secs	bf9e2a10e0b6390aog168a4	<input type="checkbox"/>			
em7admin	10.128.38.69	Expired		2017-04-28 15:17:59	2017-04-28 15:17:59	2017-04-28 15:17:59	0 secs	gg0ee4fmbaa20u30h0qan4	<input type="checkbox"/>			
em7admin	10.128.38.251	Expired		2017-04-26 15:47:57	2017-04-26 15:47:57	2017-04-26 15:47:57	0 secs	jm23accr5e6fman8h6538g2	<input type="checkbox"/>			
em7admin	10.128.38.102	Expired		2017-04-25 09:03:21	2017-04-25 09:03:21	2017-04-25 09:03:21	0 secs	rj6qa10h0khd949pp1	<input type="checkbox"/>			
em7admin	10.128.39.224	Logged Out		2017-04-21 12:48:52	2017-04-21 15:10:40	2017-04-21 15:10:40	2 hrs 21 mins 48 secs	yx0u3np3iburd47jgnfadnbg0	<input type="checkbox"/>			
em7admin	10.128.39.216	Expired		2017-04-21 13:02:34	2017-04-21 13:02:34	2017-04-21 13:02:34	0 secs	5u0k0eca7o75a01glo8z01	<input type="checkbox"/>			
em7admin	10.128.38.68	Logged Out		2017-04-20 11:49:49	2017-04-20 16:02:13	2017-04-20 16:02:13	4 hrs 15 mins 24 secs	98lbgpupgunc88hpg7g4a0	<input type="checkbox"/>			
em7admin	10.128.38.182	Expired		2017-04-20 15:31:21	2017-04-20 15:31:21	2017-04-20 15:31:21	0 secs	0p0pghq1qg2ivo4hnyg0f01	<input type="checkbox"/>			
em7admin	10.128.38.68	Expired		2017-04-20 11:46:48	2017-04-20 11:46:48	2017-04-20 11:46:48	0 secs	ja0n1a74d5ccsrsh1aqmucc633	<input type="checkbox"/>			
em7admin	10.128.38.91	Expired		2017-04-19 12:56:38	2017-04-19 12:56:38	2017-04-19 12:56:38	0 secs	780ns7cmg0a238gtofnqno2	<input type="checkbox"/>			
em7admin	10.128.38.43	Logged Out		2017-04-18 09:59:26	2017-04-18 16:17:04	2017-04-18 16:17:04	6 hrs 17 mins 38 secs	ah0p07032083mu5opjggh6	<input type="checkbox"/>			
em7admin	10.128.38.53	Expired		2017-04-18 15:22:25	2017-04-18 15:22:25	2017-04-18 15:22:25	0 secs	kk2k1kqp1p0q7u0cg5bp15	<input type="checkbox"/>			
em7admin	10.128.38.53	Expired		2017-04-18 13:45:34	2017-04-18 15:22:25	2017-04-18 15:22:25	1 hr 36 mins 51 secs	kk2k1kqp1p0q7u0cg5bp15	<input type="checkbox"/>			
em7admin	10.128.38.53	Expired		2017-04-18 11:48:16	2017-04-18 13:45:34	2017-04-18 13:45:34	1 hr 56 mins 18 secs	kk2k1kqp1p0q7u0cg5bp15	<input type="checkbox"/>			
em7admin	10.128.39.235	Expired		2017-04-17 12:57:57	2017-04-18 11:49:16	2017-04-18 11:49:16	22 hrs 51 mins 19 secs	kk2k1kqp1p0q7u0cg5bp15	<input type="checkbox"/>			
em7admin	10.128.39.231	Logged Out		2017-04-17 16:28:25	2017-04-17 17:19:34	2017-04-17 17:19:34	51 mins 9 secs	08uaq2rs1uctqhh9k4305	<input type="checkbox"/>			
em7admin	10.128.39.219	Expired		2017-04-14 16:13:11	2017-04-14 16:13:11	2017-04-14 16:13:11	0 secs	gib0h0d4b50m0gko2u2gm3	<input type="checkbox"/>			
em7admin	10.128.39.228	Expired		2017-04-14 10:30:50	2017-04-14 11:30:54	2017-04-14 11:30:54	1 hr 4 mins 4 secs	g8k0c0m58m0cubh7363nc261	<input type="checkbox"/>			
em7admin	10.128.39.228	Expired		2017-04-14 11:30:54	2017-04-14 11:30:54	2017-04-14 11:30:54	0 secs	g8k0c0m58m0cubh7363nc261	<input type="checkbox"/>			
em7admin	10.128.39.219	Expired		2017-04-14 10:43:12	2017-04-14 10:43:12	2017-04-14 10:43:12	0 secs	u17g4p0f1f5g64r2ab0	<input type="checkbox"/>			
em7admin	10.128.38.43	Logged Out		2017-04-13 16:28:48	2017-04-13 16:41:18	2017-04-13 16:41:18	12 mins 30 secs	7n023ncv0b0h034hesp8d301	<input type="checkbox"/>			
em7admin	10.128.39.142	Expired		2017-04-13 12:22:58	2017-04-13 12:22:58	2017-04-13 12:22:58	0 secs	cp1tpav0plksd296mq04fus07	<input type="checkbox"/>			
em7admin	10.128.39.175	Logged Out		2017-04-12 10:29:16	2017-04-12 16:58:43	2017-04-12 16:58:43	6 hrs 29 mins 27 secs	o8fpmcaajvgqjms1c7jron4	<input type="checkbox"/>			

2. In the **Access Sessions** page, find the session you want to end. Click the checkbox () for that session.
3. Click the **Select Actions** field (in the lower right of the page) and then select **Kill user session**. Click the **[Go]** button
4. Each selected session is ended. The user associated with each selected session is logged out of the user interface. The status of the session changes to "expired".

NOTE: After ending a user's session, that user can immediately log in to the user interface again. To prevent a user from logging in to the user interface, you must disable the user's account. For information on user accounts, see the manual *Organizations and Users*.

Viewing Lockouts and Unlocking Lockouts

If a user enters incorrect login information multiple times in a row, that username, the user's IP address, or both will be locked out of the user interface.

To view lockouts or restore login privileges to locked out users:

1. Go to the **Access Sessions** page (System > Monitor > Access Logs).
2. In the **Access Sessions** page, click the **[Lockouts]** button.
3. The **Account Lockouts** modal page allows administrators to view a list of locked-out accounts and to restore login privileges to locked out users.



Attempt Account	From Address	Attempt Time	Trys
1. ttesterson	192.168.37.12	2012-03-20 18:59:00	3

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4. The **Account Lockouts** modal page displays the following about each lockout:
 - **Attempt Account.** Username that caused the lockout.
 - **From Address.** IP address from which the failed login attempts originated.
 - **Attempt Time.** Date and time at which lockout occurred.
 - **Tries.** Number of times user tried to log in to the user interface.
5. **To remove the lock for the user account** and allow logins from the username and/or IP address, click the bomb icon (💣).

Global Settings for Lockouts

The platform includes global settings that define how lockouts behave. In the [Behavior Settings](#) page (System > Settings > Behavior), the following fields affect lock-outs:

- **Account Lockout Type**
- **Account Lockout Attempts**
- **Account Lockout Duration**
- **Lockout Contact Information**

Audit Logs

For additional information about users and their actions in the platform, you can view the **Audit Logs** page. The **Audit Logs** page provides a complete audit trail for the platform. The **Audit Logs** page displays a record of all actions in the platform that are generated by users or by managed elements. For details, see the section on [Audit Logs](#).

Managing Scheduled Tasks

The **Schedule Manager** page (Registry > Schedules > Schedule Manager) allows you to view and manage all the scheduled processes you have defined in your system.

You can define scheduled processes in the following pages:

- Report Scheduler. (For more information, see the **Reports** manual.)
- My Work Schedule. (For more information, see the **Organizations and Users** manual.)
- Recurring Ticketing Scheduler. (For more information, see the **Ticketing** manual.)
- Discovery Control Panel. (For more information, see the **Discovery and Credentials** manual.)
- Dashboards. (For more information, see the **Dashboards** manual.)
- IT Service Editor. (For more information, see the **IT Services** manual.)

- Device Manager. (For more information, see the **Device Management** manual.)
- Backup Management. (For more information, see the section on [Configuration Backups](#).)

Recommended System Maintenance

ScienceLogic also recommends that you take the following actions on a regular basis to reduce outages as much as possible.

Daily:

- Review "SL1 Operational Insights: Database Performance" classic dashboard
- Review "SL1 Operational Insights: Collector Performance" classic dashboard
- Review "SL1 Operational Insights: System Log Summary" classic dashboard
- Review "SL1 Operational Insights: Backup History" classic dashboard

Weekly:

- Run the System Status Script and review
 - Address every error item in the report
 - Read Knowledge Base articles
 - Open tickets for issues when help from SL1 Support is needed

Monthly:

- Review capacity items
 - You must understand License Usage and how to project future capacity

Quarterly:

- Audit User Profile access to verify that it meets expected needs
- Audit DNS servers and Timeservers on all collectors

Viewing the List of Schedules

The **Schedule Manager** page (Registry > Schedules > Schedule Manager) displays the following about each schedule:

Schedule Manager Schedules Found [18]														Reset	Guide
Schedule Summary *	Schedule Description	Event ID	sch_id	Context	Timezone	Start Time	Duration	Recurrence Interval	End Date	Last Run	Owner	Organization	Visibility	Enabled	
1. SAC Daily Discovery Maint	SAC Daily Discovery Maint	175	0	Discovery	America/Chicago	2017-10-01 08:00:00	30 minute	Every 2 Days	2018-10-01 08:00:00	--	AutoRegUser	System	World	Yes	
2. SAC Daily Report Maint	SAC Daily Asset List Report	158	54	Reports	America/New_York	2017-10-01 08:00:00	30 minute	Every 1 Day	2018-10-01 08:00:00	--	AutoRegUser	System	World	Yes	
3. SAC Hourly Ticket Maint	SAC Hourly Ticket Maintenance	155	40	Tickets	America/New_York	2017-10-01 08:00:00	30 minute	Every 24 Hours	2018-10-01 08:00:00	--	AutoRegUser	System	World	Yes	
4. SAC One Time Dev Maint	SAC One Time Device Maint	165	66	Devices	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	AutoRegUser	System	World	Yes	
5. SAC One Time Dev Maint	SAC One Time Device Maint	153	82	Devices	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	AutoRegUser	System	World	Yes	
6. SAC Weekly IT Service Man	SAC Weekly IT Service Schr	160	0	IT Services	America/New_York	2017-10-01 08:00:00	30 minute	Every 1 Week	2018-10-01 08:00:00	--	AutoRegUser	System	World	Yes	
7. sch_1	sch_1: admin-system-world	166	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	em7admin	System	World	Yes	
8. sch_2	sch_2: admin-system-org	167	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	em7admin	System	Organization	Yes	
9. sch_4	sch_4: admin-system-world	169	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	sac_user1	SAC_Scheduler_T	World	Yes	
10. sch_5	sch_5: admin-system-org	170	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	sac_user1	SAC_Scheduler_T	Organization	Yes	
11. sch_7	sch_7: admin-system-world	172	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	sac_user2	System	World	Yes	
12. sch_9	sch_9: admin-system-org	173	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	sac_user2	System	Organization	Yes	
13. Scrum Fu Pandas Discover	--	32	0	Discovery	America/New_York	2016-07-25 23:00:00	30 minute	Every 1 Day	--	2017-01-17 23:30:00	em7admin	System	World	Yes	
14. Scrummy Bears Discovery	--	33	0	Discovery	America/New_York	2016-07-25 23:00:00	30 minute	Every 1 Day	--	2017-01-17 23:30:00	em7admin	System	World	Yes	
15. System Patch Install - versio	--	34	882	Patches	UTC	2016-07-26 21:15:00	30 minute	Every 0 Minutes	--	2016-07-26 21:45:00	em7admin	System	World	Yes	
16. System Patch Install - versio	--	50	1714	Patches	UTC	2016-10-11 18:33:00	30 minute	Every 0 Minutes	--	2016-10-11 19:03:00	em7admin	System	World	Yes	
17. System Patch Install - versio	--	58	2169	Patches	UTC	2016-11-09 21:13:00	30 minute	Every 0 Minutes	--	2016-11-09 21:43:00	em7admin	System	World	Yes	
18. System Patch Install - versio	--	125	2530	Patches	UTC	2016-12-11 19:28:00	30 minute	Every 0 Minutes	--	2016-12-11 19:58:00	em7admin	System	World	Yes	

- **Schedule Summary.** Displays the name assigned to the scheduled process.
- **Schedule Description.** Displays a description of the scheduled process.
- **Event ID.** Displays a unique, numeric ID for the scheduled process. SL1 automatically creates this ID for each scheduled process.
- **sch id.** Displays a unique, numeric ID for the schedule. SL1 automatically creates this ID for each schedule.
- **Context.** Displays the area of SL1 upon which the schedule works.
- **Timezone.** Displays the time zone associated with the scheduled process.
- **Start Time.** Displays the date and time at which the scheduled process will begin.
- **Duration.** Displays the duration, in minutes, which the scheduled process occurs.
- **Recurrence Interval.** If applicable, displays the interval at which the scheduled process recurs.
- **End Date.** If applicable, displays the date and time on which the scheduled process will recur.
- **Last Run.** If applicable, displays the date and time the scheduled process most recently ran.
- **Owner.** Displays the username of the owner of the scheduled process.
- **Organization.** Displays the organization to which the scheduled process is assigned.
- **Visibility.** Displays the visibility level for the scheduled process. Possible values are "Private", "Organization", or "World".
- **Enabled.** Specifies if the scheduled process is enabled. Possible values are "Yes" or "No".

Enabling or Disabling One or More Schedules

You can enable or disable one or more scheduled process from the **Schedule Manager** page (Registry > Schedules > Schedule Manager). To do this:

1. Go to the **Schedule Manager** page (Registry > Schedules > Schedule Manager).

The screenshot shows the 'Schedule Manager | Schedules Found [18]' interface. It features a table with columns for Schedule Summary, Schedule Description, Event ID, sch_id, Context, Timezone, Start Time, Duration, Recurrence Interval, End Date, Last Run, Owner, Organization, Visibility, and Enabled. The first row is selected, and a dropdown menu is open over the 'Enabled' column, showing options: Administration, DELETE Schedules, ENABLE Schedules, and DISABLE Schedules. A 'Go' button is visible at the bottom right of the dropdown.

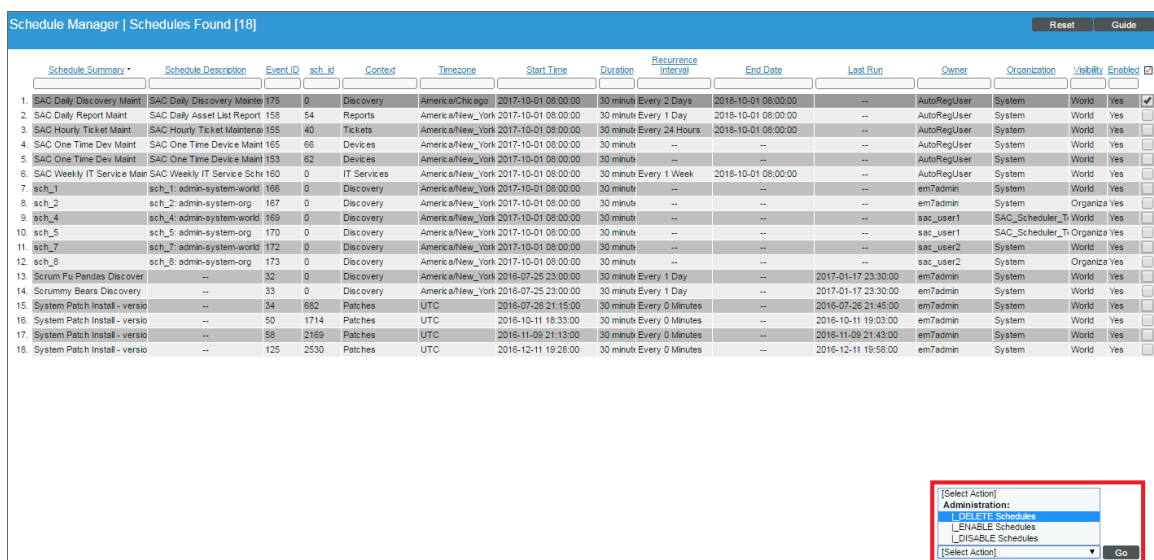
Schedule Summary	Schedule Description	Event ID	sch_id	Context	Timezone	Start Time	Duration	Recurrence Interval	End Date	Last Run	Owner	Organization	Visibility	Enabled
1. SAC Daily Discovery Maint	SAC Daily Discovery Maint	175	0	Discovery	America/Chicago	2017-10-01 08:00:00	30 minute	Every 2 Days	2018-10-01 08:00:00	--	AutoRegUser	System	World	Yes <input checked="" type="checkbox"/>
2. SAC Daily Report Maint	SAC Daily Asset List Report	158	54	Reports	America/New_York	2017-10-01 08:00:00	30 minute	Every 1 Day	2018-10-01 08:00:00	--	AutoRegUser	System	World	Yes <input type="checkbox"/>
3. SAC Hourly Ticket Maint	SAC Hourly Ticket Maint	155	40	Tickets	America/New_York	2017-10-01 08:00:00	30 minute	Every 24 Hours	2018-10-01 08:00:00	--	AutoRegUser	System	World	Yes <input type="checkbox"/>
4. SAC One Time Dev Maint	SAC One Time Device Maint	165	66	Devices	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	AutoRegUser	System	World	Yes <input type="checkbox"/>
5. SAC One Time Dev Maint	SAC One Time Device Maint	153	62	Devices	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	AutoRegUser	System	World	Yes <input type="checkbox"/>
6. SAC Weekly IT Service Maint	SAC Weekly IT Service Sch	160	0	IT Services	America/New_York	2017-10-01 08:00:00	30 minute	Every 1 Week	2018-10-01 08:00:00	--	AutoRegUser	System	World	Yes <input type="checkbox"/>
7. sch_1	sch_1: admin-system-world	166	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	em7admin	System	World	Yes <input type="checkbox"/>
8. sch_2	sch_2: admin-system-org	167	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	em7admin	System	Organiza	Yes <input type="checkbox"/>
9. sch_4	sch_4: admin-system-world	169	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	sac_user1	SAC_Scheduler_T	World	Yes <input type="checkbox"/>
10. sch_5	sch_5: admin-system-org	170	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	sac_user1	SAC_Scheduler_T	Organiza	Yes <input type="checkbox"/>
11. sch_7	sch_7: admin-system-world	172	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	sac_user2	System	World	Yes <input type="checkbox"/>
12. sch_8	sch_8: admin-system-org	173	0	Discovery	America/New_York	2017-10-01 08:00:00	30 minute	--	--	--	sac_user2	System	Organiza	Yes <input type="checkbox"/>
13. Scrum Fu Pandas Discover	--	32	0	Discovery	America/New_York	2016-07-25 23:00:00	30 minute	Every 1 Day	--	2017-01-17 23:30:00	em7admin	System	World	Yes <input type="checkbox"/>
14. Scrummy Bears Discovery	--	33	0	Discovery	America/New_York	2016-07-25 23:00:00	30 minute	Every 1 Day	--	2017-01-17 23:30:00	em7admin	System	World	Yes <input type="checkbox"/>
15. System Patch Install - versio	--	34	882	Patches	UTC	2016-07-26 21:15:00	30 minute	Every 0 Minutes	--	2016-07-26 21:45:00	em7admin	System	World	Yes <input type="checkbox"/>
16. System Patch Install - versio	--	50	1714	Patches	UTC	2016-10-11 18:33:00	30 minute	Every 0 Minutes	--	2016-10-11 19:03:00	em7admin	System	World	Yes <input type="checkbox"/>
17. System Patch Install - versio	--	58	2169	Patches	UTC	2016-11-09 21:13:00	30 minute	Every 0 Minutes	--	2016-11-09 21:43:00	em7admin	System	World	Yes <input type="checkbox"/>
18. System Patch Install - versio	--	125	2530	Patches	UTC	2016-12-11 19:28:00	30 minute	Every 0 Minutes	--	2016-12-11 19:58:00	em7admin	System	World	Yes <input type="checkbox"/>

2. Select the checkbox icon for each scheduled process you want to enable or disable.
3. Click the **Select Action** menu and choose *Enable Schedules* or *Disable Schedules*.
4. Click the **[Go]** button.

Deleting One or More Schedules

You can delete one or more scheduled process from the **Schedule Manager** page (Registry > Schedules > Schedule Manager). To do this:

1. Go to the **Schedule Manager** page (Registry > Schedules > Schedule Manager).



The screenshot shows the 'Schedule Manager | Schedules Found [18]' interface. It features a table with columns: Schedule Summary, Schedule Description, Event ID, ssh_id, Context, Timezone, Start Time, Duration, Recurrence Interval, End Date, Last Run, Owner, Organization, Visibility, and Enabled. The table lists 18 scheduled processes, including 'SAC Daily Discovery Maint', 'SAC Daily Report Maint', 'SAC Hourly Ticket Maint', 'SAC One Time Dev Maint', 'SAC Weekly IT Service Maint', and various 'sch_' entries. A dropdown menu is open at the bottom right, showing options: '[Select Action]', 'Administration', 'Enable All Schedules', 'Disable Schedules', 'Disable Schedules', and '[Select Action]'. A 'Go' button is located to the right of the dropdown.

2. Select the checkbox icon for each scheduled process you want to delete.
3. Click the **Select Action** menu and choose *Delete Schedules*.
4. Click the **[Go]** button.

Putting the Database Server into Maintenance Mode

You can now put the Database Server in maintenance mode and stop all pull processes from the Data Collectors. You can then perform database maintenance or network maintenance without generating events.

After maintenance is completed, you can put the Database Server out of maintenance mode. Pull processes from the Data Collectors will resume from the point where they were paused.

The new commands are silostart and silostop.

To put a Database Server in maintenance mode:

1. Either go to the console of a Database Server or SSH to access the Database Server.
2. Log in as **em7admin** with the appropriate password.
3. At the shell prompt, execute the following:

```
silostop
```

To put a Database Server out of maintenance mode:

1. Either go to the console of a Database Server or SSH to access the Database Server.
2. Log in as **em7admin** with the appropriate password.
3. At the shell prompt, execute the following:

```
silostart
```

Monitoring Overall System Usage and Statistics

The **System Usage** page displays:

- Tables that show the type and number of each type of task performed by SL1
- An optional line graph that displays system usage. To enable the display of this graph, go to the **Behavior Settings** page (System > Settings > Behavior) and uncheck the **Hide Perpetual License Count** checkbox. The graph displays the following metrics over time:
 - **Capacity**. The total monitoring capacity of the system. This value is determined by the license(s) for the Database Server(s) or All-In-One Appliance(s) in the system.
 - **Number of Devices**. The number of devices currently discovered in the system.
 - **System Usage**. The amount of **Capacity** that the devices in the system are currently using. This value is the sum of the **Device Ratings** for all devices in the system. The **Device Rating** for each device is calculated daily and is based on the number of collections performed for that device.
- If you have a subscription license, you can also generate reports about subscription licensing.

To view the **System Usage** page:

1. Go to the **System Usage** page (System > Monitor > System Usage).
2. The **System Usage** page appears.

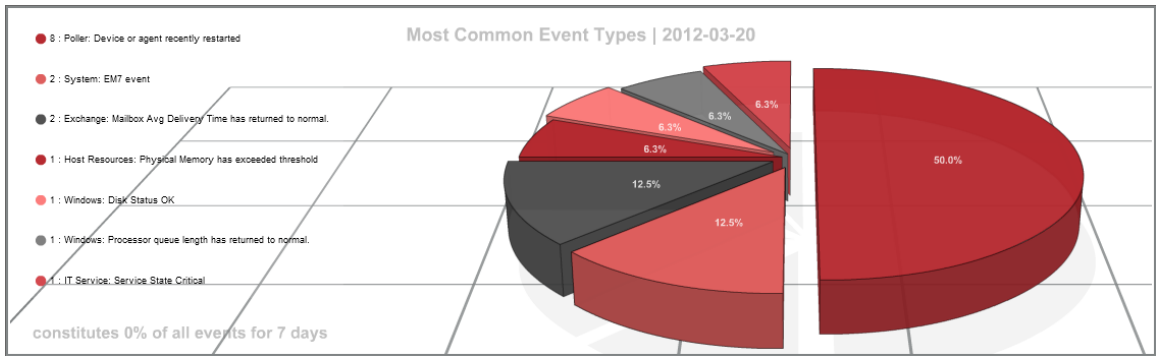
System Usage		Help	Activity	Em7admin	ScienceLogic
System Usage					
Managed Organizations	3	Dynamic Application SNMP Performance			736
User Accounts	5	Dynamic Application SNMP Configuration			875
Managed External Contacts	0	Dynamic Application XML Performance			0
Managed Vendors	1	Dynamic Application XML Configuration			0
Managed Devices	13	Dynamic Application Database Performance			0
Managed Assets	0	Dynamic Application Database Configuration			0
Managed Networks	4	Dynamic Application SOAP Performance			0
	Total Managed Elements:	Dynamic Application SOAP Configuration			0
		Dynamic Application Snippet Performance			168
CPU Monitors	0	Dynamic Application Snippet Configuration			139
File System Monitors	83	Dynamic Application XSLT Performance			0
Physical & Virtual Memory Monitors	0	Dynamic Application XSLT Config			0
	Total Vital Monitors:	Dynamic Application VM Performance			0
		Dynamic Application VMI Config			0
Domain Name Monitors	0	Dynamic Application Snippet Journal			0
Email Round-Trip Monitors	0	Dynamic Application IT Service			0
SOAP/XML Transaction Monitors	0	Dynamic Application PowerShell Performance			0
TCP/IP Port Monitors	0	Dynamic Application PowerShell Config			0
Web Content Monitors	0	Dynamic Application Bulk Snippet Configuration			0
System Process Monitors	0	Dynamic Application Internal Collection Inventory			0
SSL Cert Monitors	22	Dynamic Application Internal Collection Performance			0
Windows(tm) Service Monitors	0				0
	Total Synthetic Monitors:				0
					1918
PowerPacks	135	Network Interface Monitors [1 Min]			0
Dynamic Applications	1382	Network Interface Monitors [5 Min]			42
Event Definitions	3618	Network Interface Monitors [10 Min]			0
NOC Screens	1	Network Interface Monitors [15 Min]			0
Device Classes	6070	Network Interface Monitors [30 Min]			0
SNMP Mibs	4217	Network Interface Monitors [60 Min]			0
	Total Modeling Elements:	Network Interface Monitors [120 Min]			0
					0
					42
		Dashboards			73
		Scheduled Reports			0
		Device Groups			7
		Network Topology Views			0
		Product Catalog Elements			41
		Aligned Products			0
		Tickets			0
		Run Book Automation Actions			53
		Run Book Automation Policies			44
		RSS Syndication Feeds			2
		Dynamic Forms			2
					220
					Total Custom Elements:

Viewing an Overview of All Events

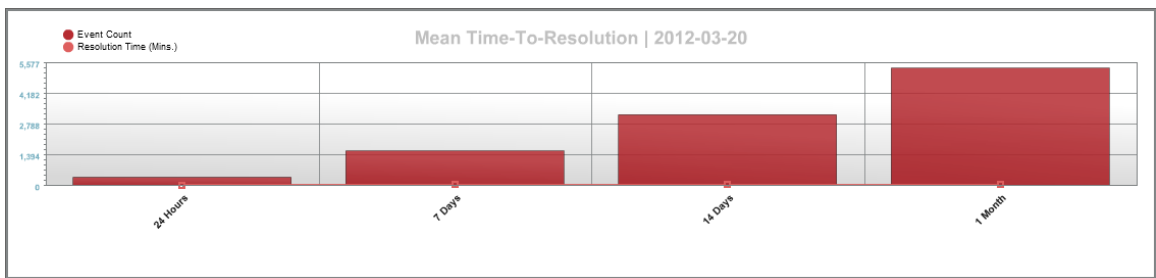
The **Event Overview** page (System > Monitor > Event Overview) provides a graphical overview of all events in SL1.

The **Event Overview** page displays the following reports:

- **Number of Events by Severity.** This graph displays event distribution by severity for the last 24 hours and for the last 7 days.
 - The y-axis displays the number of events.
 - The x-axis displays severity.
 - The red line represents events in the last 24 hours.
 - The blue line represents events in the last 7 days.
 - Mousing over a data point in the red line displays the number of events of the specified severity in the last 24 hours.
 - Mousing over a data point on the blue line displays the number of events of the specified severity in the last 7 days.



- **Most Common Event Types.** This pie graph displays the ten most frequently occurring events for the last 7 days.
 - Each slice of the pie represents an event type. The legend on the left maps each slice color to an event and lists the actual number of events of that type.
 - The graph displays percent. Compared to the total number of occurrences for the top ten events, each slice displays the percent that belong to a specific event.



- **Mean Time-to-Resolution.** This bar graph displays the number of events generated in the last 24 hours, 7 days, 14 days, and 30 days, and their average resolution time.
 - The y-axis displays the number of events.
 - The x-axis displays the time span. There is a bar for 24 hours, 7 days, 14 days, and 30 days.
 - The red bars represent the actual number of events associated with the time-to-resolution.
 - The blue bars represent the average number of events associated with the time-to-resolution.
 - Mousing over a bar displays the number of events associated with the time-to-resolution.

Viewing Events by Appliance and Event Source

The **Event Statistics** page displays a graph of the number of events processed by a selected Database Server, Data Collector, or Message Collector.

The **Event Statistics** page displays the following information:

- **Appliance.** In the field in the upper left, select from the list of all Database Servers, Data Collectors, and Message Collectors.
- **Event Type.** In the next field on the upper left, select from the list of event types. The choices are:
 - *API.* The event was generated by an external API.
 - *Dynamic.* Event was generated by a monitoring application running on the device.
 - *Email.* The event was generated by an incoming email.
 - *Internal.* Event was generated by SL1.
 - *Syslog.* Event was generated from standard system log generated by device.
 - *Trap.* Event was generated by an SNMP trap.

The graph displays the average number of events processed by the selected appliance, for the selected duration.

- The y-axis displays the average number of events.
- The x-axis displays time. The increments vary depending upon the selected data type (from the **[Options]** menu) and the date range (from the **Date Range Selection** pane).
- Mousing over any point in any line displays the value at that time-point in the **Mouse-over** column in the **Data Table** pane.
- You can use your mouse to scroll the report to the left and right.

Chapter

6

Admin Notifier

Overview

This chapter describes the **Admin Notifier**, which alerts administrator users upon login to any issues on monitored SL1 appliances that could lead to an outage, such as the database running out of space.

After login, the Admin Notifier displays a banner if any of the filtered events are found so that you can take action on the issues immediately.

This chapter includes the following topics:

How Does the Admin Notifier Work?	210
Admin Notifier in the Classic SL1 User Interface	211
What Issues Does the Admin Notifier Monitor?	212

How Does the Admin Notifier Work?

When certain events are present that could lead to a system outage, the Admin Notifier appears in SL1 for administrator users at login and persists as a banner at the top of the screen until no qualifying events are found. The Admin Notifier monitors your SL1 appliances for the events listed in the table in [What Issues Does the Admin Notifier Monitor?](#)

NOTE: If you are using the classic SL1 user interface, the Admin Notifier has additional functions. See [Admin Notifier in the Classic SL1 User Interface](#).

After logging in to SL1, administrators will see the following modal if qualifying events are found:

System Warning

You have 1 event which may lead to SL1 system failure.

OK
View Event

Click **[OK]** to continue or click **[View Events]** to go to the Events page to see a view filtered by admin events.

The System Warning banner will persist across the user interface until all of the qualifying events have been acknowledged.

To interact with the banner, you can click one of the buttons that appears on the banner:

- **Dismiss.** Hides the banner for the duration of your session or until another qualifying event is logged. If qualifying events are still present, the banner will reappear upon your next login.
- **Snooze.** Hides the banner for 15 minutes. If qualifying events are still present after 15 minutes, the banner will reappear.
- **View Events.** Opens the **Events** page with a filter applied that shows only the admin events.

Admin Notifier in the Classic SL1 User Interface

The System Warning banner appears as shown below in the classic user interface:

The screenshot shows the ScienceLogic Event Policy Manager interface. At the top, a system warning banner reads: "System Warning - You have 1 event which may lead to SL1 system failure." Below the banner is a table of event policies. The table has columns for Event Policy Name, Type, State, P-Pack, Severity, Admin Warning, Weight, ID, Expiry, Time, Threshold, Edited By, Last Edited, External ID, and Ext. Category. The table contains 20 rows of data, with various event policies listed, including AC Voltage sensor, DC Voltage sensor, Humidity, and Smoke Detector alerts.

Event Policy Name	Type	State	P-Pack	Severity	Admin Warning	Weight	ID	Expiry	Time	Threshold	Edited By	Last Edited	External ID	Ext. Category
AKCP: AC Voltage sensor detects no current	Syslog	Enabled	Yes	Critical	No	0	2074	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: AC Voltage sensor now reporting Normal	Syslog	Enabled	Yes	Healthy	No	0	2080	15 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: DC Voltage High Warning	Syslog	Enabled	Yes	Major	No	0	2085	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: DC Voltage sensor High Critical	Syslog	Enabled	Yes	Critical	No	0	2083	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: DC Voltage sensor Low Critical	Syslog	Enabled	Yes	Critical	No	0	2084	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: DC Voltage sensor Low Warning	Syslog	Enabled	Yes	Major	No	0	2086	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: DC Voltage sensor returned to Normal Status	Syslog	Enabled	Yes	Healthy	No	0	2087	15 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: Dry Contact Sensor Low Critical	Syslog	Enabled	Yes	Critical	No	0	2073	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: Dry contact sensor now Normal	Syslog	Enabled	Yes	Healthy	No	2	2078	15 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: Humidity High Warning	Syslog	Enabled	Yes	Major	No	0	2081	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: Humidity Low Warning	Syslog	Enabled	Yes	Major	No	0	2082	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: Smoke Detector Alert!	Syslog	Enabled	Yes	Critical	No	10	2079	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: Smoke detector now Normal Status	Syslog	Enabled	Yes	Healthy	No	4	2075	15 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: Water Sensor has detected water	Syslog	Enabled	Yes	Critical	No	0	2077	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
AKCP: Water sensor now Normal	Syslog	Enabled	Yes	Healthy	No	0	2076	15 Min.	0 Min.	0	em7admin	2022-03-25 14:04:41	--	--
Alteon: New Flash Enabled	Dynamic	Enabled	Yes	Notice	No	0	1896	30 Min.	0 Min.	0	em7admin	2022-03-25 14:04:33	--	--
Alteon: Primary Power Supply Failure	Dynamic	Enabled	Yes	Major	No	0	1892	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:33	--	--
Alteon: Primary Power Supply Healthy	Dynamic	Enabled	Yes	Healthy	No	0	1893	15 Min.	0 Min.	0	em7admin	2022-03-25 14:04:33	--	--
Alteon: Redundant Power Supply Failure	Dynamic	Enabled	Yes	Major	No	0	1894	90 Min.	0 Min.	0	em7admin	2022-03-25 14:04:33	--	--
Alteon: Redundant Power Supply Healthy	Dynamic	Enabled	Yes	Healthy	No	0	1895	15 Min.	0 Min.	0	em7admin	2022-03-25 14:04:33	--	--

In the classic user interface, you can select events to add to or remove from the System Warning banner. On the **Event Policy Manager** page (Registry > Events > Event Manager), the **Select Action** menu on the Event Policy Manager page includes the following options: *Enable Admin Banner Warning* and *Disable Admin Banner Warning* for selected events.

The **Event Policy Manager** page also includes a new **Admin Warning** column that specifies whether or not an event will be included in the System Warning Banner.

What Issues Does the Admin Notifier Monitor?

The following table includes the events that might appear in the Admin Notifier, the Dynamic Application that triggers the event, the severity of the event, and references that can help you resolve the problem before it causes an outage. Knowledge Base Articles (KBA) are found on the ScienceLogic Support website (<https://support.sciencelogic.com/s/knowledge>).

Event Name	Dynamic Application	Severity	Reference
Support: Database Config - License expires in less than 14 days	Support: Database Configuration	Critical	Renew license. See the chapter on <i>Licensing and Configuring an Appliance</i> in the Installation manual or Knowledge Base Article 4978 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: DRBD Proxy License Expiration Eminent	Support: DRBD Proxy License Expiration	Critical	Renew license. See the chapter on <i>Licensing and Configuring an Appliance</i> in the Installation manual or Knowledge Base Article 4979 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
InnoDB Space: Critical Threshold	Support: InnoDB Size	Critical	See the chapter on <i>Device Thresholds and Data Retention</i> in the Device Management manual or Knowledge Base Article 49870 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: SL1 Config - Appliance Not Licensed	Support: SL1 Configuration	Critical	License your SL1 appliance. See the chapter on <i>Licensing and Configuring an Appliance</i> in the Installation manual or Knowledge Base Article 4981 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: MariaDB Config - InnoDB Force Recovery Non-Zero Value	Support: MariaDB Configuration	Critical	See Knowledge Base Article 4982 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Poller: File system usage exceeded (critical) threshold	Internal	Critical	See Knowledge Base Article 4983 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Appliance Validation Not Monitored	Support: Appliance Validation	Major	Discover all appliances as devices.

Event Name	Dynamic Application	Severity	Reference
Support: Appliance Validation Minimum AIO Requirements Not Met	Support: Appliance Validation	Major	See Knowledge Base Article 4984 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Appliance Validation Minimum AP Requirements Not Met	Support: Appliance Validation	Major	See Knowledge Base Article 4985 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Appliance Validation Minimum DB Requirements Not Met	Support: Appliance Validation	Major	See Knowledge Base Article 4986 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Appliance Validation Minimum DC Requirements Not Met	Support: Appliance Validation	Major	See Knowledge Base Article 4987 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Appliance Validation Minimum MC Requirements Not Met	Support: Appliance Validation	Major	See Knowledge Base Article 4988 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: API Message Backlog Has Exceeded Threshold	Support: Async Message Backlog Performance	Major	See Knowledge Base Article 4989 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Syslog Message Backlog Has Exceeded Threshold	Support: Async Message Backlog Performance	Major	See Knowledge Base Article 4990 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Trap Message Backlog Has Exceeded Threshold	Support: Async Message Backlog Performance	Major	See Knowledge Base Article 4991 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Cluster Resource Template Outdated	Support: Cluster Configuration	Major	See Knowledge Base Article 4992 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).

Event Name	Dynamic Application	Severity	Reference
Support: DNS Resolution - Invalid Response	Support: Database Configuration	Major	See Knowledge Base Article 4993 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: SL1 will run out of space in less than 14 days	Support: DB Space Estimator	Critical	See Knowledge Base Article 4994 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Mail Backlog: Critical	Support: Mail Backlog	Critical	See Knowledge Base Article 4995 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: MariaDB Config - File per table	Support: MariaDB Configuration	Critical	See Knowledge Base Article 4996 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: MariaDB Connections High - Critical	Support: MariaDB Performance	Critical	See Knowledge Base Article 4997 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: High Rows Behind High	Support: Rows Behind	Critical	See Knowledge Base Article 4998 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Medium Rows Behind High	Support: Rows Behind	Major	See Knowledge Base Article 4999 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Siteconfig Check: Differing Variable	Support: Siteconfig Check	Critical	See Knowledge Base Article 5000 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Siteconfig Check: Missing Variable	Support: Siteconfig Check	Critical	See Knowledge Base Article 5001 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: SL1 Config - Bad Timezone	Support: SL1 Configuration	Critical	Reset timezone to UTC. See Knowledge Base Article 5002 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: SL1 Config - Pause file detected	Support: SL1 Configuration	Critical	The system is not currently collecting any information. See Knowledge Base Article 5003 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: Out of Memory - Process Has Been Killed	Syslog	Major	See Knowledge Base Article 5004 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).
Support: MariaDB Error	Syslog	Major	See Knowledge Base Article 5005 on the ScienceLogic Support website (https://support.sciencelogic.com/s/knowledge).

Chapter



7

Diagnostic Tools

Overview

This chapter describes some diagnostic tools for troubleshooting and diagnosing problems in SL1.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon (.
- To view a page containing all the menu options, click the Advanced menu icon (.

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ScienceLogic SL1 Self-Monitoring

SL1 includes a self-monitoring PowerPack that is included by default with SL1 releases. This PowerPack is called the *ScienceLogic Support Pack* PowerPack.

This self-monitoring PowerPack:

- ensures that all SL1 appliances are monitored and running the same version of SL1
- ensures that all SL1 appliances appear in the Device Manager page (Registry > Devices > Device Manager)
- ensures that configuration files on SL1 appliances are kept in sync
- ensures that configuration files on SL1 clusters are kept in sync
- monitors the health and configuration of MariaDB
- generates alerts when system resources like disk-space are approaching capacity
- monitors DNS entries for Database Servers and All-In-One appliances
- monitors long-running processes and queries
- monitors out-of-memory conditions
- ensures that CRM and corosync configurations are up to date
- ensures that configuration files match among HA Database Servers
- monitors crucial SL1 processes like datapull and config_push
- monitors "rows behind" situations and generates alerts
- monitors and fixes backlogs of email messages
- generates alerts if any of the following files differ:
 - /etc/my.cnf.d/silo_mysql.cnf
 - /etc/silo.conf

- /etc/siteconfig/mysql.siteconfig
- /etc/siteconfig/siloconf.siteconfig

Viewing Information About ScienceLogic Processes

The **Process Manager** page allows you to view a list of ScienceLogic processes and optionally define parameters for those processes. These processes gather, manipulate, and publish the data used in SL1.

CAUTION: ScienceLogic recommends that you do not edit the values in this page without first consulting ScienceLogic. Incorrect values can severely disrupt ScienceLogic platform operations.

ScienceLogic processes fall into three scheduling categories or *Frequencies*:

- **Asynchronous.** The process is launched in response to a system event or user request.
- **Scheduled.** The process is launched on a regular schedule.
- **Always.** The process always runs while SL1 is running.

SL1 performs many tasks in parallel:

- Through a modular design, allowing functions to be distributed to multiple processing platforms.
- Through multi-processing, where multiple instances of a process run simultaneously.

The **Process Manager** page allows you to view and edit the parameters of system processes.

Viewing the List of ScienceLogic Processes

To view the list of process in the **Process Manager** page:

1. Go to the **Process Manager** page (System > Settings > Admin Processes).

Process Manager													Reset	Guide
Process Name	Program File	Frequency	Runtime Offset	Async Throttle	Batch Factor	Time Factor	Run Length	State	Debug	ID	Edited By	Edit Date		
1. Application & Report Server: Remote diagnostic	em7_httpd_admin	0	--	--	--	--	--	Enabled	Disabled	54	em7admin	2009-06-29 14:06:59		
2. Application & Report Server: Scheduled Report Runner	scheduled_report_run.py	-1	--	25	--	15	15	Enabled	Disabled	58	em7admin	2009-07-14 12:20:00		
3. Application & Report Server: Secure	em7_httpd	0	--	--	--	--	--	Enabled	Disabled	53	em7admin	2009-06-29 14:06:59		
4. Application & Report Server: Standard	em7_httpd	0	--	--	--	--	--	Enabled	Disabled	52	em7admin	2009-06-29 14:06:59		
5. Data Collection: Async Dynamic App Collection	async_dynamic_collect.py	-1	--	2	--	15	15	Enabled	Disabled	129	em7admin	2010-03-04 11:53:41		
6. Data Collection: Availability	availability_collect.py	5	2	--	30	5	30	Enabled	Disabled	10	em7admin	2009-06-29 14:06:59		
7. Data Collection: CDP Collection	cdp_collect.py	120	0	--	30	0	120	Enabled	Disabled	33	em7admin	2010-03-26 10:37:39		
8. Data Collection: Critical Availability	em7_cavald	0	--	--	--	--	--	Enabled	Disabled	47	em7admin	2009-06-29 14:06:59		
9. Data Collection: Critical Port	em7_polc	0	--	--	--	--	--	Enabled	Disabled	48	em7admin	2009-06-29 14:06:59		
10. Data Collection: DNS Policy Monitoring	dns_collect.py	5	2	--	30	5	30	Enabled	Disabled	29	em7admin	2009-06-29 14:06:59		
11. Data Collection: Dynamic App	dynamic_collect.py	1	0	--	20	15	16	Enabled	Disabled	11	em7admin	2009-06-29 14:06:59		
12. Data Collection: Dynamic Refresh	dynamic_check.py	1440	200	--	30	0	1440	Enabled	Disabled	28	em7admin	2009-06-29 14:06:59		
13. Data Collection: E-Mail Round-Trip	email_rt_collect.py	5	3	--	30	0	5	Enabled	Disabled	30	em7admin	2009-06-29 14:06:59		
14. Data Collection: Filesystem statistics	filesystem_stats_collect.py	5	0	--	30	0	5	Enabled	Disabled	32	em7admin	2009-06-29 14:06:59		
15. Data Collection: Host Filesystem Inventory	filesystem_inventory_collect.py	120	44	--	30	0	120	Enabled	Disabled	31	em7admin	2009-06-29 14:06:59		
16. Data Collection: Interface Bandwidth	if_collect.py	1	0	--	20	10	11	Enabled	Disabled	12	em7admin	2009-06-29 14:06:59		
17. Data Collection: L3 Topology Collection	l3topology_collect.py	120	90	--	30	1	240	Enabled	Disabled	34	em7admin	2010-03-26 10:37:39		
18. Data Collection: OS Process	process_collect.py	120	0	--	20	0	120	Enabled	Disabled	14	em7admin	2009-06-29 14:06:59		
19. Data Collection: OS Process Check	process_check.py	5	4	--	20	2	15	Enabled	Disabled	15	em7admin	2009-06-29 14:06:59		
20. Data Collection: OS Service	service_collect.py	120	20	--	20	0	120	Enabled	Disabled	16	em7admin	2009-06-29 14:06:59		
21. Data Collection: OS Service Check	service_check.py	5	0	--	30	2	15	Enabled	Disabled	17	em7admin	2009-06-29 14:06:59		
22. Data Collection: RSS Event Feed	rss_collect.py	10	0	--	30	0	10	Enabled	Disabled	23	em7admin	2009-06-29 14:06:59		
23. Data Collection: SNMP Detail	snmp_detail_collect.py	5	0	--	30	0	5	Enabled	Disabled	24	em7admin	2009-06-29 14:06:59		
24. Data Collection: TCP Port Monitor	port_collect.py	5	0	--	30	0	5	Enabled	Disabled	20	em7admin	2009-06-29 14:06:59		
25. Data Collection: Topology	topology_collect.py	60	12	--	30	0	60	Enabled	Disabled	25	em7admin	2009-06-29 14:06:59		

[Viewing Page: 1]

2. The **Process Manager** page displays information about each ScienceLogic process. The **Process Manager** page displays the following for each process:

- **Process Name.** Name of the process.
- **Program File.** Name of the executable file associated with the process.
- **Frequency.** Frequency with which the platform launches the process. Possible values are:
 - *Asynchronous.* The process is launched in response to a system event or user request.
 - *Always.* The process always runs while SL1 is running.
 - *Scheduled.* The process runs at intervals ranging from 1 Minute to Daily.
- **Runtime Offset.** This field applies only to scheduled processes and allows the platform to stagger the launch of a process. The field specifies the number of minutes after the default scheduled time to execute a process. The default scheduled time at which processes are initially executed is midnight UTC. So if a process has a **Frequency** of 5 Minutes and the **Runtime Offset** is set to "2", the process will execute at two minutes past UTC midnight, seven minutes past UTC midnight, 12 minutes past UTC midnight, 17 minutes past UTC midnight, etc. Choices range from 0–1439.
- **Async Throttle.** This field applies only to asynchronous processes. This field indicates the number of jobs per process that can run simultaneously.

- **Batch Factor.** This field applies only to scheduled processes and determines how many multithreaded child processes are spawned on each execution of the process.

*number of tasks a process is responsible for completing / **Batch Factor** = number of child processes that will be spawned*

 - The number of tasks is typically determined by the number of devices the process is collecting data from.
 - The maximum number of child processes is limited by the number of CPUs installed in the SL1 appliance that runs the process.

NOTE: **Batch Factor** defines the maximum number of worker processes or child processes. This value has precedence over the value specified in the section of this manual on **Tuning Collector Groups in the silo.conf File**.

- **Time Factor.** Determines how long the process can run before being stopped by the process manager. This setting only applies to asynchronous processes and scheduled processes. For asynchronous processes, this is the length of time an instance of the process can run. For scheduled processes, the value of **Time Factor** is used to calculate **Run Length**.

$$(\text{Frequency} * \text{Time Factor}) + \text{Frequency} = \text{Run Length}$$

For example, suppose a process runs every 15 minutes (as specified in the **Frequency** field). A **Time Factor** of 2 means the process is allowed to run for 45 minutes. A **Time Factor** of 0 means the process is allowed to run for 15 minutes.

- **Run Length.** Specifies how long the process can run before being stopped by the process manager. This number is based on the **Time Factor** for the process.
- **State.** Current operational state of the process. Possible values are:
 - *Enabled.* Process can run.
 - *Disabled.* Process cannot run.
- **Debug.** Specifies whether debugging information is enabled for the process. For more details on debugging a process, see the section [Debugging a Process](#).
- **ID.** Unique numeric ID assigned to each process by SL1.
- **Edited By.** Date and time the process settings were last edited.
- **Edit Date.** Date and time the process settings were last edited.

Searching and Filtering the List of ScienceLogic Processes

The **Process Manager** page includes 13 filters, in the top row in the list of processes. You can specify one or more parameters to filter the display of processes. Only processes that meet all the filter criteria will be displayed in the **Process Manager** page.

You can filter by one or more of the following parameters. The list of processes is dynamically updated as you select each filter.

- For each filter except **Edit Date**, you must enter text to match against. SL1 will search for processes that match the text, including partial matches. Text matches are not case-sensitive. You can use the following special characters in each filter:
 - , (comma). Specifies an "or" operation. For example:
"dell, micro" would match all values that contain the string "dell" OR the string "micro".
 - & (ampersand). Specifies an "and" operation. For example:
"dell & micro" would match all values that contain the string "dell" AND the string "micro".
 - ! (exclamation mark). Specifies a "not" operation. For example:
"!dell" would match all values that do not contain the string "dell".
- **Process Name** You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching name.
- **Program File**. You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching program file.
- **Frequency** . You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching frequency number.
- **Runtime Offset**. You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching runtime offset.
- **Async Throttle**. You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching throttle number.
- **Batch Factor**. You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching batch factor.
- **Time Factor**. You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching time factor.
- **Run Length**. You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching run length.
- **State**. You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching state ("Enabled" or "Disabled").

- **Debug.** You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching debug state ("Enabled" or "Disabled").
- **ID.** You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching ScienceLogic process ID.
- **Edited By.** You can enter text to match, including special characters (comma, ampersand, and exclamation mark), and the **Process Manager** page will display only processes that have a matching "created by" or "edited by" value.
- **Edit Date.** You can select from a list of time periods. The **Process Manager** page will display only processes that have been created or edited within that time period:
 - *All.* Display all processes that match the other filters.
 - *Last Minute.* Display only processes that have been edited within the last minute.
 - *Last Hour.* Display only processes that have been edited within the last hour.
 - *Last Day.* Display only processes that have been edited within the last day.
 - *Last Week.* Display only processes that have been edited within the last week.
 - *Last Month.* Display only processes that have been edited within the last month.
 - *Last Year.* Display only processes that have been edited within the last year.

Editing the Parameters of a ScienceLogic Process

To view details about a specific process or edit the settings for a specific process:

CAUTION: ScienceLogic recommends that you do not edit the values in this page without first consulting ScienceLogic. Incorrect values can severely disrupt ScienceLogic platform operations.

1. Go to the **Process Manager** page (System > Settings > Admin Processes).
2. In the **Process Manager** page, find the process you want to edit. Click its wrench icon (🔧).

The screenshot shows the 'Process Editor | Editing Process [28]' interface. It features a 'Reset' and 'Guide' button at the top right. The form is divided into several sections:

- Process Name:** 'Data Collection: Dynamic Refresh' (read-only).
- Program File:** 'dynamic_check.py' (read-only).
- Operating State:** '[Enabled]' (dropdown menu).
- Debug Mode:** '[Disabled]' (dropdown menu).
- Frequency:** '[Daily]' (dropdown menu).
- Runtime Offset (Mins.):** '[203]' (dropdown menu).
- Batch Factor (Jobs):** '[30]' (dropdown menu).
- Time Factor (Mins.):** '[0]' (dropdown menu).
- Appliance Types:** A list of checkboxes for various components:
 - All-In-One Server [1]
 - Database [2]
 - Administration Portal [3]
 - Customer Portal [4]
 - Data Collection Unit [5]
 - Message Collection Unit [6]
 - Integration Server [7]
 - Storage Node [8]
 - Compute Node [9]

A 'Save' button is located at the bottom center of the form.

3. The **Process Editor** page appears and is populated with values from the selected process.
 - **Process Name.** Name of the process. This field is read-only and cannot be changed.

- **Program File.** Name of the executable file associated with the process. This field is read-only and cannot be changed.
- **Operating State.** Current operational state of the process. Specifies whether the process is enabled and able to run. Select from the drop-down list. The choices are:
 - *Enabled.* Process can run.
 - *Disabled.* Process cannot run.
- **Debug Mode.** Enables or disables debugging information for a process. For more details on debugging a process, see the section [Debugging a Process](#).

NOTE: You cannot enable debug mode for the process *Message Collection: SNMP Trap*.

- **Frequency.** This field appears only for scheduled processes and asynchronous processes. Specifies the frequency with which SL1 launches the process. Select from the drop-down list. The choices are:
 - *Asynchronous.* For asynchronous processes, this is the only available option. You cannot edit the frequency.
 - *Scheduled.* For scheduled processes, you can edit the frequency. You can select from intervals ranging from 1 Minute to Daily.

NOTE: If a process is set to a frequency of *Asynchronous* or *Always*, this field cannot be changed. If a process is set to a time interval, this field cannot be changed to *Asynchronous* or *Always*.

- **Async Throttle.** This field appears only for asynchronous processes. This field indicates the number of jobs per process that can run simultaneously. This setting only applies to asynchronous processes.
- **Runtime Offset.** This field only appears for scheduled processes. This field allows SL1 to stagger the launch of a process. The value specified in this field specifies minutes after the default scheduled time for a process. For example, if a process has a **Frequency** of *5 Minutes* and the **Minute Offset** is set to "2", the process will execute at two minutes past the hour, seven minutes past the hour, 12 minutes past the hour, 17 minutes past the hour, etc. Choices range from 0–1439.

- **Batch Factor.** This field applies only to scheduled processes and determines how many multithreaded child processes are spawned on each execution of the process.

number of tasks a process is responsible for completing/**Batch Factor** = *number of child processes that will be spawned*

- The number of tasks is typically determined by the number of devices the process is collecting data from.
- The maximum number of child processes is limited by the number of CPUs installed in the SL1 appliance that runs the process.

NOTE: **Batch Factor** defines the maximum number of worker processes or child processes. This value has precedence over the value specified in the section of this manual on **Tuning Collector Groups in the silo.conf File**.

- **Time Factor.** This field appears only for scheduled processes and asynchronous processes. This field determines how long a process can run before being killed.

- For scheduled processes, SL1 uses the formula **(Frequency * Time Factor) + Frequency**.

For example, suppose a process runs every 15 minutes. A factor of 2 means the process is allowed to run for 45 minutes. Factor of 0 means process is allowed to run for 15 minutes.

- For asynchronous processes, SL1 simply uses the value in this field as the number of minutes a process can run. This field does not appear for processes that are always running.

- **Appliance Types.** Specifies the appliance types where the process is allowed to run.

NOTE: All changes to the settings in the **Process Manager** page are logged in the **Audit Logs** page (System > Monitor > Audit Logs). The associated log entry will specify the user who altered a process, the process that was altered, and which settings for the process were changed.

4. If you make changes to one or more fields, click the **[Save]** button to save your changes.

Debugging a Process and Viewing Debug Logs


When you debug a process, you tell SL1 to use verbose logging for that process. You can then view SL1 log file to view the logs.

There might be circumstances where you have narrowed down a problem to a specific ScienceLogic process (for example, based on an error message or event). When this happens, you might find it helpful to turn on debugging for that process and view the debug logs.

WARNING: ScienceLogic recommends that you enable the debug option only while troubleshooting a problem and that you then immediately turn off debugging when you have completed troubleshooting. Don't leave the debug option enabled during normal operation of SL1. When you turn on debugging, SL1 will run significantly more slowly.

NOTE: You cannot enable debug mode for the process *Message Collection: SNMP Trap*.

To enable the debug option for a process:

1. In the **Process Manager** page, find the process you want to edit. Select its wrench icon ()
2. The **Process Editor** page appears and is populated with values for the selected process.
3. Edit the following field:
 - **Debug**. Enables or disables debugging information for a process. Select *Enabled*.
4. Click the **[Save]** button in the **Process Editor** page.
5. Log in to the console of the appliance where the process is running. Alternately, you can use SSH to open a shell session on the appliance. Log in as **em7admin** with the appropriate password. The default password is **em7admin**.

TIP: To view a list of IP addresses for all appliances in your system, go to the **Appliance Manager** page (System > Settings > Appliances).

6. If the process you are debugging is a process that has a **Frequency** of *Always*, you must restart the process to make it pick up the new debug status (enabled). To restart the process, enter the following at the shell prompt:

```
sudo service process_name restart
```

For example, if you were debugging the process for the event engine, you would enter:

```
sudo service em7_event restart
```

7. Navigate to the directory **/var/log/em7**. View the file **silو.log**. The most recent entries will be posted at the end of the file.
8. After you have finished troubleshooting the process, remember to disable debugging. If the process has a **Frequency** of *Always*, you must restart the process to make it pick up the new debug status (disabled).

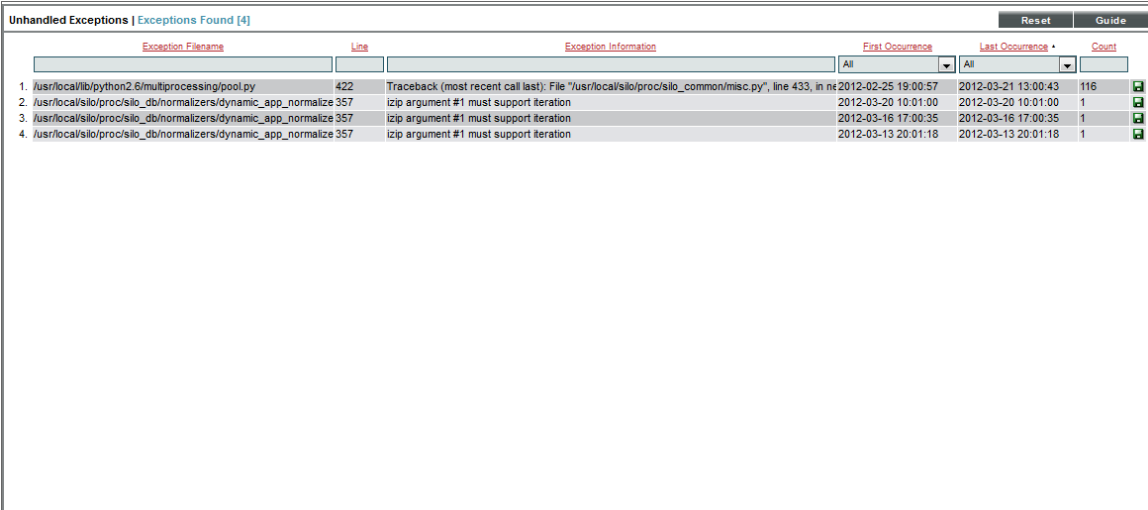
Viewing Information About Unhandled Exceptions

An **exception** specifies that something happened "out of the norm" that is preventing the software from executing the next step. Exceptions are a specific type of error, usually the result of invalid input, missing input, or a network error that prevents communication between software modules. For most exceptions, SL1 will handle the exception by logging a specific error in the System Logs and will continue to run the process. However, **if the platform does not handle the exception**, the process will stop running, and SL1 will generate an error message describing **the unhandled exception**.

Viewing the List of Unhandled Exceptions

To view the list of unhandled exceptions for all appliances:

1. Go to the **Unhandled Exceptions** page (System > Monitor > Unhandled Exceptions).
2. The **Unhandled Exceptions** page displays the following for each unhandled exception:



Unhandled Exceptions Exceptions Found [4]						Reset	Guide
Exception Filename	Line	Exception Information	First Occurrence	Last Occurrence	Count		
1. /usr/local/lib/python2.6/multiprocessing/pool.py	422	Traceback (most recent call last): File "/usr/local/silo/proc/silo_common/misc.py", line 433, in nt	2012-02-25 19:00:57	2012-03-21 13:00:43	116		
2. /usr/local/silo/proc/silo_db/normalizers/dynamic_app_normalize	357	izip argument #1 must support iteration	2012-03-20 10:01:00	2012-03-20 10:01:00	1		
3. /usr/local/silo/proc/silo_db/normalizers/dynamic_app_normalize	357	izip argument #1 must support iteration	2012-03-16 17:00:35	2012-03-16 17:00:35	1		
4. /usr/local/silo/proc/silo_db/normalizers/dynamic_app_normalize	357	izip argument #1 must support iteration	2012-03-13 20:01:18	2012-03-13 20:01:18	1		

- **Exception Filename.** Full path of the file where the exception occurred.
- **Line.** Line number of the line in the file where the exception occurred.
- **Exception Information.** Error message associated with the exception.
- **First Occurrence.** Date and time of the first occurrence of the exception.
- **Last Occurrence.** Date and time of the last occurrence of the exception.
- **Count.** Number of times the exception has occurred.

Searching and Filtering the List of Unhandled Exceptions

The **Unhandled Exceptions** page includes six filters. You can filter the list of exceptions by one or multiple of the following parameters: exception filename, line number, exception descriptions, first occurrence, last occurrence, and count. Only exceptions that meet all the filter criteria will be displayed in the **Unhandled Exceptions** page.

You can filter by one or more of the following parameters. The list of devices is dynamically updated as you select each filter.

- For the first three filters, you must enter text to match against. SL1 will search for exceptions that match the text, including partial matches. Text matches are not case sensitive. You can use the following special characters in each filter:
 - `,` Specifies an "or" operation. For example:
 - "dell, micro" would match all values that contain the string "dell" OR the string "micro".
 - `!` Specifies a "not" operation. For example:
 - "!dell" would match all values that do not contain the string "dell".
- **Exception Filename.** You can enter text to match, including special characters, and the **Unhandled Exceptions** page will display only exceptions that have a matching filename.
- **Line.** You can enter text to match, including special characters, and the **Unhandled Exceptions** page will display only exceptions that have a matching line number.
- **Exception Information.** You can enter text to match, including special characters, and the **Unhandled Exceptions** page will display only exceptions that have a matching description.
- **First Occurrence.** Only those exceptions that match all the previously selected fields and have the specified first occurrence date will be displayed. The choices are:
 - *All.* Display exceptions with all first occurrence dates.
 - *Last Minute.* Display only exceptions that first occurred within the last minute.
 - *Last Hour.* Display only exceptions that first occurred within the last hour.
 - *Last Day.* Display only exceptions that first occurred within the last day.
 - *Last Week.* Display only exceptions that first occurred within the last week.
 - *Last Month.* Display only exceptions that first occurred within the last month.
 - *Last Year.* Display only exceptions that first occurred within the last year.
- **Last Occurrence.** Only those exceptions that match all the previously selected fields and have the specified last occurrence date will be displayed. The choices are:
 - *All.* Display exceptions with all last occurrence dates.
 - *Last Minute.* Display only exceptions that last occurred within the last minute.
 - *Last Hour.* Display only exceptions that last occurred within the last hour.
 - *Last Day.* Display only exceptions that last occurred within the last day.
 - *Last Week.* Display only exceptions that last occurred within the last week.

- *Last Month*. Display only exceptions that last occurred within the last month.
- *Last Year*. Display only exceptions that last occurred within the last year.
- **Count**. You can enter text to match, including special characters, and the **Unhandled Exceptions** page will display only exceptions that have a matching count number.

Saving the Unhandled Exception to the Local Computer

You can save the full text of the unhandled exception to a file on your local computer. You can then view the text in a text editor.

To save the full text of the unhandled exception to a file:

1. Go to the **Unhandled Exceptions** page (System > Monitor > Unhandled Exceptions).
2. In the **Unhandled Exceptions** page, find the exception you want to save to a file. Click its green diskette icon (📁).

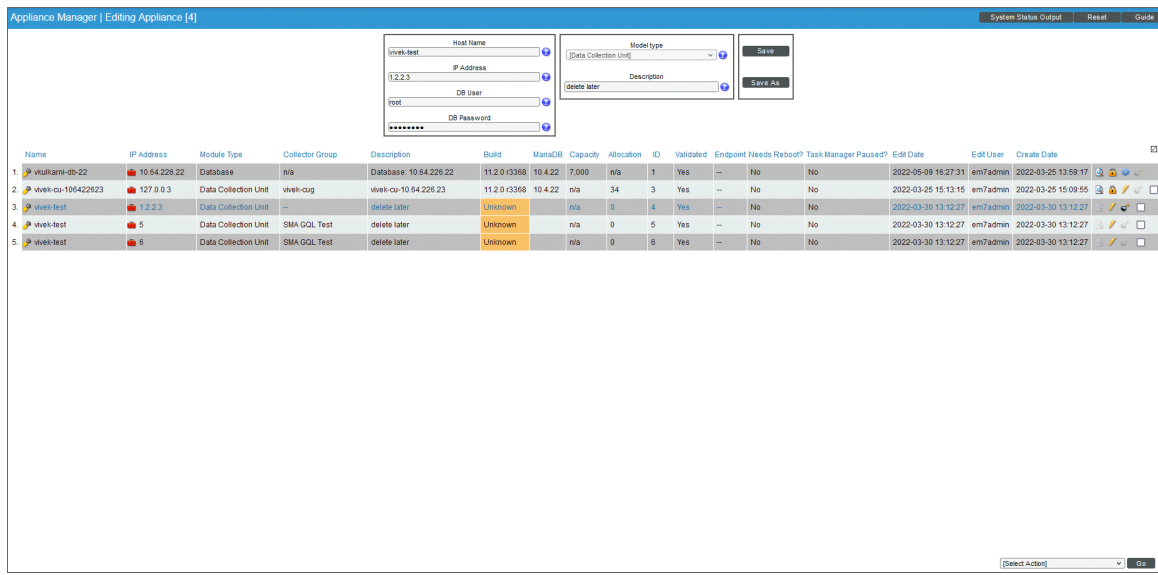
Exception Filename	Line	Exception Information	First Occurrence	Last Occurrence	Count
/usr/local/lib/python2.6/multiprocessing/pool.py	422	Traceback (most recent call last): File "/usr/local/silo/proc/silo_common/misc.py", line 433, in ne	2012-02-25 19:00:57	2012-03-21 13:00:43	116
/usr/local/silo/proc/silo_db/normalizers/dynamic_app_normalize	357	izip argument #1 must support iteration	2012-03-20 10:01:00	2012-03-20 10:01:00	1
/usr/local/silo/proc/silo_db/normalizers/dynamic_app_normalize	357	izip argument #1 must support iteration	2012-03-16 17:00:35	2012-03-16 17:00:35	1
/usr/local/silo/proc/silo_db/normalizers/dynamic_app_normalize	357	izip argument #1 must support iteration	2012-03-13 20:01:18	2012-03-13 20:01:18	1

3. When prompted, you can either immediately view the text file with a text editor or save the file to your local computer for viewing later.

Viewing the Output of the System Status Script

For each Database Server, Data Collector, and Message Collector, you can view the output of the system status script for that appliance. To do this:

1. Go to the **Appliance Manager** page (System > Settings > Appliances).



2. Locate the Database Server, Data Collector, or Message Collector that you want to view diagnostic information about.
3. Click on its magnifying-glass icon (🔍) to view the output of the system status script for that appliance.

For more information about system status reports, watch the video at <https://www.youtube.com/watch?v=oGWVH9kJ2oY>.

Viewing the Database Tables on the Database Server

In some circumstances, you might need to view the contents of the database tables (the permanent tables are stored on the Database Server). There are two ways to do this:

- Using the built-in Database Tools in the **Database Tool** page (System > Tools > DB Tool).
- Using the link to the phpMyAdmin interface in the **Appliance Manager** page (System > Settings > Appliances).

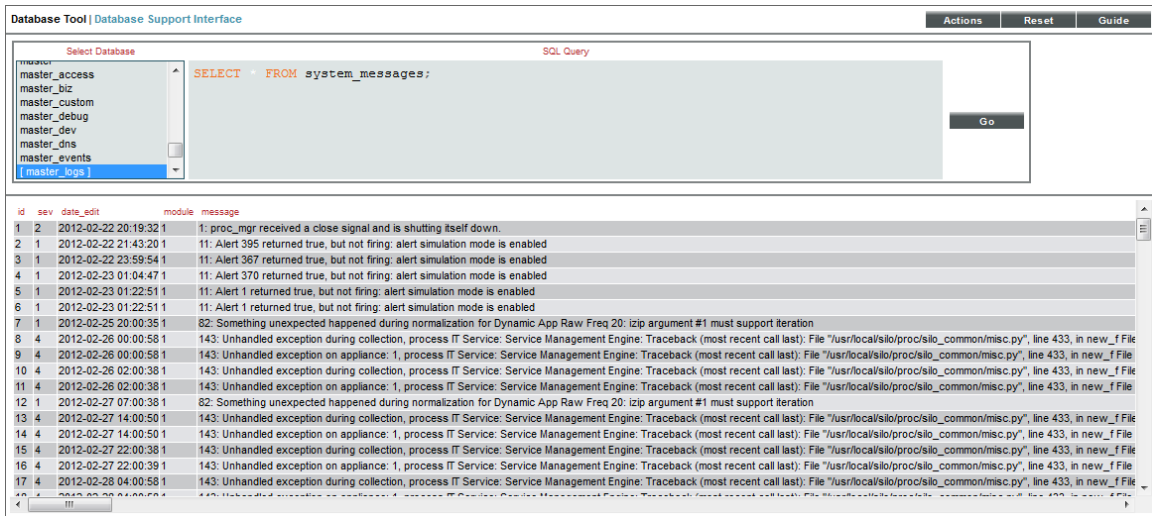
Accessing the Database Tool

The **Database Tool** page allows administrators to view information about the internal ScienceLogic databases and run SQL queries against those internal databases.

CAUTION: Contact ScienceLogic for details on using the **Database Tool** page and troubleshooting databases. Do not make changes to the database or run the Optimizer Tool without guidance from ScienceLogic.

To access the database tool:

1. Go to the **Database Tool** page (System > Tools > DB Tool).



2. To run an SQL query from the **Database Tool** page, enter values in the following fields:

- **Select Database.** Select a database to query.
- **SQL Query.** Enter an SQL query to execute against the selected database. For more information on each database and each table, use the options in the **[Actions]** menu.

NOTE: You must be familiar with SQL and know how to build a proper query before using the **Database Tool** page.

3. Click the **[Go]** button to execute the query.
4. The results from the query are displayed in the pane at the bottom of the page.
5. To view the reports about the a database(s), click the **[Actions]** menu. The following options are available:
 - **Engines.** Displays status information about the server's storage engines. For each engine, the modal page displays a description of the engine, whether the engine is supported by SL1, and whether or not the engine supports transactions, XA, and save points.
 - **Global Status.** Displays a list of global variables used in the database tables and the current value for each global variable.
 - **InnoDB Variables.** Displays a list of InnoDB variables used in SL1 and the value for each variable.
 - **Open Tables.** Displays a list of currently open tables. For each table, the modal page displays the database name, table name, whether the table is currently in use, and whether the table is currently locked.

- **Optimizer Tool.** Leads to the **Database Optimizer Tool** page, where you can choose to optimize, repair, check, flush, or analyze all the tables in a database.

CAUTION: Contact ScienceLogic for details on using the **Database Optimizer Tool** page. Do not run the Optimizer Tool without guidance from ScienceLogic.

- **Processes.** Displays a list of running threads on the databases and tables. For each process, the modal page displays the connection ID, the database user who issued the statement, the host name of the client that issued the statement, the affected database, the command, the time in seconds that the thread has been in its current state, the state of the thread, and any available description of the process.
- **Table Status.** Displays the status of each database table in the platform. For each table, the modal page displays the table name, the database engine, database version, row format, number of rows, average row-length, length of the data file, maximum length of the data file, length of the index file, number of allocated but unused bytes, the next auto-increment value, the create time for the table, the update time for the table, the table's character set and collation, the live checksum value, options used with CREATE TABLE, and any comments.
- **Variables.** Displays a list of all database system variables used in SL1 and the value of each variable.

Accessing the phpMyAdmin Interface for the Database Server

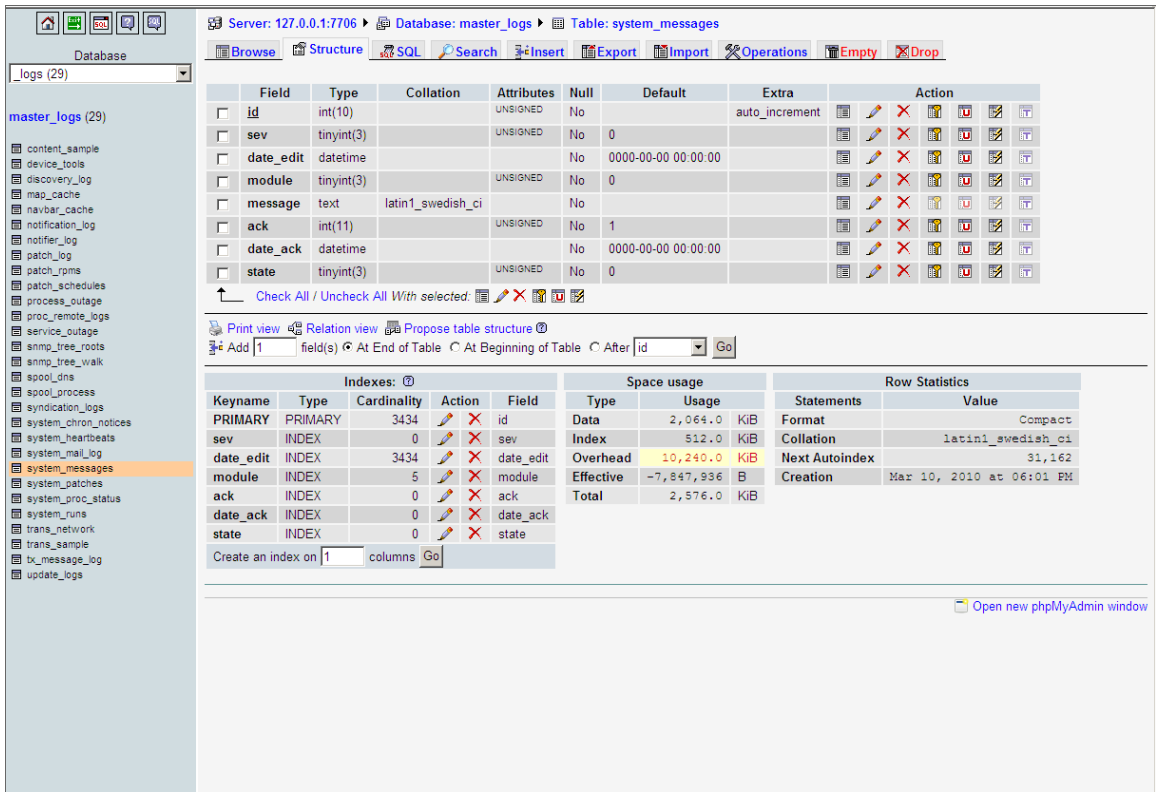
From within the user interface, you can access the phpMyAdmin interface. The phpMyAdmin interface provides a web interface for viewing and managing MySQL databases. Using the phpMyAdmin interface for a Database Server, you can also access the database tables for the Data Collectors and Message Collectors that have been added to the system using the phpMyAdmin interface for the main Database Server.

To access the phpMyAdmin interface for the database tables:

1. Go to the **Appliance Manager** page (System > Settings > Appliances).

The screenshot shows the Appliance Manager interface. At the top, there are 'Reset' and 'Guide' buttons. Below them are configuration fields for 'Host Name', 'IP Address', 'Model type' (set to 'Database [2]'), and 'Description'. There are 'Save' and 'Save As' buttons. Below the configuration fields is a table listing various appliances.

Name	IP Address	Module Type	Collector Group	Description	Build	Capacity	Allocation	ID	Validated	Edit Date	Edit User	Create Date
1. em7_db	10.0.9.90	Database	n/a	EM7 Database	18872	500	n/a	1	Yes	2012-03-20 19:08:08	em7admin	2012-03-20 18:55:16
2. em7_ap	10.0.9.50	Administration Portal	n/a	Application Server: 10.0.9.50	18872	n/a	n/a	3	Yes	2012-03-20 19:07:14	em7admin	2012-03-20 19:07:14
3. em7_cu1	10.0.9.54	Data Collection Unit	CUG1		18872	n/a	352	6	Yes	2012-03-20 19:10:05	em7admin	2012-03-20 19:10:04
4. em7_cu2	10.0.9.56	Data Collection Unit	CUG2		18872	n/a	148	5	Yes	2012-03-20 19:10:05	em7admin	2012-03-20 19:10:02
5. em7_mc	10.0.9.53	Message Collection Unit	--		18872	n/a	n/a	7	Yes	2012-03-20 19:10:20	em7admin	2012-03-20 19:10:05
6. em7_is	10.0.9.58	Integration Server	n/a	Integration Server: 10.0.9.58	18872	n/a	n/a	2	Yes	2012-03-20 19:06:18	em7admin	2012-03-20 19:06:18



Disabling Normalization, Re-Enabling Normalization, and Backfilling Raw Data

ScienceLogic does not recommend stopping normalization on Data Collectors. However, there are rare occasions where ScienceLogic Customer Support might ask you to disable normalization as part of troubleshooting.

To disable normalization:

1. Either go to the console of the Database Server or use SSH to access the Database Server.
2. Log in as user em7admin with the appropriate password.
3. Type the following at the command line:

```
sudo visilo
```

This is the file where users can customize the silo.conf file. In step #6, you will execute a command that sends these changes to the system silo.conf file.

4. In the LOCAL section, add the following line:

```
rollups_disabled=ON
```

5. Save your changes and exit the file (:wq).

6. At the command line, type the following command to rebuild the configuration file:

```
sudo /opt/em7/share/scripts/generate-silo-conf.py > silo.conf
```

7. Restart the data collection process to ensure they receive the change. Type the following at the command line:

```
sudo service em7_hfpulld restart
sudo service em7_lfpulld restart
sudo service em7_mfpulld restart
```

To re-enable normalization and normalize data that was collected while normalization was disabled:

1. Either go to the console of the Database Server or use SSH to access the Database Server.
2. Log in as user em7admin with the appropriate password.
3. Type the following at the command line:

```
sudo visilo
```

4. In the LOCAL section, add the following line:

```
rollups_disabled=OFF
```

5. Save your changes and exit the file (:wq).

6. At the command line, type the following command to rebuild the configuration file:

```
sudo /opt/em7/share/scripts/generate-silo-conf.py > silo.conf
```

7. Restart the data collection process to ensure collectors receive the change. Type the following at the command line:

```
sudo service em7_hfpulld restart
sudo service em7_lfpulld restart
sudo service em7_mfpulld restart
```

8. At the command line, type the following to normalize the data that was collected while normalization was disabled:

```
[/opt/em7/backend/data_normalizer_backfill.py --database, <database> --dids <
[device IDs]> --start <start date> --end <end date> --workers <number of
workers>
```

NOTE: To get help, at the shell prompt, type "/opt/em7/backend/data_normalizer_backfill.py -h".

where:

- --database *database*. Specifies the database that you want to backfill with normalized data. The choices are:

- `data_avail`. Table that stores normalized data for availability.
 - `data_cv`. Table that stores normalized data for Web Content policies.
 - `data_dns`. Table that stores normalized data for DNS policies.
 - `data_email`. Table that stores normalized data for Email Round-Trip policies.
 - `data_ports`. Table that stores normalized data for TCP-IP Ports policies.
 - `data_procs`. Table that stores normalized data for System Processes policies.
 - `data_services`. Table that stores normalized data for Windows Services policies.
 - `data_storage`. Table that stores normalized data for file systems.
 - `data_tv`. Table that stores normalized data for SOAP/XML Transaction policies.
 - `dynamic_app_data_appID`. Table that stores normalized data for a Dynamic Application. Specify the application ID for the Dynamic Application.
- `--dids device IDs`. Specifies the device ID of the device or devices for which you want to normalize data.
 - You can specify a single device ID.
 - You can specify multiple device IDs, separated by commas and surrounded by square brackets.
 - If you do not specify any device IDs, SL1 will normalize the specified data for all devices in your system.
 - `--start start date`. The timestamp that specifies the data to normalize. Raw data with a time stamp at this time or later will be normalized. SL1 will normalize data starting with this timestamp and ending with the end-date timestamp.
 - Specify the timestamp in the format `yyyy-mm-dd hh:mm:ss`, using a 24-hour clock. Surround the timestamp with single quotes.
 - `--end end date`. The timestamp that specifies the data to normalize. Raw data with a time stamp at this time or earlier will be normalized. SL1 will normalize data starting with the start-date timestamp and ending with this timestamp.
 - Specify the timestamp in the format `yyyy-mm-dd hh:mm:ss`, using a 24-hour clock. Surround the timestamp with single quotes.
 - `--workers workers`. Number of worker processes to assign to this task. This field is optional. Please consult ScienceLogic Customer Support for suggestions on worker processes.

For example:

```
python /opt/em7/backend/data_normalizer_backfill.py --database dynamic_app_data_16 --start '2017-10-01 00:00:00' --end '2017-10-10 00:00:00' --workers 10
```

This command normalizes raw data collected by the Dynamic Application with an application ID of 16, associated with all subscriber devices (no device IDs specified, so defaults to "all devices"), and that was collected between midnight on October 1, 2017 and midnight on October 10, 2017. The `data_normalizer_backfill.py` code uses ten worker processes to perform the normalization.

Enable Logging for Data Pull Storage Objects

To investigate missed polls or slow database queries, you can temporarily enable logging for data pull storage objects. After you complete the diagnostics, you must disable logging for data pull storage objects, because the logging can affect the performance of data pull.

Enable

To enable logging for data pull storage objects:

1. Either go to the console of the Database Server or use SSH to access the Database Server.
2. Log in as an administrator.
3. At the shell prompt, enter the following:

```
sudo visilo
```

4. In the `silو.conf` file, add the following lines:

```
[DATAPULL]
log_storage_object_stats = 1
```

5. Save your changes to the file (`:wq`).
6. You must restart the data collection processes to ensure they receive the change. To do this, enter the following at the shell prompt:

```
sudo service em7_hfpulld restart
sudo service em7_lfpulld restart
sudo service em7_mfpulld restart
```

Disable

When you have completed your diagnostics, disable logging for data pull storage objects. To do this:

1. Either go to the console of the Database Server or use SSH to access the Database Server.
2. Log in as an administrator.
3. At the shell prompt, enter the following:

```
sudo visilo
```

4. In the `silو.conf` file, edit the following:

```
[DATAPULL]
log_storage_object_stats = 0
```

5. Save your changes to the file (:wq).
6. You must restart the data collection processes to ensure they receive the change. To do this, enter the following at the shell prompt:

```
sudo service em7_hfpulld restart
sudo service em7_lfpulld restart
sudo service em7_mfpulld restart
```

Controlling Log Settings

In rare cases, you may need to modify log levels or suppression of certain logs in SL1, usually at the request of ScienceLogic Customer Support. To do so, you will navigate to the **PHP Developer Logs** page (System > Tools > PHP Developer Logs). This section describes the options included on the PHP Developer Logs page.

NOTE: This page is only available for Administrator-level users in SL1.

Setting UI Developer Log Levels

When configuring logging on an appliance, you must specify a log level. The log level controls the types of messages that are written to the user interface log file (`em7php.1og`). Each type of message has an associated number; the log level is the sum of all enabled messages. The numbers and associated message types are:

- **1.** Critical
- **2.** Error
- **4.** Warning
- **8.** Info
- **16.** Debug
- **32.** Trace

To determine the log level, sum the numbers associated with each type of message you want to enable. For example, if you want to enable Critical, Error, and Warning messages, you would sum one, two, and four to get a log level value of seven.

Setting UI/REST MySQL Query Log Levels

The UI/REST MySQL Query Log Levels settings let you specify the log level for the `mysql.1og` file. This log file collects every PHP-based call to MySQL and includes general information about the query. Determine the granularity of data you want and select one or more checkboxes.

- **Error**
- **Warning**
- **Info (non-error)**

Configuring Advanced Log Settings

In the *Advanced Settings* section, you can configure the suppressions and the date/time format you want to use:

- **Suppression List.** This list acts as a bitmask to log entries. For example, to suppress all entries for `css-em7`, you would enter "`css.em7::127`", where 127 is the sum of all possible log levels. You can specify multiple suppressions in the list, separated by commas.
- **Datetime Format.** Specifies a user-defined date format that will be used for system logs. You can use any date variables supported by the PHP date function in this field.

NOTE: Seconds and milliseconds are always appended to the date/time stamp.

Downloading Logs from the PHP Developer Logs page

To download the logs from the **PHP Developer Logs** page (System > Tools > PHP Developer Logs):

1. Go to the **PHP Developer Logs** page (System > Tools > PHP Developer Logs)
2. Under **Download Logs**, select a logfile to download.

NOTE: This page is only available for Administrator-level users in SL1.

For more information about a new method for accessing user interface logs, watch the video at <https://www.youtube.com/watch?v=1fJ1pKEIIIQ>.

COUNT(*)	module	name	cug_name
46	4	emanbwl013	PFZR_IRL_CG
16	18	emapuul021	PFZR_PUUR_CG
16	22	emarinl014	PFZR_IRL_CG

Chapter

8

Changing Passwords



Overview

This chapter describes how to:

- Change every administrator password used in SL1.

NOTE: Appliances installed as an AWS EC2 instance have the "root" operating system account disabled by default. During the setup process, the user "ec2-user" is automatically added to the operating system configuration. The ec2-user account can be used to perform administrative tasks that require SSH command-line access. The ec2-user account is permitted to perform all operating system commands using the "sudo" command without a password.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon ().
- To view a page containing all the menu options, click the Advanced menu icon ().

This chapter includes the following topics:

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Disabling phpMyAdmin

The phpMyAdmin interface provides a web interface for viewing and managing MySQL databases. By default, you can log in to the Database Server using the phpMyAdmin interface to view and manage the MySQL databases on all Database Servers, Data Collectors, and Message Collectors in the system.

To disable phpMyAdmin, you must disable the service and then disable the ports on which the service runs. To do this:

1. If you are using a distributed system, either go to the console of the Database Server or use SSH to access the Database Server. Open a shell session on the server. Log in as an administrator.
2. If you are using an All-In-One Appliance, either go to the console of the All-In-One Appliance or use SSH to access the All-In-One Appliance. Open a shell session on the server. Log in as an administrator.

NOTE: For details on enabling and using SSH, see the manual **System Administration**. For details and warnings about root access and instructions on how to make root access secure, see the manual **System Administration**.

3. Edit the file `/etc/siteconfig/firewalld-rich-rules.siteconfig`:

```
sudo vifirewalld
```

4. Add the following lines:

```
rule service name="phpmyadmin" reject\  
rule port port="8008" protocol="tcp" reject
```

5. Save your changes and exit the file (`:wq`).

Changing the Password for the Default Account for the User Interface

To change the password for the default `em7admin` user account, which can be used to access the user interface, perform the following steps:

1. Go to the **User Accounts** page (Registry > Accounts > User Accounts).

- Click the wrench icon (🔧) for the `em7admin` user. The **Account Permissions** page appears.

- Enter the new password in the **Change Password** field.
- Re-type the new password in the **Confirm Password** field.
- Click the **[Save]** button. A pop-up window appears, asking you to confirm the change.
- Click "OK" in the pop-up window. The message "Password Saved" is displayed.

Changing the Password for the Default Console User

To change the password for the default administrative user `em7admin` for console logins and SSH access:

- Either go to the console of the SL1 appliance or use SSH to access the server.
- Log in as user `em7admin` with the appropriate password. The default password is `em7admin`.
- At the shell prompt, type the following:


```
passwd
```
- When prompted, type and re-type the new password.

Changing the Password for the Web Configuration Utility

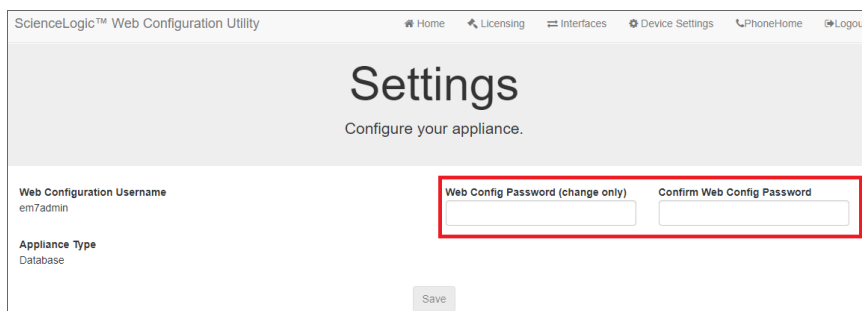
You can change the password for the Web Configuration Utility.

NOTE: If you want to change the password for the Web Configuration Utility on all SL1 appliances, you must log in to the Web Configuration Utility on each appliance and perform the steps in this section.

NOTE: You cannot change the username for the Web Configuration Utility. The username remains **em7admin**.

To change the password for the Web Configuration Utility:

1. Log in to the Web Configuration Utility. The **Configuration Utilities** page appears.
2. Click the **[Device Settings]** button. The **Settings** page appears.



ScienceLogic™ Web Configuration Utility

Home Licensing Interfaces Device Settings PhoneHome Logout

Settings

Configure your appliance.

Web Configuration Username
em7admin

Web Config Password (change only) Confirm Web Config Password

Appliance Type
Database

Save

3. In the **Settings** page, type the following:
 - **Web Config Password (change only)**. Type the new password.
 - **Confirm Web Config Password**. Type the new password again.
4. Click **[Save]**
5. Perform steps 1-4 for each appliance for which you want to change the password for the Web Configuration Utility.

Changing Database Passwords

The following SL1 appliances include a database instance:

- All-In-One Appliances
- Database Servers
- Data Collectors
- Message Collectors

By default, SL1 appliances use the following user accounts to access appliance databases:

- **ap_user**. This user is used by the user interface to access the database on a Database Server or All-In-One Appliance. This user account exists only on the Administration Portal and does not exist by default on Data Collectors and Message Collectors. By default, this user has the user name **apuser** and the password **apuser**.
- **dbuser**. This user is used by ScienceLogic platform processes to access the database instance on all appliances. By default, this user has the user name **root**.

To change the password for the **ap_user** account, you must:

1. Configure a new password for the Administration Portal using the Web Configuration Utility for the Administration Portal.

To change the password for these **dbuser** account, you must:

1. Configure a new password in the database instance.
2. Configure SL1 to use the new password.

WARNING: Exercise caution when manipulating MySQL user accounts. Do not use these procedures unless you are confident and know how to undo changes, should something go wrong.

Configuring a New Password on Collector Appliances

Perform the following steps to change the password for a user on a Collector:

1. Either go to the console of the Database Server, All-In-One Appliance, Data Collector, or Message Collector or use SSH to access the server in CLI mode.
2. Log in as **em7admin** with the appropriate password.
3. Run the following command to launch the MySQL prompt:

```
silo_mysql
```

4. From the MySQL prompt, change the root password by running the following SQL query:

```
MariaDB [(none)]> SET PASSWORD FOR 'root' = PASSWORD('new_password');
```

5. To effect the change immediately, run the following SQL query:

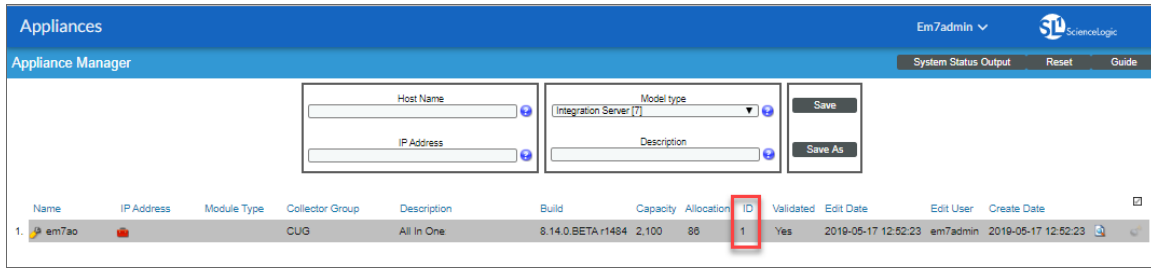
```
MariaDB [(none)]> FLUSH PRIVILEGES;
```

6. Ensure you can access the database with the new password. Exit the MySQL interface, and test by running the following command, entering the new password when prompted:

```
mysql -u root -p
```

7. Edit the `/etc/silo.conf` file and change the **dbpasswd** variable to the new password. See [Editing Silo.Conf](#) for assistance.

- From the SL1 interface, go to the **Appliances** page (System > Settings > Appliances) and retrieve the appliance ID for the Collector.



- Go to the **DB Tool** page (System > Tools > DB Tool), and enter the following query to allow the Database Appliance to access the MySQL database of the Collector:

```
UPDATE master.system_settings_licenses SET db_pass='{new password}' WHERE id={appliance ID} LIMIT 1;
```

- Confirm in the Collector Status page (System > Monitor > Collector Status) that the Collector is available.

Editing Silo.Conf

- Either go to the console of the SL1 appliance or use SSH to access the SL1 appliance.
- Open a shell session on the server.
- Type the following at the command line:

```
sudo visilo
```
- Edit the value assigned to **dbuser** and to **ap_user**. Assign the value you defined in the section [Configuring a New Password in the Database Instance](#).
- Save and close the file (:wq).

Updating the master.system_settings_licenses Table

To update the master.system_settings_licenses table after you have changed the root password on a Data Collector or Message Collector:

- Go to the **Appliance Manager** page (System > Settings > Appliances).
- Locate the Data Collector or Message Collector in the list of appliances. Note the value in the **ID** column for the Data Collector or Message Collector.
- Go to the **Database Tool** page (System > Tools > DB Tool).

4. Enter the following in the **SQL Query** field, replacing <new password> with the new password and <ID value of Collector> with the value you noted in step 2:

```
UPDATE master.system_settings_licenses SET db_user='root', db_pass=<new password> WHERE id=<ID value of Collector>;
```

If you want to update all Data Collectors and Message Collectors with the same password, enter the following in the SQL Query field, replacing <new password> with the new password:

```
UPDATE master.system_settings_licenses SET db_user='root', db_pass='<new password>' WHERE function in (5,6);
```

5. Click the **[Go]** button.

Changing the MySQL Root Password on Database Appliances

To change the MySQL root password on database appliances:

1. Either go to the console of the Database Server or use SSH to access the server in CLI mode.
2. Log in as **em7admin** with the appropriate password.

NOTE: If your Database Appliances are part of an HA cluster, place your HA cluster in maintenance mode using the steps found in the *High Availability and Disaster Recovery* manual.

3. Run the following command to launch the MySQL prompt:

```
silos_mysql
```

4. From the MySQL prompt, change the root password by running the following SQL query:

```
MariaDB [(none)]> SET PASSWORD FOR 'root' = PASSWORD('new_password');
```

5. To effect this change immediately, run the following SQL query. Enter the new password when prompted.

```
MariaDB [(none)]> FLUSH PRIVILEGES;
```

6. Ensure you can access the database with the new password. Exit the MySQL interface, and test by running the following command, entering the new password when prompted:

```
mysql -u root -p
```

7. Edit the `silos.conf` file, as described in [Editing Silos.Conf](#). Change the `dbpasswd` variable to the new password in both the [LOCAL] and [CENTRAL] sections.

NOTE: If you have clustered database appliances, be sure to update the `silos.conf` file for all cluster members.

8. If you have admin portals, update the **dbpasswd** variable in `silos.conf` on all admin portals.

9. If the Data Collector's MySQL root user password is now different from the MySQL root user password on the Database Server, and the `db_pass` column in `master.system_settings_licenses` is "NULL", then the Database Server will attempt to use its own password to connect.
10. Change the `db_pass` column for the collectors to their root MySQL user password using the instructions in [Updating the master.system_settings_licenses Table](#).
11. If you placed an HA cluster into maintenance mode to perform these steps, remember to return it to ready mode by setting `coro_config` to option 1. For more information, see the [High Availability and Disaster Recovery](#) manual.

Recovering the Root MySQL Password

To reset the root MySQL password if you become locked out:

1. Either go to the console of the Database Server or use SSH to access the server in CLI mode.
2. Log in as `em7admin` with the appropriate password.
3. Stop the `em7` and `mariadb` services:

```
systemctl stop em7 mariadb
```

4. Start the `mariadb` service with the `'--skip-grant-tables'` option:

```
systemctl set-environment MYSQLD_OPTS="--skip-grant-tables"
systemctl start mariadb
```

5. Access the MySQL database:

```
mysql -u root mysql
```

6. Reset the root password from the MySQL prompt:

```
UPDATE user SET password=PASSWORD('{new password}') WHERE User='root';
```

7. Stop the `mariadb` service again, unset the environment variable, and restart the service, using the following sequence of commands:

```
systemctl stop mariadb
systemctl unset-environment MYSQLD_OPTS
systemctl start mariadb
```

8. Ensure that you can access the MySQL database with the new password:

```
mysql -u root -p
```

9. Restart the `em7` service:

```
systemctl start em7
```

10. Ensure that the password you set is also updated in the `/etc/silo.conf` `dbpasswd` variable. For more information, see [Changing the MySQL Root Password on Database Appliances](#)

Recovering the MySQL SNMP User Account on Data Collector

If you have removed the SNMP user account from the Data Collector's MySQL database in an attempt to harden your system, you must recover the account so that SL1 can insert incoming SNMP traps into the database for processing.

To restore the SNMP user account:

1. Either go to the console of the Database Server or use SSH to access the server in CLI mode.
2. Log in as **em7admin** with the appropriate password.
3. Run the following command to restore the SNMP user account:

```
/opt/em7/share/scripts/em7_firstboot.d/30_trap_listener-db_init.sh
```

Changing the IP Address of an SL1 Appliance

Overview



The IP address for an appliance is configured at installation. To change the IP address for an appliance after installation and preserve your SL1 license, use the workflows in this section.

Moving an SL1 appliance to a new network requires pre-planning. If your SL1 configuration includes one or more Administration Portals, PhoneHome Collectors, or is configured for High Availability or Disaster Recovery, you must perform additional steps after changing IP addresses. The steps in this section allow you to change the IP address for an SL1 appliance with minimal downtime.

NOTE: This procedure requires downtime, so plan to perform this procedure during a maintenance window.

CAUTION: Ensure console access to the appliance you are migrating in case of typographical or other errors that might prevent network access when changing IP addresses.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon (.
- To view a page containing all the menu options, click the Advanced menu icon (.

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Changing the IP Address on an All-In-One Appliance

To change the primary IP address of an All-In-One Appliance :

Step 1. Stop the EM7 Service

Before changing the IP address, you must stop the EM7 service. To stop the EM7 service:

1. Either go to the console of the SL1 appliance or use SSH to access the server.
2. Login as user **em7admin** with the appropriate password.
3. Enter the following at the command line:

```
sudo systemctl stop em7
```

Step 2. Change the IP Address in the Configuration Files

You must change the ipaddress value in the configuration files.

1. Either go to the console of the SL1 appliance or use SSH to access the server.
2. Enter the following at the command line:

```
sudo visilo
```
3. Change the following line in the [LOCAL] section of the file to specify the new IP address:

```
ipaddress = new_IP_address
```
4. Save and quit the file (:wq).
5. Do steps 2-4 to change the IP address in the `/etc/silo.conf` file.

Step 3. Change the IP Address in the `/etc/hosts` File

If the `/etc/hosts` file includes an entry for the appliance, update the entry with the new IP address.

1. Either go to the console of the SL1 appliance or use SSH to access the server.
2. Enter the following at the command line:

```
sudo vi /etc/hosts
```
3. If you see an IP address for the All-In-One Appliance, change the IP address to the new IP address.

Step 4. Change the IP Address in the Network Interface Configuration File

NOTE: Be sure to set the IPADDR, PREFIX, GATEWAY and DNS# variables to the appropriate values for the new network. The PREFIX is the subnet mask in CIDR notation.

To change the IP address, Netmask, Gateway address, and DNS Server for an appliance in the `ifconfig` file:

1. Either go to the console of the SL1 appliance or use SSH to access the server.
2. Login as user **em7admin** with the appropriate password.
3. Enter the following at the command line:

```
sudo ifconfig
```


4. Your output will look like this:

```
inet6 fe80::250:56ff:fe84:455f prefixlen 64 scopeid 0x20<link>
ether 00:50:56:84:45:5f txqueuelen 1000 (Ethernet)
RX packets 1774927 bytes 161985469 (154.4 MiB)
RX errors 0 dropped 861 overruns 0 frame 0
TX packets 1586042 bytes 158898786 (151.5 MiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 0 (Local Loopback)
RX packets 13406577 bytes 4201274223 (3.9 GiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 13406577 bytes 4201274223 (3.9 GiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

5. Examine the output, find the interface that uses the old IP address, and note its name.

6. Use the vi editor to edit the settings for the interface. To do this, enter the following at the command line:

```
sudo vi /etc/sysconfig/network-scripts/ifcfg-interface name you noted in step
#5
```

For example, from our output, we could enter:

```
sudo vi /etc/sysconfig/network-scripts/ifcfg-ens32
```

7. The ifcfg file will look like this:

```
TYPE=Ethernet
BOOTPROTO=none
DNS1=10.64.20.33
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=yes
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_FAILURE_FATAL=no
NAME=ens32
UUID=d471435d-9adf-47c9-b3f3-32f61dccbad8
DEVICE=ens32
ONBOOT=yes
IPADDR=10.64.68.20
PREFIX=24
GATEWAY=10.64.68.1
IPV6_PEERDNS=yes
IPV6_PEERROUTES=yes
```

8. You can edit one or more of the following settings:
 - **DNS1**=IP address of the DNS server that will be used by the SL1 appliance.
 - **IPADDR**=New IP address of the SL1 appliance.
 - **PREFIX**=netmask for the SL1 appliance.
 - **GATEWAY**=IP address of the network gateway that will be used by the SL1 appliance.
9. Save your changes and exit the file (:wq)
10. At the command line, enter the following:

```
sudo service network restart
```

Step 5. Update the IP Address in the MySQL Database

In this step, you must set the new IP address in the `master.system_settings_licenses` table so that when SL1 is restarted, the new IP address is recognized as licensed.

1. Either go to the console of the SL1 appliance or use SSH to access the server.
2. Login as user **em7admin** with the appropriate password.
3. Enter the following at the command line:

```
silos_mysql
```

4. At the mysql prompt, enter the following query:

```
UPDATE master.system_settings_licenses SET ip="[new IP address]" WHERE ip="[old IP address]" LIMIT 1"
```

For example:

```
[em7admin@hostname ~]$ silos_mysql
```

```
MariaDB [(none)]> UPDATE master.system_settings_licenses SET ip="192.168.10.22"
WHERE ip="10.1.1.240";
Query OK, 1 row affected (0.01 sec)
Rows matched: 1 Changed: 1 Warnings: 0
```

```
MariaDB[(none)]>
```

5. Enter "exit" to exit the MySQL session.

Step 6. Reboot the Appliance

Reboot the appliance to apply all of the changes you made.

The system will boot up and will start the interface with the new IP address. SL1 will start up and will learn from the database that the new IP address matches its configuration file and the value in the database table. Therefore, SL1 will keep the current license for the appliance.

Changing the IP Address on a Database Server

Changing the primary IP address of a Database Server requires additional steps if

- the Database Server resides in a High Availability configuration or a Disaster Recovery configuration
- the Database Server might connect to Data Collectors configured for PhoneHome

In addition, when you change the primary IP address of a Database Server, you must update the configurations for any Data Collectors, Message Collectors and Administration Portals that communicate with that Database Server.

To change the IP address of a Database Server:

Step 1. Stop the EM7 Service

Before changing the IP address, you must stop the EM7 service. To stop the EM7 service:

1. Either go to the console of the Database Server or use SSH to access the server.
2. Login as user **em7admin** with the appropriate password.
3. Enter the following at the command line:

```
sudo systemctl stop em7
```

Step 2. Change the IP Address in the Configuration Files

You must change the ipaddress value in the configuration files.

1. Either go to the console of the SL1 appliance or use SSH to access the server.
2. Enter the following at the command line:

```
sudo visilo
```

3. Change the following line in the [LOCAL] section of the file to specify the new IP address:

```
ipaddress = new_IP_address
```

4. Save and quit the file (:wq).
5. Do steps 2-4 to change the IP address in the `/etc/silo.conf` file.

Step 3. Change the IP Address in the `/etc/hosts` File

If the `/etc/hosts` file contains an entry for the appliance, update the entry with the new IP address.

1. Either go to the console of the SL1 appliance or use SSH to access the server.
2. Enter the following at the command line:

```
sudo vi /etc/hosts
```

3. If you see an IP address for the Database Server, change the IP address to the new IP address.

Step 4. Change the IP Address in the Network Interface Configuration File

NOTE: Be sure to set the IPADDR, PREFIX, GATEWAY and DNS# variables to the appropriate values for the new network. The PREFIX is the subnet mask in CIDR notation.

To change the IP address, Netmask, Gateway address, and DNS Server for an appliance in the ifconfig file:

1. Either go to the console of the Database Server or use SSH to access the server.
2. Login as user **em7admin** with the appropriate password.
3. Enter the following at the command line:

```
sudo ifconfig
```

4. Your output will look like this:

```
ens32: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500inet 10.64.68.20
netmask 255.255.255.0 broadcast 10.64.68.255
inet6 fe80::250:56ff:fe84:455f prefixlen 64 scopeid 0x20<link>
ether 00:50:56:84:45:5f txqueuelen 1000 (Ethernet)
RX packets 1774927 bytes 161985469 (154.4 MiB)
RX errors 0 dropped 861 overruns 0 frame 0
TX packets 1586042 bytes 158898786 (151.5 MiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 0 (Local Loopback)
RX packets 13406577 bytes 4201274223 (3.9 GiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 13406577 bytes 4201274223 (3.9 GiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

5. Examine the output, find the interface that uses the old IP address, and note its name.
6. Use the vi editor to edit the settings for the interface. To do this, enter the following at the command line:

```
sudo vi /etc/sysconfig/network-scripts/ifcfg-interface name you noted in step
#5
```

For example, from our output, we could enter:

```
sudo vi /etc/sysconfig/network-scripts/ifcfg-ens32
```

7. The ifcfg file will look like this:

```
TYPE=Ethernet
BOOTPROTO=none
DNS1=10.64.20.33
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=yes
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_FAILURE_FATAL=no
NAME=ens32
UUID=d471435d-9adf-47c9-b3f3-32f61dccbad8
DEVICE=ens32
ONBOOT=yes
IPADDR=10.64.68.20
PREFIX=24
GATEWAY=10.64.68.1
IPV6_PEERDNS=yes
IPV6_PEERROUTES=yes
```

8. You can edit one or more of the following settings:

- **DNS1**=IP address of the DNS server that will be used by the Database Server.
- **IPADDR**=New IP address of the Database Server.
- **PREFIX**=netmask for the Database Server.
- **GATEWAY**=IP address of the network gateway that will be used by the Database Server.

9. Save your changes and exit the file (:wq)

10. At the command line, enter the following:

```
sudo service network restart
```

Step 5. Update the IP Address in the MySQL Database

In this step, you must set the new IP address in the `master.system_settings_licenses` table so that when the Database Server is restarted, SL1 recognizes the new IP address as licensed.

1. Either go to the console of the SL1 appliance or use SSH to access the server.
2. Log in as user **em7admin** with the appropriate password.
3. Enter the following at the command line:

```
silo_mysql
```

- At the mysql prompt, enter the following query:

```
UPDATE master.system_settings_licenses SET ip="[new IP address]" WHERE ip="[old IP address]" LIMIT 1"
```

For example:

```
[em7admin@hostname ~]$ silo_mysql
```

```
MariaDB [(none)]> UPDATE master.system_settings_licenses SET ip="192.168.10.22" WHERE ip="10.1.1.240";
Query OK, 1 row affected (0.01 sec)
Rows matched: 1 Changed: 1 Warnings: 0
```

```
MariaDB[(none)]>
```

- Enter "exit" to exit the MySQL session.

Step 5a: For Database Servers Configured with PhoneHome

If your Database Server is configured with PhoneHome, perform the following additional steps to change the IP address of the :Database Server

- Either go to the console of the Database Server or use SSH to access the server.
- Enter the following at the command line:

```
phonehome status
```

NOTE: If you are planning to change the IP address of multiple Database Servers, you will want to update all of the relevant IP addresses in PhoneHome in this step.

- The output will look like the following:

```
Phone Home Client configuration:
  Config Revisions: Device: 2 Destinations: 7 Global: 9

Device Id Type      State  Status  Forwards  Name
-----
  15    collector Enabled forwarded  Phone Home collector 15

Device Id Type      State  Host/Ip  Port  Name
-----
  11    database Enabled  192.168.2.2  7705  Phone Home database 11
  12    database Enabled  192.168.2.4  7705  Phone Home database 12
  13    database Enabled  192.168.2.6  7705  Phone Home database 13
```

- Note the Device ID for the Database Server. .
- Run the `phonehome set` command to change the IP address for the device ID that corresponds to the Database Server. To do this, enter the following:

```
phonehome set [device ID] ip="[new IP address]"
```

where:

- *device_id* is the device ID you noted in step #4.
- *new_ip_address* is the new IP address.

For example

```
[root@database_hostname username]# phonehome set 11 ip="[new_ip_address]"  
Reloading sshd configurations
```

6. For each Database Server that you want to change the IP address, perform step #5.

Step 5b For Clustered Database Appliances (using HA, DR, or HA+DR)

If your Database Servers are clustered for High Availability (HA), Disaster Recovery (DR), or both (HA+DR), to change the IP address of the Database Servers, you must also modify the clustering software configuration files, as described in this step.

1. Either go to the console of the Database Server or use SSH to access the server.

NOTE: Changes to the running Cluster Resource Manager (CRM) configuration take effect immediately. ScienceLogic recommends that you wait to wait to change the virtual IP address until the Database Server has been moved to its new location, if applicable.

2. You must edit the settings for the virtual IP for the cluster. At the command line, enter the following:

```
crm resource stop virtual_ip  
crm resource param virtual_ip set ip [new IP address]  
crm resource param virtual_ip set cidr_netmask [new subnet mask in CIDR notation]  
crm resource start virtual_ip
```

3. In a High Availability configuration, the two Database Servers use two rings:

- ring0 defines the private interfaces that are connected directly to one another via crossover cable.
- ring1 defines the public interfaces that host the virtual IP and conduct the SL1 related tasks.

To update these values in a High Availability configuration, you must edit the file `/etc/corosync/corosync.conf..`

4. Use a file editor like vi to edit /etc/corosync/corosync.conf.
5. You will see something like this:

```
nodelist {
  node {
    ring0_addr: 192.168.25.200
    ring1_addr: 10.1.20.25
    name: hardb1
    nodeid: 1
  }
  node {
    ring0_addr: 192.168.25.201
    ring1_addr: 10.1.20.26
    name: hardb2
    nodeid: 2
  }
}
```

6. For the Database Server with the new IP address, edit the value for ring0_addr to match the new IP address. Save the file.

DRBD is the service that synchronizes the Database Servers in a High Availability or Disaster Recovery configuration. The DRBD file /etc/drbd.d/r0.res defines how data (on resource 0) is synchronized.

- In SL1 configured for High Availability , DRBD uses the private IPs to synchronize high-availability data.
- In SL1 configured for High Availability plus Disaster Recovery, DRBD uses the private interface to synchronize high-availability data and the virtual IP and the public IP addresses to synchronize data for disaster recovery.
- In SL1 configured for Disaster Recovery, DRBD uses the virtual IP and the public IP addresses to synchronize data.

7. Use a file editor like vi to edit /etc/drbd.d/r0.res. It will look something like this:

```
resource r0 {
  protocol A;
  device /dev/drdb1;
  stacked-on-top-of r0-L {
    address 127.0.0.1:7789;
    proxy on hadrdb1 hadrdb2 {
      inside 127.0.0.1:7790;
      outside 192.168.25.200:7788;
    }
  }
}
on hadrdb2
  disk /dev/mapper/em7vg-db;
  address 127.0.0.1:7789;
  meta-disk internal;
  proxy on hadrdb3 {
    inside 127.0.0.1:7790;
    outside 192.168.25.201:7788;
  }
}
```


8. Replace instances of the old IP address with the new IP address and save the file.
9. Shut down the Database Server .
10. Upon reboot of the Database Server, run a discovery session to rediscover the Database Server with its new IP address.

Step 6. Reboot the Appliance

Reboot the Database Server to apply all of the changes you made.

CAUTION: If you are migrating a High Availability cluster, shut down the secondary first, then the primary, so that SL1 does not perform a failover. Restart up the primary first, and after it is up and running, restart on the secondary.

The system will boot up and will start the interface with the new IP address. SL1 will start up and will learn from the database that the new IP address matches its configuration file and the value in the database table. Therefore, SL1 will keep the current license for the appliance.

Step 7. Change the Database Appliance IP Address in the Administration Portals, Data Collectors, and Message Collectors

You must edit the configuration for each SL1 node that communicates with the Database Server. To do so, perform the following steps on each Administration Portal, Data Collector, and Message Collector in your SL1 system.

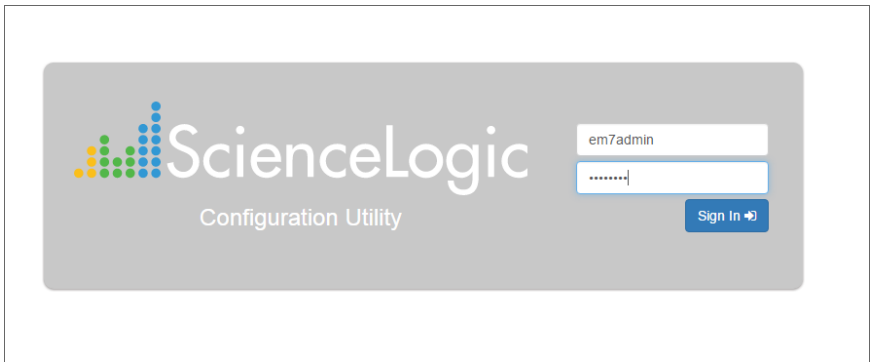
Perform the following steps to log in to the Web Configuration Utility:

1. You can log in to the Web Configuration Utility using any web browser supported by SL1. The address of the Web Configuration Utility is in the following format:

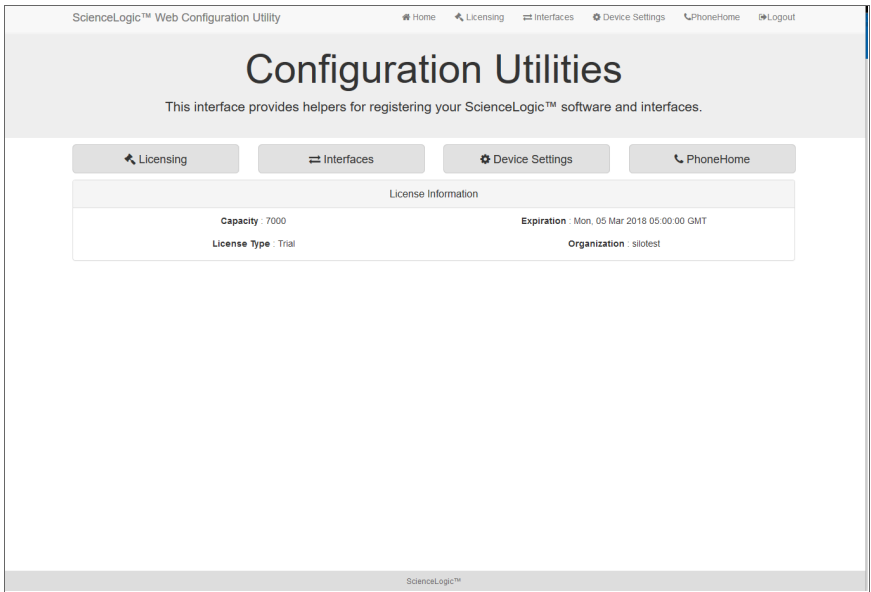
```
https://ip-address-of-appliance:7700
```

NOTE: For AWS instances, *ip-address-of-appliance* is the public IP for the AWS instance. To locate the public IP address for an AWS instance, go to AWS, go to the **Instances** page, and highlight an instance. The **Description** tab in the lower pane will display the public IP.

2. When prompted to enter your user name and password, log in as the "em7admin" user with either the default password of **em7admin** or the password you configured.



3. After logging in, the main **Configuration Utility** page appears:



4. Click the [**Device Settings**] button in the upper-right of the page. The **Settings** page appears.

5. In the **Settings** page, enter the following:
 - **Database IP Address.** The new IP address of the Database Server.
 - **Database Username.** Username for the database account that the Administration Portal will use to communicate with the Database Server.
 - **Accept the default values in all other fields.**
6. Click the **[Save]** button. You may now log out of the Web Configuration Utility.

Changing the IP Address on a Data Collector or Message Collector

You can change the IP address of a Data Collector or Message Collector in two ways:

- In the Web Configuration Utility
- From the command line of the Data Collector or Message Collector

Regardless of the method you choose, SL1 will automatically update the IP address of the Data Collector or Message Collector in:

- `/etc.sillo.conf`
- `/etc/sysconfig/network-scripts/ifcfg-ens160`
- `/etc/hosts`
- the `master.system_settings_licenses` table, in the `ip` column

The following sections explain the necessary steps.

Using the Web Configuration Utility to Change the IP Address of a Data Collector or Message Collector

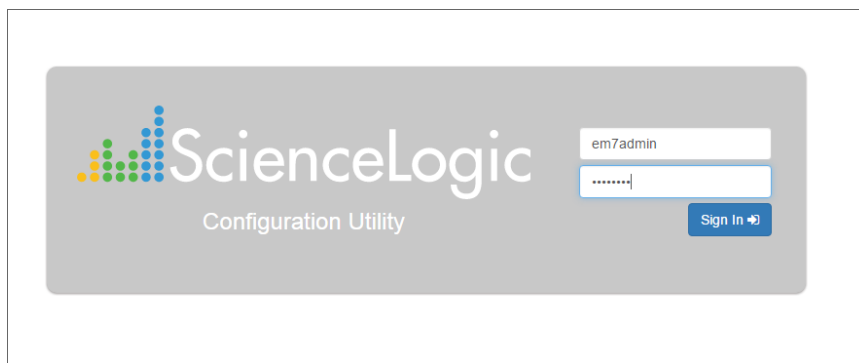
Perform the following steps to log in to the Web Configuration Utility:

1. You can log in to the Web Configuration Utility using any web browser supported by SL1 . The address of the Web Configuration Utility is in the following format:

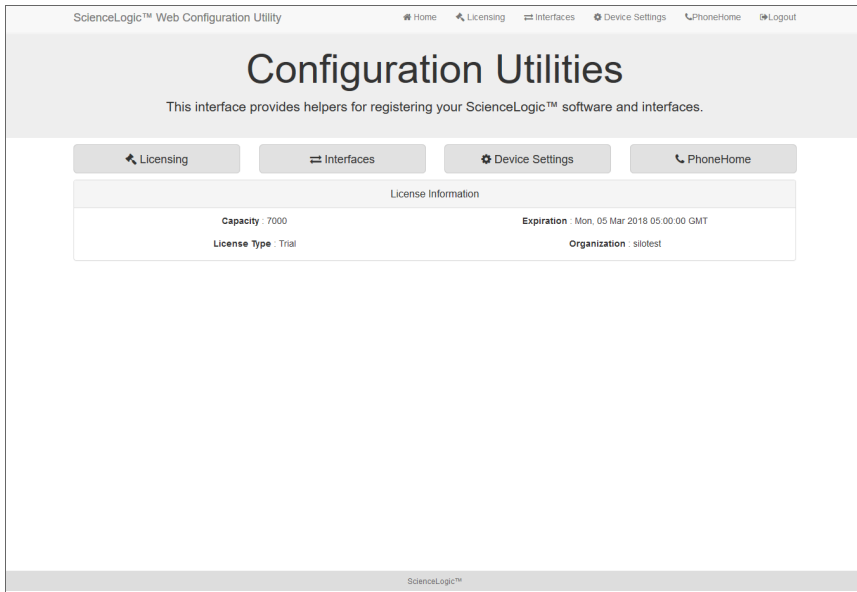
```
https://ip-address-of-appliance:7700
```

NOTE: For AWS instances, *ip-address-of-appliance* is the public IP for the AWS instance. To locate the public IP address for an AWS instance, go to AWS, go to the **Instances** page, and highlight an instance. The **Description** tab in the lower pane will display the public IP.

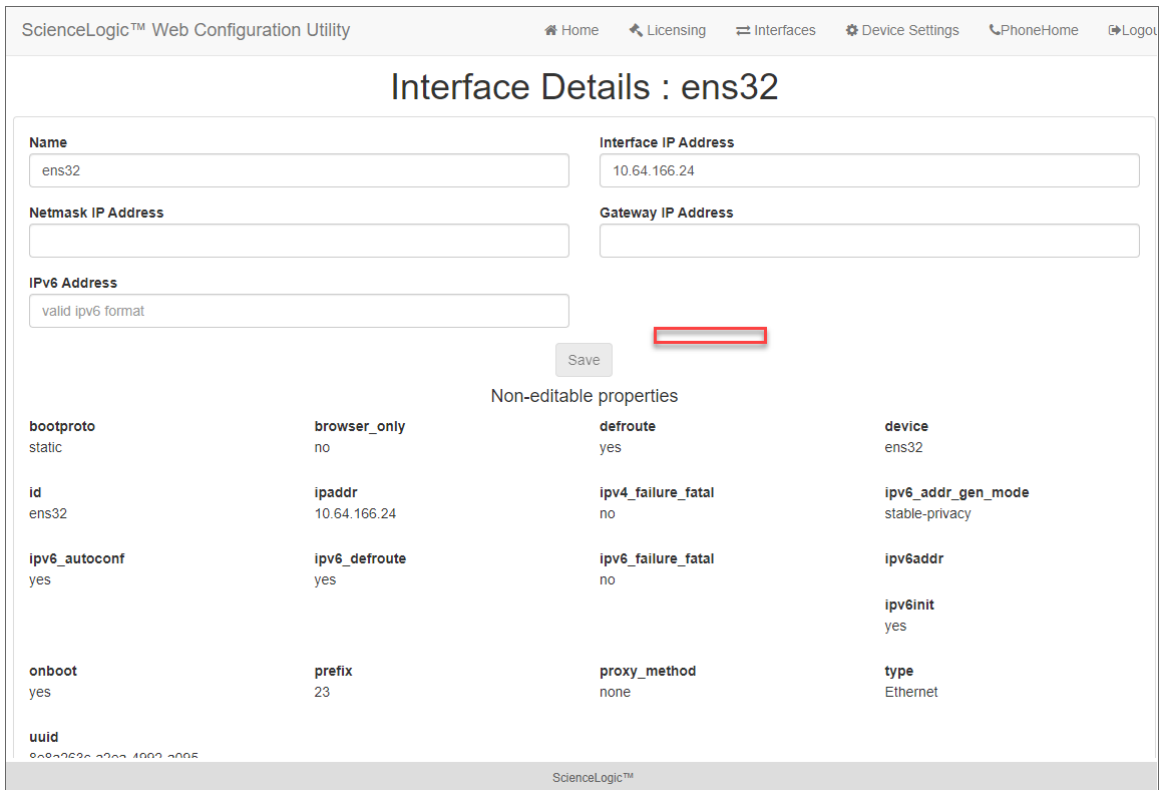
2. When prompted to enter your user name and password, log in as the "em7admin" user with either the default password of **em7admin** or the password you configured.



3. After logging in, the main **Configuration Utility** page appears:



4. Select the **Interfaces** tab.
5. In the **Interfaces** page, select the interface that you want to edit.



6. Enter values in the following fields:

- **Interface IP Address.** Required. Enter the IP address for the bonded interface in standard IPv4, dotted-octet format.

7. The IP address for the Data Collector or Message Collector will be automatically updated in all the necessary configuration file and database tables.

Using the Command Line to Change the IP Address of a Data Collector or Message Collector

1. Either go to the console of the Data Collector or Message Collector or use SSH to access the server.
2. At the shell prompt, enter:

```
update_ip <interface_ID> <new_IP>
```

where:

- *interface_ID* is the name of the interface, usually `ensn32` or `ens160`.
- *new_IP* is the new IP address to assign to the interface.



3. The IP address for the Data Collector or Message Collector will be automatically updated in all the necessary configuration file and database tables.

Changing Name Servers on an SL1 Appliance

Overview

This chapter describes how to change domain name servers (DNS) on an SL1 appliance.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon (.
- To view a page containing all the menu options, click the Advanced menu icon (.

This chapter includes the following topics:

Changing Name Servers on an SL1 Appliance	263
Installing Additional RPMs on an SL1 Appliance	265

Changing Name Servers on an SL1 Appliance

Domain Name Server (DNS) server settings are configured at installation. You cannot adjust the DNS settings later through the Web Configurator. Instead, you must use the command line interface (CLI) to change the DNS server information. This action requires no downtime.

To change the DNS settings:

1. Edit the `/etc/resolv.conf` file by entering the following command:

```
sudo vi /etc/resolv.conf
```
2. Change the **nameserver** entry to the IP address of the new DNS or add new DNS entries to the file.

3. Save and quit to commit the changes.

This change immediately causes the OS to use the new DNS, with no reboot or service restarts required. If you have multiple nameservers listed in the file, the system will try each entry in the list until it gets a response or runs out of nameservers.

Next, add the DNS to the interface configuration file so that the change will persist if the network service is restarted or the appliance is rebooted.

To add one or more domain name servers to the interface configuration file:

1. Either go to the console of the SL1 appliance or use SSH to access the server.
2. Log in as user **em7admin** with the appropriate password. The default password is **em7admin**.
3. Determine the name of your primary interface (not the "lo" interface) by running the following command:
`ip addr`
4. Edit the corresponding interface configuration file in the `/etc/sysconfig/network-scripts` directory:
`sudo vi /etc/sysconfig/network-scripts/ifcfg-{interface name}`
5. Find the "DNS1" entry and change the IP address to the IP address of the new DNS.

NOTE: You can enter additional DNS servers and define them as DNS2, DNS3, and so on.

6. Save and quit to commit the changes.

Installing Additional RPMs on an SL1 Appliance

For certain patch releases, ScienceLogic might require additional RPMs to be installed on specific appliance types. If an RPM install is required, the release notes will indicate the additional RPMs to install on each specific appliance type.

To install additional RPMs on an appliance, perform the following steps:

1. Download the RPM files provided by ScienceLogic to your local machine.
2. Log in as root at the appliance console.
3. Copy each of the downloaded RPM files to the appliance. To copy the downloaded files, perform the following command as root at the console of the appliance:

```
scp <username-on-local-machine>@<ip-address-of-your-local-machine>:<full-path-to-rpm-on-your-local-machine> <full-path-on-appliance-to-copy-to>
```

4. Use the following command to run the RPM installer for each of the RPM files:

```
rpm -U <name-of-rpm-file>.rpm
```

5. If you have not yet done so, apply the latest patch to your SL1 system.

Chapter



11

Backup Management

Overview

This chapter describes how to prepare to back up your SL1 system, to define and run your backups, and to restore from different backup types.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon ().
- To view a page containing all the menu options, click the Advanced menu icon ().

This chapter includes the following topics:

<i>Types of SL1 Backups</i>	266
<i>Preparing for SL1 Backups</i>	268
<i>Creating a Backup Credential</i>	268
<i>Configuration Backups</i>	269
<i>Full Backup</i>	276
<i>Additional Configuration for Solaris NFS Remote Shares</i>	282
<i>DR Backup</i>	283
<i>Performing Configuration Backups and Full Backups on the Disaster Recovery Database Server</i>	287

Types of SL1 Backups

SL1 allows you to define three types of backups for your system.

- **Configuration Backup.** Includes the core database tables and files required to restore an SL1 system. A configuration backup includes scope and policy information, but **not performance data, data collected using configuration Dynamic Applications, events, or logs.**
- **Full Backup.** Includes all SL1 databases and tables but does not include the configuration files specified in /etc/backup. These files are backed up in each configuration backup.
- **Disaster Recovery Backup.** Includes a full backup of the disaster-recovery database for SL1 systems configured for disaster recovery (DR). The Disaster Recovery backup is similar to the Full Backup.

The **Backup Management** page (System > Settings > Backup), shown below, lets you define your backups and run them on demand.

The screenshot displays the 'Backup Management' page in a web browser. The page has a blue header with 'Backup' on the left, 'Activity', 'Em7admin', and the ScienceLogic logo on the right. Below the header is a 'Backup Management' section with 'Reset' and 'Guide' buttons. The main content area is divided into four panels:

- Configuration Backup:** Includes fields for 'Every' (1), 'Interval' ([Disabled]), 'Start Time / Date' (2011-01-01 00:00:00), 'Timezone' ([_ UTC]), 'Configuration Credentials' ([nfs valid]), 'Configuration Protocol' ([NFS-Remote]), and 'Configuration Subdirectory' (/nfsshare).
- Full Backup:** Includes fields for 'Every' (1), 'Interval' ([Disabled]), 'Start Time / Date' (2011-01-01 00:00:00), 'Timezone' ([_ UTC]), 'Full Credentials' ([nfs valid]), 'Full Protocol' ([NFS-Remote]), 'Full Subdirectory' (/nfsshare), and 'Custom mariabackup Options'.
- DR Backup:** Includes fields for 'Every' (1), 'Interval' ([Disabled]), 'Start Time / Date' (2011-01-01 00:00:00), 'Timezone' ([_ UTC]), 'DR Credentials' ([nfs valid]), 'DR Protocol' ([NFS-Remote]), and 'DR Subdirectory' (/nfsshare).
- Immediate Backup:** A vertical panel containing a 'Save' button and three 'Backup Now' buttons for 'Configuration Backup', 'Full Backup', and 'DR Backup'.

CAUTION: ScienceLogic does not support vmotion or VMware Snapshots for backups of data. For backup purposes, ScienceLogic supports only ScienceLogic backups to remote storage. vmotion and VMware Snapshots can cause SL1 outages.

Preparing for SL1 Backups

Before creating a backup of your system, you must complete the following steps:

1. Identify the external system (NFS or SMB mount) and a directory to which you want to write the backups. You will need to specify the hostname or IP address of this system and the directory when configuring your backups.

NOTE: It is the responsibility of the system administrator for the external system to create any necessary entries in `/etc/fstab` required to allow the SL1 system to access the share as root.

2. Create a credential in SL1 that allows SL1 to write to the external system (NFS or SMB mount) where you will store the backups.
3. Define the configuration backup, full backup, or DR backup in SL1.

Creating a Backup Credential

Creating a Basic/

Backup Credential

If you are backing up your SL1 system, you must create a **Basic/Snippet** backup credential that allows SL1 to write to the external backup systems.

To create a **Basic/Snippet** backup credential:

1. Go to the **Credentials** page (Manage > Credentials).
2. Click **[Create New]** and select *Create Basic/Snippet Credential*. The **Create Credential** modal appears:

NOTE: Alternatively, if you are using the classic SL1 user interface, you can go to the **Credential Management** page (System > Manage > Credentials), click the **[Actions]** button, and select *Create Basic/Snippet Credential* to use the **Credential Editor** modal.

3. Define values in the following fields:

- **Credential Name.** Name of the credential. Can be any combination of alphanumeric characters.
- **Organization.** Select **All Organizations** or select an organization from the drop-down.
- **Hostname/IP.** The hostname or IP address.
- **Port.** This field is deprecated. Backups will not use this field.
- **Timeout (ms).** This field is deprecated. Backups will not use this field.
- **Username.** Username to use when connecting to the external system. If you are backing up to NFS-remote, this field is not required.
- **Password.** Password to use when connecting to the external system. If you are backing up to NFS-remote, this field is not required.

4. Click **[Save]**.

Configuration Backups

A configuration backup stores a copy of the core database tables that are required to restore an SL1 system. Configuration backups use the "MySQL dump" tool to create backups.

You must store configuration backups on an external system (not the Database Server or All-In-One Appliance). You can specify that configuration backups be stored on an NFS mount or SMB mount on an external system.

NOTE: SL1 Systems prior to 8.12 allow you to store backups locally. New SL1 systems later than 8.12 require you to store backups on an external system.

NOTE: If you have a large system and very large backup files, you can use an alternative method to perform backups that reduces performance issues during backup. For more information, see the section [Performing Config Backups and Full Backups on a Disaster Recovery Database Server](#).

NOTE: SL1 automatically retains your last seven configuration backups.

Note the following information about configuration backups:

- SL1 can launch configuration backups automatically at the interval you specify.
- During configuration backup, the ScienceLogic database remains online.
- When the configuration backup starts, SL1 creates a temporary mount point to your remote share in `/data.local/backup/remote<unix_timestamp>`.

What Does a Configuration Backup Include?

A configuration backup includes:

- Scope and policy information, but **not performance data, data collected using configuration Dynamic Applications, or events**.
- By default, the following files are backed up during a configuration backup:
 - `/etc/backup.conf`
 - `/etc/corosync/corosync.conf`
 - `/etc/drbd.d/r0.res`
 - `/etc/drbd-proxy.license`
 - `/etc/hosts`
 - `/etc/my.cnf.d/silo_mysql.cnf`
 - `/etc/nginx/*`
 - `/etc/phonehome/*`
 - `/etc/php-fpm.d/*.conf`
 - `/etc/postfix/main.cf`
 - `/etc/silo.conf`
 - `/etc/siteconfig/*`
 - `/etc/ssh/*.key`
 - `/etc/ssh/*.pub`
 - `/etc/sysconfig/network-scripts/ifcfg-*`
 - `/etc/sysctl.d/*`

- /etc/systemd/system/mariadb.service.d/*.conf
 - /opt/em7/nextui/nextui.conf
 - /usr/libexec/postfix/main.cf
 - /var/log/em7/*
- All files and folders specified in /etc/backup.conf. If you have additional files that you want to include in configuration backups, you can include them in the file /etc/backup.conf.
 - The following databases:
 - **master**. Includes system-level settings for SL1, Dynamic Application definitions and alignments, run book automation and action policies, monitoring policy definitions, and credentials.
 - **master_access**. Includes user account information, access keys, and access hooks.
 - **master_ap2**. Includes files from the new UI, including files from Business Services.
 - **master_biz**. Includes asset information, dashboards, distribution lists, document templates, IT Service policy information, organization information, product SKU information, RSS feeds, ticketing information, and user preferences. By default, configuration backups do not include the *ticket_external_requests* table from the master_biz database.
 - **master_custom**. Includes GUI customizations, dashboard widget definitions, and PowerPack files.
 - **master_dev**. Includes information associated with device records, excluding performance data, data collected using configuration Dynamic Applications, events, or logs.
 - **master_dns**. Includes DNS information.
 - **master_events**. The configuration backup includes only the *event_suppressions* table from this database. This table stores event suppression settings.
 - **master_filestore**. Includes information about files, PowerPacks, and notes. By default, configuration backups do not include the tables *metadata_system_package*, *metadata_system_patch*, *storage_system_package*, and *storage_system_patch*.

NOTE: In SL1 versions prior to 8.14, configuration backups contained RPM update and package files. In version 8.14 and higher, configuration backups no longer contain these files, making the backup process complete faster and making the backup file smaller.

- **master_platform**. Includes information about ScienceLogic appliances.
- **master_reports**. Includes custom report definitions.
- **mysql**. Contains the configuration settings for the MariaDB database.
- **scheduler**. Includes all instances of scheduled items: reports, discovery sessions, etc.
- **sysinfo**. Contains the configuration settings for High Availability, Disaster Recovery, and PhoneHome Collectors.

Viewing the Databases and Tables Included or Excluded from a Configuration Backup

To see which databases and tables are *included* in configuration backups in your environment:

1. Navigate to the **Database Tool** page (System > Tools > DB Tool)

NOTE: The **Database Tool** page does not display for users that do not have sufficient permissions for that page.

2. In the **Select Database** field, select *Master*.
3. In the "SQL Query" field, enter this query:

```
SELECT backup_db_list FROM `system_settings_backup` WHERE id = 1
```

To see which databases and tables are *excluded* in configuration backups in your environment:

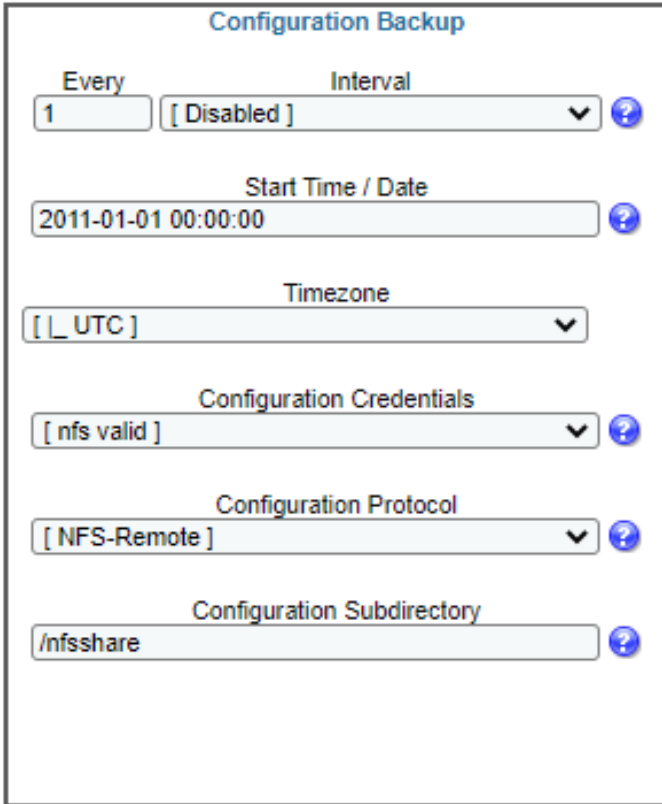
1. Navigate to the **Database Tool** page (System > Tools > DB Tool)
2. In the **Select Database** field, select *Master*.
3. In the "SQL Query" field, enter this query:

```
SELECT backup_cb_table_exclude FROM `system_settings_backup` WHERE id = 1
```


Defining a Configuration Backup

To define and schedule a configuration backup:

1. Go to the **Backup Management** page (System > Settings > Backup).
2. In the **Configuration Backup** pane, provide values in the following fields:



The screenshot shows a configuration pane titled "Configuration Backup". It contains several fields for setting up a backup schedule and location:

- Every**: A text input field containing the value "1".
- Interval**: A dropdown menu currently showing "[Disabled]".
- Start Time / Date**: A text input field containing "2011-01-01 00:00:00".
- Timezone**: A dropdown menu currently showing "[L UTC]".
- Configuration Credentials**: A dropdown menu currently showing "[nfs valid]".
- Configuration Protocol**: A dropdown menu currently showing "[NFS-Remote]".
- Configuration Subdirectory**: A text input field containing "/nfsshare".

Each dropdown menu has a blue question mark icon to its right, and the text input fields also have a blue question mark icon to their right.

- **Every**. Together with the **Interval** field, specifies the frequency of the backup.
- **Interval**. Together with the **Every** field, you must specify how frequently SL1 should automatically execute a configuration backup. Your choices are:
 - *Disabled*. Configuration backups are disabled. If you want to run on-demand configuration backups only, you do not need to change this setting.
 - *Day*. SL1 will execute configuration backups daily as specified (for example, every 2 days).
 - *Week*. SL1 will execute configuration backups weekly as specified (for example, every 2 weeks).
 - *Month*. SL1 will execute configuration backups monthly as specified (for example, every 1 month).

- **Start Time / Date.** If you enabled configuration backups, you must specify the start time. You must specify the date on which you want configuration backups to begin, as well as the time of day you want the backups to run. For example, you might want to run configuration backups during a maintenance window late at night. Click the field to open a calendar and time selector.
- **Timezone.** Optional. Specify the timezone to use when running a backup. The default is UTC. Use the drop-down list to select the timezone.
- **Configuration Credentials.** Select the credential you created for SL1 to use to connect to your external system (NFS or SMB). For more information, see [Creating a Backup Credential](#).
- **Configuration Protocol.** Specify the type of external system where the configuration backup will be stored. Choices are:
 - *NFS-Remote.* When you select this option, SL1 stores the configuration backup on an NFS share.

NOTE: If you select the *NFS-remote* option, and your NFS share is hosted on a Solaris system, you must perform the steps listed in the [Additional Configuration for Solaris NFS Mounts](#) section.

- *SMB-Remote.* When you select this option, SL1 stores the configuration backup on an SMB share.
- **Configuration Subdirectory.** Specify a directory on the NFS or SMB share in which you would like to store the configuration backup. When entering the subdirectory path, include the leading slash ("/"). On the remote share, the current Unix time will be appended to the directory name to ensure the directory name is unique each time the backup runs.
4. Click the **[Save]** button to save your settings. SL1 will execute the configuration backup at the specified interval, starting on the date you specified in the **Start Time / Date** field and using the time you specified in the **Start Time / Date** field.
 5. To run the backup immediately, click the **[Backup Now]** button under **Configuration Backup** in the **Immediate Backup** section of the **Backup Management** page. SL1 will run the backup immediately, as well as running the scheduled backup you configured in this procedure.

Restoring a Configuration Backup

If you have performed configuration backups, you can restore your system from a configuration backup in the event of data corruption or other failure. The configuration backup file contains one SQL (.sql) file for each database that was included in the configuration backup.

NOTE: These steps assume that the Database Server has not been previously configured.

NOTE: To complete these steps, you must be familiar with how to edit a file using the vi text editor. If you need assistance with these steps, please contact ScienceLogic Support.

To restore a database using the backup file:

1. Either go to the console of the Database Server or use SSH to access the server.

NOTE: The Database Server to which you are restoring the backup must be at the same revision number as the Database Server that created the backup file.

2. Log in as user **em7admin** and assume root user privileges by using the following command:

```
$ sudo -s
```

3. Execute the following commands at the command line to uncompress the backup file, where `<new_subdirectory>` is a directory you create that will be the destination for your uncompressed files:

```
mkdir /data.local/db/<new_subdirectory>
cd /data.local/db/<new_subdirectory>
export RCLONE_CONFIG_BACKUP_BUCKET_ACL="private"
export RCLONE_CONFIG_BACKUP_CHUNK_SIZE="128Mi"
export RCLONE_CONFIG_BACKUP_TYPE="s3"
export RCLONE_CONFIG_BACKUP_UPLOAD_CONCURRENCY="4"
export RCLONE_CONFIG_BACKUP_PROVIDER="<--- Provider --->"
export RCLONE_CONFIG_BACKUP_ACCESS_KEY_ID="<--- Access Key ID --->"
export RCLONE_CONFIG_BACKUP_SECRET_ACCESS_KEY="<--- Secret Access Key --->"
export RCLONE_CONFIG_BACKUP_ENDPOINT="<--- Endpoint URL --->"
export RCLONE_CONFIG_BACKUP_REGION="<--- Region --->"
export RCLONE_CONFIG_CRYPT_TYPE="crypt"
export RCLONE_CONFIG_CRYPT_DIRECTORY_NAME_ENCRYPTION="false"
export RCLONE_CONFIG_CRYPT_FILENAME_ENCRYPTION="off"
export RCLONE_CONFIG_CRYPT_REMOTE="backup:/<--- Bucket --->/<--- Folder --->"
export RCLONE_CONFIG_CRYPT_PASSWORD="`rclone obscure '<--- Encryption Password -->'"
export RCLONE_CONFIG_CRYPT_PASSWORD2="`rclone obscure '<--- Encryption Salt --->'"
rclone cat crypt:<--- File Name without the .bin --->|pigz -d|tar xv
```

4. Your target directory will now contain one SQL file for each database included in the backup. Copy the configuration backup files to their original locations. For example:

```
cp -r opt /
cp -r var /
cp -r etc /
cp -r usr /
```

5. To restore a database, execute the following command using the username of a user that has administrative privileges in MySQL (by default, the user is **root** and the password is **em7admin**):

```
silomysql <name_of_database> -u <username> -p<password> < <name_of_database>.sql
```

NOTE: Do not include a space between "-p" and the password.

For example, to restore the database "master" as the user "root" with the default password of "em7admin", perform the following command:

```
silomysql master -u root -pem7admin < master.sql
```

6. To restore all the databases that are included in the backup file, repeat step 5 for each .sql file.
7. Re-license the Database Server using the standard licensing procedure. For details, see the section on **Licensing and Configuring an Appliance** in the **Installation and Initial Configuration** manual.

Full Backup

Running a full backup creates a complete backup of the ScienceLogic database. Full backups use a built-in tool called MariaBackup.

You must store full backups on an external system (not the Database Server or All-In-One Appliance). You can specify that full backups be stored on an NFS mount or SMB mount on an external system.

NOTE: SL1 Systems prior to 8.12 allow you to store backups locally. New SL1 systems later than 8.12 require you to store backups on an external system.

NOTE: If you have a large system and very large backup files, you can use an alternative method to perform backups that reduces performance issues during backup. For more information, see the section "Performing Config Backups and Full Backups on a Disaster Recovery Database Server" in the **System Administration** manual.

Note the following information about full backups:

- SL1 can launch full backups automatically at the interval you specify.
- During a full backup, the ScienceLogic database remains online.

What Does a Full Backup Include?

A full backup does the following:

- A full backup includes all databases and tables.
- A full backup does not back up the files in /etc/backup.conf.

NOTE: For very large SL1 systems, ScienceLogic recommends you use a SAN with snapshot technology to backup and restore data.

NOTE: If your SL1 System uses AWS RDS (remote database), the **Full Backup** option is disabled.

Defining a Full Backup

Full backups include all databases and tables. SL1 automatically launches this backup at the frequency and time you specify.

To define and schedule a full backup:

1. Go to the **Backup Management** page (System > Settings > Backup).

2. In the **Full Backup** pane, provide values in the following fields:

The screenshot shows a configuration window titled "Full Backup". It contains the following fields and values:

- Every**: 1
- Interval**: [Disabled]
- Start Time / Date**: 2011-01-01 00:00:00
- Timezone**: [L UTC]
- Full Credentials**: [nfs valid]
- Full Protocol**: [NFS-Remote]
- Full Subdirectory**: /nfsshare
- Custom mariabackup Options**: (empty)

- **Every**. Together with the **Interval** field, specifies the frequency of the backup.
- **Interval**. Together with the **Every** field, specifies how frequently SL1 should automatically execute a full backup. Your choices are:
 - *Disabled*. Full backups are disabled.
 - *Day*. SL1 will execute full backups daily as specified (for example, every 2 days).
 - *Week*. SL1 will execute full backups weekly as specified (for example, every 2 weeks).
 - *Month*. SL1 will execute full backups monthly as specified (for example, every 1 month).
- **Start Time / Date**. If you enabled full backups, you must specify the start time. You must specify the date on which you want configuration backups to begin, as well as the time of day you want the backups to run. For example, you might want to run configuration backups during a maintenance window late at night. Click the field to open a calendar and time selector.
- **Timezone**. Optional. Specify the timezone to use when running a backup. The default is UTC. Use the drop-down list to select the timezone.
- **Full Credentials**. Select the credential you created for SL1 to use to connect to your external system (NFS or SMB). For more information, see [Creating a Backup Credential](#).
- **Full Protocol**. Specify the type of external system where the full backup will be stored. Choices are:

- *NFS-Remote*. When you select this option, SL1 stores the backup on an NFS share.

NOTE: If you select the *NFS-remote* option, and your NFS share is hosted on a Solaris system, you must perform the steps listed in the [Additional Configuration for Solaris NFS Mounts](#) section.

- *SMB-Remote*. When you select this option, SL1 stores the backup on an SMB share.
4. Click the **[Save]** button to save your settings. SL1 will execute the full backup at the frequency and time you specified in the **Every**, **Interval**, and **Start Time/Date** fields.
 5. To run the backup immediately, click the **[Backup Now]** button under **Full Backup**. SL1 will immediately run the backup and will still run the backup at the frequency and time you specified in the **Backup Frequency** and **Start Time** fields.

Restoring a Full Backup

To restore a SL1 system using a full backup file, perform the following steps:

NOTE: These steps assume that the Database Server has not been previously configured.

NOTE: To complete these steps, you must be familiar with how to edit a file using the vi text editor. If you need assistance with these steps, please contact ScienceLogic Support.

1. Either go to the console of the Database Server where you want to restore the backup, or use SSH to log in to the Database Server.

NOTE: The Database Server to which you are restoring the backup must be at the same revision number as the Database Server that created the backup file.

2. Log in as user **em7admin** and then assume root privileges:

```
$ sudo -s
```

3. Execute the following commands:

WARNING: Executing this command will stop the database. SL1 will not be operational until you complete the restore procedure.

```

siloctl stop --full
systemctl stop mariadb
rm -rf /data.local/db/*
mkdir /data.local/db/.tmp
cd /data.local/db/.tmp
export RCLONE_CONFIG_BACKUP_BUCKET_ACL="private"
export RCLONE_CONFIG_BACKUP_CHUNK_SIZE="128Mi"
export RCLONE_CONFIG_BACKUP_TYPE="s3"
export RCLONE_CONFIG_BACKUP_UPLOAD_CONCURRENCY="4"
export RCLONE_CONFIG_BACKUP_PROVIDER="<--- Provider --->"
export RCLONE_CONFIG_BACKUP_ACCESS_KEY_ID="<--- Access Key ID --->"
export RCLONE_CONFIG_BACKUP_SECRET_ACCESS_KEY="<--- Secret Access Key --->"
export RCLONE_CONFIG_BACKUP_ENDPOINT="<--- Endpoint URL --->"
export RCLONE_CONFIG_BACKUP_REGION="<--- Region --->"
export RCLONE_CONFIG_CRYPT_TYPE="crypt"
export RCLONE_CONFIG_CRYPT_DIRECTORY_NAME_ENCRYPTION="false"
export RCLONE_CONFIG_CRYPT_FILENAME_ENCRYPTION="off"
export RCLONE_CONFIG_CRYPT_REMOTE="backup:/<--- Bucket --->/<--- Folder --->"
export RCLONE_CONFIG_CRYPT_PASSWORD="`rclone obscure '<--- Encryption Password --
->'`"
export RCLONE_CONFIG_CRYPT_PASSWORD2="`rclone obscure '<--- Encryption Salt ---
>'`"
time rclone cat crypt:<--- Full Backup File Name without the .bin --->|pigz -
d|mbstream -vvv -x -C .

```

4. Create a local directory or a directory on a mounted server that has sufficient space for your data to be extracted. This must be a directory **other than /data.local/db**:

```

mkdir <directory for data extraction>
cd <directory for data extraction>
pigz -dc <full_path_and_name_of_backup_file.gz> | mbstream -x -C .

```

Where *<directory for data extraction>* is the directory you created that will be the destination for your uncompressed files, and where *<full path and filename for backup.tgz>* is the location and name of your backup file. For example:

```

cd /backups/full
pigz -dc /mnt/db1_full_2021-02-01_21-00-00.gz | mbstream -x -C .

```

5. Execute the following command, where *<subdirectory>* is the directory you created in the previous step:

```
more /<directory for data extraction>/backup_my.conf
```

6. Locate the line that looks like the following. Copy or write down the exact text that appears, such as:

```
innodb_data_file_path=ibdata1:354M;ibdata2:500M:autoextend:max:8925M
```

7. Execute the following command to edit the /etc/my.cnf.d/silo_mysql.cnf file:

```
vimysql
```


8. Add the line you copied in Step 7 to the `mysql.siteconfig` file, such as:

```
innodb_data_file_path=ibdata1:354M;ibdata2:500M:autoextend:max:8925M
```

9. Save the file and exit the editor by entering `:wq`.
10. Execute the following command to build the updated configuration file:

```
vimysql -f
```

11. Execute the following commands:

```
mariabackup --prepare --target-dir=  
mariabackup --move-back --force-non-empty-directories --target-dir .  
cd /data.local/db  
rm -rf .tmp  
chown -R mysql:mysql *  
systemctl start mariadb  
siloctl start --full
```

NOTE: Note that these commands assume you have changed directories to the directory that contains the extracted backup files. If you want to run these commands from a location other than the location of the extracted backup files, then you must enter a value after "target-dir=" to point to the directory where the extracted files are located. To learn more about MariaBackup, see <https://mariadb.com/kb/en/full-backup-and-restore-with-mariabackup/>.

NOTE: Depending on the size of the backup, the `mariabackup` command might take a long time to complete.

12. Re-license the Database Server using the standard licensing procedure. For details, see the section on "Licensing and Configuring an Appliance" in the *Installation and Initial Configuration* manual.

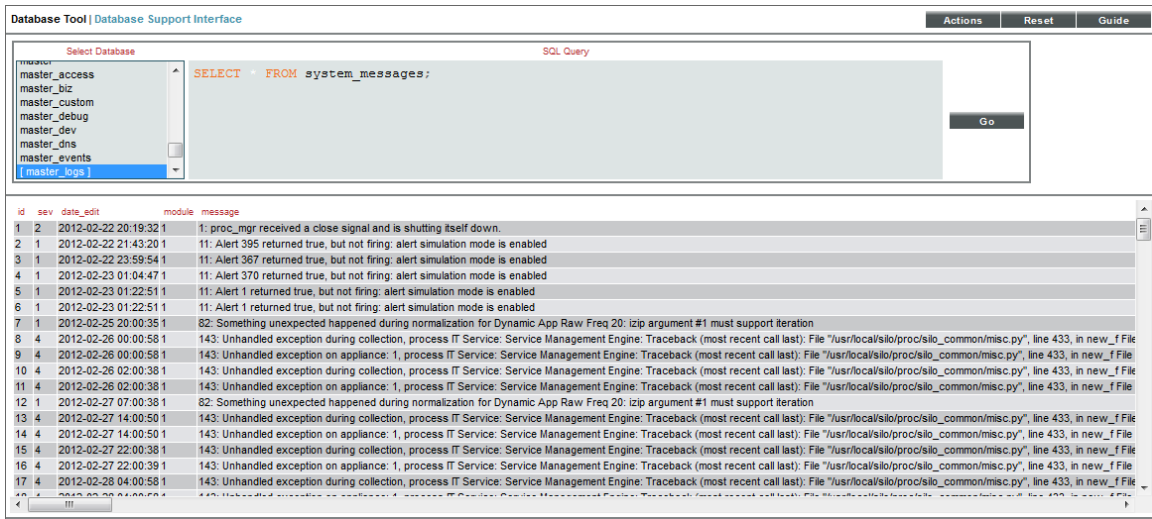
Retaining Full Backups

SL1 can automatically delete backups to save space on the external system where you store your backup files.

You can specify a retention value. SL1 will keep the retention value plus one additional backup.

To specify the number of full backups to retain, perform the following:

1. Go to the **Database Tool** page (System > Tools > DB Tool).



2. In the SQL Query field, enter the following:


```
UPDATE master.system_settings_backup SET backup_retention = <number of backups to retain> WHERE id = 2
```
3. For example, the following command would retain five full backups, the last four plus the current backup:


```
UPDATE master.system_settings_backup SET backup_retention = 4 WHERE id = 2
```
4. Click the **[Go]** button to execute the query.
5. SL1 will create an entry in `/var/log/em7/silo.log` when a backup is deleted.

Additional Configuration for Solaris NFS Remote Shares

To use the *NFS-remote* backup protocol with an NFS share hosted on a Solaris system, you must configure the Solaris system to allow the backup process to change file ownership permissions. To do this:

- In `/etc/dfs/dfstab` on the Solaris system, you must specify that the fully-qualified domain name of the Database Server or All-In-One Appliance can access the NFS file system as root. For example:


```
share -F nfs -o sec=sys,root=database.sciencelogic.local -d "ScienceLogic Backup Share" /export/home/backup
```
- In `/etc/defaults/nfs` on the Solaris system, include the line `"NFSMAPID_DOMAIN=<domain of Database Server or All-In-One Appliance>".` For example:


```
NFSMAPID_DOMAIN=ScienceLogic.local
```

You can test this configuration by mounting the NFS file system from the console of your SL1 appliance, creating a new file on the file system using the "touch" command, and then executing the command "ls -la". If the Solaris system is configured correctly, the output of the ls command will indicate that the new file was created and is owned by the "root" user.

DR Backup

For SL1 systems configured for disaster recovery, DR Backup temporarily stops replication, mounts the database, and runs a full backup of the disaster-recovery database. The process then re-enables replication and performs a partial resynchronization from the primary.

You must store DR backups on an external system (not the Database Server or All-In-One Appliance). You can specify that DR backups be stored on a remote NFS mount or SMB mount.

Disaster Recovery Backups use 'tar' to create a copy and compress the /data.local/db directory.

DR backup includes all configuration data, performance data, and log data. During DR backup, the primary ScienceLogic database remains online.

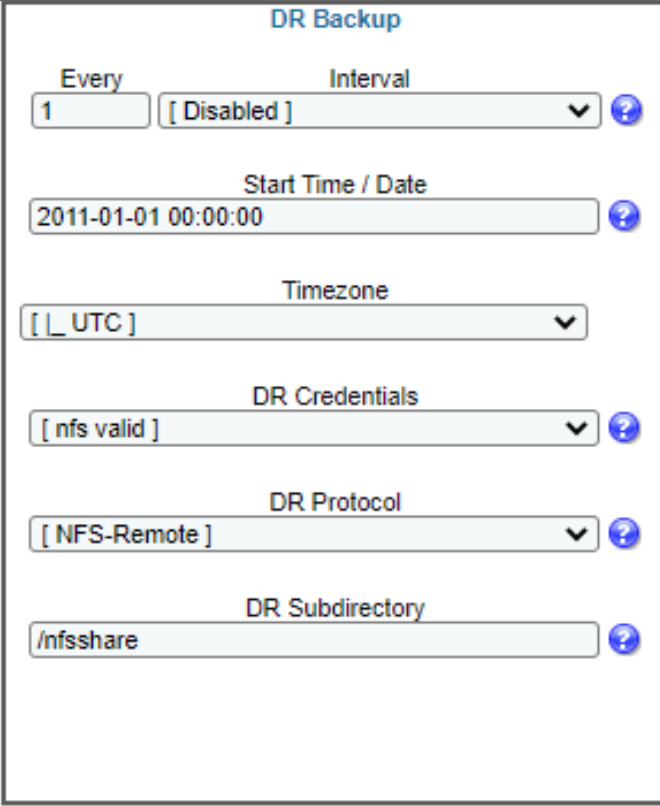
NOTE: The **DR Backup** fields appear only for systems configured for Disaster Recovery. DR Backup is not available for the two-node High Availability cluster.

NOTE: If your SL1 System uses AWS RDS (remote database), the **DR Backup** option is disabled.

Defining a DR Backup

To define and schedule a DR backup:

1. Go to the **Backup Management** page (System > Settings > Backup).



The screenshot shows a configuration pane titled "DR Backup" with the following fields:

- Every**: A text input field containing the value "1".
- Interval**: A dropdown menu currently showing "[Disabled]".
- Start Time / Date**: A text input field containing "2011-01-01 00:00:00".
- Timezone**: A dropdown menu currently showing "[_ UTC]".
- DR Credentials**: A dropdown menu currently showing "[nfs valid]".
- DR Protocol**: A dropdown menu currently showing "[NFS-Remote]".
- DR Subdirectory**: A text input field containing "/nfsshare".

2. In the **DR Backup** pane, provide values in the following fields:

- **Every**. Together with the **Interval** field, specifies the frequency of the backup.
- **Interval**. Together with the **Every** field, you must specify how frequently SL1 should automatically execute a configuration backup. Your choices are:
 - *Disabled*. DR backups are disabled. If you want to run on-demand DR backups only, you do not need to change this setting.
 - *Day*. SL1 will execute DR backups daily as specified (for example, every 2 days).
 - *Week*. SL1 will execute DR backups weekly as specified (for example, every 2 weeks).
 - *Month*. SL1 will execute DR backups monthly as specified (for example, every 1 month).

- **Start Time/Date.** If you enabled DR backups, you must specify the start time. You must specify the date on which you want DR backups to begin, as well as the time of day you want the backups to run. For example, you might want to run DR backups during a maintenance window late at night. Click the field to open a calendar and time selector.
- **Timezone.** Optional. Specify the timezone to use when running a backup. The default is UTC. Use the drop-down list to select the timezone.
- **DR Credentials.** Select the credential you created for SL1 to use to connect to your external system (NFS or SMB). For more information, see [Creating a Backup Credential](#).

NOTE: Your organization membership(s) might affect the list of credentials you can see in the **DR Credentials** field. For details, see the *Discovery and Credentials* manual.

- **DR Protocol.** Specifies where SL1 should store the full backups. Choices are:
 - *NFS-Remote.* When you select this option, SL1 stores the DR backup on an NFS share.

NOTE: If you select the *NFS-remote* option, and your NFS mount is hosted on a Solaris system, you must perform the steps listed in the [Additional Configuration for Solaris NFS Mounts](#) section of this chapter.

- *SMB-Remote.* When you select this option, SL1 stores the DR backup on an SMB share.
- **DR Subdirectory.** Specify a directory on the NFS or SMB share in which you would like to store the DR backup. When entering the subdirectory path, include the leading slash ("/"). On the remote share, the current Unix time will be appended to the directory name to ensure the directory name is unique each time the backup runs.
4. Click the **[Save]** button to save your settings. SL1 will execute the DR backup at the frequency and time you specified in the **Backup Frequency** and **Start Time** fields.
 5. To run the backup immediately, click the **[Backup Now]** button under **DR Backup**. SL1 will immediately run the backup and will still run the backup at the frequency and time you specified in the **Backup Frequency** and **Start Time** fields.

Restoring a DR Backup

To restore a Database Server using a DR backup file, perform the following steps:

NOTE: These steps assume that the Database Server has not been previously configured.

1. The Database Server to which you are restoring the backup must be at the same revision number as the Database Server that created the backup file.

2. Either go to the console of the Database Server where you want to restore the backup or use SSH to access the Database Server.
3. Log in as user **em7admin** and sudo to the root account:

```
sudo -s
```

4. Execute the following commands:

WARNING: Executing this command will stop the database. SL1 will not be operational until you complete the restore procedure.

```
siloctl stop --full
systemctl stop mariadb
rm -rf /data/db/*
cd /data/db
export RCLONE_CONFIG_BACKUP_BUCKET_ACL="private"
export RCLONE_CONFIG_BACKUP_CHUNK_SIZE="128Mi"
export RCLONE_CONFIG_BACKUP_TYPE="s3"
export RCLONE_CONFIG_BACKUP_UPLOAD_CONCURRENCY="4"
export RCLONE_CONFIG_BACKUP_PROVIDER="<--- Provider --->"
export RCLONE_CONFIG_BACKUP_ACCESS_KEY_ID="<--- Access Key ID --->"
export RCLONE_CONFIG_BACKUP_SECRET_ACCESS_KEY="<--- Secret Access Key --->"
export RCLONE_CONFIG_BACKUP_ENDPOINT="<--- Endpoint URL --->"
export RCLONE_CONFIG_BACKUP_REGION="<--- Region --->"
export RCLONE_CONFIG_CRYPT_TYPE="crypt"
export RCLONE_CONFIG_CRYPT_DIRECTORY_NAME_ENCRYPTION="false"
export RCLONE_CONFIG_CRYPT_FILENAME_ENCRYPTION="off"
export RCLONE_CONFIG_CRYPT_REMOTE="backup:<--- Bucket --->/<--- Folder --->"
export RCLONE_CONFIG_CRYPT_PASSWORD="`rclone obscure '<--- Encryption Password --
->'`"
export RCLONE_CONFIG_CRYPT_PASSWORD2="`rclone obscure '<--- Encryption Salt ---
>'`"
time rclone cat crypt:<--- Full Backup File Name without the .bin --->|pigz -
d|mbstream -vvv -x -C .
rclone cat crypt:<--- File Name without the .bin --->|pigz -d|tar xv
```

5. Execute the following commands, substituting the full pathname of your backup file:

```
mv /data/db/data/db/* .
rm -rf /data/db/data
cp /data/db/etc/my.cnf.d/silo_mysql.cnf /root/silo_mysql.bak
rm -rf /data/db/etc
chown -R mysql:mysql /data/db/*
```

6. Execute the following commands to restart SL1 and the database:

```
systemctl start em7
systemctl start mariadb
```

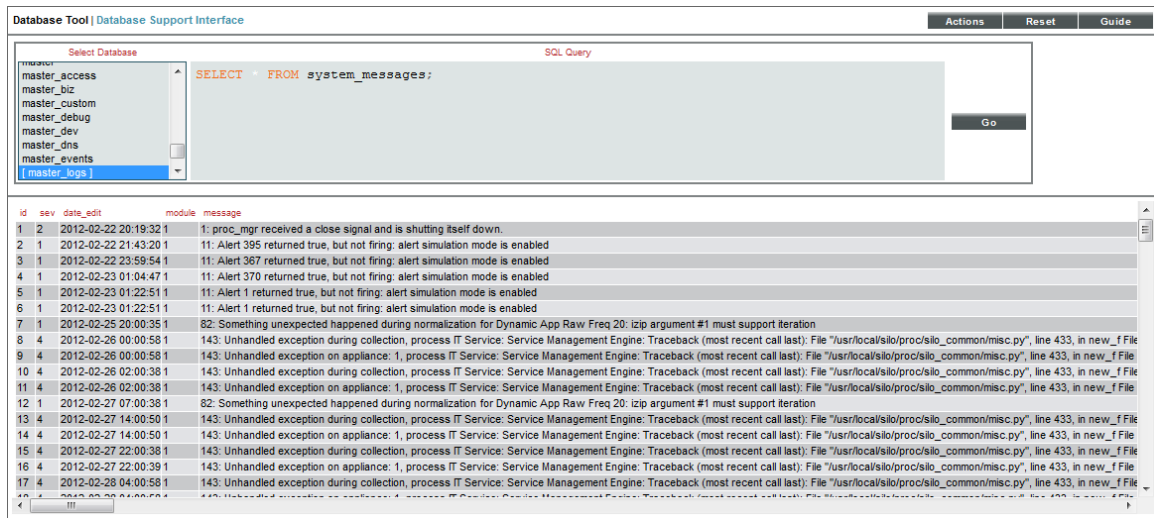
Retaining DR Backups

SL1 can automatically delete backups to save space on the external system where you store your backup files.

You can specify a retention value. SL1 will keep the retention value plus one additional backup.

To specify the number of DR backups to retain, perform the following:

1. Go to the **Database Tool** page (System > Tools > DB Tool).



2. In the SQL Query field, enter the following:

```
UPDATE master.system_settings_backup SET backup_retention = <number of backups to retain> WHERE id = 3
```

3. For example, the following command would retain five DR backups, the last four and the current backup:

```
UPDATE master.system_settings_backup SET backup_retention = 4 WHERE id = 3
```

4. Select the **[Go]** button.
5. SL1 will create an entry in `/var/log/em7/silo.log` when a backup is deleted.

Performing Configuration Backups and Full Backups on the Disaster Recovery Database Server

Users with large systems and very large backup files can use an alternative method to back up SL1. This alternative method, performing backups from the Disaster Recovery Database Server, reduces performance issues during backup.

DR Backup is a method for **backing up the Disaster Recovery system**. Performing standard configuration backups or full backups on the Disaster Recovery Database Server is an alternative method to **backup SL1**.

Unlike the DR Backup, which uses tar to make a compressed copy of the /data/db directory, performing a configuration backup from a Disaster Recovery Database Server uses the MySQL Dump tool and backs up the same data as described in the section on **Configuration Backups**.

Unlike the DR Backup, which uses tar to make a compressed copy of the /data/db directory, performing a full backup from a Disaster Recovery Database Server uses the MariaBackup tool and backs up the same data as described in the section on **Full Backups**.

During a configuration backup or full backup from a Disaster Recovery Database Server:

- The Disaster Recovery Database Server does not appear active to any other SL1 appliances.
- No applications or services can connect to the Disaster Recovery Database Server.

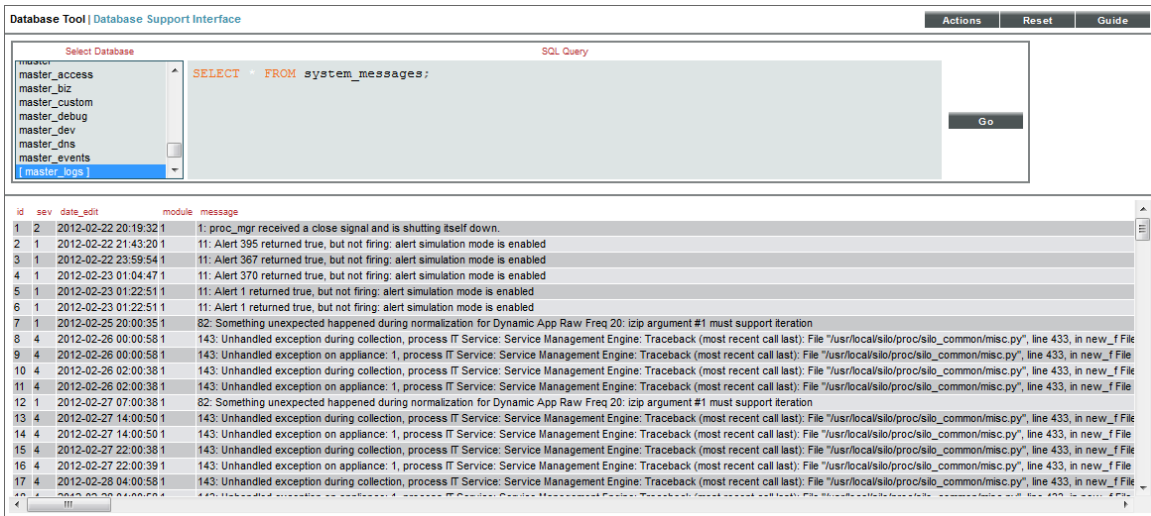
NOTE: After you define configuration backups on the Disaster Recovery Database Server, you should disable any other existing configuration backups. However, you can continue to use standard DR Backup to backup your Disaster Recovery system.

NOTE: After you define full backups on the Disaster Recovery Database Server, you should disable any other existing full backups. However, you can continue to use standard DR Backup to backup your Disaster Recovery system.

Configuration Backup on a Disaster Recovery Database Server

To perform a configuration backup on the Disaster Recovery Database Server:

1. Go to the **Database Tool** page (System > Tools > DB Tool).



2. In the SQL Query field, enter the following:

```
UPDATE master.system_settings_backup SET backup_on_dr = 1 WHERE id = 1
```

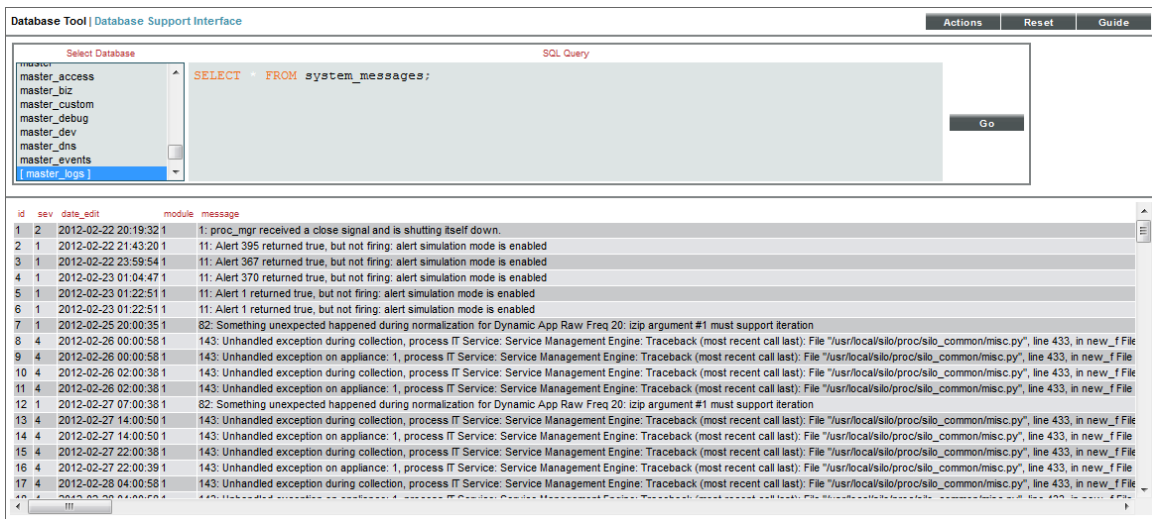
3. Select the **[Go]** button.
4. Follow the instructions in the section on [Creating a Credential](#).
5. Following the instructions in the section on [Defining a Configuration Backup](#).
6. To restore the backup, follow the steps in the section [Restoring a Configuration Backup](#).

NOTE: If you enabled configuration backups on the Disaster Recovery Database Server, you should disable standard configuration backups.

Full Backup on a Disaster Recovery Database Server

To perform a full backup on the Disaster Recovery Database Server:

1. Go to the **Database Tool** page (System > Tools > DB Tool).



2. In the SQL Query field, enter the following:

```
UPDATE master.system_settings_backup SET backup_on_dr = 1 WHERE id = 2
```

3. Select the **[Go]** button.
4. Follow the instructions in the section on [Creating a Credential](#).
5. Following the instructions in the section on [Defining a Full Backup](#).
6. To restore the backup, follow the steps in the section [Restoring a Full Backup](#) to restore a configuration backup.

NOTE: If you enabled full backups on the Disaster Recovery Database Server, you should disable standard full backups.

Chapter



12

Viewing License Data

Overview

This chapter describes license data for SL1 .

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon ().
- To view a page containing all the menu options, click the Advanced menu icon ().

This chapter includes the following topics:

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Viewing License Information

The **License Information** modal enables you to:

- View a list of all third-party licenses that are aligned with SL1
- Search for specific licenses
- View the full text of each license

To view license information:

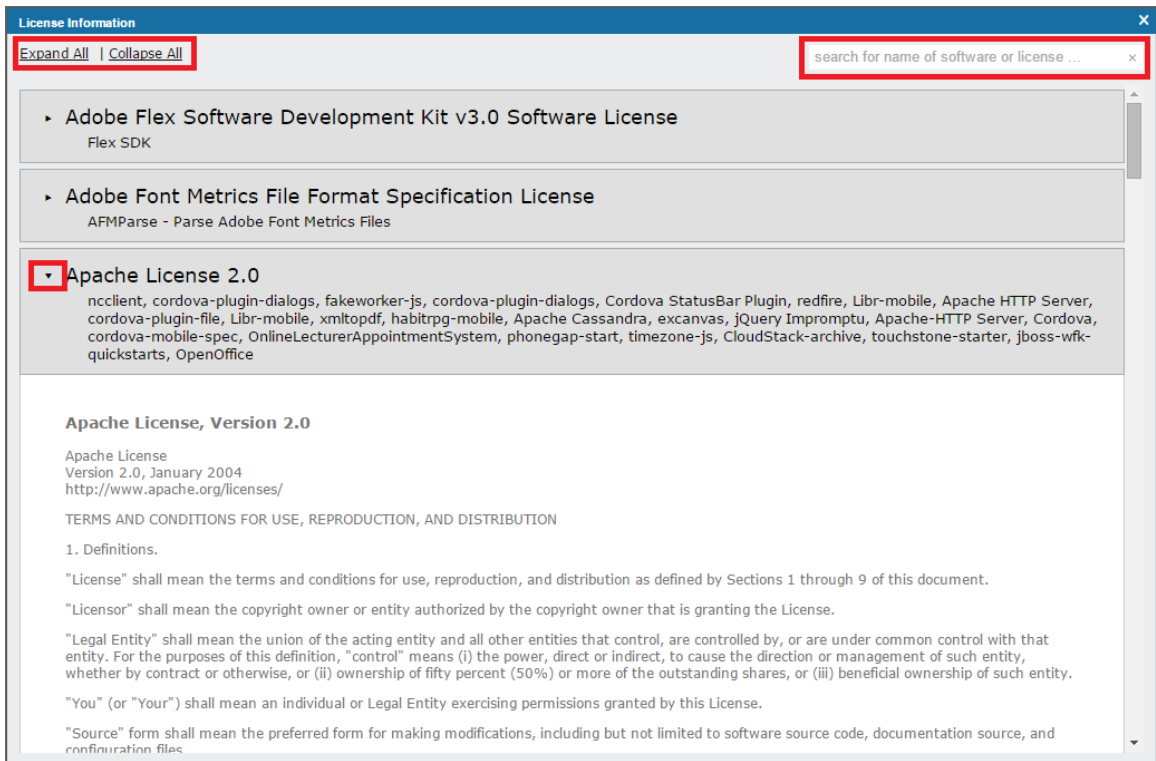
1. Click the **Toolbox** button in the upper-right of the ScienceLogic browser session and then select *License Information*.

The screenshot shows the ScienceLogic interface with a table of devices and a 'License Information' modal window open. The table lists various devices with columns for IP Address, Device Category, Device Class, Sub-class, DID, Organization, Current State, Collection Group, and Collection Shim. The modal window displays a list of licenses, including 'Cisco Systems | CTI Manager Service', 'Cisco Systems | Extension Mobility Service', and 'Cisco Systems | TFTP Service'. The modal also shows a 'TRIAL LICENSE: 62 DAYS REMAINING' notification and a 'Logged in as em7admin' status.

Device Name	IP Address	Device Category	Device Class Sub-class	DID	Organization	Current State	Collection Group	Collection Shim
1	10.8.13.20	UC Service	Cisco Systems CTI Manager Service	1106	System	Healthy	CUO	Unavailable
2	10.8.13.20	UC Service	Cisco Systems Extension Mobility Service	1109	System	Healthy	CUO	Unavailable
3	10.8.13.25	UC Service	Cisco Systems TFTP Service	1107	System	Healthy	CUO	Unavailable
4	10.8.13.21	UC Service	Cisco Systems TFTP Service	1107	System	Healthy	CUO	Unavailable
5	10.8.13.28	UC Service	Cisco Systems Cisco WebDialer Service	1108	System	Healthy	CUO	Unavailable
6	10.8.13.21	UC Service	Cisco Systems CTI Manager Service	1115	System	Healthy	CUO	Unavailable
7	10.8.13.23	UC Service	Cisco Systems Extension Mobility Service	1118	System	Healthy	CUO	Unavailable
8	10.8.13.21	UC Service	Cisco Systems TFTP Service	1114	System	Healthy	CUO	Unavailable
9	10.8.13.21	UC Service	Cisco Systems TFTP Service	1117	System	Healthy	CUO	Unavailable
10	10.8.13.21	UC Service	Cisco Systems Cisco WebDialer Service	1116	System	Healthy	CUO	Unavailable
11	10.8.13.22	UC Service	Cisco Systems CTI Manager Service	1122	System	Healthy	CUO	Unavailable
12	10.8.13.22	UC Service	Cisco Systems Extension Mobility Service	1125	System	Healthy	CUO	Unavailable
13	10.8.13.22	UC Service	Cisco Systems TFTP Service	1121	System	Healthy	CUO	Unavailable
14	10.8.13.22	UC Service	Cisco Systems TFTP Service	1123	System	Healthy	CUO	Unavailable
15	10.8.13.22	UC Service	Cisco Systems Cisco WebDialer Service	1124	System	Healthy	CUO	Unavailable
16	10.168.37.35	UC Device Trunk	Cisco Systems H323 Trunk	1141	System	Healthy	CUO	Unavailable
17	10.168.37.35	UC Device Trunk	Cisco Systems H323 Trunk	1142	System	Healthy	CUO	Unavailable
18	10.17.18.415	Network Application	FS Networks, Inc. BIG-IP LTM Pool Member	1550	System	Healthy	CUO	Unavailable
19	173.36.219.46	Network Utility	Cisco Systems ACI	2	ACI	Healthy	CUO	User-Disabled
20	173.36.219.46	Virtual Infrastructure	Cisco Systems ACI Application Network Profile	16	ACI	Major	CUO	Unavailable
21	173.36.219.46	Virtual Infrastructure	Cisco Systems ACI Tenant	12	ACI	Healthy	CUO	Active
22	173.36.219.46	Virtual Infrastructure	Cisco Systems ACI Tenant	14	ACI	Healthy	CUO	Active
23	173.36.219.46	Virtual Infrastructure	Cisco Systems ACI Tenant	13	ACI	Healthy	CUO	User-Disabled
24	173.36.219.46	Virtual Infrastructure	Cisco Systems ACI Tenant	11	ACI	Major	CUO	User-Disabled
25	173.36.219.46	Cloud Service	Service AWS Service	1651	System	Minor	CUO	Active
26	173.36.219.46	UC MediaResource	Cisco Systems ANI Container	1112	System	Healthy	CUO	Unavailable
27	173.36.219.46	UC MediaResource	Cisco Systems ANI Container	1656	System	Healthy	CUO	Unavailable
28	173.36.219.46	UC MediaResource	Cisco Systems ANI	1135	System	Healthy	CUO	Unavailable
29	173.36.219.46	UC MediaResource	Cisco Systems ANI	1134	System	Healthy	CUO	Unavailable
30	173.36.219.46	UC MediaResource	Cisco Systems ANI	1136	System	Healthy	CUO	Unavailable
31	173.36.219.46	Network Application	Cisco Systems ACI APIC Controller	8	ACI	Major	CUO	User-Disabled
32	173.36.219.46	Network Application	Cisco Systems ACI APIC Controller	8	ACI	Major	CUO	User-Disabled
33	173.36.219.46	Network Application	Cisco Systems ACI APIC Controller	7	ACI	Critical	CUO	User-Disabled
34	173.36.219.46	Cloud Storage	Microsoft Azure Storage Container	891	Azure	Healthy	CUO	Unavailable
35	173.36.219.46	Cloud Storage	Microsoft Azure Storage Container	812	Azure	Major	CUO	Unavailable
36	173.36.219.46	Cloud Account	Microsoft Azure Storage Account	777	Azure	Major	CUO	Unavailable
37	173.36.219.46	Cloud Network	Microsoft Azure Virtual Network	888	Azure	Major	CUO	Unavailable
38	173.36.219.46	Cloud Service	Microsoft Azure Services	889	Azure	Major	CUO	Active
39	173.36.219.46	Cloud Storage	Microsoft Azure SQL Database	9208	Azure	Healthy	CUO	Unavailable
40	173.36.219.46	Cloud Account	Microsoft Azure Account	681	Azure	Healthy	CUO	Active
41	173.36.219.46	Network Application	FS Networks, Inc. BIG-IP Local Traffic Manager	1228	System	Healthy	CUO	Active

The **License Information** modal appears. All of the licenses that are aligned with SL1 are listed.

2. On the **License Information** modal, you can do the following:



- To view any license in its entirety, click its right-arrow icon. When you do, the icon becomes a down-arrow, and the full license information appears.
- To view all of the licenses in their entirety, click the **Expand All** link.
- To view only the condensed information for each license, click the **Collapse All** link.
- To search for a specific license, type part or all of its name in the search box in the upper-right of the page and then press the **Enter** key.

Chapter

13

Subscription Licenses

Overview



If you have a subscription license, you can use the **Subscription Usage** page (Manage > Subscription Usage) to:

- View current or historical subscription license usage graphs
- Download subscription license usage data for manual upload to the ScienceLogic billing server
- Upload a receipt from the ScienceLogic billing server

If your SL1 system is configured to communicate with the ScienceLogic billing server, usage data will be sent automatically from your SL1 system to the ScienceLogic billing server once a day. After the ScienceLogic billing server receives the usage data, SL1 will automatically mark the license usage file as delivered.

If your SL1 system is not configured to communicate with the ScienceLogic billing server or if the connection to the ScienceLogic billing server fails, you can manually upload usage data to the ScienceLogic billing server.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon (.
- To view a page containing all the menu options, click the Advanced menu icon (.

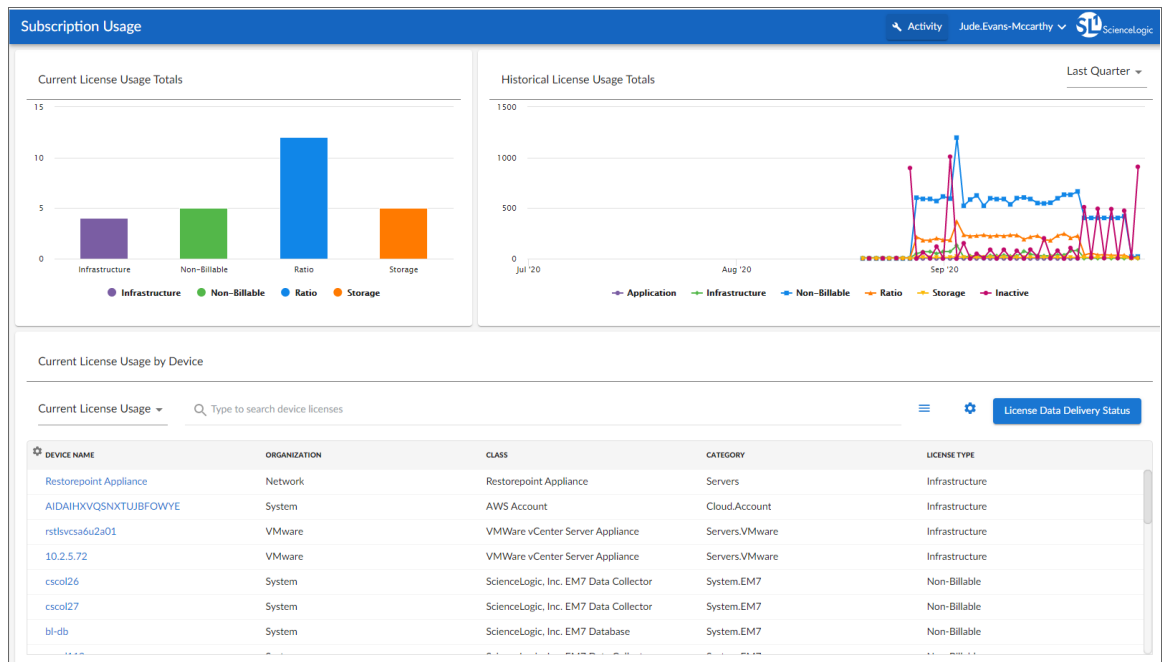
This chapter includes the following topics:

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Viewing Delivery Status	295
Manually Uploading License Usage to ScienceLogic	296
Downloading the Daily License Usage File	297
Manually Uploading the Daily License Usage File to ScienceLogic	298

Viewing the Subscription License Usage

If you have a subscription license, you can view a dashboard on license usage for your SL1 system. To view the dashboard containing the license usage for your SL1 system:

1. Go to the **System Usage** page (Manage > Subscription Usage). The **Subscription Usage** page appears.



2. The dashboard displays three reports:
 - Current License Usage Totals
 - Historical License Usage Totals
 - Current License Usage by Device or Current License Counts by Device Class, depending on your selection

Device categories depend upon your specific license agreement with ScienceLogic. The types of license categories that appear in the dashboard reports will reflect your license agreement with ScienceLogic.

Viewing Delivery Status

The **License Data Delivery Status** page displays the status of one or more daily license usage files. To view the **License Data Delivery Status** page:

1. Go to the **Subscription Usage** page (Manage > Subscription Usage).
2. Click the **[License Data Delivery Status]** button.
4. The **License Data Delivery Status** modal appears and displays a list of daily license usage files. For each daily license usage file, the **License Data Delivery Status** page displays the following:
 - **Summary Date.** Date associated with the daily license-usage file.
 - **Delivery Status.** Possible values are:
 - "0" (zero). File has not been uploaded to the ScienceLogic billing server.
 - "1" (one). File has been uploaded to the ScienceLogic billing server and may be deleted from the SL1 system by the automated maintenance process.
 - **Summary Size.** Size of the daily license usage file.

License Data				Reset	Download
	Summary Date	Delivery Status	Summary Size (kB)	<input checked="" type="checkbox"/>	
1.	2020-10-04 00:00:00	0	10948.4	<input type="checkbox"/>	
2.	2020-10-03 00:00:00	0	10948.4	<input type="checkbox"/>	
3.	2020-10-02 00:00:00	0	10948.4	<input type="checkbox"/>	
4.	2020-10-01 00:00:00	0	10948.4	<input type="checkbox"/>	
5.	2020-09-30 00:00:00	0	10948.4	<input type="checkbox"/>	
6.	2020-09-29 00:00:00	0	10948.4	<input type="checkbox"/>	
7.	2020-09-28 00:00:00	0	10948.4	<input type="checkbox"/>	
8.	2020-09-27 00:00:00	0	10948.4	<input type="checkbox"/>	
9.	2020-09-26 00:00:00	0	10948.4	<input type="checkbox"/>	
10.	2020-09-25 00:00:00	0	10948.4	<input type="checkbox"/>	
11.	2020-09-24 00:00:00	0	10948.4	<input type="checkbox"/>	

No file chosen

Manually Uploading License Usage to ScienceLogic

If your SL1 system is configured to communicate with ScienceLogic, usage data will automatically be sent to the ScienceLogic billing server once a day. After the ScienceLogic billing server receives the usage data, SL1 will automatically mark the license usage file as delivered.

If your SL1 system is not configured to communicate with ScienceLogic or if the connection to the ScienceLogic billing server fails:

- You can use the **License Data Delivery Status** page to manually download the daily license-usage file.
- You can then log in to the ScienceLogic billing server and manually upload the daily license-usage file.
- You can then use the **License Data Delivery Status** page to upload the ScienceLogic "receipt" to your SL1 system, allowing SL1 to mark the license usage file as delivered.
- License usage files will not be deleted from your system until they are delivered.

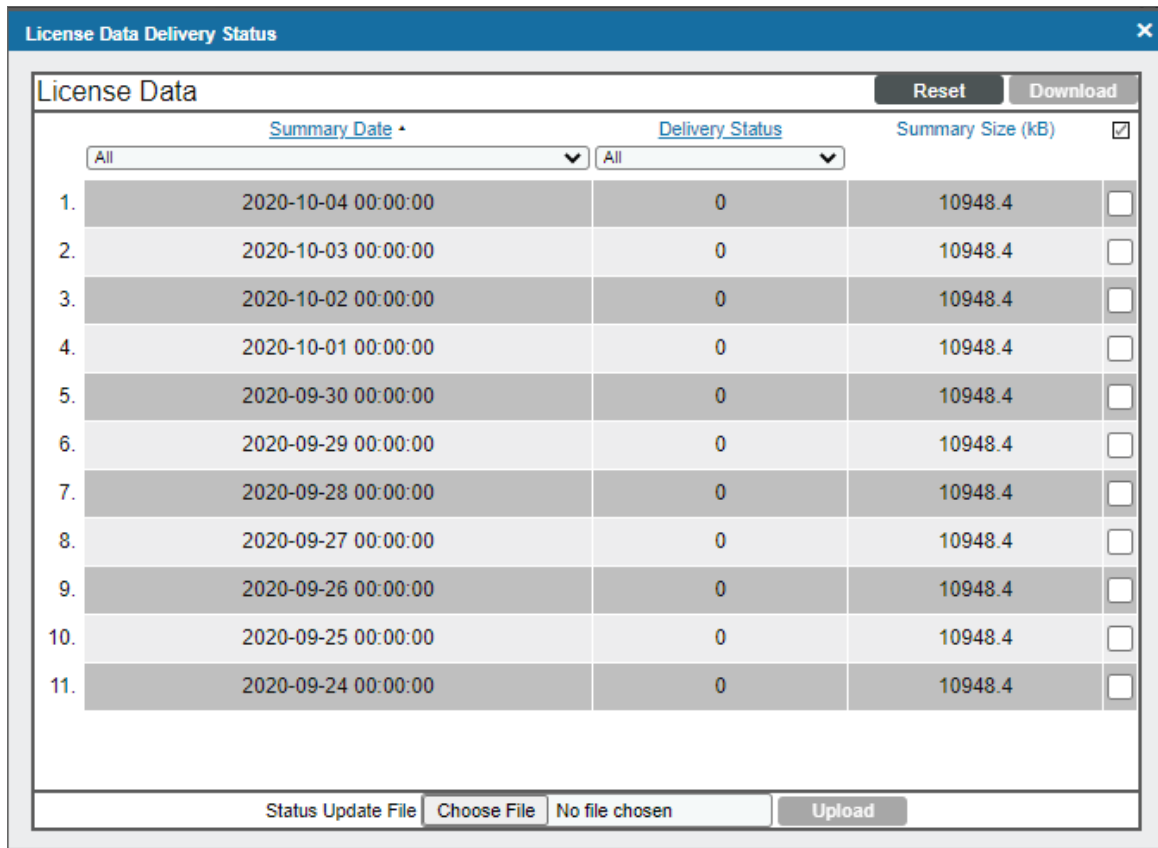
Downloading the Daily License Usage File

If your SL1 system is not configured to communicate with ScienceLogic or if the connection to the ScienceLogic billing server fails, you can use the **License Data Delivery Status** page to manually download the daily license usage file. You can then log in to the ScienceLogic Licensing and Billing server and manually upload the daily license usage file.

To download the daily license-usage file using the **License Data Delivery Status** page:

1. Go to the **Subscription Usage** page (Manage > Subscription Usage).
2. Click [**License Data Delivery Status**].

3. Select one or more daily license usage files to download to your local computer, and then click the **[Download]** button.



NOTE: If the download size exceeds 50MB, the **[Download]** button is disabled.

4. The daily license usage file is saved to your local computer. The downloaded file is usually named "license_data.json.gz".

Manually Uploading the Daily License Usage File to ScienceLogic

After downloading the daily license usage file to your local computer, you can manually upload the file to the ScienceLogic billing server. To do this:

1. Log in to the ScienceLogic billing system.
2. Go to the **Subscription Data** page (Preferences > Account > Subscription Billing).
3. In the **Subscription Data** page, go to the **Subscription Data Update** pane. Use the **[Browse]** button to find the daily license-usage file that you downloaded to your local computer.

4. Click the **[Get Update]** button to upload the daily license-usage file to the ScienceLogic server.

Subscription Data | For [System Administrator] | Organization: System

Subscription Data Update

License Data File Choose File No file chosen Get Update

Subscription Data Receipt Status

From 07/11/2015 To 10/11/2015 Get Status

Device Count by License Type

- No Data -

5. The ScienceLogic server will provide a "receipt" file for you to download. This file is usually called "status_updated.json.gz". You must upload this receipt to your SL1 system.

Uploading the ScienceLogic Receipt

After uploading the daily license usage file to the ScienceLogic Billing server, the ScienceLogic server will provide a "receipt" file for you to download. This file is usually called "status_updated.json.gz".

You must upload this "receipt" file to your SL1 system to inform your SL1 system that the upload was successful and that the SL1 system may delete the daily license usage file.

To upload the "receipt" file:

1. Go to the **Subscription Usage** page (Manage > Subscription Usage).
2. Click **[License Data Delivery Status]**.
3. In the **Status Update File** field, click **[Choose File]** and browse to locate the "receipt" file.

4. Click the **[Upload]** button to upload the "receipt" file to your SL1 system.

License Data				Reset	Download
	Summary Date	Delivery Status	Summary Size (kB)	<input checked="" type="checkbox"/>	
1.	2020-10-04 00:00:00	0	10948.4	<input type="checkbox"/>	
2.	2020-10-03 00:00:00	0	10948.4	<input type="checkbox"/>	
3.	2020-10-02 00:00:00	0	10948.4	<input type="checkbox"/>	
4.	2020-10-01 00:00:00	0	10948.4	<input type="checkbox"/>	
5.	2020-09-30 00:00:00	0	10948.4	<input type="checkbox"/>	
6.	2020-09-29 00:00:00	0	10948.4	<input type="checkbox"/>	
7.	2020-09-28 00:00:00	0	10948.4	<input type="checkbox"/>	
8.	2020-09-27 00:00:00	0	10948.4	<input type="checkbox"/>	
9.	2020-09-26 00:00:00	0	10948.4	<input type="checkbox"/>	
10.	2020-09-25 00:00:00	0	10948.4	<input type="checkbox"/>	
11.	2020-09-24 00:00:00	0	10948.4	<input type="checkbox"/>	

Status Update File Choose File No file chosen Upload

Data Retention Settings for Licensing

The **Data Retention Settings** page contains settings for subscribers.

To adjust these settings:

1. Go to the **Data Retention Settings** page (System > Settings > Data Retention).
2. The following sliders appear under the **Subscription Data Retention** heading:
 - **Subscriber Device Configuration Data.** For users with a subscriber license. Number of months to retain the files and database tables that contain configuration information for a device. Default value is twelve months.
 - **Subscriber Device Usage Data.** For users with a subscriber license. Number of months to retain information on total number of events and total number of tickets. Default value is six months.
 - **Subscriber System Configuration Data.** For users with a subscriber license. Number of months to retain the files and database tables that contain configuration information for the SL1 system. Default value is twelve months.

- **Subscriber System Usage Data.** For users with a subscriber license. Number of months to retain information on total number of events and total number of tickets. Default value is six months.
- **Subscriber Device Type Data.** For users with a subscriber license. Number of months to retain the files and database tables that map each device to a device category, as per your subscriber license. Default value is six months.
- **Subscriber Daily Delivery Data.** For users with a subscriber license. Number of months to retain the "crunched" license usage data that is calculated each day using the Subscriber Device Configuration Data, Subscriber System Configuration Data, Subscriber System Usage Data, and Subscriber Device Type Data. SL1 will not prune data that has not yet been delivered to the ScienceLogic Licensing and Billing server. Default value is three months.

The **Data Retention Settings** page contains settings for feature data retention as well. This data is applicable to all systems.

To adjust these settings:

1. Go to the **Data Retention Settings** page (System > Settings > Data Retention).
2. The following sliders appear under the **Feature Data Retention** heading:
 - **Feature Configuration Data.** Feature data is information about how SL1 is being used, including configuration data and performance metrics. Number of months to retain raw feature configuration values. Default value is six months.
 - **Feature Performance Data.** Feature data is information about how SL1 is being used, including configuration data and performance metrics. Number of months to retain raw performance metric values. Default value is six months.
 - **Feature Performance Data Aggregation Daily.** For users with a subscriber license. Number of months to retain the files and database tables that contain aggregated daily-performance values. Default value is six months.
 - **Feature Performance Data Aggregation Hourly.** For users with a subscriber license. Number of months to retain the files and database tables that contain hourly-performance values. Default value is six months.

Feature Data Retention

Feature Configuration Data		6	months* [Current: 6 months*]
Feature Performance Data		6	months* [Current: 6 months*]
Feature Performance Data Aggregation Daily		6	months* [Current: 6 months*]
Feature Performance Data Aggregation Hourly		6	months* [Current: 6 months*]

* 1 month = 30 days

Chapter

14

CAC Authentication

Overview

SL1 supports CAC authentication. The **Client Certificate & CAC Authentication** page allows you to define a check for SSL certificate that controls whether the login page is displayed to the end user. This feature is primarily used to authenticate Common Access Card (CAC) users against a Department of Defense (DoD) issued server-side certificate; however, based on your business needs, this feature can also be used with your own client/server certificates.

The CAC is a United States DoD smartcard issued as standard identification for Active Duty Military personnel, reserve personnel, civilian employees, and eligible contractor personnel.

CAC provides applications with a more secure way to authenticate the identity of a user, application, or device. However, even if a user authenticates with a certificate, it does not mean that they user is authorized to access the requested data. For more information on authentication and authorization, see the DoD documentation on authentication and authorization for DoD web servers.

DoD has implemented an external interoperability strategy for secure information sharing with external partners. Some DoD industry partners have implemented corporate PKIs, and others have obtained certificates from approved commercial PKIs. Some DoD international allied and coalition partners also have established PKIs to issue certificates to their personnel. Systems and applications with user populations that hold approved external credentials should be configured to accept those credentials rather than requiring the users to obtain Common Access Cards (CACs) or External Certification Authority (ECA) certificates. For the complete list of DoD approved external PKIs and interoperability tools, see the DoD documentation on interoperability..

DoD policy requires that external credentials have an assurance level of medium hardware or higher, so systems accepting external credentials must have an assurance level enforcement capability. Depending on technology, this can be accomplished through use of the Interoperability Root CAs (IRCA) or implementation of a local certificate policy object identifier (OID) filtering solution such as the DoD PKE Trust Anchor Constraints Tools (TACT). For a complete list of approved partner OIDs, see the DoD documentation on the approved assurance levels from external partner PKIs.

Each CAC contains a client-side security certificate from the DoD certificate authority (DoD Root CA). This client-side certificate allows the CAC to authenticate with web servers that include the server-side security certificate from the DoD certificate authority. Web servers with the server-side security certificate are deemed secure for DoD use.



SL1 allows you to configure appliances that provide the user interface (Administration Portal, All-In-One Appliance, or the Database Server) for use with DoD certificates or your own certificates. You can install server-side certificates on the user interface appliances and then authenticate access to those web servers with a CAC or a client-side certificate associated with a user's web browser.

When authentication of the client-side certificate against the server-side certificate is successful, the CAC is used as the user's authentication to SL1. If the Authentication Profile contains both the "CAC/Client Cert" and "EM7 Login Page" credential sources and a CAC is not presented or is invalid, then the ScienceLogic login page is presented to the end user.

NOTE: You can use CAC authentication to log in to either the current SL1 user interface ("AP2") or the classic SL1 user interface. Follow the steps described in this chapter to configure your CAC authentication, regardless of which user interface you use.

NOTE: Currently, SL1 does not support client-side certificate authentication for login to the console, either through SSH or through a keyboard connected to the appliance.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon ().
- To view a page containing all the menu options, click the Advanced menu icon ().

This chapter includes the following topics:

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Prerequisites

To use client certificate authentication with SL1, you must first meet the following requirements:

1. Organizations must be created and configured. For more information, see "Creating and Editing Organizations" in the **Organizations and Users** manual.
2. An LDAP or AD Credential must be configured with a Service Account and the appropriate permissions to query AD. The Service account must have the following types of permissions in order for LDAP/AD query to function properly.
3. (Optional) Configure User Policies if you will use SL1 authentication. You do not need to configure user policies if you are using Active Directory (AD) or LDAP. For more information, see "Creating a User Policy" in the **Organizations and Users** manual.
4. If you are using LDAP or Active Directory as your user store, you must configure this as your Authentication Resource before setting up your Authentication Profile. For more information, see [Authentication Resources](#).
5. Configure an Authentication Profile for CAC authentication. When setting up your Authentication Profile for CAC, align the "CAC/Client Cert" credential with the profile as the first credential source. Align the EM7 Login Page as a secondary credential source for administrator access. For more information, see [Creating an Authentication Profile](#).
6. Configure an emergency account ("break glass" account) for the Database Server. Because CAC will work only with the Database Server's DNS name, an emergency account ensures that the em7admin account is used only as a last resort.
7. Go to the **Authentication Profiles** page (System > Settings > Authentication > Profiles). Select the wrench icon (🔧) for the default profile. In the **Authentication Profile Editor** page, in the **Aligned Credential Sources** field, delete any existing CAC/Client Cert credentials.
8. Your users must have either:
 - Valid CACs with valid client-side certificates already loaded onto the cards, or
 - Valid client-side certificates installed in their web browser.
6. If CACs are used, the browser through which the user logs on to the user interface must be able to read security certificates from the cards.
7. Enable the *Force Secure HTTPS* setting. In the **Behavior Settings** page (System > Settings > Behavior), enable this setting by selecting the checkbox. Only when the Administration Portal, All-In-One Appliance, or the Database Server uses HTTPS will the appliance request a security certificate from the CAC or client web browser.
8. In the **SSL Certificates** page (System > Settings > Authentication > Admin SSL Certificates, or System > Settings > Authentication > SSL Certificates in the classic SL1 user interface), you must install the certificate chain on the Administration Portal, All-In-One Appliance, or the Database Server in PEM format. A certificate chain usually includes a root CA certificate and an intermediate certificate. Your organization might require multiple intermediate certificates to provide access to all users. To learn more about importing a certificate, see the section [Importing an SSL Certificate](#).

NOTE: If you want to extract part of the Common Name to customize the username that is displayed in SL1 after CAC authentication, you can edit the ScienceLogic configuration file to customize the displayed username. You do not need to do this if you are using the msUPN. For more information, see [Extracting the Common Name from a Certificate for Authentication](#).

9. In the **Client Certificate & CAC Authentication** page (System > Settings > Authentication > CAC Client Cert Auth, or System > Settings > Authentication > CAC/ClientCert Auth in the classic SL1 user interface), you must configure the server-side certificate and test it against your client-side certificate. For more information, see [Defining the Client Certificate Chain](#).

Importing SSL Certificates

Secure Sockets Layer, or SSL, is a protocol for securely transmitting data via the Internet. SSL uses a private key to encrypt data to be transferred over an Internet connection. In SL1, you can import server-side SSL certificate files, including DoD certificate files used in CAC authentication, to the Administration Portal, All-In-One Appliance, or the Database Server.

Note the following:

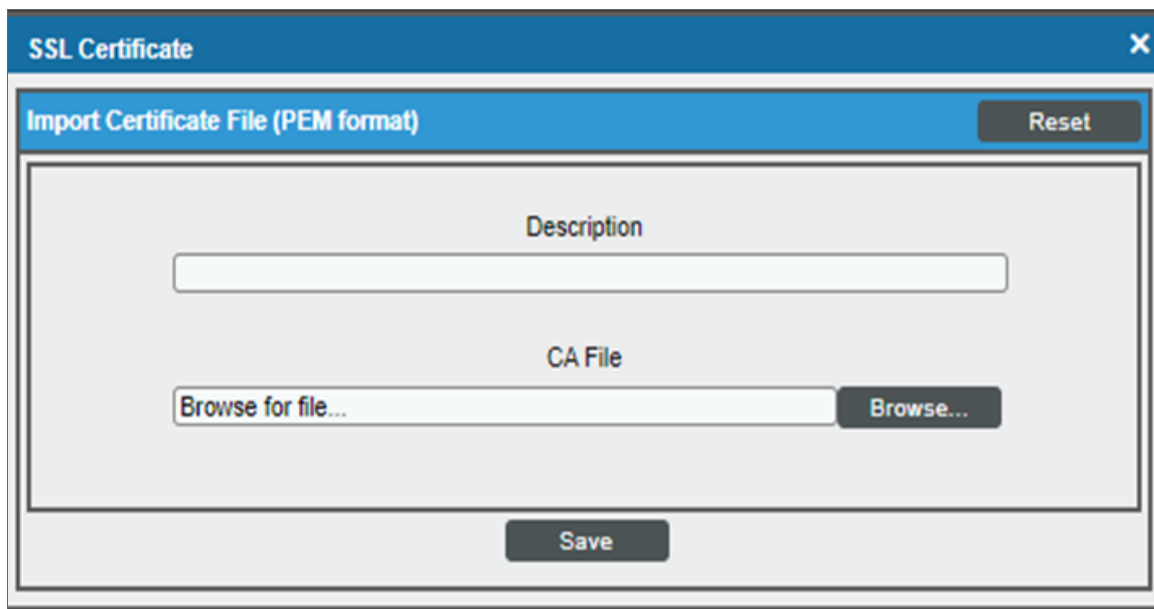
- You must have one root certificate and one certificate for each intermediate authority in the client certificate chain. If you have users with CACs issued by different intermediate authorities, you must import SSL certificates for all possible client authentication chains into SL1.
- All SSL certificates must be in PEM format.
- You can test your SSL certificate files by using the following command, where <certificate_file_name> is the full name of the certificate file:

```
openssl x509 -text -noout -in <certificate_file_name>
```

TIP: It is a best practice to check each certificate file before attempting to import the file. If you encounter an error, resolve that error before you continue.

To import an SSL certificate for CAC authentication:

1. Go to the **SSL Certificates** page (System > Settings > Authentication > Admin SSL Certificates, or System > Settings > Authentication > SSL Certificates in the classic SL1 user interface).
2. In the **SSL Certificates** page, click the **[Actions]** menu. Select **Import PEM Certificate File**. The **Import Certificate File (PEM format)** modal appears.



3. In the **Import Certificate File (PEM format)** modal, enter the following:
 - **Description**. Description of the certificate.
 - **CA File**. Browse for the server-side certificate file on your local computer.
4. Click the **[Save]** button to load the certificate to the Administration Portal, All-In-One Appliance, or the Database Server.
5. Repeat these steps for each certificate file you want to import. When finished, verify that all of your certificates appear in the listing shown on the SSL Certificates page (System > Settings > Authentication > Admin SSL Certificates, or System > Settings > Authentication > SSL Certificates in the classic SL1 user interface).

TIP: A best practice is to make note of the value in the Hash field shown for each certificate and verify that the hash values match the symlink files in the `/var/lib/em7/certs` directory on the appliance after completing the configuration of your client certificate chain. You will use these hash values in [Verifying SSL Certificate File Import and Resolving Issues](#).

Extracting the Common Name from a Certificate for Authentication

By default, the certificate configuration file (`em7_certificate.conf`) is configured to display the full common name (CN) of the CAC user as the username in SL1 after authentication. If this meets your requirements, then you do not need to update the configuration file and can skip this section.

NOTE: If you are using the Microsoft User Principal Name (MS UPN) in your certificates, you do not need to make any edits in the configuration file.

However, if you require that SL1 use only a portion of the CN, then you can edit the certificate configuration file to parse out a username from the CN in the certificate.

For example, in some instances you might want to use an employee's ID number as the username. To do that, you must edit the Nginx configuration file.

To do so:

1. Log in to the console of the ScienceLogic appliance as the root user.
2. Navigate to the directory `/etc/nginx/conf.d/` :

```
cd /etc/nginx/conf.d/
```

3. Open the file `em7_certificate.conf` with a text editor like `vi`:

```
vi em7_certificate.conf
```

4. Modify the file to extract the CN from the full Distinguished Name (DN) found in the certificate based on how you want to map the username to an LDAP system or how you want the usernames to look if you are using SL1 internal as the backend of your authentication configuration.

This is the default configuration of the file:

```
# Create the Username for EM7 to use from the Certificate
# Default: Pull the Common Name from the DN.
map $ssl_client_s_dn $ssl_client_username {
    ~/?CN=(?<CN>[^/,]+) $CN;
}
```

Modify the string to extract the name. The following is a regular expression that extracts the CN from the full DN) found in the certificate:

```
map $ssl_client_s_dn $ssl_client_username { ~/CN=[A-Z\.\.]+(?<num>[0-9]+)
$num; }
```

5. Save and quit (`:wq`) the file.

Defining the Client Certificate Chain

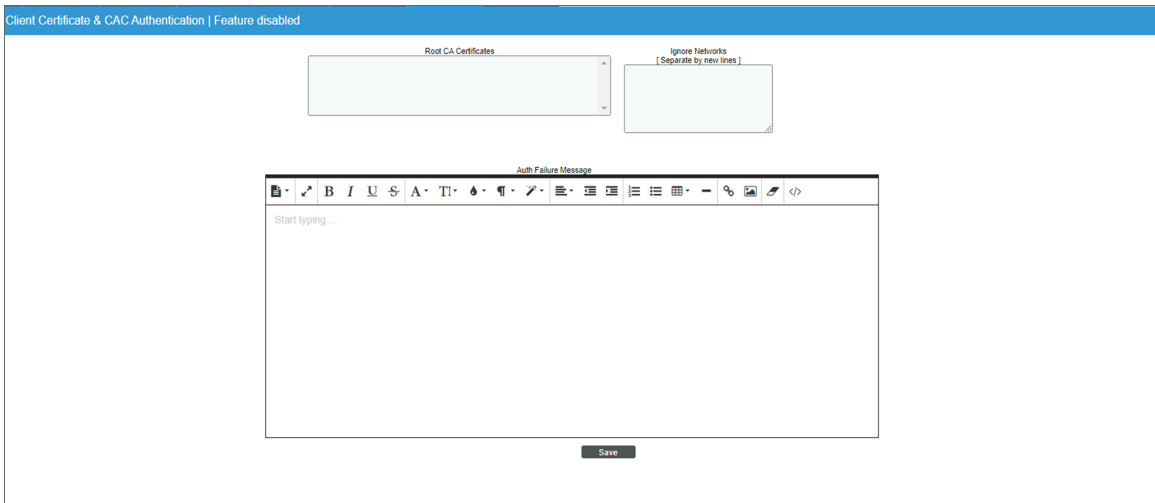
After importing your SSL Certificates, you must consolidate the SSL PEM certificates into a combined file (`em7_combined.crt`). On the CAC/ClientCert Auth menu, select all of the desired SSL PEM certificates. After saving, SL1 will update the `em7_combined.crt` file with all of the selected SSL PEM certificates. SL1 will then use only the selected PEM certificates for validating and authenticating users.

You can also define some custom settings for client-side certificate authentication. You can define error messages that are displayed to the end user if authentication fails. Optionally, you can also define IP addresses in this modal for which the user interface will not perform certificate authentication, if you have not already created an Authentication Profile for this purpose. See [Accessing the Appliance without CAC Authentication](#) for more information.

When authentication is successful, the user interface displays the **ScienceLogic Login** page to the user.

To define the authentication settings:

1. Access the user interface with your CAC or a browser with your client-side certificate installed.
2. Go to the **Client Certificate & CAC Authentication** page (System > Settings > Authentication > CAC Client Cert Auth, or System > Settings > Authentication > CAC/ClientCert Auth in the classic SL1 user interface).



3. Supply a value in each of the following fields:
 - **Root CA Certificates.** Select *all* root and intermediate certificates that make up the chain from a list of certificates installed on the **SSL Certificates** page (System > Settings > Authentication > Admin SSL Certificates, or System > Settings > Authentication > SSL Certificates in the classic SL1 user interface). Your client-side certificate will be authenticated against the selected server-side root and intermediate certificates.
 - **Auth Failure Message.** Enter text for the error message that appears to users if authentication fails.

CAUTION: You cannot save your authentication settings until you enter text in the "Auth Failure Message" field.

- **Ignore Networks.** In this field, you can enter a list of networks and hosts from which certificate authentication **is not required**. During each login, the platform will compare the client's IP address to the list entered in this field. If the client's IP address is included in this field, SL1 will not require certificate authentication from that client.

NOTE: If you are using Authentication Profiles to configure access from specific resources from which certificate authentication is not required, you do not need to use the *Ignore Networks* field. For more information, see [Accessing the Appliance without CAC Authentication](#).

- In the *Ignore Networks* field, you can enter one or more IP addresses, each separated by a new-line character (press the [**<Enter>**] key).
- In the list of IPs to ignore, you can enter only the first octet, only the first and second octet, only the first, second, and third octet, or all four octets. SL1 will interpret the entry as if the rightmost octet is followed by * (asterisk).

For example:

- 192.168.10.142 will allow a single host to log in to the user interface without certificate authentication
- 192 behaves the same as entering 192*. This will allow all hosts included in 192.0.0.1 through 192.254.254.254 to log in to the user interface without certificate authentication
- 192.168.10.24 behaves the same as entering 192.168.10.24*. This will allow all hosts 192.168.10.24, 192.168.10.240, 192.168.10.241, 192.168.10.242, 192.168.10.243, 192.168.10.244, 192.168.10.245, 192.168.10.246, 192.168.10.247, 192.168.10.248, and 192.168.10.249

4. Click the [**Save**] button to save your settings. The user interface displays the message:

```
Settings Saved Successfully. Configuration must be tested in order to take effect.
```

CAUTION: Do not click the Test link at this time.

Verifying SSL Certificate File Import and Resolving Issues

After you have imported your SSL certificates and configured your client certificate chain, it is important to verify the your certificate files were imported correctly and are valid in SL1.

To verify that your SSL certificate files were imported correctly:

1. Either go to the console of the SL1 appliance where you imported the SSL certificates, or use SSH to log in.
2. Navigate to the `/var/lib/em7/certs` directory. At the shell prompt, enter:

```
ls -l
```

- Review the list of hash symlink files in the directory and compare them to the list of certificates on the SSL Certificates page. Ensure that the hash values shown in SL1 match the hash symlink files. Note that the hash symlink in the `/var/lib/em7/certs` directory (in blue text) for a certificate file is appended with ".0", as shown in the image below.

```

[root@aio-169-161 em7admin]# ll /var/lib/em7/certs/
total 140
lrwxrwxrwx. 1 s-em7-http s-em7-core    21 Jun 25 03:41 4f5db21f.0 -> DoD_ .pem
lrwxrwxrwx. 1 s-em7-http s-em7-core    21 Jun 25 03:41 60085f15.0 -> DoD_ .pem
lrwxrwxrwx. 1 s-em7-http s-em7-core    21 Jun 25 03:41 9cf5f371.0 -> DoD_ .pem
lrwxrwxrwx. 1 s-em7-http s-em7-core    21 Jun 25 03:41 d7fc5635.0 -> DoD_ .pem
-rw-r--r--. 1 s-em7-http s-em7-core   1716 Jun 25 03:35      pem
-rw-r--r--. 1 s-em7-http s-em7-core   1716 Jun 25 03:36      pem
-rw-r--r--. 1 s-em7-http s-em7-core   1753 Jun 25 03:36      pem
-rw-r--r--. 1 s-em7-http s-em7-core   1753 Jun 25 03:37      pem
-rw-r--r--. 1 s-em7-http s-em7-core   1753 Jun 25 03:37      pem
-rw-r--r--. 1 s-em7-http s-em7-core   1269 Jun 25 03:35      pem
lrwxrwxrwx. 1 s-em7-http s-em7-core    22 Jun 25 03:41 ebe73690.0 -> DoD_ 3.pem
lrwxrwxrwx. 1 s-em7-http s-em7-core    21 Jun 25 03:41 ec465775.0 -> DoD_ .pem
-rw-rw-r--. 1 s-em7-core s-em7-core   9960 Jun 25 03:41 em7_combined.crt
-rw-rw-r--. 1 s-em7-core s-em7-core   1489 Jun 2 00:35 em7_default.crt
-rw-rw-r--. 1 s-em7-core s-em7-core  11972 Jun 2 00:35 em7_import_dodeca2.cac
-rw-rw-r--. 1 s-em7-core s-em7-core  10485 Jun 2 00:35 em7_import_dodeca.cac
-rw-rw-r--. 1 s-em7-core s-em7-core   5302 Jun 2 00:35 em7_import_rel3_dodroot_1024.cac
-rw-rw-r--. 1 s-em7-core s-em7-core  66452 Jun 2 00:35 em7_import_rel3_dodroot_2048.cac
-rw-r--r--. 1 s-em7-http s-em7-core     0 Jun 25 03:41 f9b9dee864d0b27dda9dde4bbdfb9cf7.sync
[root@aio-169-161 em7admin]#

```

All of the following must be true. If any of these are not true, then the certificate file was not imported and saved correctly in SL1:

- One hash symlink file should exist in the directory for each of the imported certificate files.
 - The file size of the "em7_combined.crt" file is equal to the combined file sizes of all of the certificate (.pem) files. (The file "em7_combined.crt" is *not* equal to the "em7_default.crt" file.)
 - When you view the contents of the "em7_combined.crt" file using `cat` or similar command, the file is the concatenation of all of the certificate (.pem) files. NGINX references the "em7_combined.crt" file as the file containing the client certificate chain.
- If any of the conditions listed above are not true, then the certificate file was not imported and saved correctly in SL1. To resolve the problem:
 - Log in to the SL1 appliance user interface.
 - Go to the **Client Certificate & CAC Authentication** page (System > Settings > Authentication > CAC Client Cert Auth, or System > Settings > Authentication > CAC/ClientCert Auth in the classic SL1 user interface).
 - Edit the *Auth Failure Message* field. Make a change to the section.
 - Click **[Save]**.
 - Repeat steps 1-3 to verify your certificate files.

Clearing the SL1 Cache and Restarting NGINX

Before you proceed to testing the configuration, you must clear the SL1 cache, restart nginx, and close any browsers you have open. This will ensure the best outcome when testing.

1. Log in to the user interface on the SL1 appliance.
2. Click on the **[Toolbox]** button (☰) and choose *Misc > Clear SL1 System Cache*.
3. Log out of the SL1 appliance.
4. Either go to the console of the SL1 appliance where you imported the SSL certificates, or use SSH to log in to the appliance.
5. Run the following command to restart nginx:

```
sudo systemctl restart nginx
```
6. Close any open browsers that have been used to access the appliance.

Testing the Configuration

After you define the certificate authentication settings, you must test your client-side certificate against the server-side certificate you selected in the **Root CA Certificates** field. Testing your configuration is required to prevent an incorrect configuration from preventing administrator access to the user interface. If the test is successful, the certificate authentication settings will be applied. If the test is unsuccessful, the certificate authentication settings will not be applied.

To test certificate authentication settings:

1. With your CAC inserted in the reader, access the user interface of your SL1 appliance using the IP address or domain name defined in the **AP Hostname Pattern** field of the CAC Authentication Profile (System > Settings > Authentication > Profiles). Log in with an administrator account.
2. Go to the **Client Certificate & CAC Authentication** page (System > Settings > Authentication > CAC Client Cert Auth, or System > Settings > Authentication > CAC/ClientCert Auth in the classic SL1 user interface).
3. After defining the certificate, you will see the following message at the top of the pane:

```
Configuration must be tested in order to take effect: TEST.
```

4. Click the **TEST** link. SL1 will attempt to authenticate your client-side certificate against the selected server-side certificate.
5. If the test authentication is successful, SL1 will display the following message at the top of the pane and end users with the appropriate client certificate or CAC can now access the user interface using client certificate authentication:

```
Configuration verified and enabled.
```

6. A new field, **Client Cert / CAC Auth**, appears with a default value of *Allowed*. You can select one of the following values for this field:
 - *Allowed*. This is the default value. Users with CAC and a corresponding account in the platform are automatically logged in to the platform when the user enters the URL of the Administration Portal or the All-In-One. If a CAC user does not have an account defined in the platform, the login screen is displayed. When a non-CAC user enters the URL of the Administration Portal or the All-In-One, they will see the message defined in the **Auth Failure Message** field (defined in the previous section).
 - *Locked*. Users with CAC and an aligned account in the platform are automatically logged in to the platform when the user enters the URL of the Administration Portal or the All-In-One. If a CAC user does not have an account defined in the platform, or a user does not have a CAC, when that user enters the URL of the Administration Portal or the All-In-One, they will see the message defined in the **Auth Failure Message** field (defined in the [certificate authentication settings](#)).
7. Set the *Certificate User Field* to "Common Name" (default) or "MS UPN".

NOTE: ScienceLogic recommends that you set this field to *Locked* unless your implementation specifically requires one of the other options.

NOTE: If you are using LDAP or Active Directory (AD) for user authentication, set this field to "MS UPN".

8. Select the **[Save]** button to save the setting in the **Client Cert / CAC Auth field**.
9. If the test authentication is unsuccessful, the user interface will display the following message at the top of the pane. The settings will not be applied, and client certificate authentication will not be used until the problem is corrected:

```
ERROR: configuration was not successfully tested with CAC or Client Certificate.
```

Accessing the Appliance without CAC Authentication

In certain circumstances, you might need to access your SL1 Appliance without using CAC authentication. For example, the following are some reasons you might want to use another authentication type:

- For use during initial setup
- For appliance access when a certificate has expired
- For maintenance or administrator accounts
- For certain internal networks that will not require certificate authentication

You can configure the appliance to accept a login in these cases in two ways:

- By configuring an Authentication Profile to use an alternative authentication resource (for example, EM7 Internal) for certain networks or hosts. For more information, see the chapter on "Authentication Profiles" in the **System Administration** manual.
- By using the Ignore Networks field on the **Client Certificate & CAC Authentication** page (System > Settings > Authentication > CAC Client Cert Auth, or System > Settings > Authentication > CAC/ClientCert Auth in the classic SL1 user interface). For more information, see [Defining the Client Certificate Chain](#).

Special Circumstance: Multiple Levels of Intermediate Certificates

By default, SL1 is configured to handle the typical certificate hierarchy, which comprises three levels: root, intermediate, and client certificates. This represents a depth of 2 from the root to the client certificate. If your organization will use CAC authentication in which you have multiple levels of intermediate certificates in the hierarchy, you will need to change this setting (`ssl_verify_depth`) as described in the procedure below.

To update the value of `ssl_verify_depth`:

1. Log in to the console of the ScienceLogic appliance as the root user.
2. Navigate to the directory `/etc/nginx/conf.d/` :

```
cd /etc/nginx/conf.d/
```
3. Open the file `em7ngx_web_ui.conf` with a text editor like `vi`:

```
vi em7ngx_web_ui.conf
```
4. Edit the `ssl_verify_depth` value to be the depth from client certificate to the root certificate (for example, 3):

```
ssl_verify_depth 3;
```
5. Save and quit (`:wq`) the file.



Authentication Profiles and Resources

Overview

This chapter describes the following topics:

- **Authentication Profiles.** Policies that align user accounts with one or more types of authentication.
- **Authentication Resources.** Configuration policies that describe how SL1 should communicate with a user store.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon (.
- To view a page containing all the menu options, click the Advanced menu icon (.

This chapter includes the following topics:

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Authentication Profiles

Authentication profiles are policies that align user accounts with one or more types of authentication:

- **Alignment by pattern matching.** SL1 examines the URL or IP address that a user enters in a browser to connect to an Administration Portal, Database Server, or All-In-One Appliance. If the URL or IP address matches the criteria specified in an authentication profile, SL1 will automatically use the matching profile to perform user authentication.
- **Credential Source.** Specifies from where SL1 should extract the username and password or certificate to be authenticated. These credentials are passed to SL1 through HTTP. SL1 then passes the credentials to each authentication resource specified in the authentication profile (for example, CAC/Client Cert). The authentication resources communicate with user stores that can authenticate the credentials entered by a user.
- **Authentication Resource.** Specifies the connector to use to communicate with the user store, the credential to use to connect to the user store (if applicable), such as your Active Directory server, and the URLs to examine during authentication. Authentication Resource also maps attributes from the user's account in the user store to fields in the ScienceLogic user account. For details on creating an authentication resource, see the section on [Authentication Resources](#).

NOTE: If you will be using Single Sign-On (SSO) as your method of authentication, your SSO resource must be placed in its own Authentication Profile, since it will take priority over any other authentication method defined. If you have multiple SSO resources, each *must* be in its own profile.

Viewing the List of Authentication Profiles

To view a list of all authentication profiles in SL1:

1. Go to the **Authentication Profiles** page (System > Settings > Authentication > Profiles).

Authentication Profiles | Authentication Profiles Found [2] Create Reset Guide

	Profile Name	ID	Hostname Pattern	Priority Order	Edited By	Last Edited	
1.	🔍 CAC_Users	4	testing	0		2021-07-09 11:29:12	🗑️
2.	🔍 default	1	--	--	em7admin	--	🗑️

[Select Action]

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2. The following information is displayed about each authentication profile:

- **Profile Name.** Name of the authentication profile.
- **ID.** Unique numeric ID, automatically assigned by SL1 to each authentication profile.
- **Hostname Pattern.** This field is used to match the URL or IP address that a user enters in a browser to connect to an Administration Portal, Database Server, or All-In-One Appliance. If the URL or IP address matches the value in this field, SL1 applies the authentication profile to the user for the current session.
- **Priority Order.** If your SL1 System includes multiple authentication profiles, SL1 evaluates the authentication profiles in priority order, ascending. This column displays the priority order value for the authentication profiles, where 0 (zero) is the highest priority.
- **Edited By.** The user who created or last edited the authentication profile.
- **Last Edited.** Date and time the authentication profile was created or last edited.

TIP: To sort the list of authentication profiles, click on a column heading. The list will be sorted by the column value, in ascending order. To sort by descending order, click the column heading again. The **Last Edited** column sorts by descending order on the first click; to sort by ascending order, click the column heading again.

Filtering the List of Authentication Profiles

You can filter the list of authentication profiles on the **Authentication Profiles** page by one or more of the following parameters: **Profile Name**, **ID**, **Hostname Pattern**, **Priority Order**, **Edited By**, and **Last Edited**. The list of authentication profiles is dynamically updated as you select each filter.

For each filter, except **Last Edited**, you must enter text to match against. SL1 will search for authentication profiles that match the text, including partial matches, and will filter while you type. Text matches are not case-sensitive. You can use the following special characters in each filter except **Last Edited**:

- , (comma). Specifies an "or" operation. For example:
"dell, micro" would match all values that contain the string "dell" OR the string "micro".
- & (ampersand). Specifies an "and" operation. For example:
"dell & micro" would match all values that contain the string "dell" AND the string "micro".
- ! (exclamation mark). Specifies a "not" operation. For example:
"!dell" would match all values that do not contain the string "dell".
- ^ (caret mark). Specifies "starts with". For example:
"^ micro" would match all strings that start with "micro", like "microsoft".
"^ " will include all rows that have a value in the column.
"! ^ " will include all rows that have no value in the column.
- \$ (dollar sign). Specifies "ends with". For example:
"\$ware" would match all strings that end with "ware", like "VMware".
"\$" will include all rows that have a value in the column.
"!\$" will include all rows that have no value in the column.

By default, the cursor is placed in the first Filter-While-You-Type field. You can use the <Tab> key or your mouse to move your cursor through the fields.

Only authentication profiles that meet all the following filter criteria will be displayed in the **Authentication Profiles** page:

- **Profile Name**. Name of the authentication profile. You can enter text to match, including special characters, and the **Authentication Profiles** page will display only authentication profiles that have a matching name.
- **ID**. Unique numeric ID, automatically assigned by SL1 to each authentication profile. You can enter text to match, including special characters, and the **Authentication Profiles** page will display only authentication profiles that have a matching ID.
- **Hostname Pattern**. This field is used to match the URL or IP address that a user enters in a browser to connect to an Administration Portal, Database Server, or All-In-One Appliance. If the URL or IP address matches the value in this field, SL1 applies the authentication profile to the user for the current session. You can enter text to match, including special characters, and the **Authentication Profiles** page will display only authentication profiles that have a matching hostname pattern.

- **Priority Order.** You can enter text to match, including special characters, and the **Authentication Profiles** page will display only authentication profiles that have a matching priority number.
- **Edited By.** The user who created or last edited the authentication profile. You can enter text to match, including special characters, and the **Authentication Profiles** page will display only authentication profiles that have been created or edited by a matching username.
- **Last Edited.** Date and time the authentication profiles was created or last edited. You can select from a list of time periods. The **Authentication Profiles** page will display only authentication profiles that have been created or edited within that time period.

The "default" Authentication Profile

SL1 includes a *default* authentication profile, for which the following rules apply:

- You cannot delete the *default* profile.
- If an **AP Hostname Pattern** fails to match all the other authentication profiles, SL1 applies the *default* authentication profile.
- For users running version 7.7 or earlier of SL1 who apply one or more patches to upgrade to version 7.8, the **default** profile allows ScienceLogic authentication to perform as it did prior to version 7.8.
 - On patched systems, the *default* profile is included in the patch.
 - On patched systems, the *default* profile is pre-configured to allow ScienceLogic administrators to log in via the ScienceLogic login page and the authentication resource *EM7 Internal*.
 - On patched systems, the *default* profile is pre-configured to allow credentials via *CAC/Client Certificate*, *HTTP Auth*, or the *EM7 Login Page*.
 - On patched systems, the *default* profile is pre-configured to use all legacy authentication resources: *SSO (legacy)*, *LDAP/AD (legacy)*, and *EM7 Internal*.

NOTE: Administrators can edit the default profile and use the new, non-legacy authentication resources but are not required to do so.

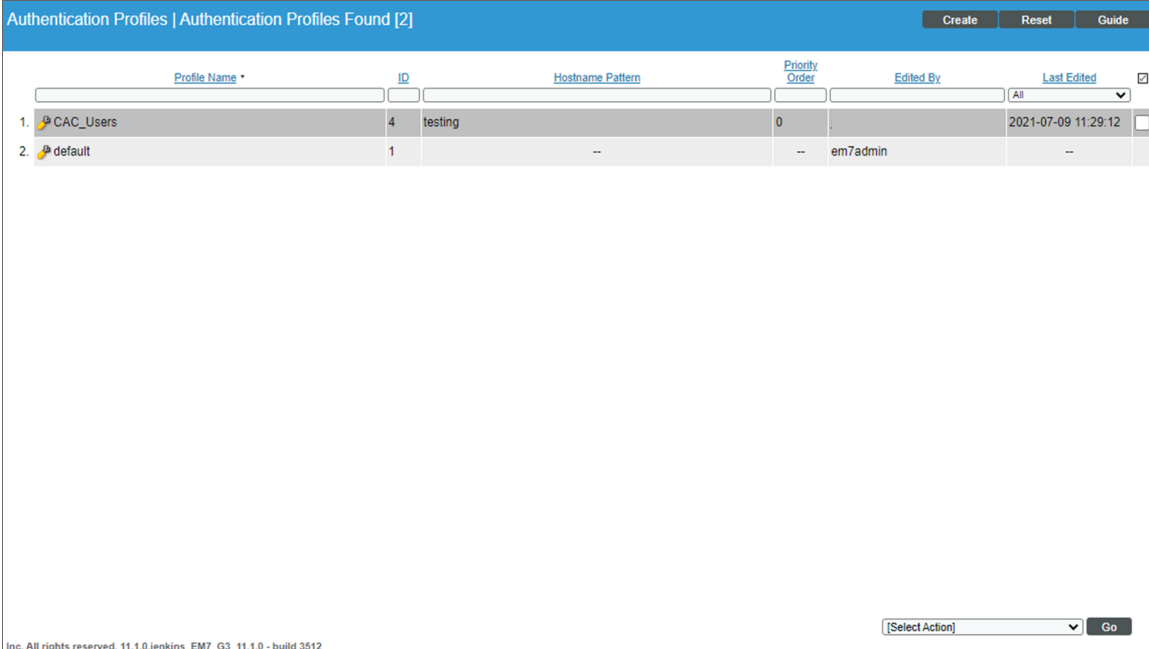
- For users who installed version 7.8 or later of SL1 using an ISO, initially the *default* profile is pre-configured to allow ScienceLogic administrators to log in via *CAC/Client Certificate*, *HTTP Auth*, or the *EM7 Login Page* and the authentication resource *EM7 Internal*. This allows administrators to log in and perform initial configuration on the SL1 system.
 - On ISO systems, the *default* profile is included in the patch.
 - On ISO systems, the *default* profile is pre-configured to allow credentials via *CAC/Client Certificate*, *HTTP Auth*, or the *EM7 Login Page*.
 - On ISO systems, the *default* profile is pre-configured to use only the authentication resource *EM7 Internal*.

NOTE: After initial configuration, administrators can edit the **default** profile as best fits their organization.

Creating an Authentication Profile

To create a new authentication profile:

1. Go to the **Authentication Profiles** page (System > Settings > Authentication > Profiles).



The screenshot shows a web interface for managing authentication profiles. At the top, there is a blue header with the text "Authentication Profiles | Authentication Profiles Found [2]" and three buttons: "Create", "Reset", and "Guide". Below the header is a table with the following columns: "Profile Name", "ID", "Hostname Pattern", "Priority Order", "Edited By", and "Last Edited". The table contains two rows of data:

	Profile Name	ID	Hostname Pattern	Priority Order	Edited By	Last Edited
1.	CAC_Users	4	testing	0		2021-07-09 11:29:12
2.	default	1	--	--	em7admin	--

At the bottom right of the table area, there is a "[Select Action]" dropdown menu and a "Go" button. At the bottom left, there is a small footer text: "Inc. All rights reserved. 11.1.0.jenkins_EM7_G3_11.1.0 - build 3512".

2. Click the **[Create]** button. The **Authentication Profile Editor** modal appears.

The screenshot shows the 'Authentication Profile Editor' modal. At the top, there's a title bar 'Create Authentication Profile' and a subtitle 'Authentication Profile Editor | Creating New Authentication Profile'. Below the subtitle, there's a 'Reset' button. The main form has four input fields: 'Name', 'Priority Order', 'Pattern Type' (a dropdown menu currently showing 'Wildcard'), and 'AP Hostname Pattern'. Below these fields, there are two sections: 'Available Credential Sources' and 'Available Authentication Resources'. Each section has a list of items on the left and an 'Aligned' list on the right. The 'Available Credential Sources' list contains 'CAC/Client Cert', 'EM7 Login Page', and 'HTTP Auth'. The 'Available Authentication Resources' list contains 'asdfasdf', 'asdfasdfasdf', and 'EM7 Internal'. There are arrows between the lists to move items back and forth. At the bottom of the modal is a 'Save' button.

3. Enter values in the following fields:

- **Name**. Name of the authentication profile.
- **Priority Order**. If your SL1 System includes multiple authentication profiles, SL1 evaluates the authentication profiles in ascending priority order. SL1 will apply the authentication profile that matches the hostname or IP in the current URL AND has the lowest value in the **Priority Order** field.
- **Pattern Type**. Specifies how SL1 will evaluate the value in the **AP Hostname Pattern** field. Choices are:
 - *Wildcard*. SL1 will perform a text match, with wildcard characters (asterisks).
 - *Regex*. SL1 will use regular expressions to compare the **AP Hostname Pattern** to the current session information.

- **AP Hostname Pattern.** This field is used to match the URL or IP address that a user enters in a browser to connect to an Administration Portal, Database Server, or All-In-One Appliance. If the URL or IP address matches the value in this field, SL1 applies the authentication profile to the user for the current session.
 - For example, if you specify "*" (asterisk), any IP address or URL will match. SL1 will then apply this authentication profile to every session on an Administration Portal, Database Server, or All-In-One Appliance.
 - If you enter "192.168.38.235", SL1 will apply the authentication profile to each session on an Administration Portal, Database Server, or All-In-One Appliance where the user enters "192.168.38.235" into the browser.
 - If you enter "*.sciencelogic.local", SL1 will apply the authentication profile to each session on an Administration Portal, Database Server, or All-In-One Appliance where the user enters a URL ending with ".sciencelogic.local" into the browser.
- **Available Credential Sources.** This field tells SL1 how to retrieve the user's credentials from the HTTP request to SL1. To align a credential source with the authentication profile, highlight the credential source and click the right-arrow button. You can select zero, one, or multiple credential sources for the authentication profile. Initially, this pane displays a list of all the credential sources:

NOTE: If you will be using CAC authentication, align the CAC/Client Cert credential source. If this is your primary method of logging in to SL1, align CAC/Client Cert as the number one credential source. ScienceLogic recommends having EM7 Login Page aligned, as well, for administrator or maintenance access.

- *CAC/Client Cert.* SL1 will retrieve a certificate from the HTTP request.
- *EM7 Login Page.* SL1 will retrieve a user name and password from the ScienceLogic login page fields.
- *HTTP Auth.* SL1 will retrieve a user name and password from the HTTP request.

NOTE: If you are using Single Sign-On (SSO) authentication, the **Available Credential Sources** field is ignored. You do not have to align a credential source because credentials are submitted directly to an Identity Provider (IdP) instead of SL1.


- **Aligned Credentials Sources.** This field displays the list of credential sources that have been aligned with the authentication profile. The authentication profile will examine each credential source in the order in which it appears in this list. When the authentication profile find the user's credential, the authentication profile stops examining any remaining credential sources in the list.
- **Available Authentication Resources.** This field tells SL1 which authentication resources to use to authenticate the retrieved credentials. To align an authentication resource with the authentication profile, highlight the authentication resource and click the right-arrow button. You must select at least one authentication resource (but can select more than one). For details on creating an authentication resource, see the section on [Authentication Resources](#).

- **Aligned Authentication Resources.** This field displays the list of authentication resources that have been aligned with the authentication profile. The authentication profile will examine each authentication resource in the order in which it appears in this list. When an authentication resource successfully authenticates the user, the authentication profile stops executing any remaining authentication resources in the list.

4. Click the **[Save]** button to save your changes to the new authentication profile.

Editing an Authentication Profile

The **Authentication Profiles** page allows you to edit an existing authentication profile. To do so:

1. Go to the **Authentication Profiles** page (System > Settings > Authentication > Profiles).
2. Find the authentication profile that you want to edit. Click its wrench icon (.
3. The **Authentication Profile Editor** modal page appears. In this page, you can edit the value of one or more fields.
4. Click the **[Save]** button to save your changes to the authentication profile.

Deleting One or More Authentication Profiles

The **Authentication Profiles** page allows you to delete one or more authentication profiles from SL1. To do so:

1. Go to the **Authentication Profiles** page (System > Settings > Authentication > Profiles).
2. Select the checkbox of each authentication profile that you want to delete.
3. Click the **Select Actions** menu (in the lower right), select *DELETE Authentication Profile*, and then click the **[Go]** button. The selected authentication profiles will be deleted.

NOTE: You cannot delete the **default** authentication profile.

Authentication Resources

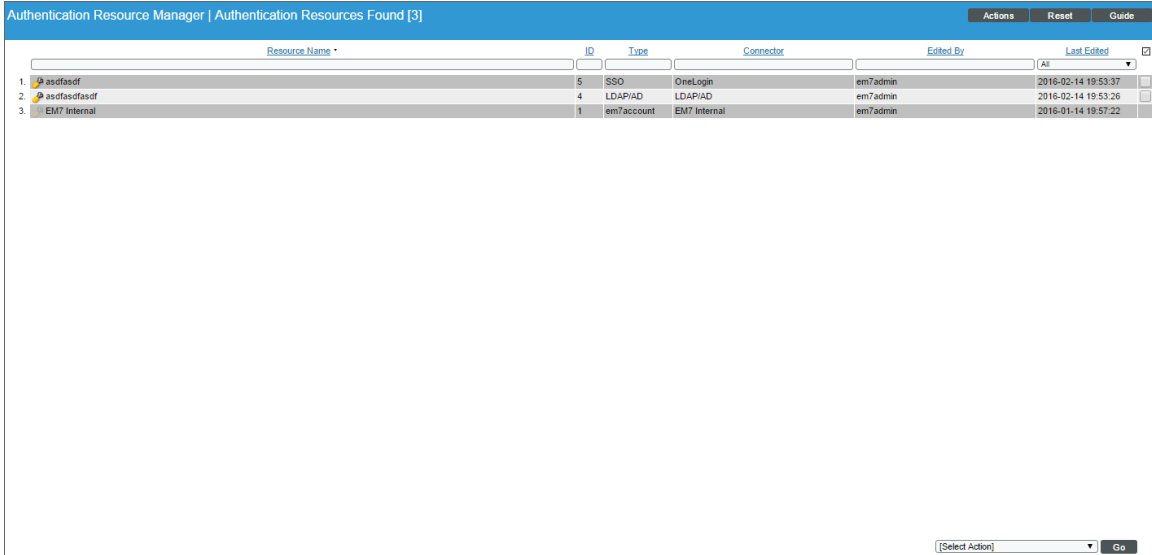
An authentication resource is a configuration policy that describes how SL1 should communicate with a user store. An authentication resource specifies the connector to use to communicate with the user store, the credential to use to connect to the user store (if applicable), and the URLs to examine during authentication. An authentication resource also maps attributes from the user's account in the user store to fields in the ScienceLogic user account.

Viewing the List of Authentication Resources

The **Authentication Resource Manager** page displays a list of all authentication resources in the SL1 System.

To view the list of authentication resources :

1. Go to the **Authentication Resource Manager** page (System > Settings > Authentication > Resources).



The screenshot shows the 'Authentication Resource Manager' interface with the title 'Authentication Resources Found [3]'. It features a table with the following columns: Resource Name, ID, Type, Connector, Edited By, and Last Edited. The table contains three entries:

	Resource Name	ID	Type	Connector	Edited By	Last Edited
1.	asofasof	5	SSO	OneLogin	em7admin	2016-02-14 19:53:37
2.	asofasofasof	4	LDAP/AD	LDAP/AD	em7admin	2016-02-14 19:53:26
3.	EM7 Internal	1	em7account	EM7 Internal	em7admin	2016-01-14 19:57:22

2. The following information is displayed about each authentication resource:

TIP: To sort the list of authentication resources, click on a column heading. The list will be sorted by the column value, in ascending order. To sort by descending order, click the column heading again. The **Last Edited** column sorts by descending order on the first click; to sort by ascending order, click the column heading again

- **Resource Name.** Name of the authentication resource.
- **ID.** Unique numeric ID, automatically assigned by SL1 to each authentication resource.
- **Type.** Specifies the user store that is associated with the resource. Possible types are:
 - *EM7 Internal.* The authentication resource communicates and passes information to and from the ScienceLogic Database.
 - *LDAP/AD.* The authentication resource communicates and passes information to and from an LDAP server or Active Directory server.
 - *SSO.* The authentication resource communicates and passes information to and from a SAML Identity Provider (IdP) or Service Provider (SP).

- **Connector.** The software that allows communication between the authentication resource and the user store. Possible connectors are:
 - *EM7 Internal.* Software that communicates with the ScienceLogic Database.
 - *LDAP/AD.* Software that communicates with an LDAP server or Active Directory server.
 - *LDAP/AD - Legacy.* Software that communicates with an LDAP server or Active Directory server for ScienceLogic servers that were configured prior to version 7.8 of SL1. SL1 Systems that were upgraded to version 7.8 using patches can continue to use the same authentication methods without making changes to user accounts or the LDAP server or Active Directory server.
 - *OneLogin.* Software that communicates with a SAML Identity Provider (IdP).
 - *SimpleSAML - Legacy.* Software that communicates with a SAML Identity Provider (IdP) and Service Provider (SP) for ScienceLogic servers that were configured prior to version 7.8 of SL1. SL1 Systems that were upgraded to version 7.8 using patches can continue to use the same authentication methods without making changes to user accounts, the SAML configuration, or the SSO provider.
- **Edited By.** The user who created or last edited the authentication resource.
- **Last Edited.** Date the time the authentication resource was created or last edited.

Filtering the List of Authentication Resources

You can filter the list of authentication resources on the **Authentication Resource Manager** page by one or more of the following parameters: **Resource Name**, **ID**, **Type**, **Connector**, **Edited By**, and **Last Edited**. The list of authentication resources is dynamically updated as you select each filter. For each filter except **Last Edited**, you must enter text to match against. SL1 will search for authentication resources that match the text, including partial matches. Text matches are not case-sensitive. You can use the following special characters in each filter except **Last Edited**:

- , (comma). Specifies an "or" operation. For example:
 "dell, micro" would match all values that contain the string "dell" OR the string "micro".
- & (ampersand). Specifies an "and" operation. For example:
 "dell & micro" would match all values that contain the string "dell" AND the string "micro".
- ! (exclamation mark). Specifies a "not" operation. For example:
 "!dell" would match all values that do not contain the string "dell".
- ^ (caret mark). Specifies "starts with". For example:
 "^ micro" would match all strings that start with "micro", like "microsoft".
 "^ " will include all rows that have a value in the column.
 "! ^ " will include all rows that have no value in the column.

- \$ (dollar sign). Specifies "ends with". For example:

"\$ware" would match all strings that end with "ware", like "VMware".

"\$" will include all rows that have a value in the column.

"!\$" will include all rows that have no value in the column.

By default, the cursor is placed in the first Filter-While-You-Type field. You can use the <Tab> key or your mouse to move your cursor through the fields.

Only authentication resources that meet all the following filter criteria will be displayed in the **Authentication Resource Manager** page:

- **Resource Name.** Name of the authentication resource. You can enter text to match, including special characters, and the **Authentication Resource Manager** page will display only authentication resources that have a matching name.
- **ID.** Unique numeric ID, automatically assigned by SL1 to each authentication resource. You can enter text to match, including special characters, and the **Authentication Resource Manager** page will display only authentication resources that have a matching ID.
- **Type.** Specifies the user store that is associated with the resource. You can enter text to match, including special characters, and the **Authentication Resource Manager** page will display only authentication resources that have a matching type.
- **Connector.** The specific software that allows communication between the authentication resource and the user store. You can enter text to match, including special characters, and the **Authentication Resource Manager** page will display only authentication resources that have a matching connector.
- **Last Edited.** Date and time the authentication resources was created or last edited. You can select from a list of time periods. The **Authentication Resource Manager** page will display only authentication resources that have been created or edited within that time period.
- **Edited By.** ScienceLogic user who created or last edited the authentication resource. You can enter text to match, including special characters, and the **Authentication Resource Manager** page will display only authentication resources that have been created or edited by a matching username.

The "EM7 Internal" Resource

The *EM7 Internal* resource allows you to access the user store in the ScienceLogic database.

- By default, each SL1 System, whether upgraded to version 7.8 or built from a 7.8 ISO, includes the *EM7 Internal* authentication resource.
- You cannot create an *EM7 Internal* authentication resource.
- You cannot edit or delete the *EM7 Internal* authentication resource included with your SL1 System.
- Each SL1 System can include only one the *EM7 Internal* authentication resource.

Creating an LDAP/AD Authentication Resource

The **LDAP/AD Auth Resource Editor** page allows you to define an authentication resource for use with an LDAP/AD user store. An LDAP/AD authentication resource specifies the connector (communication software) to use to communicate with the LDAP/AD user store and the credential to use to connect to the user store. An LDAP/AD authentication resource can also map attributes from the user's LDAP/AD account to fields in the ScienceLogic user account.

ScienceLogic administrators can use LDAP or Active Directory to authenticate ScienceLogic users. There are two ways to use LDAP or Active Directory authentication with SL1 :

- You can configure SL1 to automatically create user accounts for existing LDAP or Active Directory users and then always use LDAP or Active Directory to authenticate those users when they log in to SL1.
- You can use LDAP or Active Directory to authenticate one or more ScienceLogic users when they log in to SL1.

To create an LDAP/AD authentication resource:

1. Go to the **Authentication Resource Manager** page (System > Settings > Authentication > Resources).
2. Click the **[Actions]** menu and then select *Create LDAP/AD Resource*. The **LDAP/AD Auth Resource Editor** modal page appears.

The screenshot shows the 'Authentication Resource Editor' window for editing an LDAP/AD resource. The window title is 'Authentication Resource SILO-AD'. The main title bar reads 'Authentication Resource Editor | Editing LDAP/AD Resource [2]' with 'New' and 'Reset' buttons. The interface is divided into several sections:

- Basic Settings:** Includes fields for Name (SILO-AD), Read Credential (QA-Silo AD), Write Credential (None (disable)), User Name Suffix, Search Filter (sAMAccountName=%u, %u = email prefix / EMT username, %e = email address), Sync directory values to EMT on login (enable), and Sync EMT values to directory on save (disable).
- Attribute Mapping:** A table with columns for EMT Field and Directory Attribute. Fields include First Name (givenname), Last Name (sn), Title, Department (department), Phone (telephonenumber), Fax (facsimiletelephonenumber), Mobile (mobile), Pager (pager), MFA User, Primary Email (mail), Secondary Email, Street Address (streetaddress), Suite / Building, City, State (st), Postal Code (postalcode), and Country (c).
- User Policy Alignment:** Includes Type (Static policy alignment) and Policy (SILO).
- Organization:** A field with a dropdown menu showing '[directory attribute specifies organization ID]'.

At the bottom, there are 'Save' and 'Save As' buttons.

3. Enter values in the following fields:

Basic Settings

- **Name.** Name of the LDAP/AD authentication resource.

- **Read Credential.** Credential that allows SL1 to read data from an LDAP or Active Directory server. Select from a list of all LDAP and Active Directory credentials to which you have access. If this field has been set to a credential to which you do not have access, this field will display the value *Restricted Credential*. If you set this field to a different credential, the entry for *Restricted Credential* will be removed from the field; you will not be able to re-align the field with the *Restricted Credential*.
- **Write Credential.** Credential that allows SL1 to write data to an LDAP or Active Directory server. Select from a list of all LDAP and Active Directory credentials to which you have access. If this field has been set to a credential to which you do not have access, this field will display the value *Restricted Credential*. If you set this field to a different credential, the entry for *Restricted Credential* will be removed from the field; you will not be able to re-align the field with the *Restricted Credential*.

NOTE: Your organization membership(s) might affect the list of credentials you can see in the **Read Credential** field and the **Write Credential** field. For details, see the **Discovery & Credentials** manual.

- **User Name Suffix.** Optional field. Because SL1 can authenticate against multiple LDAP or Active Directory servers, there is a risk of collision among user names. In this field, you can enter a string to append to the user name to minimize the risk of collision. For example:
 - Suppose we entered **@ad.local** in this field.
 - Suppose the next LDAP/AD user logs in to SL1 with the user name **bishopbrennan**.
 - SL1 will log that user in as **bishopbrennan@ad.local**.

NOTE: A best practice to avoid collisions is to use email addresses as user names.

- **Search Filter.** Specifies where to find the user's account information in LDAP or Active Directory. You must tell SL1 where to find the LDAP or AD attribute that maps to the user's account name in SL1.

For example, an LDAP user might use his/her uid value to log in to SL1. In the ScienceLogic account, that uid value will then become the user's **Account Login Name**.

You can use the following variables in the search filter:

- [%u]. ScienceLogic login name.
- %e. Email address.
- An example search filter for LDAP might be:

```
(&(objectClass=person)(uid=%u))
```

This says to search in the object class called "person" for the uid that matches the ScienceLogic login name (entered when the user logs in to SL1 and then stored in the variable %u).

- An example search filter for Active Directory might be:

```
(sAMAccountName=%u)
```

This says to search for the samaccountname attribute that matches the ScienceLogic login name (entered when the user logs in to SL1 and then stored in the variable %u).

- For more information on the syntax of LDAP and AD search filters, see [RFC 4515](#).
- **Sync directory values to EM7 on login.** If an LDAP or AD administrator makes changes to an LDAP or AD account, SL1 will automatically retrieve those updates and apply them to the user's account in SL1 (in the **Account Properties** page) the next time the user logs in to SL1. (For more information about user account properties, see the **Organizations & Users** manual.)
- **Sync EM7 values to directory on save.** If a ScienceLogic administrator made changes to the ScienceLogic account, SL1 will automatically write those changes to the user's account in LDAP or Active Directory.

NOTE: The **Sync EM7 values to directory on save** option requires a write credential.

Attribute Mapping

If you have configured SL1 to automatically create ScienceLogic accounts for LDAP or AD users, these fields specify the LDAP or AD attribute value that will be automatically inserted into each field in each user's **Account Properties** page. (For more information about user account properties, see the **Organizations & Users** manual.)

SL1 automatically populates as many of these fields as possible. You can edit or delete the default values provided by SL1. For example, SL1 automatically inserts the value of the LDAP/AD attribute "sn" (surname) into the **Last Name** field in each user's **Account Properties** page.

NOTE: SL1 requires that the LDAP or AD attribute name that you specify in each field uses **all lower-case characters**.

- **First Name.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **First Name** field in each user's **Account Properties** page. By default, SL1 inserts the value of the LDAP/AD attribute "givenname" into this field.
- **Last Name.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Last Name** field in each user's **Account Properties** page. By default, SL1 inserts the value of the LDAP/AD attribute "sn" into this field.
- **Title.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Title** field in each user's **Account Properties** page.
- **Department.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Department** field in each user's **Account Properties** page.
- **Phone.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Phone** field in each user's **Account Properties** page. By default, SL1 inserts the value of the LDAP/AD attribute "telephonenumber" into this field.

- **Fax.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Fax** field in each user's **Account Properties** page.
- **Mobile.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Mobile** field in each user's **Account Properties** page. By default, SL1 inserts the value of the LDAP/AD attribute "mobile" into this field.
- **Pager.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Pager** field in each user's **Account Properties** page.
- **Primary Email.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Primary Email** field in each user's **Account Properties** page. By default, SL1 inserts the value of the LDAP/AD attribute "mail" into this field.
- **Secondary Email.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Secondary Email** field in each user's **Account Properties** page.
- **Street Address.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Street Address** field in each user's **Account Properties** page. By default, SL1 inserts the value of the LDAP/AD attribute "streetaddress" into this field.
- **Suite/Building.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Suite/Building** field in each user's **Account Properties** page.
- **City.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **City** field in each user's **Account Properties** page. By default, SL1 inserts the value of the LDAP/AD attribute "l" into this field.
- **State.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **State** field in each user's **Account Properties** page. By default, SL1 inserts the value of the LDAP/AD attribute "st" into this field.
- **Postal Code.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Postal Code** field in each user's **Account Properties** page. By default, SL1 inserts the value of the LDAP/AD attribute "postalcode" into this field.
- **Country.** Specifies the LDAP or AD attribute value that will be automatically inserted into the **Country** field in each user's **Account Properties** page.
- **Organization.** Specifies the LDAP or AD attribute value that will be used to automatically define the **Primary Organization** field in each user's **Account Permissions** page. You must also specify one of the following:
 - *directory attribute specifies organization ID.* If selected, the attribute in the **Organization** field specifies an organization ID.
 - *directory attribute specifies organization name.* If selected, the attribute in the **Organization** field specifies an organization name.
 - *directory attribute specifies organization CRM ID.* If selected, the attribute in the **Organization** field specifies the CRM ID of an organization.

NOTE: To use Attribute Mapping for **Organization**, your LDAP/AD schema must include an attribute that maps to ScienceLogix Organization names, Organization IDs, or Organization CRM IDs.

NOTE: When you create a new LDAP/AD user, you must align a user policy with that user. If the aligned user policy specifies an organization for the user, the value from the user policy will overwrite the value from Attribute Mapping.

User Policy Alignment

- **Type.** Specifies whether SL1 should automatically create ScienceLogic accounts for each LDAP or Active Directory user in the search base (which is specified in the credential), whether SL1 should simply use LDAP or Active Directory to authenticate one or more users, or whether SL1 will refuse to authenticate specific users. Choices are:
 - *Do not authenticate new users from directory.* Only those users who have an account already created in SL1 can log in to SL1. However, if one or more users' **Account Permissions** page specifies *LDAP /Active Directory* in the **Authentication Method** field, SL1 will authenticate those users with either LDAP or Active Directory, using the settings and credentials specified in this page.
 - *Static policy alignment.* If an LDAP or AD user logs in to SL1 using the LDAP or AD attribute specified in the **Search Filter** field, SL1 will automatically create an account for that user. SL1 will use **one user policy** (specified in the **Policy** field) to create all imported LDAP or AD user accounts. SL1 will also use the settings and credentials specified in this page when creating the account.
 - *Dynamic policy alignment.* If an LDAP or AD user logs in to SL1 using the LDAP or AD attribute specified in the **Search Filter** field, SL1 will automatically create an account for that user. SL1 will **choose from among multiple user policies** to create imported LDAP or AD user accounts. For example, some imported user accounts might use "user policy A"; other imported user accounts might use "user policy B". SL1 will also use the settings and credentials specified in this page when creating the account.

NOTE: If you selected *Static policy alignment* in the **Type** field, you must supply a value in the **Policy** field:

- **Policy.** Specifies the user policy to use to automatically create a ScienceLogic account for each LDAP or AD user. Select from a list of all user policies that specify *LDAP /Active Directory* in the **Authentication Method** field.

NOTE: If you selected *Dynamic policy alignment* in the **Type** field, you must supply values in the **Attribute**, **Value**, and **Policy** fields.

- **Attribute.** Specifies the LDAP or AD attribute you want to use to differentiate imported user accounts. For example, you could select the attribute "department" and then assign different user policies to import user accounts from different departments. You can also use this field to exclude LDAP or AD accounts for which you do not want to create a ScienceLogic account.

- **Value.** Specifies the LDAP or AD attribute value. That is, you specify one of the possible values for the attribute (specified in the **Attribute** field). SL1 will compare the value in this field to the retrieved value for the **Attribute**.
- **Policy.** Choose one of the following:
 - *Do Not Authenticate.* If selected, if the retrieved value of the specified **Attribute** matches the value in the **Value** field, the user is not authenticated. This setting applies to new users for whom LDAP or Active Directory would have to create a new account in SL1 and for users who already have an account in SL1.
 - *the policy you want to associate with that value.* Select from a list of all user policies that specify LDAP /Active Directory in the **Authentication Method** field.
 - For example, suppose you specified "department" in the **Attribute** field. Suppose that the "department" attribute could have two possible values: "Sales" or "NOC".
 - Suppose you created two user policies. One user policy, called "Sales User Policy", includes the appropriate ticket queues and access keys for Sales personnel. Another user policy, called "NOC User Policy", include the appropriate ticket queues and access keys for NOC personnel.
 - In one of the **Value** fields, you could specify "Sales". In the corresponding **Policy** field, you could then specify "Sales User Policy".
 - In the next **Value** field, you could specify "NOC". In the corresponding **Policy** field, you could specify "NOC User Policy".
 - After defining these two **Value** fields and corresponding **Policy** fields, user accounts from the Sales department would be imported into SL1 using the Sales User Policy. User accounts from the NOC department would be imported into SL1 using the NOC User Policy.
- To define additional **Value** and **Policy** fields, click on the green plus-sign (+) icon.

4. Click the **[Save]** button to save your changes to the new authentication resource.

Creating an SSO Authentication Resource

The **SSO Auth Resource Editor** page allows you to define an authentication resource for use with a SAML IdP. An SSO authentication resource specifies the connector (communication software) to use to communicate with the SAML IdP and the URLs to use to send and retrieve information from the SAML IdP. An SSO authentication resource can also map attributes from the user's SSO account to fields in the ScienceLogic user account.

ScienceLogic administrators can use SSO to authenticate ScienceLogic users. There are two ways to use SSO authentication with SL1:

- You can configure SL1 to automatically create user accounts for existing SSO users and then always use SSO to authenticate those users when they log in to SL1.
- You can use SSO to authenticate one or more ScienceLogic users when they log in to SL1.

To create an SSO authentication resource:

1. Go to the **Authentication Resource Manager** page (System > Settings > Authentication > Resources).

- Click the **[Actions]** menu and then select *Create SSO Resource*. The **SSO Auth Resource Editor** page appears.

- Enter values in the following fields:

Basic Settings

- **Name**. Name of the SSO authentication resource.
- **IdP Entity ID**. Globally unique name for the identity provider or service provider, in the format of an absolute URL.
- **IdP Cert Fingerprint**. The SHA1 certificate fingerprint, provided by the identity provider or service provider.
- **User Name Suffix**. Optional field. Because a user can authenticate against multiple SSO servers, there is a risk of collision among user names. In this field, you can enter a string to append to the ScienceLogic user name to minimize risk of collision. For example:
 - Suppose we entered **@ad.local** in this field.
 - Suppose the next LDAP/AD user logs in to SL1 with the user name **bishopbrennan**.
 - SL1 will log in that user as **bishopbrennan@ad.local**.

NOTE: A best practice to avoid collisions is to use email addresses as user names.

- **IdP SSO URL**. The URL to which SL1 will send login requests to the IdP. This field must contain an absolute URL.

- **IdP SLS URL.** Optional field. If you want each user to be automatically logged out of the IdP when that user logs out of SL1, enter the URL to which SL1 will post the logout request to the IdP. If you leave this field blank, a user can log out of SL1 without automatically logging out of the IdP.
- **Sync directory values to EM7 on login.** If an SSO administrator makes changes to an SSO account, SL1 will automatically retrieve those updates and apply them to the user's account in SL1 (in the **Account Properties** page) the next time the user logs in to SL1. (For more information about user account properties, see the **Organizations & Users** manual.)

Attribute Mapping

If you have configured SL1 to automatically create ScienceLogic accounts for SSO users, these fields specify the SAML attribute value that will be automatically inserted into each field in each user's **Account Properties** page. (For more information about user account properties, see the **Organizations & Users** manual.)

SL1 automatically populates as many of these fields as possible. You can edit or delete the default values provided by SL1. For example, SL1 automatically inserts the value of the SAML attribute "sn" (surname) into the **Last Name** field in each user's **Account Properties** page.

NOTE: SL1 requires that the SAML attribute name that you specify in each field uses all lowercase characters.

- **First Name.** Specifies the SAML attribute value that will be automatically inserted into the **First Name** field in each user's **Account Properties** page. By default, SL1 inserts the value of the SAML attribute "givenname" into this field.
- **Last Name.** Specifies the SAML attribute value that will be automatically inserted into the **Last Name** field in each user's **Account Properties** page. By default, SL1 inserts the value of the SAML attribute "sn" into this field.
- **Title.** Specifies the SAML attribute value that will be automatically inserted into the **Title** field in each user's **Account Properties** page.
- **Department.** Specifies the SAML attribute value that will be automatically inserted into the **Department** field in each user's **Account Properties** page.
- **Phone.** Specifies the SAML attribute value that will be automatically inserted into the **Phone** field in each user's **Account Properties** page. By default, SL1 inserts the value of the SAML attribute "telephonenumber" into this field.
- **Fax.** Specifies the SAML attribute value that will be automatically inserted into the **Fax** field in each user's **Account Properties** page.
- **Mobile.** Specifies the SAML attribute value that will be automatically inserted into the **Mobile** field in each user's **Account Properties** page. By default, SL1 inserts the value of the SAML attribute "mobile" into this field.
- **Pager.** Specifies the SAML attribute value that will be automatically inserted into the **Pager** field in each user's **Account Properties** page.

- **Primary Email.** Specifies the SAML attribute value that will be automatically inserted into the **Primary Email** field in each user's **Account Properties** page. By default, SL1 inserts the value of the SAML attribute "mail" into this field.
- **Secondary Email.** Specifies the SAML attribute value that will be automatically inserted into the **Secondary Email** field in each user's **Account Properties** page.
- **Street Address.** Specifies the SAML attribute value that will be automatically inserted into the **Street Address** field in each user's **Account Properties** page. By default, SL1 inserts the value of the SAML attribute "streetaddress" into this field.
- **Suite/Building.** Specifies the SAML attribute value that will be automatically inserted into the **Suite/Building** field in each user's **Account Properties** page.
- **City.** Specifies the SAML attribute value that will be automatically inserted into the **City** field in each user's **Account Properties** page. By default, SL1 inserts the value of the SAML attribute "l" into this field.
- **State.** Specifies the SAML attribute value that will be automatically inserted into the **State** field in each user's **Account Properties** page. By default, SL1 inserts the value of the SAML attribute "st" into this field.
- **Postal Code.** Specifies the SAML attribute value that will be automatically inserted into the **Postal Code** field in each user's **Account Properties** page. By default, SL1 inserts the value of the SAML attribute "postalcode" into this field.
- **Country.** Specifies the SAML attribute value that will be automatically inserted into the **Country** field in each user's **Account Properties** page.
- **Organization.** Specifies the SAML attribute value that will be used to automatically define the **Primary Organization** field in each user's **Account Permissions** page. You must also specify one of the following:
 - *directory attribute specifies organization ID.* The attribute in the **Organization** field specifies an organization ID.
 - *directory attribute specifies organization name.* The attribute in the **Organization** field specifies an organization name.
 - *directory attribute specifies organization CRM ID.* The attribute in the **Organization** field specifies the CRM ID of an organization.

NOTE: To use Attribute Mapping for **Organization**, your SAML schema must include an attribute that maps to All-In-One Appliance Organization names, Organization IDs, or Organization CRM IDs.

NOTE: When you create a new SSO user, you must align a user policy with that user. If the aligned user policy specifies an organization for the user, the value from the user policy will overwrite the value from Attribute Mapping.

User Policy Alignment

- **Type**. Specifies whether SL1 should automatically create ScienceLogic accounts for each SSO user, whether SL1 should simply use SSO to authenticate one or more users, or whether SL1 will refuse to authenticate specific users. Choices are:
 - *Do not authenticate new users*. Only those users who have an account already created in SL1 can log in to SL1, which will authenticate those users with SSO using the settings specified in this page.
 - *Static policy alignment*. If an SSO user tries to access SL1, SL1 will automatically create an account for that user. SL1 will use **one user policy** (specified in the **Policy** field) to create the imported SSO user accounts for this authentication resource. SL1 will also use the settings specified in this page when creating the account.
 - *Dynamic policy alignment*. If an SSO users tries to access SL1, SL1 will automatically create an account for that user. SL1 will choose from among **multiple user policies** to create imported SSO user accounts for this authentication resource. For example, some imported user accounts might use "user policy A"; other imported user accounts might use "user policy B". SL1 will also use the settings specified in this page when creating the account.

NOTE: If you selected *Static policy alignment* in the **Type** field, you must supply a value in the **Policy** field.

- **Policy**. Specifies the user policy to use to automatically create a ScienceLogic account for each SSO user. Select from a list of all user policies.

NOTE: If you selected *Dynamic policy alignment* in the **Type** field, you must supply values in the **Attribute**, **Value**, and **Policy** fields.

- **Attribute**. Specifies the SAML attribute you want to use to differentiate imported user accounts. For example, you could select the attribute *department* and then assign different user policies to import user accounts from different departments. You can also use this field to exclude SSO accounts for which you **do not want to allow authentication**.
- **Value**. Specifies the SAML attribute value. That is, you specify one of the possible values for the attribute (specified in the **Attribute** field). SL1 will compare the value in this field to the retrieved value for the **Attribute**.
- **Policy**. Choose one of the following:
 - *Do Not Authenticate*. If the retrieved value of the specified **Attribute** matches the value in the **Value** field, the user is not authenticated. This setting applies to new users for whom SSO would have to create a new account in SL1 and for users who already have an account in SL1.
 - *the policy you want to associate with that value*. Select from a list of all user policies that specify SSO in the **Authentication Method** field.
 - For example, suppose you specified *department* in the **Attribute** field. Suppose that the *department* attribute could have two possible values: *Sales* or *NOC*.

- Suppose you created two user policies. One user policy, called *Sales User Policy*, includes the appropriate ticket queues and access keys for Sales personnel. Another user policy, called *NOC User Policy*, includes the appropriate ticket queues and access keys for NOC personnel.
 - In one of the **Value** fields, you could specify *Sales*. In the corresponding **Policy** field, you could then specify *Sales User Policy*.
 - You could then click on the plus-sign icon (+) and add another **Value** field and another **Policy** field.
 - In the next **Value** field, you could specify *NOC*. In the corresponding **Policy** field, you could specify *NOC User Policy*.
 - After defining these two **Value** fields and the corresponding **Policy** fields, user accounts from the *Sales* department would be imported into SL1 using the *Sales User Policy*.
 - User accounts from the *NOC* department would be imported into SL1 using the *NOC User Policy*.
- To define additional **Value** and **Policy** fields, click on the green plus-sign icon (+).
4. Click the **[Save]** button to save your changes to the new authentication resource.

Editing an Authentication Resource

The **Authentication Resource Manager** page allows you to edit an existing authentication resource. To do so:

1. Go to the **Authentication Resource Manager** page (System > Settings > Authentication > Resources).
2. Find the authentication resource that you want to edit. Click its wrench icon (🔧).
 - For LDAP/AD Resources, the **LDAP/AD Auth Resource Editor** page appears. In this page, you can edit the values for one or more fields. For more information, see the [Creating an LDAP/AD Authentication Resource](#) section.
 - For SSO Resources, SSO Auth Resource Editor page appears. In this page, you can edit the values for one or more fields. For more information, see the [Creating an SSO Authentication Resource](#) section.
3. Click the **[Save]** button to save your changes to the authentication resource.

Deleting an Authentication Resource

The **Authentication Resource Manager** page allows you to delete one or more authentication resources from SL1. To do so:

1. Go to the **Authentication Resource Manager** page (System > Settings > Authentication > Resources).
2. Select the checkbox (☑) of each authentication resource that you want to delete.
3. Click the **Select Actions** menu (in the lower right), select *DELETE Authentication Resource*, and then click the **[Go]** button. The selected authentication resources will be deleted.

NOTE: You cannot delete the *EM7 Internal* authentication resource.

Chapter

16

Installing an SSL Certificate

Overview

SSL is an acronym for Secure Sockets Layer. SSL is a protocol for securely transmitting data via the internet. SSL uses a private key to encrypt data to be transferred over the Internet connection. Usually, URLs that include "HTTPS" are using SSL for security.



To implement SSL, an SSL certificate resides on the web server and is used to encrypt the data and to identify the website. The SSL certificate contains information about the certificate holder, the domain for which the certificate was issued, the name of the Certificate Authority who issued the certificate, and the root and the country in which the certificate was issued.

There are two ways to acquire an SSL certificate:

- You can purchase a certificate from a vendor (called a "certificate authority"), such as VeriSign or GeoTrust.
- You can "self-sign" your own certificate. Using available tools (both open source and proprietary), you can create and sign your own SSL certificate instead of purchasing from a certificate authority.

SL1 includes a self-signed certificate from ScienceLogic. Self-signed certificates can trigger a warning message in some browsers. For this reasons, some customers might prefer to purchase an SSL certificate from a certificate authority and install the certificate on one or more servers.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon .
- To view a page containing all the menu options, click the Advanced menu icon ().

This chapter includes the following topics:

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Certificates for ScienceLogic Servers

Each SL1 appliance includes a self-signed certificate from ScienceLogic.

Each SL1 appliance uses the Nginx web server and OpenSSL.

If you want to use commercial SSL certificates with SL1, you must purchase certificates for the following SL1 appliances:

- For each Administration Portal, Database Server, or All-In-One Appliance you must purchase **two** certificates, one for the standard user interface and one for the Configuration Utility.
- For each Data Collector, you must purchase one certificate, for use with the Configuration Utility.
- For each Message Collector, you must purchase one certificate, for use with the Configuration Utility.

Requesting a Commercial SSL Certificate

To purchase a commercial SSL certificate, you must first create a private key and then use the private key to create a Certificate Signing Request (CSR). You must then send the CSR to a Certificate Authority (CA). Some well-known CAs are VeriSign, GeoTrust, Thawte, GoDaddy, and Comodo. The CA will charge you a fee and send you a certificate for use with your private key.

To create a CSR, perform the following on each SL1 appliance.

1. Either go to the console of the SL1 appliance or use SSH to access the server. Open a shell session on the SL1 appliance. Log in as "em7admin".
2. Generate a private key for the server. To do this, enter the following at the shell prompt:

```
sudo openssl genrsa -aes256 -out [keyname].key 4096
```

where:

- *[keyname]* is a name for the private key. For example, you might want to name the private key for an administration portal *adminport.key*.

NOTE: Make sure the file is **not** named *silossl.key*, which is the name of the pre-existing ScienceLogic, self-signed certificate file.

3. Enter a passphrase for the key when prompted.

TIP: A best practice is to make a backup copy of the key file and the passphrase and store both in a secure location.

4. Remove the passphrase from the key before generating a Certificate Signing Request (CSR). To do this, enter the following command at the shell prompt, inserting the keyname you used where indicated:

```
sudo openssl rsa -in [keyname].key -out [keyname].key.insecure
```

5. Create a Certificate Signing Request (CSR) for the private key you created in the previous steps. To do this, enter the following command at the shell prompt:

```
sudo openssl req -new -key [keyname].key.insecure -out [keyname].csr
```

where:

- *[keyname]* is a name for the CSR for the specific server. For example, you might want to name the private key for an administration portal *adminport.key* and name the CSR for that key *adminport.csr*.

NOTE: Make sure the keyname is **not** *siloss.key*. This is the name of the pre-existing ScienceLogic, self-signed certificate file.

6. Enter the demographic information for your key.
 - Enter a two-letter Country Name (for example, US).
 - Enter your State or Province full name (for example, Virginia).
 - Enter your Locality Name or city (for example, Reston).
 - Enter your Organization Name or company (for example, ScienceLogic).
 - Enter the Common Name, that is, your server's hostname (for example, myhost.sciencelogic.com).
 - Enter your Email Address. This is where you want communication from the Certificate Authority to be sent.
7. Send the .csr file you generated to a Certificate Authority. The Certificate Authority will provide details on how to send the .csr file. The Certificate Authority will then send you a .crt file. The .crt file is the public key that matches your private key for the SL1 appliance. Some Certificate Authorities, e.g. GoDaddy, might use an intermediate certificate to sign the provided certificate. If an intermediate certificate is used, the Certificate Authority will provide a bundle of chained certificates in a second .crt file.

Creating Your Own Certificate

There are two reasons you might create your own SSL certificate:

- If your organization is a root Certificate Authority (for example, some departments of the United States government), you can create your own private key and public key for each ScienceLogic server.

- If your security requirements permit a self-signed certificate, you can create your own private key and public key for each SL1 appliance.

NOTE: Remember to create key pairs for all for each SL1 appliance in your SL1 system, and also remember to create two key pairs for each Administration Portal in your SL1 system.

NOTE: If your organization is a Certificate Authority, see your organization's internal documentation on creating a certificate for NGINX.

To create a self-signed certificate:

1. Either go to the console of the SL1 appliance or use SSH to open a shell session on the SL1 appliance.
2. Log in as an administrator (such as em7admin).
3. Generate a private key for the server. To do this, enter the following at the shell prompt:

```
sudo openssl genrsa -aes256 -out [keyname].key 4096
```

where *[keyname]* is a name for the private key. For example, you might want to name the private key for an Administration Portal *adminport.key*.

CAUTION: Make sure the file is **not** named **silossl.key**. This is the name of the pre-existing ScienceLogic, self-signed certificate file.

4. Enter a passphrase for the key when prompted.

TIP: A best practice is to make a backup copy of the key file and the passphrase and store both in a secure location.

5. Remove the passphrase from the key before you continue. To do this, enter the following command at the shell prompt, inserting the keyname you used where indicated:

```
sudo openssl rsa -in [keyname].key -out [keyname].key.insecure
```

6. Create a self-signed certificate based on the private key you generated in the previous steps. To do this, enter the following at the shell prompt:

```
sudo openssl req -new -x509 -nodes -sha1 -days 365 -key [keyname].key -out [keyname].crt
```

where:

- `[keyname].key` is the private key for the SL1 appliance .
- `[keyname].crt` is the public key (certificate) for the SL1 appliance.

For example, you might want to name the private key for an Administration Portal `adminport.key`, and name the certificate file for that key `adminport.crt`. The resulting `.crt` file is the public key that matches your private key for the SL1 appliance.

CAUTION: Make sure the files are **not** named `silssl.crt` and `silssl.key`. These are the names of the pre-existing ScienceLogic, self-signed certificate files.

7. Copy your private key and certificate files to `/etc/nginx`.
8. **On Collectors.** Add the private key and certificate file to each Collector for the Configuration Utility. To do this, add the names of the new `.key` and `.crt` files to the following files:
`/etc/nginx/conf.d/em7ngx_web_ui.conf`
`/etc/nginx/conf.d/em7ngx_em7proxy_web_ui.conf`
9. **On the Administration Portal, Database Server, or All-in-One Appliance.** Add the private key and certificate file for the user interface. To do this, add the names of the new `.key` and `.crt` files to the following files:
`/etc/nginx/conf.d/em7ngx_web_ui.conf`
`/etc/nginx/conf.d/em7ngx_em7proxy_web_ui.conf`
10. Restart the Web Configuration Utility and web server by entering the following command:
`sudo systemctl restart nginx`

Installing the Certificate on an SL1 Appliance

ScienceLogic does not provide support for third party certificates. Be advised that installing a new SSL certificate can affect the operation of SSL services.

Most certificate authorities provide support and resources on installing and enabling their certificates in Nginx web servers. If you have questions, please refer to your Certificate Authority.

WARNING: The following steps will stop and restart the SL1 appliance and temporarily make the Administration Portal site unavailable. Confirm with your System Administrator that you are permitted to restart the ScienceLogic Web Service.

NOTE: These instructions assume that you are familiar with the Linux shell and the "vi" editor.

To install a commercial SSL certificate on a SL1 appliance, perform the following:

1. Purchase a certificate from a certificate authority.
2. Copy the certificate files (`*.key` and all `*.crt` files) to a server that can access the SL1 appliance via SFTP.

NOTE: Make sure the files are **not** named **silssl.crt** and **silssl.key**. These are the names of the pre-existing ScienceLogic, self-signed certificate files.

3. Use SFTP or SCP to copy the .crt file(s) and the .key file to the SL1 appliance in the /etc/nginx directory.
4. Either go to the console of the SL1 appliance or use SSH to access the server. Open a shell session on the SL1 appliance. Log in as "em7admin".
5. If an intermediate certificate has been used to sign the certificate file, execute the following commands to combine the server certificate and the bundle of chained certificates provided by the Certificate Authority, entering the server certificate name, bundle name, and combined certificate name where indicated:

```
cd /etc/nginx
cat [server certificate name].crt [bundle name].crt > [combined certificate name].crt
```

Use the combined .crt file name when updating the nginx configuration.

6. For each appliance, edit the following files to configure the certificate for the Configuration Utility:

- /etc/nginx/conf.d/em7webconfig.conf
- /etc/nginx/conf.d/em7_sladmin.conf
- Edit the following lines, removing references to silssl.crt and silssl.key and replacing with the names of the new .key and .crtfiles:

```
ssl_certificate /etc/nginx/[name of .crt file];
ssl_certificate_key /etc/nginx/[name of .key file];
```

7. In addition, for each Administration Portal, Database Server, and All-In-One Appliance, you must also edit the following files to configure the certificate for the user interface:


- /etc/nginx/conf.d/em7ngx_web_ui.conf
- /etc/nginx/conf.d/em7ngx_em7proxy_web_ui.conf
- Edit the following lines, removing references to silssl.pem and silssl.key and replacing with the names of the new key files:

```
ssl_certificate /etc/nginx/[name of .crt file];
ssl_certificate_key /etc/nginx/[name of .key file];
```

8. Next, you will need to restart the webconfig and webserver. To do this, execute the following command:

- For all appliances, enter:

```
sudo systemctl restart nginx
```

9. To test the SSL certificate, open a browser session and connect to the Administration Portal, Database Server, or All-In-One Appliance using https.
 - From the Administration Portal, go to System > Settings > Appliances.
 - In the **Appliance Manager** page, select the toolbox icon () for each server. Notice that the URL for the Configuration Utility includes https.

Chapter

17

Managing Host Files

Overview



The **Host File Entry Manager** page allows you to edit and manage host files for all of the Data Collectors from a single page in the SL1 system. When you create or edit an entry in the **Host File Entry Manager** page, SL1 automatically sends an update to every Data Collector in the specified Collector Group.

The **Host File Entry Manager** page is helpful when:

- The SL1 system does not reside in the end-customer's domain
- The SL1 system does not have line-of-sight to an end-customer's DNS service
- A customer's DNS service cannot resolve a host name for a device that the SL1 system monitors

You can create host file entries for each device managed by the SL1 system. You can create duplicate host file entries, one for each Collection Group, to ensure that all Collection Groups can resolve all host names for monitored devices.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon (.
- To view a page containing all the menu options, click the Advanced menu icon (.

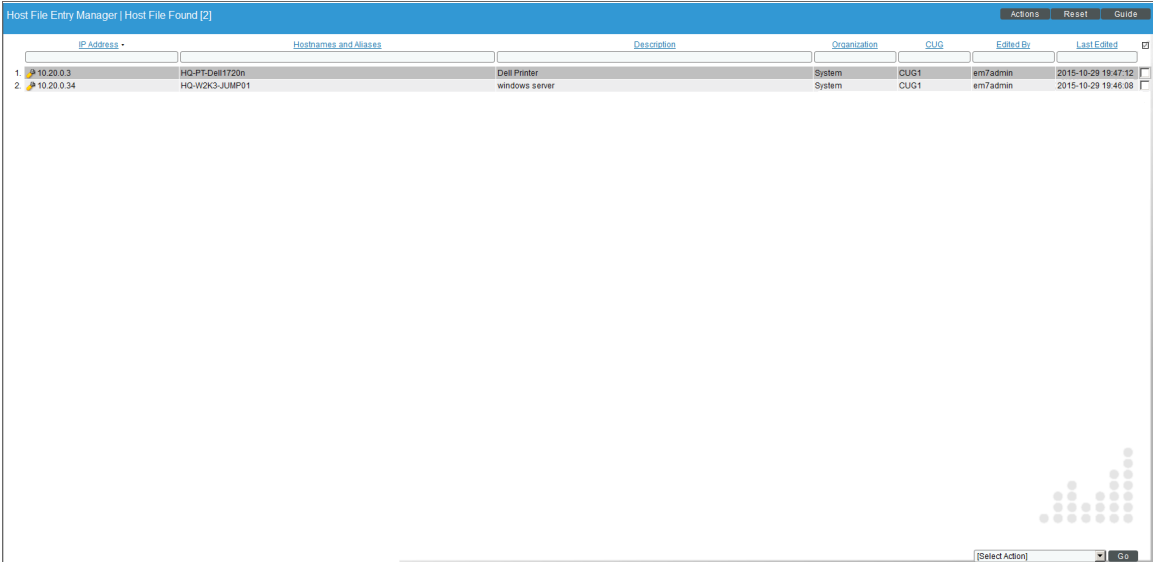
This chapter includes the following topics:

Viewing the List of Host Entries	346
Creating a New Host Entry	347
Editing a Host Entry	348
Using an Existing Host File Entry to Create a New Host File Entry (Save As)	350
Deleting One or More Host Entries	351

Viewing the List of Host Entries

To view the list of host entries, perform the following steps:

1. Go to the **Host File Entry Manager** page (System > Customize > Host Files).



The screenshot shows the 'Host File Entry Manager' interface with a table of host entries. The table has columns for IP Address, Hostnames and Aliases, Description, Organization, CUG, Edited By, and Last Edited. Two entries are visible:

	IP Address	Hostnames and Aliases	Description	Organization	CUG	Edited By	Last Edited
1	10.20.0.2	HQ-RT-DellT720n	Dell Printer	System	CUG1	em7admin	2015-10-29 19:47:12
2	10.20.0.34	HQ-W2K3_JUMP01	windows server	System	CUG1	em7admin	2015-10-29 19:46:08

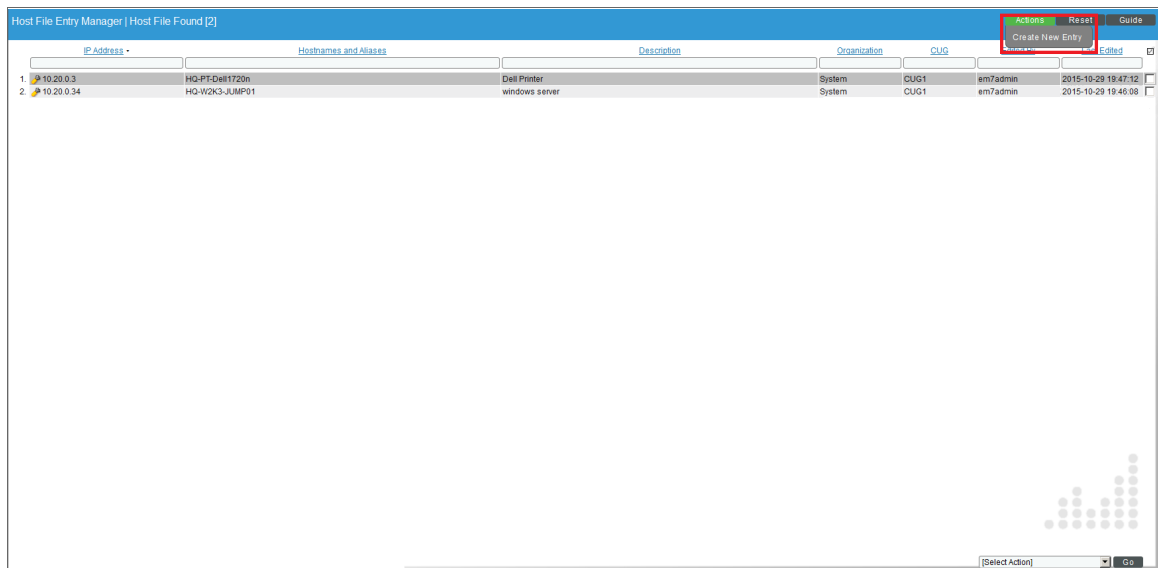
2. The **Host File Entry Manager** page displays the following about each host entry:

- **IP Address.** The IP address to resolve with the host name.
- **Hostnames and Aliases.** The host name to align with the specified IP address. You can also include a space-delimited list of aliases for the host name.
- **Description.** Description of the host entry.
- **Organization.** Organization associated with the host.
- **CUG.** The Collector Group to which SL1 will send the host entry. The host entry will be added to the host file on each Data Collection Server in the Collector Group.
- **Edited By .** User who created or last edited the host entry.
- **Last Edit.** Date the host entry was created or last edited.

Creating a New Host Entry

To create a host file entry:

1. Go to the **Host File Entry Manager** page (System > Customize > Host Files).



2. Click the [Action] menu and choose **Create New Entry**. The **Create New Host File Entry** modal page appears.

The screenshot shows the 'Host File Entry Editor' modal page. It has a title bar 'Host File Entry Editor' and a close button. Below the title bar is a sub-header 'Create New Host File Entry' and a 'Reset' button. The form contains several input fields: 'IP Address', 'Hostnames and Aliases', and 'Description'. Below these are two dropdown menus: 'Organization' (set to '[System]') and 'Collector' (set to 'CUG1'). At the bottom of the form is a 'Save' button.

3. In the **Create New Host File Entry** modal page, supply values in the following fields:
 - **IP Address**. The IP address to resolve with the hostname.

NOTE: Server hostnames should be aligned to external IP addresses when supporting Network Address Translation (NAT) environments.

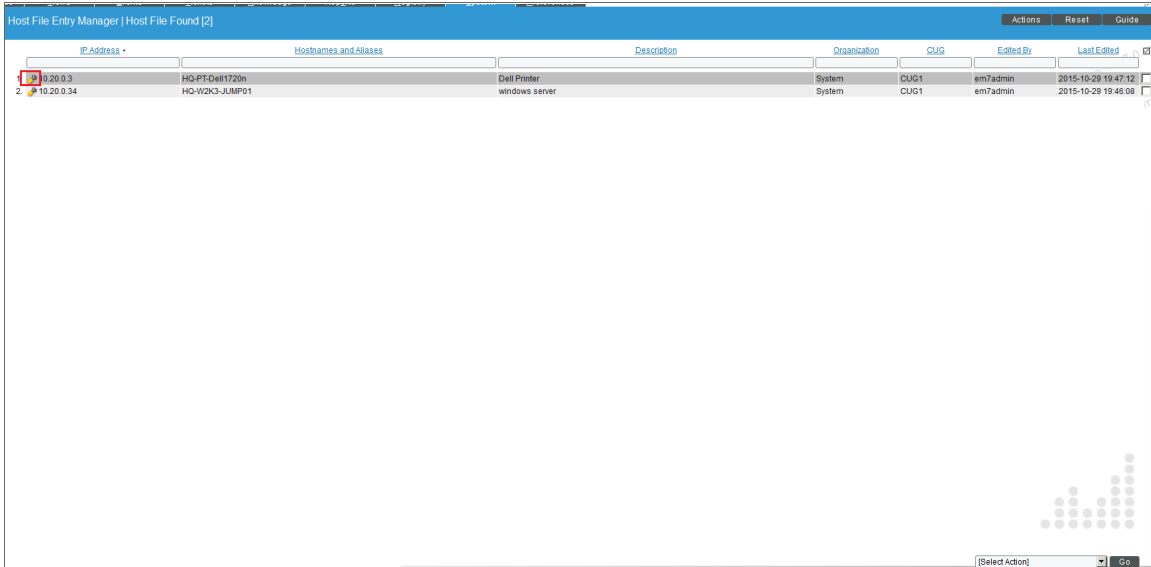
- **Hostnames and Aliases.** The hostname to align with the specified IP address. You can also include a space-delimited list of aliases for the host name.
- **Description.** Description of the host entry. This field is not written to the host file. This field is for administrators to use when managing host file entries.
- **Organization.** Organization associated with the host. You can select from a list of all existing organizations. This field is not written to the host file. This field is for administrators to use when managing host file entries. For example, a service provider could assign each customer its own organization and then use this field to manage host file entries for each customer.

4. Click the **[Save]** button to save the new host entry.

Editing a Host Entry

To edit a host entry, perform the following steps:

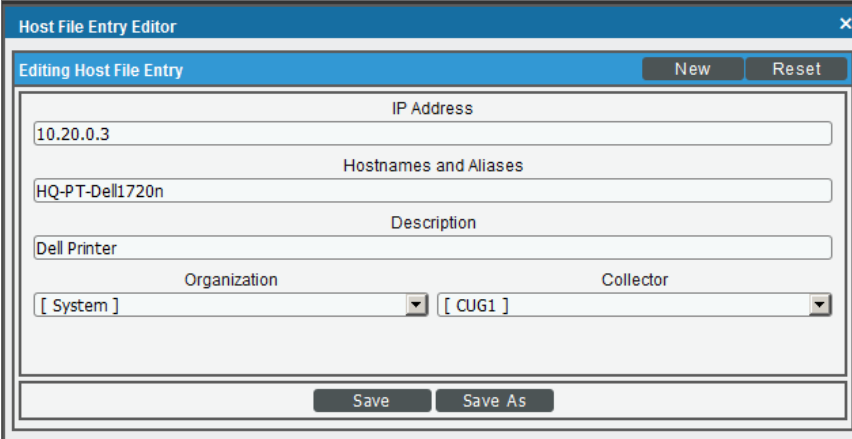
1. Go to the **Host File Entry Manager** page (System > Customize > Host Files).



The screenshot shows the 'Host File Entry Manager' interface with a table of host entries. The table has columns for IP Address, Hostnames and Aliases, Description, Organization, CUG, Edited By, and Last Edited. Two entries are visible: one for a Dell Printer and one for a windows server. The first entry is highlighted with a red box.

IP Address	Hostnames and Aliases	Description	Organization	CUG	Edited By	Last Edited
19.20.0.3	HQ-PT-Dell1720n	Dell Printer	System	CUG1	em7admin	2015-10-29 19:47:12
10.20.0.34	HQ-W2K3-JUMP01	windows server	System	CUG1	em7admin	2015-10-29 19:46:08

2. Click the wrench icon (🔧) for the host file entry you want to edit. The **Editing Host File Entry** modal page appears, populated with values from the selected host file entry.



The screenshot shows a modal window titled "Host File Entry Editor" with a close button (X) in the top right corner. The window has a blue header bar with the text "Editing Host File Entry" and two buttons: "New" and "Reset". The main content area contains several input fields and dropdown menus:

- IP Address:** A text input field containing "10.20.0.3".
- Hostnames and Aliases:** A text input field containing "HQ-PT-Dell1720n".
- Description:** A text input field containing "Dell Printer".
- Organization:** A dropdown menu with "[System]" selected.
- Collector:** A dropdown menu with "[CUG1]" selected.

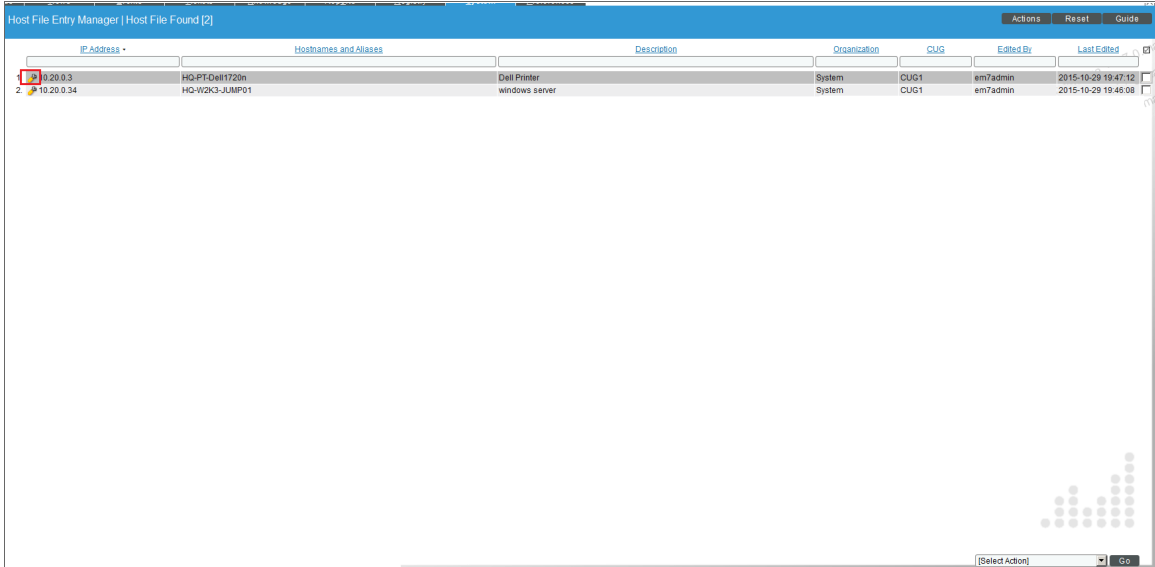
At the bottom of the modal, there are two buttons: "Save" and "Save As".

3. In the **Editing Host File Entry** modal page, you can edit one or more of the following fields:
 - **IP Address.** The IP address to resolve with the host name.
 - **Hostnames and Aliases.** The host name to align with the specified IP address. You can also include a space-delimited list of aliases for the host name.
 - **Description.** Description of the host entry. This field is not written to the host file. This field is for administrators to use when managing host file entries.
 - **Organization.** Organization associated with the host. You can select from a list of all existing organizations. This field is not written to the host file. This field is for administrators to use when managing host file entries. For example, a service provider could assign each customer its own organization and then use this field to manage host file entries for each customer.
4. Click the **[Save]** button to save your changes.

Using an Existing Host File Entry to Create a New Host File Entry (Save As)

To create a new host entry, using an existing host entry as the template:

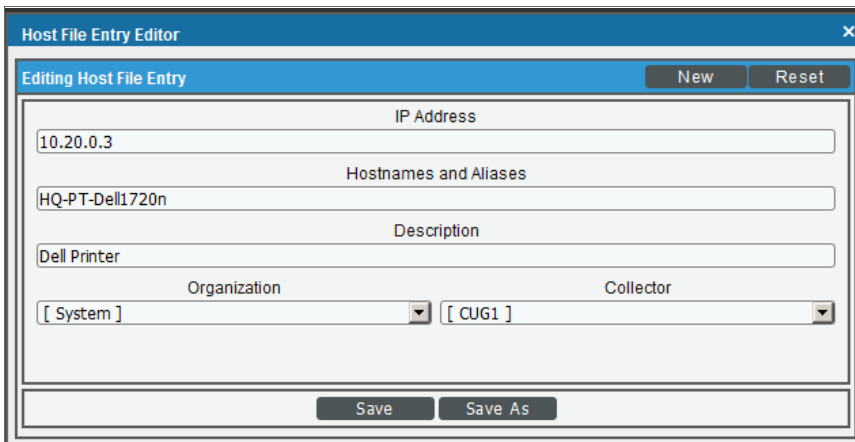
1. Go to the **Host File Entry Manager** page (System > Customize > Host Files).



The screenshot shows the 'Host File Entry Manager' interface. At the top, there are tabs for 'Actions', 'Reset', and 'Guide'. Below the tabs is a table with the following columns: IP Address, Hostnames and Aliases, Description, Organization, CUG, Edited By, and Last Edited. The table contains two entries:

IP Address	Hostnames and Aliases	Description	Organization	CUG	Edited By	Last Edited
10.20.0.3	HQ-PT-Dell1720n	Dell Printer	System	CUG1	em7admin	2015-10-29 19:47:12
10.20.0.34	HQ-W2K3-JUMP01	windows server	System	CUG1	em7admin	2015-10-29 19:48:08

2. Click the wrench icon (🔧) for the host file entry you want to edit. The **Editing Host File Entry** modal page appears, populated with values from the selected host file entry.



The screenshot shows the 'Host File Entry Editor' modal page. It has a title bar with 'Host File Entry Editor' and a close button. Below the title bar is a sub-header 'Editing Host File Entry' with 'New' and 'Reset' buttons. The form contains the following fields:

- IP Address: 10.20.0.3
- Hostnames and Aliases: HQ-PT-Dell1720n
- Description: Dell Printer
- Organization: [System] (dropdown)
- Collector: [CUG1] (dropdown)

At the bottom of the form are 'Save' and 'Save As' buttons.

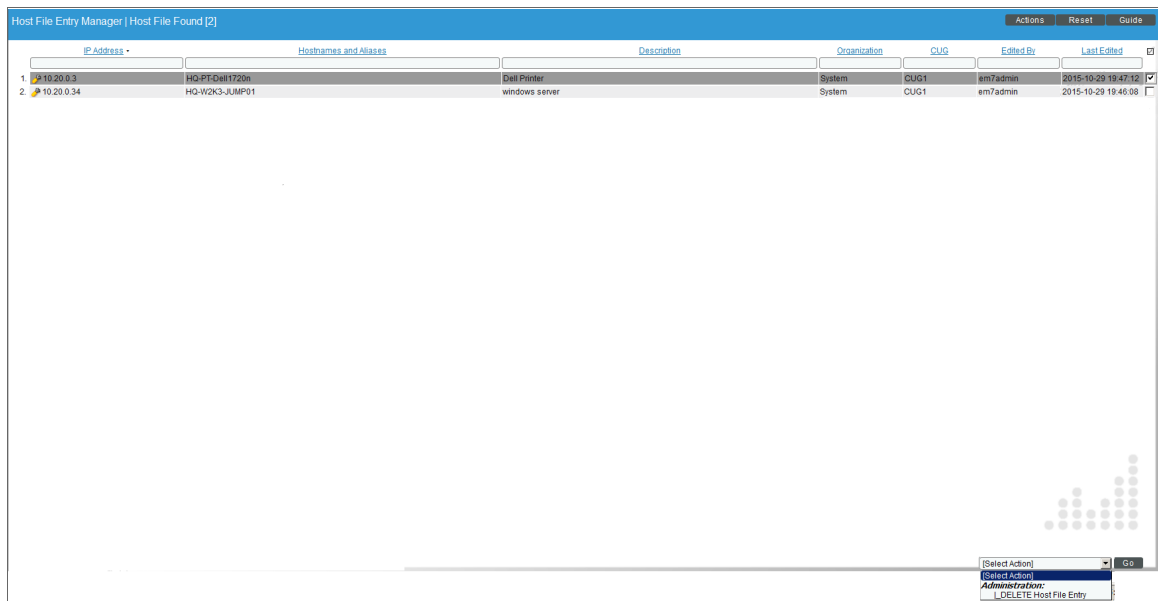
3. In the **Editing Host File Entry** modal page, you can edit one or more of the following fields:
 - **IP Address.** The IP address to resolve with the host name.

- **Hostnames and Aliases.** The host name to align with the specified IP address. You can also include a space-delimited list of aliases for the host name.
 - **Description.** Description of the host entry. This field is not written to the host file. This field is for administrators to use when managing host file entries.
 - **Organization.** Organization associated with the host. You can select from a list of all existing organizations. This field is not written to the host file. This field is for administrators to use when managing host file entries. For example, a service provider could assign each customer its own organization and then use this field to manage host file entries for each customer.
4. Click the **[Save As]** button to save your changes as a new host file entry. A pop-up message appears, asking if you want to save your edits as a new entry. Click the **[OK]** button.

Deleting One or More Host Entries

To delete one or more host entries, perform the following steps:

1. Go to the **Host File Entry Manager** page (System > Customize > Host Files).



2. Select the checkbox for each host file entry you want to delete.
3. Click the **Select Action** field in the lower right, then select **DELETE Host File Entry**. Click the **[Go]** button.

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