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# Monitoring Linux and Solaris Systems

Linux Base Pack version 102

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## Introduction

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### Overview

This manual describes how to configure SNMP and Syslog for Linux and Solaris systems and how to monitor Linux systems with SL1 using the Dynamic Applications in the *Linux Base Pack PowerPack*.

The following sections provide an overview of SNMP, Net-SNMP, Secure Shell (SSH), and the *Linux Base Pack PowerPack*:

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## What is SNMP?

Simple Network Management Protocol (SNMP) is a set of standard protocols for managing diverse computer hardware and software within a TCP/IP network. SNMP is the most common protocol used by network monitoring and management applications to exchange information between devices. SL1 uses this protocol and other protocols to collect availability, performance, and configuration information.

SNMP uses a server-client structure.

- Clients are called **agents**. Devices and software that run SNMP are agents. For the purposes of this document, Net-SNMP is the agent.
- The server is called the **management system**. SL1 is the management system.

Typically, **agents**:

- Implement the SNMP protocol on the device.
- Store data points as defined by the Management Information Base (MIB) file.
- Can asynchronously signal an event to the manager.

Typically, a **management system**:

- Uses the SNMP Protocol.
- Queries agents.
- Receives responses (data points) from agents.
- Acknowledges asynchronous events from agents.

Most enterprise-level network hardware is configured for SNMP and can be SNMP-enabled. Many enterprise software applications are also SNMP-compliant. When SNMP is running on a device, it uses a standard format to collect and store data about the device and/or software. For example, SNMP might collect information on each network interface and the traffic on each interface. SL1 can then query the device to retrieve the stored data.

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## What is Net-SNMP?

Net-SNMP is a suite of applications used to implement SNMP. Net-SNMP is an agent. Standard Net-SNMP includes the **snmpd** daemon and a suite of client utilities. Net-SNMP can be run on any supported operating system, and SL1 will then be able to communicate with and collect data from the device.

## Why Should I Use Net-SNMP?

- Net-SNMP is an open-source application. It is free to use and distribute.
- Because Net-SNMP is widely used, there are many user groups and support forums for the product.

**NOTE:** Although ScienceLogic does not directly support the Net-SNMP agent, this document will get you started on the installation and configuration tasks for Net-SNMP. For detailed documentation on Net-SNMP, see <http://www.net-snmp.org>.

- Net-SNMP includes source and pre-compiled objects for all major flavors of UNIX and Linux as well as a number of other operating systems.
- Net-SNMP is an **extensible** agent. Generally, SNMP agents can retrieve only data that has been defined in a MIB file. In most cases, a hardware or software manufacturer creates the MIB file and then ships the MIB file with the product. Net-SNMP allows users to add values to the MIB file and retrieve values from scripts, programs, and files.
- Net-SNMP is a natural fit with SL1's Dynamic Applications. Using Net-SNMP and dynamic applications, users can create reports, coupled graphs, and events based on the data points that are most useful to them.

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## SNMP Terminology

This section defines some basic SNMP terminology. You should be familiar with the following terminology before installing and configuring Net-SNMP:

- **SNMP (Simple Network Management Protocol)**. A set of standard protocols for managing diverse computer hardware and software within a TCP/IP network. SNMP is the most common network protocol used by network monitoring and management applications to exchange management information between devices. SL1 uses this protocol and other protocols to collect availability, performance, and configuration information.

SNMP uses a server-client structure. Clients are called agents. Devices and software that run SNMP are agents. The server is called the management system. SL1 is the management system.

Most enterprise-level network hardware is configured for SNMP and can be SNMP-enabled. Many enterprise software applications are also SNMP-compliant. When SNMP is running on a device, it uses a standard format to collect and store data about the device and/or software. For example, SNMP might collect information on each network interface and the traffic on each interface. SL1 can then query the device to retrieve the stored data.

- **SNMP Tree**. SNMP uses a tree structure. The first few branches of the tree are organizational and do not apply to specific manufacturers and device. The starting point for all device or application info is:

1.3.6.1.4.1.vendor\_number

For details on SNMP tree structure, see <http://www.iana.org/assignments/enterprise-numbers>.

For an overview of the entire SNMP tree, see <http://www3.rad.com/networks/applications/snmp/main.htm>

- **MIB (Management Information Base)**. A collection of objects that can be monitored by a network management system (in this case, SL1). The objects are organized hierarchically and stored in a MIB file. SNMP requires a standardized format for each MIB file. This standardized format allows SL1 to gather data on any device where SNMP is enabled. A MIB file is usually associated with a manufacturer and a device. Some companies use a single MIB that contains information on all their products; some manufacturers create a separate MIB for each product.
- **OID (Object ID)**. OIDs are the numeric IDs that are used in the SNMP tree. OIDs are used to define manufacturers, devices, and the characteristics of devices. OIDs are defined and organized in MIB files.
- In SL1, the **root OID** (sometimes called the vendor number) refers to the unique number assigned to each manufacturer. Each root OID is registered with IANA. For example, the root OID for American Power Conversion (APC) Corporation is 1.3.6.1.4.1.318. APC can then create and organize OIDs under this root OID. For example:
  - 1.3.6.1.4.1.318 is the root OID for American Power Conversion Corporation
  - 1.3.6.1.4.1.318.1 could mean "all products". APC could then define unique IDs under "all products".
  - 1.3.6.1.4.1.318.1.1 could mean "hardware"
  - 1.3.6.1.4.1.318.1.2 could mean "software"

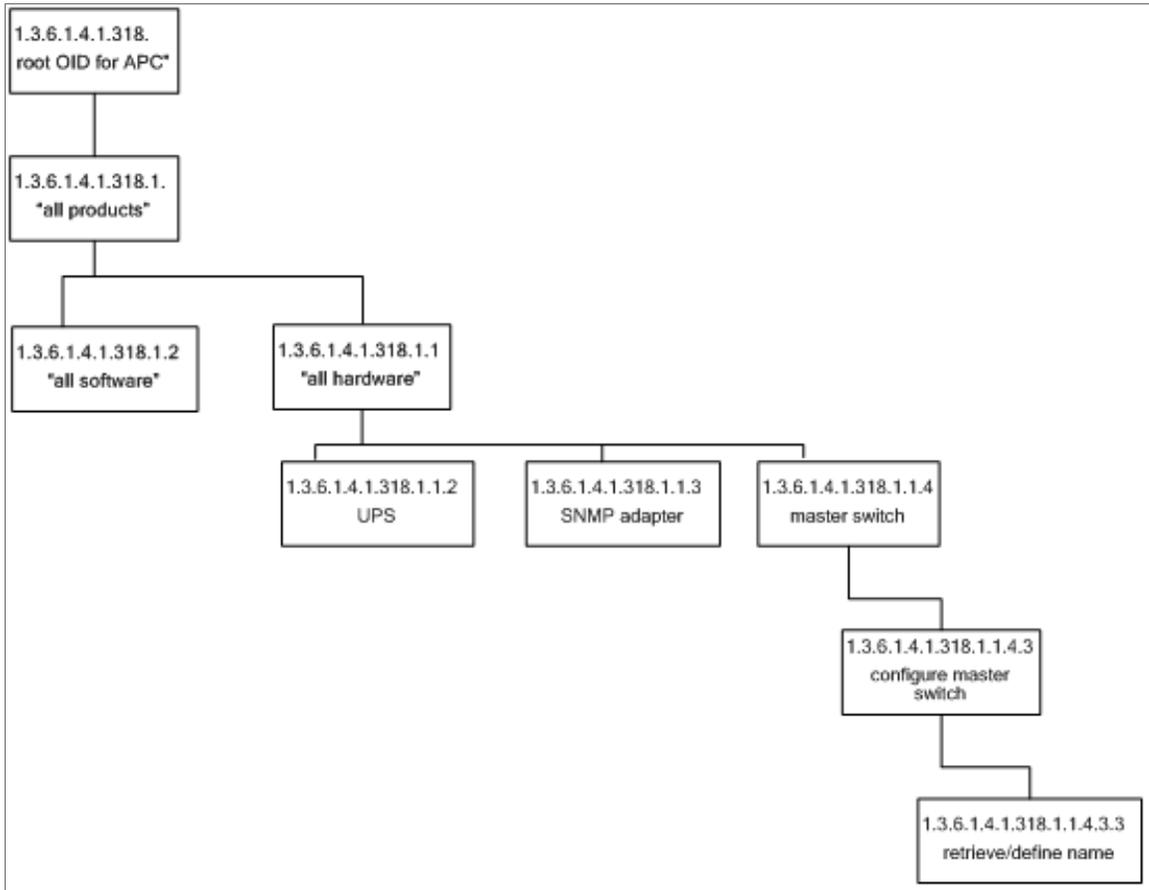
All the OIDs that occur under 1.3.6.1.4.1.318.1.1 would be mapped to types of hardware, for example:

- 1.3.6.1.4.1.318.1.1.2 could mean "UPS"
- 1.3.6.1.4.1.318.1.1.3 could mean "SNMP adapter"
- 1.3.6.1.4.1.318.1.1.4 could mean "master switch"

All the OIDs that occur under each type of hardware (UPS, SNMP adapter, master switch) would be mapped to specific parameters that can be monitored and controlled through SNMP commands. For example:

- 1.3.6.1.4.1.318.1.1.4.3 could mean "configuration settings for master switch"
- 1.3.6.1.4.1.318.1.1.4.3.3 could mean "retrieve or define name for master switch"

The section of the SNMP tree for our example would look like this:



## What is SSH?

Secure Shell (SSH) is a network protocol that enables users to securely access a command-line shell on a remote computer or server over an unsecured network. SSH provides strong encryption and authentication capabilities, making it an ideal method for securely administering commands or transferring data between a client and server.

To make SSH even more secure, you can use SSH keys instead of a simple password to log in to a server. SSH keys consist of two long strings of characters, called a public/private key pair, that are much less susceptible than passwords are to brute force attacks. The public key is placed on the server you want to access, while the private key resides on the client. When you use SSH to log in to the server from the client, the key pair is used to authenticate the session.

In SL1, some Dynamic Applications of type "Snippet" use SSH to communicate with a remote device. To use these Dynamic Applications, you must define an SSH credential. This credential specifies the hostname or IP address of the system you want to monitor, the port number used to access that system, and the private key used for authentication.

**NOTE:** The default TCP port for SSH servers is 22.

## What Does the Linux Base Pack PowerPack Monitor?

To monitor Linux systems with SSH using SL1, you must install the *Linux Base Pack PowerPack*. This PowerPack enables you to discover, model, and collect data about Linux systems.

The *Linux Base Pack PowerPack* includes:

- Dynamic Applications that discover and collect configuration and performance data for Linux systems
- Event Policies and corresponding alerts that are triggered when Linux systems meet certain status criteria
- Device Classes for each type of Linux system monitored
- A Run Book Action and an Automation policy to assign the proper device classes to Linux systems

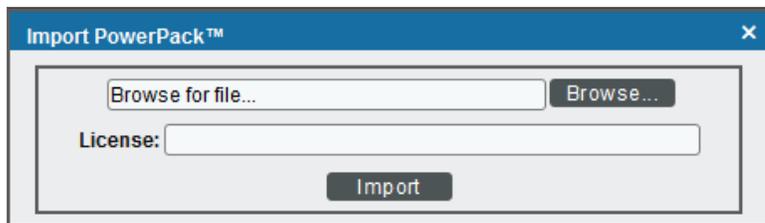
## Installing the Linux Base Pack PowerPack

To monitor Linux systems with SSH, you must import and install the latest version of the *Linux Base Pack PowerPack*.

**TIP:** By default, installing a new version of a PowerPack overwrites all content in that PowerPack that has already been installed on the target system. You can use the **Enable Selective PowerPack Field Protection** setting in the **Behavior Settings** page (System > Settings > Behavior) to prevent new PowerPacks from overwriting local changes for some commonly customized fields. (For more information, see the **System Administration** manual.)

To download and install a PowerPack:

1. Download the PowerPack from the [ScienceLogic Customer Portal](#).
2. Go to the **PowerPack Manager** page (System > Manage > PowerPacks).
3. In the **PowerPack Manager** page, click the **[Actions]** button, then select *Import PowerPack*.
4. The **Import PowerPack** dialog box appears:



5. Click the **[Browse]** button and navigate to the PowerPack file.
6. When the **PowerPack Installer** modal page appears, click the **[Install]** button to install the PowerPack.

**NOTE:** If you exit the **PowerPack Installer** modal page without installing the imported PowerPack, the imported PowerPack will not appear in the **PowerPack Manager** page. However, the imported PowerPack will appear in the **Imported PowerPacks** modal page. This page appears when you click the **[Actions]** menu and select *Install PowerPack*.

## Installing and Configuring Net-SNMP for Linux

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### Overview

The following sections describe how to install Net-SNMP on a Linux device and how to configure Net-SNMP:

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**NOTE:** For detailed descriptions of Net-SNMP for each supported operating system, see <http://www.net-snmp.org>.

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## Installing Net-SNMP on Linux Devices

For each Linux device that you want to monitor with Net-SNMP, you must install and configure Net-SNMP. ***If you want to monitor multiple devices with Net-SNMP, you must install Net-SNMP and create the `snmpd.conf` file on each device to be monitored.***

**NOTE:** Most Linux distributions will require the same installation and configuration as described in this chapter.

If Net-SNMP is correctly installed and configured on a Linux device, SL1 can automatically query the device and collect data. SL1 includes multiple default Dynamic Applications for the Net-SNMP agent. These Dynamic Applications allow SL1 to collect selected data-points from Net-SNMP devices. The data is then used to create reports and graphs, accessible via the graphical user-interface.

By querying Net-SNMP data-points, SL1 can collect and present at least the following about a device:

- System name, operating system, operating system version, and uptime
- File-system configuration and usage
- Memory size and usage
- CPU usage
- Installed software
- Running processes
- Network interface details, including name, speed, and MAC address
- Bandwidth usage

Installing and Configuring Net-SNMP on a Linux computer includes the following steps:

1. [Verifying and Installing Net-SNMP using free RPM Packages.](#)
2. [Stopping `snmpd`.](#)
3. [Creating the `snmpd.conf` file.](#) This file defines how the Net-SNMP agent will behave and includes information on the physical location and the contact information for the server, access control for the Net-SNMP agent, and trap destinations for the agent.
4. [Starting `snmpd` and testing connectivity to Net-SNMP.](#)

---

## Step 1: Verifying and Installing Net-SNMP with RPM Packages

The operating system for SL1 ships with the following RPM packages for Net-SNMP:

- net-snmp-5.7.2-24.silo.el7.x86\_64
- net-snmp-libs-5.7.2-24.silo.el7.x86\_64
- net-snmp-utils--5.7.2-24.silo.el7.x86\_64

To continue with the steps in this chapter, you must verify the presence of these RPMs on the server that SL1 will monitor. To do this:

1. Open a shell session
2. Enter one of the following at the prompt:

```
rpm -qa | grep net-snmp
```

or

```
yum list net-snmp
```

3. Ensure that the output of this command includes each RPM listed above.
4. If one or more of these packages are missing you can run the appropriate command from the following commands:

```
yum install net-snmp
yum install net-snmp-libs
yum install net-snmp-utils
```

5. After you have verified and installed all the packages, you can create the net-snmp configuration file and start the snmp service (agent).

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## Step 2: Stopping snmpd

The Linux RPM for net-snmp includes the snmpd (Net-SNMP agent) binary as follows:

- The snmpd binary is installed in the directory /usr/sbin/snmpd.
- The configuration file for the snmpd agent is installed in /etc/snmp/snmpd.conf

**NOTE:** You should configure the snmpd.conf file before you start the snmpd daemon.

You must check if the snmpd agent is running. If it is, you must stop the snmpd agent so you can create the configuration file.

To check the snmpd agent and stop it (if necessary):

1. Open a shell session.
2. To see if the snmpd agent is running, enter the following at the prompt:

```
/etc/init.d/snmpd status
```

3. If snmpd is running, you will see a message like "snmpd is running".
4. If the snmpd agent is running, enter the following command to stop the agent:

```
/etc/init.d/snmpd stop
```

---

## Step 3: Creating the snmpd.conf file

The snmpd.conf. file defines how the Net-SNMP daemon will behave and includes information about the physical location and contact information for the server, access control for the Net-SNMP agent, and trap destinations for the Net-SNMP agent.

**CAUTION:** In most cases, your computer(s) will already have an existing /etc/snmp/snmpd.conf file that includes the default settings. Because we want to create a new, clean snmpd.conf file, you must replace the existing file. You must move, not copy, the file, to ensure that you are creating a new file and not simply append new settings to the default settings in the snmpd.conf file. After stopping the snmpd agent, you must move the existing config file.

To move the existing configuration file, open a shell session and enter the following at the command line:

```
mv /etc/snmp/snmpd.conf /etc/snmp/snmpd.conf.orig
```

To create the /etc/snmp/snmpd.conf file:

- You can replace your snmpd.conf file with one of the examples in the following sections. There is an example configuration file for Net-SNMP for SNMPv2 and another for SNMPv3 on Linux.
- The example configuration files contain the basic settings that SL1 will need to communicate successfully with the Net-SNMP agent on the Linux server.
- For basic compatibility, you should edit your file to include only the entries from the selected example.

**NOTE:** Net-SNMP is highly customizable, and SL1 can fully take advantage of these customizations. If you are interested in extending your Net-SNMP agent, please contact ScienceLogic Professional Services.

### Example snmpd.conf file for SNMPv2:

The following is a working example of a snmpd.conf file for SNMPv2. You should edit your snmpd.conf file to include only the entries from this example file.

**NOTE:** This snmpd.conf file does *not* include encrypting SNMP access to the Linux client.

The file should be located in /etc/snmp/snmpd.conf:

```
# snmpd.conf
#
# - created by the snmpconf configuration program
#
#####
# SECTION: System Information Setup
#
# This section defines some of the information reported in
# the "system" mib group in the mibII tree.
# syslocation: The [typically physical] location of the system.
# Note that setting this value here means that when trying to
# perform an snmp SET operation to the sysLocation.0 variable will make
# the agent return the "notWritable" error code. IE, including
# this token in the snmpd.conf file will disable write access to
# the variable.
# arguments: location_string
syslocation "Reston, Virginia"
# syscontact: The contact information for the administrator
# Note that setting this value here means that when trying to
# perform an snmp SET operation to the sysContact.0 variable will make
# the agent return the "notWritable" error code. IE, including
# this token in the snmpd.conf file will disable write access to
# the variable.
# arguments: contact_string
syscontact "ScienceLogic Support 1-703-354-1010"
#####
# SECTION: Access Control Setup
#
# This section defines who is allowed to talk to your running
# snmp agent
# rocommunity: a SNMPv1/SNMPv2c read-only access community name
# arguments: community [default|hostname|network/bits] [oid]
rocommunity public
# rwcommunity: a SNMPv1/SNMPv2c read-write access community name
# arguments: community [default|hostname|network/bits] [oid]
# rwcommunity private
#####
# SECTION: Trap Destinations
#
# Here we define who the agent will send traps to.
# trap2sink: A SNMPv2c trap receiver
# arguments: host [community] [portnum]
#
trap2sink 192.168.10.71 public
# End of File
```

**NOTE:** The example `snmpd.conf` file for SNMPv2 uses the default community string ("public") and ScienceLogic-specific examples of Contact and Location information and Trap Destinations. You will need to change these settings to match your local environment.

## Adding Read/Write Access to the `snmpd.conf` File for SNMPv2

The example `snmpd.conf` file provides only Read Only access to your Linux system from SL1 (using the default "SNMP public" credential that is included in SL1). If you require SL1 to have Read/Write access to your Linux system, you will need to perform the following steps.

1. In the `snmpd.conf` file, uncomment the line for `rwcommunity`. To do this:

Change this line:

```
# rwcommunity private
```

To:

```
rwcommunity private
```

2. Save your changes and exit the file.

## Example `snmpd.conf` file for SNMPv3:

The following is a working example of a `snmpd.conf` file for SNMPv3. For operation with SL1, you should edit your `snmpd.conf` file to include only entries from this example file.

This example `snmpd.conf` file includes read and write community strings and encrypts all Net-SNMP access to your Linux system from SL1.

The file should reside in `/etc/snmp/snmpd.conf`:

```
# snmpd.conf
#
# - created by the snmpconf configuration program
#####
# SECTION: System Information Setup
#
# This section defines some of the information reported in
# the "system" mib group in the mibII tree.
# syslocation: The [typically physical] location of the system.
# Note that setting this value here means that when trying to
# perform an snmp SET operation to the sysLocation.0 variable will make
# the agent return the "notWritable" error code. IE, including
# this token in the snmpd.conf file will disable write access to
# the variable.
# arguments: location_string
syslocation "Reston, Virginia"
# syscontact: The contact information for the administrator
# Note that setting this value here means that when trying to
# perform an snmp SET operation to the sysContact.0 variable will make
```

```

# the agent return the "notWritable" error code. IE, including
# this token in the snmpd.conf file will disable write access to
# the variable.
# arguments: contact_string
syscontact "ScienceLogic Support: 1-703-354-1010"
#####
# SECTION: Access Control Setup
#
# This section defines who is allowed to talk to your running
# snmp agent.
# rwuser: a SNMPv3 read-write user
# arguments: user [noauth|auth|priv] [restriction_oid]
rouser linuser priv
createUser linuser SHA linuserpass DES linprivpass
rwuser linadmin priv
createUser linadmin SHA linauthpass DES linprivpass
#####
# SECTION: Trap Destinations
#
# Here we define who the agent will send traps to.
# trap2sink: A SNMPv2c trap receiver
# arguments: host [community] [portnum]
#
trap2sink 192.168.10.71 public
# End of File

```

**NOTE:** The example snmpd.conf file for SNMPv3 uses ScienceLogic-specific examples of Contact and Location information and Trap Destinations. You will need to change these settings to match your local environment. In SL1, you must create a Read-Only credential for SNMPv3 and a Read/Write credential for SNMPv3 that match the credentials specified in the snmpd.conf file.

## Step 4: Starting snmpd and Testing connectivity to Net-SNMP

These sections describe how to start the snmpd agent and how to test connectivity to Net-SNMP.

- If you use SNMPv2 and used the example snmpd.conf file for SNMPv2, follow the steps in the section on SNMPv2.
- If you use SNMPv3 and used the example snmpd.conf file for SNMPv3, follow the steps in the section on SNMPv3.

### Testing the Example snmpd.conf file for SNMPv2

Now that you have created the new snmpd.conf file for SNMPv2 on your Linux system, you can start the snmpd service (agent) and test that the new file is working. To do this:

1. You must first restart the snmpd agent. To do this, open a shell session and enter the following at the command prompt:

```
/etc/init.d/snmpd start
```

2. The snmpd agent should now start running.
3. To test the snmpd agent and the new configuration file, enter the following at the command prompt:

```
snmpwalk -v 2c -c public localhost system
```

4. You should see output similar to:

```
SNMPv2-MIB::sysDescr.0 = STRING: Linux ps-centos-lnx 2.6.18-92.el5 #1 SMP Tue Jun 10
18:49:47 EDT 2008 i686
SNMPv2-MIB::sysObjectID.0 = OID: NET-SNMP-MIB::netSnmAgentOIDs.10
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (437) 0:00:04.37
SNMPv2-MIB::sysContact.0 = STRING: "ScienceLogic Support 1-703-354-1010"
SNMPv2-MIB::sysName.0 = STRING: ps.centos-lnx
SNMPv2-MIB::sysLocation.0 = STRING: "Reston, Virginia"
SNMPv2-MIB::sysORLastChange.0 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORID.1 = OID: SNMPv2-MIB::snmpMIB
SNMPv2-MIB::sysORID.2 = OID: TCP-MIB::tcpMIB
SNMPv2-MIB::sysORID.3 = OID: IP-MIB::ip
SNMPv2-MIB::sysORID.4 = OID: UDP-MIB::udpMIB
SNMPv2-MIB::sysORID.5 = OID: SNMP-VIEW-BASED-ACM-MIB::vacmBasicGroup
SNMPv2-MIB::sysORID.6 = OID: SNMP-FRAMEWORK-MIB::snmpFrameworkMIBCompliance
SNMPv2-MIB::sysORID.7 = OID: SNMP-MPD-MIB::snmpMPDCompliance
SNMPv2-MIB::sysORID.8 = OID: SNMP-USER-BASED-SM-MIB::usmMIBCompliance
SNMPv2-MIB::sysORDescr.1 = STRING: The MIB module for SNMPv2 entities
SNMPv2-MIB::sysORDescr.2 = STRING: The MIB module for managing TCP implementations
SNMPv2-MIB::sysORDescr.3 = STRING: The MIB module for managing IP and ICMP
implementations
SNMPv2-MIB::sysORDescr.4 = STRING: The MIB module for managing UDP implementations
SNMPv2-MIB::sysORDescr.5 = STRING: View-based Access Control Model for SNMP.
SNMPv2-MIB::sysORDescr.6 = STRING: The SNMP Management Architecture MIB.
SNMPv2-MIB::sysORDescr.7 = STRING: The MIB for Message Processing and Dispatching.
SNMPv2-MIB::sysORDescr.8 = STRING: The management information definitions for the
SNMP User-based Security Model.
SNMPv2-MIB::sysORUpTime.1 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.2 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.3 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.4 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.5 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.6 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.7 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.8 = Timeticks: (0) 0:00:00.00
```

## Testing the Example snmpd.conf file for SNMPv3

Now that you have created the new snmpd.conf file for SNMPv3 on your Linux system, you can start the snmpd service (agent) and test that the new file is working. To do this:

1. You must first restart the snmpd agent. To do this, open a shell session and enter the following at the command prompt:

```
/etc/init.d/snmpd start
```

2. The snmpd agent should now start running.
3. To test the snmpd agent and the new configuration file, enter the following at the command prompt. We are using the credentials from the example snmpd.conf file for SNMPv3 (*linuser*, *linuserpass*, and *linprivpass*); if you used different credentials, please substitute them in the command:

```
snmpwalk -v 3 -u linuser -l authPriv -a SHA -A linuserpass -x DES -X linprivpass localhost system
```

4. You should see output similar to:

```
SNMPv2-MIB::sysDescr.0 = STRING: Linux ps-centos-lnx 2.6.18-92.el5 #1 SMP Tue Jun 10
18:49:47 EDT 2008 i686
SNMPv2-MIB::sysObjectID.0 = OID: NET-SNMP-MIB::netSnmAgentOIDs.10
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (327207) 0:54:32.07
SNMPv2-MIB::sysContact.0 = STRING: "ScienceLogic Support 1-703-354-1010"
SNMPv2-MIB::sysName.0 = STRING: ps-centos-lnx
SNMPv2-MIB::sysLocation.0 = STRING: "Reston, Virginia"
SNMPv2-MIB::sysORLastChange.0 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORID.1 = OID: SNMPv2-MIB::snmpMIB
SNMPv2-MIB::sysORID.2 = OID: TCP-MIB::tcpMIB
SNMPv2-MIB::sysORID.3 = OID: IP-MIB::ip
SNMPv2-MIB::sysORID.4 = OID: UDP-MIB::udpMIB
SNMPv2-MIB::sysORID.5 = OID: SNMP-VIEW-BASED-ACM-MIB::vacmBasicGroup
SNMPv2-MIB::sysORID.6 = OID: SNMP-FRAMEWORK-MIB::snmpFrameworkMIBCompliance
SNMPv2-MIB::sysORID.7 = OID: SNMP-MPD-MIB::snmpMPDCompliance
SNMPv2-MIB::sysORID.8 = OID: SNMP-USER-BASED-SM-MIB::usmMIBCompliance
SNMPv2-MIB::sysORDescr.1 = STRING: The MIB module for SNMPv2 entities
SNMPv2-MIB::sysORDescr.2 = STRING: The MIB module for managing TCP implementations
SNMPv2-MIB::sysORDescr.3 = STRING: The MIB module for managing IP and ICMP
implementations
SNMPv2-MIB::sysORDescr.4 = STRING: The MIB module for managing UDP implementations
SNMPv2-MIB::sysORDescr.5 = STRING: View-based Access Control Model for SNMP.
SNMPv2-MIB::sysORDescr.6 = STRING: The SNMP Management Architecture MIB.
SNMPv2-MIB::sysORDescr.7 = STRING: The MIB for Message Processing and Dispatching.
SNMPv2-MIB::sysORDescr.8 = STRING: The management information definitions for the
SNMP User-based Security Model.
SNMPv2-MIB::sysORUpTime.1 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.2 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.3 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.4 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.5 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.6 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.7 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORUpTime.8 = Timeticks: (0) 0:00:00.00
```

---

## Creating SNMP Credentials for Linux

The following sections describe how to create SNMP credentials in SL1 to monitor Linux devices.

- If you use SNMPv2 and used the example snmpd.conf file for SNMPv2, follow the steps in the section on SNMPv2.
- If you use SNMPv3 and used the example snmpd.conf file for SNMPv3, follow the steps in the section on SNMPv3.

# Creating SNMPv2 Credentials

SNMP Credentials (called "community strings" in earlier versions of SNMP) allow SL1 to access SNMP data on a managed device. SL1 uses SNMP credentials to perform discovery, run auto-discovery, and gather information from SNMP Dynamic Applications.

To create an SNMPv2 credential:

1. Go to the **Credential Management** page (System > Manage > Credentials).
2. In the **Credential Management** page, click the **[Actions]** menu. Select **Create SNMP Credential**.

The screenshot shows the 'Credential Management | Credentials Found [62]' page. It features a table with columns for Profile Name, Organization, RO Use, RW Use, RA Use, Type, Credential User, Host, Port, Timeout (ms), ID, and Last. A dropdown menu is open over the table, listing actions such as 'Create SNMP Credential', 'Create Database Credential', 'Create SOAP/XML Host Credential', 'Create LDAP/AD Credential', 'Create Basic Snippet Credential', 'Create SSH/Key Credential', and 'Create PowerShell Credential'. The table lists various credentials including Amazon Web Services, Azure, Cisco, EMC, and LifeSize.

Profile Name	Organization	RO Use	RW Use	RA Use	Type	Credential User	Host	Port	Timeout (ms)	ID	Last
1. Amazon Web Services Credential	System	--	--	--	SOAP/XML Host	AWS Account Access	example.com	80	2000	1	2015-05-14
2. Azure Credential - SOAP/XML	[all orgs]	--	--	--	SOAP/XML Host	+AD_USER+	login.windows.net	443	60000	60	2015-05-14
3. Azure Credential - SSH/Key	[all orgs]	--	--	--	SSH/Key	<SUBSCRIPTION_ID_H %D	--	22	180000	59	2015-05-14
4. Cisco SNMPv2 - Example	[all orgs]	--	--	--	SNMP	--	--	161	1500	3	2015-05-14
5. Cisco SNMPv3 - Example	[all orgs]	--	--	--	SNMP	[USER_GOES_HERE]	--	161	1500	2	2015-05-14
6. Cisco ACI	[all orgs]	--	--	128	Basic/Snippet	admin	173.36.219.46	443	0	62	2015-05-14 15:05:24
7. Cisco ACI Credential	[all orgs]	--	--	--	Basic/Snippet	admin	198.18.133.200	443	0	61	2015-05-14 14:32:20
8. Cloudkick - Example	[all orgs]	--	--	--	Basic/Snippet	[SECURITY KEY GOES	127.0.0.1	443	5000	9	2015-05-14 11:25:31
9. CUCM PerfmonService 8.0 Example	[all orgs]	--	--	--	SOAP/XML Host	--	%D	8443	2000	4	2015-05-14 11:25:12
10. EM7 Central Database	[all orgs]	--	--	--	Database	root	localhost	7706	0	51	2015-05-14 11:28:41
11. EM7 Collector Database	[all orgs]	--	--	--	Database	root	%D	7707	0	14	2015-05-14 11:25:43
12. EM7 DB	[all orgs]	--	--	--	Database	root	%D	7706	0	35	2015-05-14 11:28:32
13. EM7 DB - DB Info	[all orgs]	--	--	--	SOAP/XML Host	root	%D	80	3000	38	2015-05-14 11:28:32
14. EM7 DB - My conf	[all orgs]	--	--	--	SOAP/XML Host	root	%D	80	3000	37	2015-05-14 11:28:32
15. EM7 DB - Ssl conf	[all orgs]	--	--	--	SOAP/XML Host	root	%D	80	3000	36	2015-05-14 11:28:32
16. EM7 Default V2	[all orgs]	--	--	--	SNMP	--	--	161	1500	10	2015-05-14 11:25:42
17. EM7 Default V3	[all orgs]	--	--	--	SNMP	em7defauth3	--	161	500	11	2015-05-14 11:25:42
18. EMC - Example	[all orgs]	--	--	--	Basic/Snippet	root	%D	443	10000	15	2015-05-14 11:25:47
19. GGGrid - Example	[all orgs]	--	--	--	Basic/Snippet	[SECURITY KEY GOES	127.0.0.1	443	5000	16	2015-05-14 11:25:51
20. IPSLA Example	[all orgs]	--	--	--	SNMP	--	--	161	1500	5	2015-05-14 11:25:14
21. LifeSize - Endpoint SNMP	[all orgs]	--	--	--	SNMP	control	--	161	3000	18	2015-05-14 11:25:58
22. LifeSize - Endpoint SSH/CLI	[all orgs]	--	--	--	Basic/Snippet	auto	%D	22	3	17	2015-05-14 11:25:58
23. Local API	[all orgs]	--	--	--	Basic/Snippet	em7admin	10.0.0.180	80	5000	22	2015-05-14 11:28:11
24. NetApp 7-mode	[all orgs]	--	--	--	Basic/Snippet	root	%D	443	3000	24	2015-05-14 11:28:20
25. NetApp w/SSL Option	[all orgs]	--	--	--	SOAP/XML Host	root	%D	443	3000	26	2015-05-14 11:28:20
26. NetApp w/SSL Option Off	[all orgs]	--	--	--	SOAP/XML Host	root	%D	443	10000	25	2015-05-14 11:28:20
27. Nexus netconf	[all orgs]	--	--	--	Basic/Snippet	--	%D	22	10000	6	2015-05-14 11:25:16
28. Nexus snmp	[all orgs]	--	--	--	SNMP	--	--	161	10000	7	2015-05-14 11:25:16
29. Polycom - Advanced	[all orgs]	--	--	--	SOAP/XML Host	admin	%D	80	20000	28	2015-05-14 11:28:24
30. Polycom - CDR	[all orgs]	--	--	--	SOAP/XML Host	admin	%D	80	20000	31	2015-05-14 11:28:24
31. Polycom - Interface	[all orgs]	--	--	--	SOAP/XML Host	admin	%D	80	20000	29	2015-05-14 11:28:24

3. The **Credential Editor** modal page appears. In this page, you can define the new SNMP credential. To define the new credential, supply values in the following fields:

The screenshot shows a window titled "Credential Editor" with a close button (X) in the top right corner. Below the title bar is a blue header with the text "Create New SNMP Credential" and a "Reset" button on the right. The main content area is divided into three sections:

- Basic Settings:** Contains a "Profile Name" text input field, an "SNMP Version" dropdown menu (set to "[ SNMP V2 ]"), a "Port" text input field (set to "161"), a "Timeout(ms)" text input field (set to "1500"), and a "Retries" text input field (set to "1").
- SNMP V1/V2 Settings:** Contains two text input fields: "SNMP Community (Read-Only)" and "SNMP Community (Read/Write)".
- SNMP V3 Settings:** Contains a "Security Name" text input field, a "Security Passphrase" text input field, an "Authentication Protocol" dropdown menu (set to "[ MD5 ]"), a "Security Level" dropdown menu (set to "[ Authentication Only ]"), an "SNMP v3 Engine ID" text input field, a "Context Name" text input field, a "Privacy Protocol" dropdown menu (set to "[ DES ]"), and a "Privacy Protocol Pass Phrase" text input field.

At the bottom center of the form is a "Save" button.

- **Profile Name.** Name of the credential. Can be any combination of alphanumeric characters. This field is required.
- **SNMP Version.** SNMP version. Select *SNMP V2*. This field is required.
- **Port.** The port SL1 will use to communicate with the external device or application. The default value is *161*. This field is required.
- **Timeout (ms).** Time, in milliseconds, after which SL1 will stop trying to communicate with the SNMP device. The default value is *1500*. This field is required.
- **Retries.** Number of times SL1 will try to authenticate and communicate with the external device. The default value is *1*. This field is required.

## SNMP V1/V2 Settings

These fields appear if you selected SNMP V1 or SNMP V2 in the **SNMP Version** field. Otherwise, these fields are grayed out.

- **SNMP Community (Read Only)**. The SNMP community string (password) required for read-only access of SNMP data on the remote device or application. For read-only SNMP V2 credentials, this field is required and you should leave the **SNMP Community (Read/Write)** field blank. Enter the same value as you entered for **rocommunity** in the snmpd.conf file.
- **SNMP Community (Read/Write)**. The SNMP community string (password) required for read and write access of SNMP data on the remote device or application. For read/write SNMP V2 credentials, this field is required and you should leave the **SNMP Community (Read Only)** field blank. Enter the same value as you entered for **rwcommunity** in the snmpd.conf file.

4. Click the **[Save]** button to save the new SNMP credential.

**NOTE:** When you define an SNMP Credential, the credential will automatically be aligned with the organization(s) you are a member of.

## Creating SNMPv3 Credentials

The example snmpd.conf file for SNMPv3 provides both Read Only and Read/Write access to your Linux system from SL1. You must therefore define two new SNMPv3 credentials (one for read-only access and one for read/write access) in SL1, so SL1 can successfully communicate with your Linux system. To do this:

1. Go to the **Credential Management** page (System > Manage > Credentials).
2. In the **Credential Management** page, click the **[Actions]** menu. Select **Create SNMP Credential**.

Credential Management   Credentials Found [62]													Actions	Reset	Guide
Profile Name	Organization	RO Use	RW Use	DA Use	Type	Credential User	Host	Port	Timeout (ms)	ID	Last				
1. Amazon Web Services Credential	System	--	--	--	SOAP/XML Host	[AWS Account Access] example.com		80	2000	1	2015-05-16				
2. Azure Credential - SOAP/XML	[all orgs]	--	--	--	SOAP/XML Host	<AD_USER> login.windows.net		443	60000	60	2015-05-14				
3. Azure Credential - SSH/Key	[all orgs]	--	--	--	SSH/Key	<SUBSCRIPTION_ID_H> %D		22	180000	59	2015-05-14				
4. Cisco SNMPv2 - Example	[all orgs]	--	--	--	SNMP	--	--	161	1500	3	2015-05-14				
5. Cisco SNMPv3 - Example	[all orgs]	--	--	--	SNMP	[USER_GOES_HERE]		161	1500	2	2015-05-14				
6. Cisco ACI	[all orgs]	--	--	126	Basic/Snippet	admin	173.36.219.46	443	0	62	2015-05-14 15:05:24	em7admin			
7. Cisco ACI Credential	[all orgs]	--	--	--	Basic/Snippet	admin	168.16.133.200	443	0	61	2015-05-14 14:32:20	em7admin			
8. Cloudtek - Example	[all orgs]	--	--	--	Basic/Snippet	SECURITY KEY GOES	127.0.0.1	443	5000	9	2015-05-14 11:25:31	em7admin			
9. CUCM PerformanceService 8.0 Example	[all orgs]	--	--	--	SOAP/XML Host	--		8443	2000	4	2015-05-14 11:28:12	em7admin			
10. EM7 Central Database	[all orgs]	--	--	--	Database	root	localhost	7706	0	51	2015-05-14 11:28:41	em7admin			
11. EM7 Collector Database	[all orgs]	--	--	--	Database	root	%D	7707	0	14	2015-05-14 11:25:43	em7admin			
12. EM7 DB	[all orgs]	--	--	--	Database	root	%D	7706	0	35	2015-05-14 11:28:32	em7admin			
13. EM7 DB - DB Info	[all orgs]	--	--	--	SOAP/XML Host	root	%D	80	3000	38	2015-05-14 11:28:32	em7admin			
14. EM7 DB - My.cnf	[all orgs]	--	--	--	SOAP/XML Host	root	%D	80	3000	37	2015-05-14 11:28:32	em7admin			
15. EM7 DB - Ssl.conf	[all orgs]	--	--	--	SOAP/XML Host	root	%D	80	3000	36	2015-05-14 11:28:32	em7admin			
16. EM7 Default V2	[all orgs]	--	--	--	SNMP	--	--	161	1500	10	2015-05-14 11:25:42	em7admin			
17. EM7 Default V3	[all orgs]	--	--	--	SNMP	em7defaultv3	--	161	500	11	2015-05-14 11:25:42	em7admin			
18. EMC - Example	[all orgs]	--	--	--	Basic/Snippet	root	%D	443	10000	15	2015-05-14 11:25:47	em7admin			
19. EMCGrid - Example	[all orgs]	--	--	--	Basic/Snippet	SECURITY KEY GOES	127.0.0.1	443	5000	16	2015-05-14 11:25:51	em7admin			
20. IPCLA Example	[all orgs]	--	--	--	SNMP	--	--	161	1500	5	2015-05-14 11:25:14	em7admin			
21. LifeSize - Endpoint SNMP	[all orgs]	--	--	--	SNMP	control	--	161	3000	18	2015-05-14 11:25:58	em7admin			
22. LifeSize - Endpoint SSH/CLI	[all orgs]	--	--	--	Basic/Snippet	auto	%D	22	3	17	2015-05-14 11:25:58	em7admin			
23. Local API	[all orgs]	--	--	--	Basic/Snippet	em7admin	10.0.0.190	80	5000	22	2015-05-14 11:28:11	em7admin			
24. NetApp 7-mode	[all orgs]	--	--	--	Basic/Snippet	root	%D	443	3000	24	2015-05-14 11:28:20	em7admin			
25. NetApp w/SSL Option	[all orgs]	--	--	--	SOAP/XML Host	root	%D	443	3000	26	2015-05-14 11:28:20	em7admin			
26. NetApp w/SSL Option Off	[all orgs]	--	--	--	SOAP/XML Host	root	%D	443	10000	25	2015-05-14 11:28:20	em7admin			
27. Nexus netconf	[all orgs]	--	--	--	Basic/Snippet	--	%D	22	10000	6	2015-05-14 11:25:16	em7admin			
28. Nexus snmp	[all orgs]	--	--	--	SNMP	--	--	161	10000	7	2015-05-14 11:25:16	em7admin			
29. Polycom - Advanced	[all orgs]	--	--	--	SOAP/XML Host	admin	%D	80	20000	28	2015-05-14 11:28:24	em7admin			
30. Polycom - CDR	[all orgs]	--	--	--	SOAP/XML Host	admin	%D	80	20000	31	2015-05-14 11:28:24	em7admin			
31. Polycom - Interface	[all orgs]	--	--	--	SOAP/XML Host	admin	%D	80	20000	29	2015-05-14 11:28:24	em7admin			

- The **Credential Editor** modal page appears. In this page, you can define the new SNMP credential. To define the new read-only credential, supply values in the following fields:

The screenshot shows the 'Credential Editor' window with the following fields and values:

- Basic Settings:**
  - Profile Name:
  - SNMP Version:
  - Port:
  - Timeout(ms):
  - Retries:
- SNMP V1/V2 Settings:**
  - SNMP Community (Read-Only):
  - SNMP Community (Read/Write):
- SNMP V3 Settings:**
  - Security Name:
  - Security Passphrase:
  - Authentication Protocol:
  - Security Level:
  - SNMP v3 Engine ID:
  - Context Name:
  - Privacy Protocol:
  - Privacy Protocol Pass Phrase:

Buttons: 'Reset' (top right), 'Save' (bottom center).

- **Profile Name.** Name of the read-only credential. Can be any combination of alphanumeric characters. This field is required.
- **SNMP Version.** SNMP version. Select *SNMP V3*. This field is required.
- **Port.** The port SL1 will use to communicate with the external device or application. The default value is *161*. This field is required.
- **Timeout (ms).** Time, in milliseconds, after which SL1 will stop trying to communicate with the SNMP device. The default value is *1500*. This field is required.
- **Retries.** Number of times SL1 will try to authenticate and communicate with the external device. The default value is *1*. This field is required.

### SNMP V3 Settings

These fields appear if you selected *SNMP V3* in the **SNMP Version** field. Otherwise, these fields are grayed out.

- **Security Name.** Name used for read-only SNMP authentication. This field is required. Enter the same value as you entered for *rouser* in the `snmpd.conf` file.
- **Security Passphrase.** Password used to authenticate the credential. This value must contain at least 8 characters. This value is required if you want to use a **Security Level** that includes authentication. Enter the same value as you entered in the `createuser` line in the `snmpd.conf` file.

- **Authentication Protocol.** Select an authentication algorithm for the credential. Choices are MD5 or SHA. This field is required. Select *SHA*.

**NOTE:** If your SL1 system is FIPS-compliant, MD5 authentication for SNMP will fail. FIPS-compliant SL1 systems require SHA authentication for SNMP.

- **Security Level.** Specifies the combination of security features for the credentials. This field is required. Choices are:
  - *No Authentication / No Encryption.*
  - *Authentication Only.* This is the default value.
  - *Authentication and Encryption.* This is the option specified in the example `snmpd.conf` file.
- **SNMPv3 Engine ID.** The unique engine ID for the SNMP agent you want to communicate with. (SNMPv3 authentication and encryption keys are generated based on the associated passwords and the engine ID.) This field is optional.
- **Context Name.** A context is a mechanism within SNMPv3 (and AgentX) that allows you to use parallel versions of the same MIB objects. For example, one version of a MIB might be associated with SNMP Version 2 and another version of the same MIB might be associated with SNMP Version 3. For SNMP Version 3, specify the context name in this field. This field is optional.
- **Privacy Protocol.** The privacy service encryption and decryption algorithm. Choices are *DES* or *AES*. The default value is *DES*. This field is required. The example `snmpd.conf` file specifies *DES*.
- **Privacy Protocol Passphrase.** Privacy password for the credential. This field is optional.

4. Click the **[Save]** button to save the new read-only SNMPv3 credential.
5. Repeat steps 1-4 to also create the new read/write SNMPv3 credential, updating the field values as needed.

**NOTE:** When you define an SNMP Credential, the credential will automatically be aligned with the organization(s) you are a member of.

## Installing and Configuring Net-SNMP for Solaris

---

### Overview

The following sections describe how to install Net-SNMP on a Solaris device and how to configure Net-SNMP:

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**NOTE:** For detailed descriptions of Net-SNMP for each supported operating system, see <http://www.net-snmp.org>.

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## Installing Net-SNMP on Solaris Devices

For each Solaris device that you want to monitor with Net-SNMP, you must install and configure Net-SNMP. **If you want to monitor multiple devices with Net-SNMP, you must install Net-SNMP and create the `snmpd.conf` file on each device to be monitored.**

If Net-SNMP is correctly installed and configured on a Solaris device, SL1 can automatically query the device and collect data. SL1 includes multiple default Dynamic Applications for Net-SNMP. These Dynamic Applications allow SL1 to collect selected data-points from Net-SNMP devices. The data is then used to create reports and graphs, accessible via the graphical user-interface.

By querying Net-SNMP data-points, SL1 can collect and present at least the following about a device:

- System name, operating system, operating system version, and uptime
- File-system configuration and usage
- Memory size and usage
- CPU usage
- Installed software
- Running processes
- Network interface details, including name, speed, and MAC address
- Bandwidth usage

Installing and Configuring Net-SNMP on a Solaris computer includes the following steps:

1. [Installing and configuring the latest version of Net-SNMP from `http://www.sunfreeware.com`](http://www.sunfreeware.com)
2. [Optionally, stopping `snmpdx` and `snmpxdmid`.](#)
3. [Creating the `snmpd.conf` file.](#) This file defines how the Net-SNMP agent will behave and includes information on the physical location and the contact information for the server, access control for the Net-SNMP agent, and trap destinations for the agent.
4. [Starting `snmpd` and testing the newly installed Net-SNMP for Solaris 10.](#)

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### Step 1: Installing Net-SNMP from <http://www.sunfreeware.com>

Solaris 10 includes Net-SNMP v 5.09. You can find the files in the `/usr/sfw` directories. This version of Net-SNMP is outdated and known to be buggy.

**ScienceLogic strongly recommends that you download the latest version of Net-SNMP for Solaris 10 from <http://www.sunfreeware.com>.** You can download packages that are precompiled for Solaris 10.

The following Sun packages are required for Net-SNMP on Solaris 10, Update 6:

- libiconv-1.11-sol10-x86-local
- zlib-1.2.3-sol10-x86-local
- gcc-3.4.6-sol10-sparc-local.gz
- netsnmp-5.4.2.1-sol10-sparc-local.gz
- netsnmp-5.4.2.1-sol10-sparc-local.gz

After downloading the latest version of Net-SNMP for Solaris 10, perform the following steps to remove the old version (Net-SNMP v 5.09) and replace it with the latest version:

1. Open a shell session and login as root. At the command prompt, enter the following to stop the old version of Net-SNMP:

```
svcadm disable sma
```

2. At the command prompt, enter the following to remove the package for the old version of Net-SNMP:

```
pkgrm SUNWsmagt
```

3. To uncompress the packages, enter the following (where *filename* is the name of the compressed file):

```
gunzip filename.gz
```

4. To install the packages and dependencies for the newest Net-SNMP, open a shell session, log in as root, and enter the following at the root command prompt:

```
pkgadd -d libiconv-1.11-sol10-x86-local pkgadd -d zlib-1.2.3-sol10-x86-local
```

```
pkgadd -d gcc-3.4.6-sol10-sparc-local
```

```
pkgadd -d openssl-0.9.8k-sol10-sparc-local
```

```
pkgadd -d netsnmp-5.4.2.1-sol10-sparc-local
```

---

## Step 2: Stopping snmpdx and snmpXdmid

Net-SNMP for Solaris 10 (both Net-SNMP v 5.09 or the latest version from sunfreeware.org) includes two daemons that **are not used by SL1**:

- **snmpdx**. Old Sun Solstice Master Agent. You can disable this service by opening a shell session and entering the following at the command prompt:

```
svcadm disable snmpdx
```

- **snmpXdmid**. Sun DMI extension agent. You can disable this service by opening a shell session and entering the following at the command prompt:

```
svcadm disable dmi
```

**NOTE:** You are not required to disable these services. However, SL1 does not use these services.

## Step 3: Creating the snmpd.conf file

The `snmpd.conf` file defines how the Net-SNMP daemon will behave and includes information about the physical location and contact information for the server, access control for the Net-SNMP agent, and trap destinations for the Net-SNMP agent.

**CAUTION:** In most cases, your computer(s) will already have an existing `/etc/snmp/snmpd.conf` file that includes the default settings. Because we want to create a new, clean `snmpd.conf` file, you must replace the existing file. You must move, not copy, the file, to ensure that you are creating a new file and not simply append new settings to the default settings in the `snmpd.conf` file.

After stopping the snmpd agent, you must move the existing config file. To do this, open a shell session and enter the following at the command line:

```
mv /etc/snmp/snmpd.conf /etc/snmp/snmpd.conf.orig
```

- You can replace your `snmpd.conf` file with one of the examples in the following sections. There is an example configuration file for Net-SNMP for SNMPv2 on Solaris and another for SNMPv3 on Solaris.
- The example configuration files contain the basic settings that SL1 will need to communicate successfully with the Net-SNMP agent on the Solaris server.
- For basic SL1 compatibility, you should edit your file to include only the entries from the selected example.

**NOTE:** Net-SNMP is highly customizable, and SL1 can take advantage of these customizations. If you are interested in extending your Net-SNMP agent, please contact ScienceLogic Professional Services.

### Example snmpd.conf file for SNMPv2:

The following is a working example of a `snmpd.conf` file for SNMPv2 for Solaris running Net-SNMP 5.4.2.1. You should edit your `snmpd.conf` file to include only the entries from this example file.

**NOTE:** This `snmpd.conf` file does **not** include encrypting SNMP access to the Solaris client.

The file should be located in `/etc/snmp/snmpd.conf`:

```
# snmpd.conf
#
# - created by the snmpconf configuration program
```

```

#
#####
# SECTION: System Information Setup
#
# This section defines some of the information reported in
# the "system" mib group in the mibII tree.
# syslocation: The [typically physical] location of the system.
# Note that setting this value here means that when trying to
# perform an snmp SET operation to the sysLocation.0 variable will make
# the agent return the "notWritable" error code. IE, including
# this token in the snmpd.conf file will disable write access to
# the variable.
# arguments: location_string
syslocation "Reston, Virginia"
# syscontact: The contact information for the administrator
# Note that setting this value here means that when trying to
# perform an snmp SET operation to the sysContact.0 variable will make
# the agent return the "notWritable" error code. IE, including
# this token in the snmpd.conf file will disable write access to
# the variable.
# arguments: contact_string
syscontact "ScienceLogic Support 1-703-354-1010"
#####
# SECTION: Access Control Setup
#
# This section defines who is allowed to talk to your running
# snmp agent
# rocommunity: a SNMPv1/SNMPv2c read-only access community name
# arguments: community [default|hostname|network/bits] [oid]
rocommunity public
# rwcommunity: a SNMPv1/SNMPv2c read-write access community name
# arguments: community [default|hostname|network/bits] [oid]
# rwcommunity private
#####
# SECTION: Trap Destinations
#
# Here we define who the agent will send traps to.
# trap2sink: A SNMPv2c trap receiver
# arguments: host [community] [portnum]
#
trap2sink 192.168.10.71 public
# End of File

```

**NOTE:** The example snmpd.conf file for SNMPv2 uses the default community string ("public") and ScienceLogic-specific examples of Contact and Location information and Trap Destinations. You will need to change these settings to match your local environment.

### Adding Read/Write Access to the snmpd.conf File for SNMPv2

The example snmpd.conf file provides only Read Only access to your Solaris device from SL1 (using the default "SNMP public" credential that is included in SL1). If you require SL1 to have Read/Write access to your Solaris device, you will need to perform the following steps.

1. In the snmpd.conf file, uncomment the line for rwcommunity. To do this:

Change this line:

```
# rwcommunity private
```

To:

```
rwcommunity private
```

## Example snmpd.conf file for SNMPv3:

The following is a working example of a snmpd.conf file for SNMPv3 for Solaris running Net-SNMP 5.4.2.1. You should edit your snmpd.conf file to include only entries from this example file.

This snmpd.conf file includes read and write community strings and encrypts access to Solaris.

The file lives in /etc/snmp/snmpd.conf:

```
# snmpd.conf
#
# - created by the snmpconf configuration program
#
#####
# SECTION: System Information Setup
#
# This section defines some of the information reported in
# the "system" mib group in the mibII tree.
# syslocation: The [typically physical] location of the system.
# Note that setting this value here means that when trying to
# perform an snmp SET operation to the sysLocation.0 variable will make
# the agent return the "notWritable" error code. IE, including
# this token in the snmpd.conf file will disable write access to
# the variable.
# arguments: location_string
syslocation "Reston, Virginia"
# syscontact: The contact information for the administrator
# Note that setting this value here means that when trying to
# perform an snmp SET operation to the sysContact.0 variable will make
# the agent return the "notWritable" error code. IE, including
# this token in the snmpd.conf file will disable write access to
# the variable.
# arguments: contact_string
syscontact "ScienceLogic Support 1-703-354-1010"
#####
# SECTION: Access Control Setup
#
# This section defines who is allowed to talk to your running
# snmp agent.
# rouser: a SNMPv3 read-only user
# arguments: user [noauth|auth|priv] [restriction_oid]
rouser soluser priv
createUser soluser SHA soluserpass DES solprivpass
# rwuser: a SNMPv3 read-write user
# arguments: user [noauth|auth|priv] [restriction_oid]
rwuser soladmin priv
createUser soladmin SHA solauthpass DES solprivpass
#####
# SECTION: Trap Destinations
#
# Here we define who the agent will send traps to.
# trap2sink: A SNMPv2c trap receiver
```

```
# arguments: host [community] [portnum]
#
trap2sink 192.168.10.71 public
# End of File
```

**NOTE:** The example `snmpd.conf` file for SNMPv3 uses Sciencelogic-specific examples of Contact and Location information and Trap Destinations. You will need to change these settings to match your local environment. In the user interface, you must create a Read-Only credential for SNMPv3 and a Read/Write credential for SNMPv3 that match the credentials specified in the `snmpd.conf` file.

## Step 4: Starting `snmpd` and Testing Connectivity to Net-SNMP

After you have created the `snmpd.conf` file, you can start the `snmpd` daemon and test connectivity to Net-SNMP. The following sections describe how to perform these tasks:

### Starting Net-SNMP and the `snmpd` Agent

1. To start Net-SNMP, open a shell session, login as root, and enter the following at the command prompt:

```
/usr/local/sbin/snmpd -c /etc/snmp/conf/snmpd.conf
```

2. This command starts the new Sunfreeware version of Net-SNMP.
3. Because we have replaced the older version of Net-SNMP (managed with SMA) that was shipped with Solaris, we need to replace the old start/stop utility.
4. First, we need to rename the existing, SMA-based start/stop script. To do this, open a shell session and enter the following at the command prompt:

```
mv /etc/init.d/init.snmpd /etc/init.d/init.snmpd.old
```

5. Next, use your favorite editor to edit the file `/etc/init.d/init.snmpd` so that it contains only the following.

```
#!/bin/sh
mode=$1
usage_error() {
echo " $0 start (start init.snmpd process)"
echo " $0 stop (stop init.snmpd process)"
echo " $0 restart (restart init.snmpd process)"
echo " "
}
if [ ! -d /usr/local/sbin ]
then # /usr not mounted
exit 1
fi
set `usr/bin/id`
if [ $1 != "uid=0(root)" ]; then
echo "$0: must be run as root"
exit 1
fi
# Body
#
case "$mode" in
```

```

'start')
/usr/local/sbin/snmpd -c /etc/snmp/conf/snmpd.conf
;;
'stop')
pkill -9 /usr/local/sbin/snmpd
;;
'restart')
pkill -1 /usr/local/sbin/snmpd
;;
*)
usage_error
exit 1
;;
esac
exit 0
# End of Script

```

6. Save your changes to /etc/init.d/init.snmpd.
7. If you want Net-SNMP to start automatically upon system startup and stop automatically upon system shutdown, place additional copies of the script in the following directories with the following names:

/etc/rc0.d/K03init.snmp – Stop script

/etc/rc3.d/S90init.snmpd – Start script

## Testing Connectivity to Net-SNMP for SNMPv2

Now that Net-SNMP is installed and running, you should test access to the new Net-SNMP agent. If you are using SNMPv2, you can perform the following steps to test access:

1. Open a shell session. At the command prompt, enter the following:

/usr/local/bin/snmpwalk -v 2c -c public localhost system

2. Your output should look like this:

```

SNMPv2-MIB::sysDescr.0 = STRING: SunOS ps-sol10u6-13-50 5.10 Generic_137138-09 i86pc
SNMPv2-MIB::sysObjectID.0 = OID: NET-SNMP-MIB::netSnmpAgentOIDs.3
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (25439) 0:04:14.39
SNMPv2-MIB::sysContact.0 = STRING: "Professional Services, Reston, Virginia"
SNMPv2-MIB::sysName.0 = STRING: ps-sol10u6-13-50
SNMPv2-MIB::sysLocation.0 = STRING: "PS ESX Server"
SNMPv2-MIB::sysORLastChange.0 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORID.1 = OID: SNMP-FRAMEWORK-MIB::snmpFrameworkMIBCompliance
SNMPv2-MIB::sysORID.2 = OID: SNMP-MPD-MIB::snmpMPDCompliance
SNMPv2-MIB::sysORID.3 = OID: SNMP-USER-BASED-SM-MIB::usmMIBCompliance
SNMPv2-MIB::sysORID.4 = OID: SNMPv2-MIB::snmpMIB
SNMPv2-MIB::sysORID.5 = OID: TCP-MIB::tcpMIB
SNMPv2-MIB::sysORID.6 = OID: IP-MIB::ip
SNMPv2-MIB::sysORID.7 = OID: UDP-MIB::udpMIB
SNMPv2-MIB::sysORID.8 = OID: SNMP-VIEW-BASED-ACM-MIB::vacmBasicGroup
SNMPv2-MIB::sysORDescr.1 = STRING: The SNMP Management Architecture MIB.
SNMPv2-MIB::sysORDescr.2 = STRING: The MIB for Message Processing and Dispatching.
SNMPv2-MIB::sysORDescr.3 = STRING: The management information definitions for the
SNMP User-based Security Model.
SNMPv2-MIB::sysORDescr.4 = STRING: The MIB module for SNMPv2 entities

```

```

SNMPv2-MIB::sysORDescr.5 = STRING: The MIB module for managing TCP implementations
SNMPv2-MIB::sysORDescr.6 = STRING: The MIB module for managing IP and ICMP
implementations
SNMPv2-MIB::sysORDescr.7 = STRING: The MIB module for managing UDP implementations
SNMPv2-MIB::sysORDescr.8 = STRING: View-based Access Control Model for SNMP.
SNMPv2-MIB::sysORUpTime.1 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORUpTime.2 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORUpTime.3 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORUpTime.4 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORUpTime.5 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORUpTime.6 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORUpTime.7 = Timeticks: (1) 0:00:00.01
SNMPv2-MIB::sysORUpTime.8 = Timeticks: (1) 0:00:00.01

```

## Testing Connectivity to Net-SNMP for SNMPv3

Now that Net-SNMP is installed and running, you should test access to the new Net-SNMP agent. If you are using SNMPv3, you can perform the following steps to test access:

1. Open a shell session. At the command prompt, enter the following:

```

/usr/local/bin/snmpwalk -v 3 -u soluser -l authPriv -a SHA -A soluserpass -x DES -X solprivpass localhost
system

```

2. Your output should look like this:

```

SNMPv2-MIB::sysDescr.0 = STRING: SunOS dev-sol-01 5.10 Generic_120012-14 i86pc
SNMPv2-MIB::sysObjectID.0 = OID: NET-SNMP-MIB::netSnmAgentOIDs.3
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (127763694) 14 days, 18:53:56.94
SNMPv2-MIB::sysContact.0 = STRING: ScienceLogic Support 1-703-354-1010
SNMPv2-MIB::sysName.0 = STRING: dev-sol-01
SNMPv2-MIB::sysLocation.0 = STRING: Reston, Virginia
SNMPv2-MIB::sysServices.0 = INTEGER: 76
SNMPv2-MIB::sysORLastChange.0 = Timeticks: (606) 0:00:06.06
SNMPv2-MIB::sysORID.1 = OID: SNMP-FRAMEWORK-MIB::snmpFrameworkMIBCompliance
SNMPv2-MIB::sysORID.2 = OID: SNMP-MPD-MIB::snmpMPDCompliance
SNMPv2-MIB::sysORID.3 = OID: SNMP-USER-BASED-SM-MIB::usmMIBCompliance
SNMPv2-MIB::sysORID.4 = OID: SNMPv2-MIB::snmpMIB
SNMPv2-MIB::sysORID.5 = OID: TCP-MIB::tcpMIB
SNMPv2-MIB::sysORID.6 = OID: IP-MIB::ip
SNMPv2-MIB::sysORID.7 = OID: UDP-MIB::udpMIB
SNMPv2-MIB::sysORID.8 = OID: SNMP-VIEW-BASED-ACM-MIB::vacmBasicGroup
SNMPv2-MIB::sysORID.9 = OID: IF-MIB::ifMIB
SNMPv2-MIB::sysORDescr.1 = STRING: The SNMP Management Architecture MIB.
SNMPv2-MIB::sysORDescr.2 = STRING: The MIB for Message Processing and Dispatching.
SNMPv2-MIB::sysORDescr.3 = STRING: The management information definitions for the
SNMP User-based Security Model.
SNMPv2-MIB::sysORDescr.4 = STRING: The MIB module for SNMPv2 entities
SNMPv2-MIB::sysORDescr.5 = STRING: The MIB module for managing TCP implementations
SNMPv2-MIB::sysORDescr.6 = STRING: The MIB module for managing IP and ICMP
implementations
SNMPv2-MIB::sysORDescr.7 = STRING: The MIB module for managing UDP implementations
SNMPv2-MIB::sysORDescr.8 = STRING: View-based Access Control Model for SNMP.
SNMPv2-MIB::sysORDescr.9 = STRING: The MIB module to describe generic objects for
network interface sub-layers
SNMPv2-MIB::sysORUpTime.1 = Timeticks: (604) 0:00:06.04
SNMPv2-MIB::sysORUpTime.2 = Timeticks: (604) 0:00:06.04

```

```

SNMPv2-MIB::sysORUpTime.3 = Timeticks: (604) 0:00:06.04
SNMPv2-MIB::sysORUpTime.4 = Timeticks: (606) 0:00:06.06
SNMPv2-MIB::sysORUpTime.5 = Timeticks: (606) 0:00:06.06
SNMPv2-MIB::sysORUpTime.6 = Timeticks: (606) 0:00:06.06
SNMPv2-MIB::sysORUpTime.7 = Timeticks: (606) 0:00:06.06
SNMPv2-MIB::sysORUpTime.8 = Timeticks: (606) 0:00:06.06
SNMPv2-MIB::sysORUpTime.9 = Timeticks: (606) 0:00:06.06

```

## Creating SNMP Credentials for Solaris

The following sections describe how to create SNMP credentials in SL1 to monitor Solaris devices.

- If you use SNMPv2 and used the example snmpd.conf file for SNMPv2, follow the steps in the section on SNMPv2.
- If you use SNMPv3 and used the example snmpd.conf file for SNMPv3, follow the steps in the section on SNMPv3.

## Creating SNMPv2 Credentials

SNMP Credentials (called "community strings" in earlier versions of SNMP) allow SL1 to access SNMP data on a managed device. SL1 uses SNMP credentials to perform discovery, run auto-discovery, and gather information from SNMP Dynamic Applications.

To create an SNMPv2 credential:

1. Go to the **Credential Management** page (System > Manage > Credentials).
2. In the **Credential Management** page, click the **[Actions]** menu. Select **Create SNMP Credential**.

Profile Name	Organization	RO Use	RW Use	DA Use	Type	Credential User	Host	Port	Timeout (ms)	ID	Last
1. Amazon Web Services Credential	System	--	--	--	SOAP/XML Host	[AWS Account Access] example.com		80	2000	1	2015-05-16
2. Azure Credential - SOAP/XML	[all orgs]	--	--	--	SOAP/XML Host	<AD_USER>	login.windows.net	443	60000	60	2015-05-14
3. Azure Credential - SSH/Key	[all orgs]	--	--	--	SSH/Key	<SUBSCRIPTION_ID_H %D		22	180000	59	2015-05-14
4. Cisco SNMPv2 - Example	[all orgs]	--	--	--	SNMP	--	--	161	1500	3	2015-05-14
5. Cisco SNMPv3 - Example	[all orgs]	--	--	--	SNMP	[USER_GOES_HERE]	--	161	1500	2	2015-05-14
6. Cisco ACI	[all orgs]	--	--	128	Basic/Snippet	admin	173.36.219.46	443	0	62	2015-05-14 15:05:24
7. Cisco ACI Credential	[all orgs]	--	--	--	Basic/Snippet	admin	198.18.133.200	443	0	61	2015-05-14 14:32:20
8. Cloudkick - Example	[all orgs]	--	--	--	Basic/Snippet	[SECURITY KEY GOES]	127.0.0.1	443	5000	9	2015-05-14 11:25:31
9. CUCM PerformService 8.0 Example	[all orgs]	--	--	--	SOAP/XML Host	--	%D	8443	2000	4	2015-05-14 11:25:12
10. EM7 Central Database	[all orgs]	--	--	--	Database	root	localhost	7706	0	51	2015-05-14 11:28:41
11. EM7 Collector Database	[all orgs]	--	--	--	Database	root	%D	7707	0	14	2015-05-14 11:25:43
12. EM7 DB	[all orgs]	--	--	--	Database	root	%D	7706	0	35	2015-05-14 11:28:32
13. EM7 DB - DB Info	[all orgs]	--	--	--	SOAP/XML Host	root	%D	80	3000	38	2015-05-14 11:28:32
14. EM7 DB - My.cnf	[all orgs]	--	--	--	SOAP/XML Host	root	%D	80	3000	37	2015-05-14 11:28:32
15. EM7 DB - Sys.cnf	[all orgs]	--	--	--	SOAP/XML Host	root	%D	80	3000	36	2015-05-14 11:28:32
16. EM7 Default V2	[all orgs]	--	--	--	SNMP	--	--	161	1500	10	2015-05-14 11:25:42
17. EM7 Default V3	[all orgs]	--	--	--	SNMP	em7defaultv3	--	161	500	11	2015-05-14 11:25:42
18. EMC - Example	[all orgs]	--	--	--	Basic/Snippet	root	%D	443	10000	15	2015-05-14 11:25:47
19. GoGrid - Example	[all orgs]	--	--	--	Basic/Snippet	[SECURITY KEY GOES]	127.0.0.1	443	5000	16	2015-05-14 11:25:51
20. IPSLA Example	[all orgs]	--	--	--	SNMP	--	--	161	1500	5	2015-05-14 11:25:14
21. LifeSize Endpoint SNMP	[all orgs]	--	--	--	SNMP	control	--	161	3000	18	2015-05-14 11:25:58
22. LifeSize Endpoint SSH/CLI	[all orgs]	--	--	--	Basic/Snippet	auto	%D	22	3	17	2015-05-14 11:25:58
23. Local API	[all orgs]	--	--	--	Basic/Snippet	em7admin	10.0.0.180	80	5000	22	2015-05-14 11:28:11
24. NetApp 7-mode	[all orgs]	--	--	--	Basic/Snippet	root	%D	443	3000	24	2015-05-14 11:28:20
25. NetApp w/SSL Option	[all orgs]	--	--	--	SOAP/XML Host	root	%D	443	3000	26	2015-05-14 11:28:20
26. NetApp w/SSL Option Off	[all orgs]	--	--	--	SOAP/XML Host	root	%D	443	10000	25	2015-05-14 11:28:20
27. Nexus netconf	[all orgs]	--	--	--	Basic/Snippet	--	%D	22	10000	8	2015-05-14 11:25:16
28. Nexus snmp	[all orgs]	--	--	--	SNMP	--	--	161	10000	7	2015-05-14 11:25:16
29. Polycom - advanced	[all orgs]	--	--	--	SOAP/XML Host	admin	%D	80	20000	28	2015-05-14 11:28:24
30. Polycom - CDR	[all orgs]	--	--	--	SOAP/XML Host	admin	%D	80	20000	31	2015-05-14 11:28:24
31. Polycom - Interface	[all orgs]	--	--	--	SOAP/XML Host	admin	%D	80	20000	29	2015-05-14 11:28:24

- The **Credential Editor** modal page appears. In this page, you can define the new SNMP credential. To define the new credential, supply values in the following fields:

The screenshot shows the 'Credential Editor' modal window with the following sections:

- Basic Settings:** Includes fields for Profile Name, SNMP Version (set to [SNMP V2]), Port (161), Timeout(ms) (1500), and Retries (1).
- SNMP V1/V2 Settings:** Includes fields for SNMP Community (Read-Only) and SNMP Community (Read/Write).
- SNMP V3 Settings:** Includes fields for Security Name, Security Passphrase, Authentication Protocol (set to [MD5]), Security Level (set to [Authentication Only]), SNMP v3 Engine ID, Context Name, Privacy Protocol (set to [DES]), and Privacy Protocol Pass Phrase.

A 'Reset' button is located in the top right corner, and a 'Save' button is at the bottom center.

- **Profile Name.** Name of the credential. Can be any combination of alphanumeric characters. This field is required.
- **SNMP Version.** SNMP version. Select *SNMP V2*. This field is required.
- **Port.** The port SL1 will use to communicate with the external device or application. The default value is *161*. This field is required.
- **Timeout (ms).** Time, in milliseconds, after which SL1 will stop trying to communicate with the SNMP device. The default value is *1500*. This field is required.
- **Retries.** Number of times SL1 will try to authenticate and communicate with the external device. The default value is *1*. This field is required.

## SNMP V1/V2 Settings

These fields appear if you selected SNMP V1 or SNMP V2 in the **SNMP Version** field. Otherwise, these fields are grayed out.

- **SNMP Community (Read Only)**. The SNMP community string (password) required for read-only access of SNMP data on the remote device or application. For read-only SNMP V2 credentials, this field is required and you should leave the **SNMP Community (Read/Write)** field blank. Enter the same value as you entered for **rocommunity** in the snmpd.conf file.
- **SNMP Community (Read/Write)**. The SNMP community string (password) required for read and write access of SNMP data on the remote device or application. For read/write SNMP V2 credentials, this field is required and you should leave the **SNMP Community (Read Only)** field blank. Enter the same value as you entered for **rwcommunity** in the snmpd.conf file.

4. Click the **[Save]** button to save the new SNMP credential.

**NOTE:** When you define an SNMP Credential, the credential will automatically be aligned with the organization(s) you are a member of.

## Creating SNMPv3 Credentials

The example snmpd.conf file for SNMPv3 provides both Read Only and Read/Write access to your Solaris system from SL1. You must therefore define two new SNMPv3 credentials (one for read-only access and one for read/write access) in SL1, so SL1 can successfully communicate with your Solaris system. To do this:

1. Go to the **Credential Management** page (System > Manage > Credentials).
2. In the **Credential Management** page, click the **[Actions]** menu. Select **Create SNMP Credential**.

Credential Management   Credentials Found [62]											Actions	Reset	Guide	
Profile Name	Organization	RD Use	RW Use	DA Use	Type	Credential User	Host	Port	Timeout (ms)	ID	Last			
1 Amazon Web Services Credential	System	--	--	--	SOAP/XML Host	AWS Account Access	example.com	80	2000	1	2015-05-16	Create SNMP Credential		
2 Azure Credential - SOAP/XML	System	--	--	--	SOAP/XML Host	<AD_USER>	login.windows.net	443	60000	60	2015-05-14	Create Database Credential		
3 Azure Credential - SSHKey	System	--	--	--	SSHKey	<SUBSCRIPTION_ID> %D		22	180000	59	2015-05-14	Create SOAP/XML Host Credential		
4 Cisco SNMPV2 - Example	System	--	--	--	SNMP			161	1500	3	2015-05-14	Create LDAP/AD Credential		
5 Cisco SNMPV3 - Example	System	--	--	--	SNMP	[USER_GOES_HERE]		161	1500	2	2015-05-14	Create Basic/Snippet Credential		
6 Cisco - ACL	System	--	--	128	Basic/Snippet	admin	173.38.219.46	443	0	62	2015-05-14 15:05:24	Create SSH/Key Credential	em7admin	
7 Cisco - ACL Credential	System	--	--	--	Basic/Snippet	admin	198.18.133.200	443	0	61	2015-05-14 14:32:20	Create PowerShell Credential	em7admin	
8 Cloudkick - Example	System	--	--	--	Basic/Snippet	SECURITY KEY GOES	127.0.0.1	443	5000	9	2015-05-14 11:25:31	Create LDAP/AD Credential	em7admin	
9 CUCM Performance Service 3.0 Example	System	--	--	--	SOAP/XML Host			8443	2000	4	2015-05-14 15:25:10	Create Basic/Snippet Credential	em7admin	
10 EMT Central Database	System	--	--	--	Database	root	localhost	7706	0	51	2015-05-14 11:26:41	Create SSH/Key Credential	em7admin	
11 EMT Collector Database	System	--	--	--	Database	root		7707	0	14	2015-05-14 11:25:43	Create PowerShell Credential	em7admin	
12 EMT DB	System	--	--	--	Database	root	%D	7706	0	35	2015-05-14 11:26:32	Create SSH/Key Credential	em7admin	
13 EMT DB - DB Info	System	--	--	--	SOAP/XML Host	root	%D	80	3000	38	2015-05-14 11:26:32	Create SSH/Key Credential	em7admin	
14 EMT DB - My.cnf	System	--	--	--	SOAP/XML Host	root	%D	80	3000	37	2015-05-14 11:26:32	Create PowerShell Credential	em7admin	
15 EMT DB - Sdk.conf	System	--	--	--	SOAP/XML Host	root	%D	80	3000	36	2015-05-14 11:26:32	Create SSH/Key Credential	em7admin	
16 EMT Default V2	System	--	--	--	SNMP			161	1500	10	2015-05-14 11:25:42	Create PowerShell Credential	em7admin	
17 EMT Default V3	System	--	--	--	SNMP	em7admin3		161	500	11	2015-05-14 11:25:42	Create PowerShell Credential	em7admin	
18 EMC - Example	System	--	--	--	Basic/Snippet	root	%D	443	10000	15	2015-05-14 11:25:47	Create SSH/Key Credential	em7admin	
19 GIGrid - Example	System	--	--	--	Basic/Snippet	SECURITY KEY GOES	127.0.0.1	443	5000	16	2015-05-14 11:25:51	Create SSH/Key Credential	em7admin	
20 IPSLA Example	System	--	--	--	SNMP			161	1500	5	2015-05-14 11:25:14	Create SSH/Key Credential	em7admin	
21 LRISSC - Endpoint SNMP	System	--	--	--	SNMP	control		161	3000	18	2015-05-14 11:25:56	Create SSH/Key Credential	em7admin	
22 LRISSC - Endpoint SSH/CLI	System	--	--	--	Basic/Snippet	admin	%D	22	3	17	2015-05-14 11:25:58	Create SSH/Key Credential	em7admin	
23 Local API	System	--	--	--	Basic/Snippet	em7admin	10.0.0.180	80	5000	22	2015-05-14 11:26:11	Create SSH/Key Credential	em7admin	
24 NetApp 7-mode	System	--	--	--	Basic/Snippet	root	%D	443	3000	24	2015-05-14 11:26:20	Create SSH/Key Credential	em7admin	
25 NetApp wSSL Option	System	--	--	--	SOAP/XML Host	root	%D	443	3000	26	2015-05-14 11:26:20	Create SSH/Key Credential	em7admin	
26 NetApp wSSL Option Off	System	--	--	--	SOAP/XML Host	root	%D	443	10000	25	2015-05-14 11:26:20	Create SSH/Key Credential	em7admin	
27 Nexus netconf	System	--	--	--	Basic/Snippet		%D	22	10000	6	2015-05-14 11:25:16	Create SSH/Key Credential	em7admin	
28 Nexus snmp	System	--	--	--	SNMP			161	10000	7	2015-05-14 11:25:16	Create SSH/Key Credential	em7admin	
29 Polycom - Advanced	System	--	--	--	SOAP/XML Host	admin	%D	80	20000	28	2015-05-14 11:26:24	Create SSH/Key Credential	em7admin	
30 Polycom - CDR	System	--	--	--	SOAP/XML Host	admin	%D	80	20000	31	2015-05-14 11:26:24	Create SSH/Key Credential	em7admin	
31 Polycom - Interface	System	--	--	--	SOAP/XML Host	admin	%D	80	20000	29	2015-05-14 11:26:24	Create SSH/Key Credential	em7admin	

- The **Credential Editor** modal page appears. In this page, you can define the new SNMP credential. To define the new read-only credential, supply values in the following fields:

The screenshot shows the 'Credential Editor' window with the following fields and values:

- Basic Settings:**
  - Profile Name: Solaris Read Only User
  - SNMP Version: SNMP V3
  - Port: 161
  - Timeout(ms): 1500
  - Retries: 1
- SNMP V1/V2 Settings:**
  - SNMP Community (Read-Only): (empty)
  - SNMP Community (Read/Write): (empty)
- SNMP V3 Settings:**
  - Security Name: solarisuser
  - Security Passphrase: (masked with dots)
  - Authentication Protocol: [ MD5 ]
  - Security Level: Authentication and Encryption
  - SNMP v3 Engine ID: (empty)
  - Context Name: (empty)
  - Privacy Protocol: [ DES ]
  - Privacy Protocol Pass Phrase: (masked with dots)

Buttons: 'Reset' (top right), 'Save' (bottom center).

- **Profile Name.** Name of the read-only credential. Can be any combination of alphanumeric characters. This field is required.
- **SNMP Version.** SNMP version. Select *SNMP V3*. This field is required.
- **Port.** The port SL1 will use to communicate with the external device or application. The default value is *161*. This field is required.
- **Timeout (ms).** Time, in milliseconds, after which SL1 will stop trying to communicate with the SNMP device. The default value is *1500*. This field is required.
- **Retries.** Number of times SL1 will try to authenticate and communicate with the external device. The default value is *1*. This field is required.

### SNMP V3 Settings

These fields appear if you selected *SNMP V3* in the **SNMP Version** field. Otherwise, these fields are grayed out.

- **Security Name.** Name used for read-only SNMP authentication. This field is required. Enter the same value as you entered for *rouser* in the `snmpd.conf` file.
- **Security Passphrase.** Password used to authenticate the credential. This value must contain at least 8 characters. This value is required if you want to use a **Security Level** that includes authentication. Enter the same value as you entered in the `createuser` line in the `snmpd.conf` file.

- **Authentication Protocol.** Select an authentication algorithm for the credential. Choices are MD5 or SHA. This field is required. Select *SHA*.

**NOTE:** If your SL1 system is FIPS-compliant, MD5 authentication for SNMP will fail. FIPS-compliant SL1 systems require SHA authentication for SNMP.

- **Security Level.** Specifies the combination of security features for the credentials. This field is required. Choices are:
  - *No Authentication / No Encryption.*
  - *Authentication Only.* This is the default value.
  - *Authentication and Encryption.* This is the option specified in the example `snmpd.conf` file.
- **SNMPv3 Engine ID.** The unique engine ID for the SNMP agent you want to communicate with. (SNMPv3 authentication and encryption keys are generated based on the associated passwords and the engine ID.) This field is optional.
- **Context Name.** A context is a mechanism within SNMPv3 (and AgentX) that allows you to use parallel versions of the same MIB objects. For example, one version of a MIB might be associated with SNMP Version 2 and another version of the same MIB might be associated with SNMP Version 3. For SNMP Version 3, specify the context name in this field. This field is optional.
- **Privacy Protocol.** The privacy service encryption and decryption algorithm. Choices are *DES* or *AES*. The default value is *DES*. This field is required. The example `snmpd.conf` file specifies *DES*.
- **Privacy Protocol Passphrase.** Privacy password for the credential. This field is optional.

4. Click the **[Save]** button to save the new read-only SNMPv3 credential.
5. Repeat steps 1-4 to also create the new read/write SNMPv3 credential, updating the field values as needed.

**NOTE:** When you define an SNMP Credential, the credential will automatically be aligned with the organization(s) you are a member of.

## Configuring Syslog for Linux and Solaris

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### Overview

The following sections describe how to configure syslog for Linux and Solaris:

<i>What is Syslog?</i> .....	38
<i>Configuring Syslog for Linux</i> .....	39
<i>Configuring Syslog for Solaris</i> .....	40

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### What is Syslog?

Syslog is a protocol and utility for capturing and logging system information. This system information can be stored locally, remotely, or both. syslog allows a server to forward log messages over the network to SL1. SL1 then uses these messages to monitor the health of the server and trigger events (if necessary).

Because the syslog utility is mature and widely-used, there is an array of commercial and open source implementations. This chapter provides only a basic outline of how to configure syslog to send messages to SL1.

Entries in a syslog can include the following severity descriptions:

Severity	Description
0 Emergency:	System is unusable. A "panic" condition. Notify all technical staff. Affects multiple servers, applications, systems, or sites. For example, an outage caused by an earthquake.
1 Alert	Failure in primary system. Immediate action is required. Notify appropriate staff. Example would be "loss of backup ISP connection".

Severity	Description
2 Critical	Failure in primary system. Immediate action is required before problem escalates to "alert". For example, "loss of primary ISP connection".
3 Error	Non-urgent failure. Action is required but not urgent. These messages should be relayed to appropriate support staff for resolution.
4 Warning	Indication that an error is about to occur. Action is required but not immediately. For example, "file system is 85% full".
5 Notice	Normal but significant condition. No immediate action required. Events that are unusual but are not considered error conditions. Should be examined to spot potential problems.
6 Informational	Normal operational messages. No action required. These may be harvested for reporting, measuring through-put, etc.
7 Debug	Information that is useful to developers for debugging the application; not useful during operations.

---

## Configuring Syslog for Linux

To configure your Linux server to send syslogs to SL1, you must edit the file `/etc/syslog.conf`.

1. Before editing the `/etc/syslog.conf` file, ensure that syslog is enabled. To do this, open a shell session, log in as root, and enter the following at the command prompt:

```
service syslog status
```

2. Backup the existing `/etc/syslog.conf` file. To do this, open a shell session, log in as root, and enter the following at the command prompt:

```
cp /etc/syslog.conf /etc/syslog.orig
```

3. Use your favorite editor to edit the `/etc/syslog.conf` file and add the following line:
  - If you are using an All-In-One Appliance, use the IP address of the All-In-One Appliance.
  - If you are using a Distributed System and the Collector Group that will monitor your device includes a Message Collector, use the IP address of the Message Collector.
  - If you are using a Distributed System and the Collector Group that will monitor your device includes a single Data Collector that performs the message collection function, use the IP address of the Data Collector.

```
*.err;kern.debug;daemon.notice;mail.crit @<IP_OF_SCIENCELOGIC_APPLIANCE>
```

**NOTE:** syslog includes many facilities. The facilities referenced above are merely a starting point as suggested by ScienceLogic.

4. After you edit the `syslog.conf` file, you must **restart the syslog service**. To do this, open a shell session and enter the following at the command prompt:

```
service syslog restart
```

5. To test sending syslog messages to SL1, open a shell session and enter the following at the command prompt:

```
logger -p kern.debug "Test Kern Debug Message to EM7"
```

6. To see if the message was sent to SL1, check:

- on the Linux device, the file `/var/log/messages`
- in SL1, the device logs of the corresponding Linux device.

**NOTE:** By default, SL1 includes multiple event policies based on syslog messages. ScienceLogic recommends that you review these policies to ensure that they suit your business needs. To view these policies, go to Registry > Events > Event Manager. Use the sort and filter tools to view all policies of type "syslog." From the same page, you can edit these event policies or create your own event policies based on syslog messages. For more information on event policies, see the manual on **Events**.

---

## Configuring Syslog for Solaris

To configure your Solaris 10 server to send syslogs to SL1, you must edit the file `/etc/syslog.conf`.

1. Before editing the `/etc/syslog.conf` file, ensure that syslog is enabled. To do this, open a shell session, login as root, and enter the following at the command prompt:

```
svcs system-log
```

2. Backup the existing `/etc/syslog.conf` file. To do this, open a shell session, login as root, and enter the following at the command prompt:

```
cp /etc/syslog.conf /etc/syslog.orig
```

3. Use your favorite editor to edit the `/etc/syslog.conf` file and add the following line:

- If you are using an All-In-One Appliance, use the IP address of the All-In-One Appliance.
- If you are using a Distributed System and the Collector Group that will monitor your device includes a Message Collector, use the IP address of the Message Collector.

- If you are using a Distributed System and the Collector Group that will monitor your device includes a single Data Collector that performs the message collection function, use the IP address of the Data Collector.

\*.err;kern.debug;daemon.notice;mail.crit @<IP\_OF\_SCIENCELOGIC\_APPLIANCE>

**NOTE:** syslog includes many facilities. The facilities referenced above are merely a starting point as suggested by ScienceLogic.

4. After you edit the syslog.conf file, you must **restart the syslog service**. To do this, open a shell session, login as root, and enter the following at the command prompt:

```
svcadm restart system-log
```

5. To test sending syslog messages to SL1, open a shell session and enter the following at the command prompt:

```
logger -p daemon.notice "Test Debug Message to EM7"
```

6. To see if the message was sent to SL1, check:

- on the Solaris device, the file /var/adm/messages
- in SL1, the device logs of the corresponding Solaris device.

**NOTE:** By default, SL1 includes multiple event policies based on syslog messages. ScienceLogic recommends that you review these policies to ensure that they suit your business needs. To view these policies, go to Registry > Events > Event Manager. Use the sort and filter tools to view all policies of type "syslog." From the same page, you can edit these event policies or create your own event policies based on syslog messages. For more information on event policies, see the manual on **Events**.

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# Chapter

# 5

## Monitoring Linux with SSH

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### Overview

The following sections describe how to configure and discover Linux devices for monitoring by SL1 using SSH and the *Linux Base Pack PowerPack*:

<i>Prerequisites for Monitoring Linux Devices with SSH</i> .....	42
<i>Configuring Linux Devices to Collect Data</i> .....	43
<i>Creating an SSH/Key Credential</i> .....	44
<i>Discovering Linux Devices</i> .....	45
<i>Relationships Between Component Devices</i> .....	47

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### Prerequisites for Monitoring Linux Devices with SSH

Before you can monitor Linux devices using the *Linux Base Pack PowerPack*, you must have the following information about the devices that have already been properly configured:

- IP addresses of the devices you want to monitor
- SSH private keys for the devices you want to monitor

Additionally, if you want to collect interface information about your Linux devices, you must install *ifconfig* on those devices.

## Configuring Linux Devices to Collect Data

The "Linux: Configuration Cache" and "Linux: Performance Cache" Dynamic Applications collect data and cache; other Dynamic Applications in the *Linux Base Pack PowerPack* consume that cache.

The following table lists the Collection Objects included in those Dynamic Applications and the Linux commands used by each of those objects. You can use these commands to grant or restrict access to certain data types on the user account you will use to monitor your Linux devices.

Dynamic Application	Collection Object	Command
Linux: Configuration Cache	ARP Cache	<code>cat /proc/net/arp</code>
	CPU Cache	<code>cat /proc/cpuinfo</code>
	DMI Cache	<code>sudo dmidecode -t 1,2,3</code>
	Domain Name Cache	<code>cat /proc/sys/kernel/domainname</code>
	Hostname Cache	<code>cat /proc/sys/kernel/hostname</code>
	Kernel Version	<code>cat /proc/sys/kernel/version</code>
	Local Time Cache	<code>date</code>
	Network TCP Services	<code>netstat -ltn</code>
	Network UDP Service	<code>netstat -lun</code>
	OS Release Cache	<code>cat /proc/sys/kernel/osrelease</code>
	Release Information Cache	<code>cache_release</code>
	Route Cache	<code>netstat -rn</code>
	Uname Cache	<code>uname -a</code>
	Version Cache	<code>cat /proc/version</code>
Linux: Performance Cache	Disk Cache	<code>df:df -kPT</code>
	Disk I/O Cache	<code>cat /proc/diskstats</code>
	Load Average	<code>cat /proc/loadavg</code>
	Memory Cache	<code>cat /proc/meminfo</code>
	Network Interface Cache	<code>ifconfig</code>
	Proc Stats Cache	<code>cat /proc/stat</code>
	Protocol Stats Cache	<code>cat /proc/net/snmp</code>
	Zombie Processes	<code>ps -aux   grep Z</code>

# Creating an SSH/Key Credential

To configure SL1 to monitor Linux devices using SSH, you must first create an SSH/Key credential. This credential allows the Dynamic Applications in the *Linux Base Pack PowerPack* to connect with a Linux device.

To create an SSH/Key credential:

1. Go to the **Credential Management** page (System > Manage > Credentials).
2. Click the **[Actions]** menu, and then select **Create SSH/Key Credential**. The **Create New SSH/Key Credential** modal page appears.

Profile Name	Organization	BO Use	BW Use	DA Use	Type	Credential User	Host	Port	Timeout (ms)	ID	Last	Actions	
1 Amazon Web Services Credential	[All orgs]	--	--	--	SOAP/XML Host	[AWS Account Access]	example.com	80	2000	1	2015-05-14 11:25:14	Create SNMP Credential	
2 Azure Credential - SOAP/XML	[All orgs]	--	--	--	SOAP/XML Host	<AD_USER>	login.windows.net	443	60000	60	2015-05-14 11:25:14	Create Database Credential	
3 Azure Credential - SSHKey	[All orgs]	--	--	--	SSHKey	<SUBSCRIPTION_ID_H	N/D	22	180000	59	2015-05-14 11:25:14	Create SOAP/XML Host Credential	
4 Cisco SNMPv2 - Example	[All orgs]	--	--	--	SNMP	--	--	161	1500	3	2015-05-14 11:25:14	Create LLDAP Credential	
5 Cisco SNMPv3 - Example	[All orgs]	--	--	--	SNMP	[USER_GOES_HERE]	--	161	1500	2	2015-05-14 11:25:14	Create Basic/Snippet Credential	
6 Cisco ACI	[All orgs]	--	--	--	126	Basic/Snippet	admin	173.30.210.46	443	0	62	2015-05-14 15:05:24	Create PowerShell Credential
7 Cisco ACI Credential	[All orgs]	--	--	--	Basic/Snippet	admin	198.16.133.200	443	0	61	2015-05-14 14:32:20	em7admin	
8 Cloudkick - Example	[All orgs]	--	--	--	Basic/Snippet	[SECURITY KEY GOES]	127.0.0.1	443	5000	9	2015-05-14 11:25:31	em7admin	
9 CUCM PerformanceService 8.9 Example	[All orgs]	--	--	--	SOAP/XML Host	--	--	8443	2000	4	2015-05-14 11:25:12	em7admin	
10 EMT Central Database	[All orgs]	--	--	--	Database	root	localhost	7706	0	51	2015-05-14 11:26:41	em7admin	
11 EMT Collector Database	[All orgs]	--	--	--	Database	root	N/D	7707	0	14	2015-05-14 11:25:43	em7admin	
12 EMT DB	[All orgs]	--	--	--	Database	root	N/D	7706	0	35	2015-05-14 11:26:32	em7admin	
13 EMT DB - DB Info	[All orgs]	--	--	--	SOAP/XML Host	root	N/D	80	3000	36	2015-05-14 11:26:32	em7admin	
14 EMT DB - My conf	[All orgs]	--	--	--	SOAP/XML Host	root	N/D	80	3000	37	2015-05-14 11:26:32	em7admin	
15 EMT DB - Sdk conf	[All orgs]	--	--	--	SOAP/XML Host	root	N/D	80	3000	36	2015-05-14 11:26:32	em7admin	
16 EMT Default V2	[All orgs]	--	--	--	SNMP	--	--	161	1500	10	2015-05-14 11:25:42	em7admin	
17 EMT Default V3	[All orgs]	--	--	--	SNMP	em7DefaultV3	--	161	500	11	2015-05-14 11:25:42	em7admin	
18 EMC - Example	[All orgs]	--	--	--	Basic/Snippet	root	N/D	443	10000	15	2015-05-14 11:25:47	em7admin	
19 GoGrid - Example	[All orgs]	--	--	--	Basic/Snippet	[SECURITY KEY GOES]	127.0.0.1	443	5000	16	2015-05-14 11:25:51	em7admin	
20 IPSLA Example	[All orgs]	--	--	--	SNMP	--	--	161	1500	5	2015-05-14 11:25:14	em7admin	
21 iService - Endpoint SNMP	[All orgs]	--	--	--	SNMP	control	--	161	3000	18	2015-05-14 11:25:58	em7admin	
22 iService - Endpoint SSH/CLI	[All orgs]	--	--	--	Basic/Snippet	auto	N/D	22	3	17	2015-05-14 11:25:58	em7admin	
23 Local API	[All orgs]	--	--	--	Basic/Snippet	em7admin	10.0.0.180	80	5000	22	2015-05-14 11:26:11	em7admin	
24 NetApp 7-mode	[All orgs]	--	--	--	Basic/Snippet	root	N/D	443	3000	24	2015-05-14 11:26:20	em7admin	
25 NetApp iSSSL Option	[All orgs]	--	--	--	SOAP/XML Host	root	N/D	443	3000	26	2015-05-14 11:26:20	em7admin	
26 NetApp iSSSL Option CRT	[All orgs]	--	--	--	SOAP/XML Host	root	N/D	443	10000	25	2015-05-14 11:26:20	em7admin	
27 Nexus netconf	[All orgs]	--	--	--	Basic/Snippet	--	N/D	22	10000	6	2015-05-14 11:25:16	em7admin	
28 Nexus snmp	[All orgs]	--	--	--	SNMP	--	--	161	10000	7	2015-05-14 11:25:16	em7admin	
29 Polycom - Advanced	[All orgs]	--	--	--	SOAP/XML Host	admin	N/D	80	20000	28	2015-05-14 11:26:24	em7admin	
30 Polycom - CDR	[All orgs]	--	--	--	SOAP/XML Host	admin	N/D	80	20000	31	2015-05-14 11:26:24	em7admin	
31 Polycom - Interface	[All orgs]	--	--	--	SOAP/XML Host	admin	N/D	80	20000	29	2015-05-14 11:26:24	em7admin	

3. On the **Create New SSH/Key Credential** modal page, supply values in the following fields:

**Credential Editor**

Create New SSH/Key Credential Reset

**Basic Settings**

Credential Name:

Hostname/IP:  Port:  Timeout (ms):

Username:  Password:

Private Key (PEM Format):

Save

- **Credential Name.** Type a name for the credential.
- **Hostname/IP.** Type the hostname or IP address of the Linux device you want to monitor.
  - You can include the variable **%D** in this field. SL1 will replace the variable with the IP address of the device that is currently using the credential.
  - You can include the variable **%N** in this field. SL1 will replace the variable with hostname of the device that is currently using the credential. If SL1 cannot determine the hostname, SL1 will replace the variable with the primary management IP address for the device.
- **Port.** Type the port number associated with the data you want to retrieve.

**NOTE:** The default TCP port for SSH servers is 22.

- **Timeout (ms).** Type the time, in milliseconds, after which SL1 will stop trying to communicate with the authenticating server.
- **Username.** Type the username for an SSH or user account with root privileges on the device to be monitored.
- **Password.** Type the password for an SSH user account on the device to be monitored.
- **Private Key (PEM Format).** Type or paste the SSH private key that you want SL1 to use, in PEM format.

**NOTE:** To monitor Amazon Web Services Linux instances, the private key must include the lines "BEGIN RSA PRIVATE KEY" and "END RSA PRIVATE KEY", as well as all preceding and following dashes on those lines.

4. Click **[Save]**.

---

## Discovering Linux Devices

To discover Linux devices using a discovery session, perform the following steps:

1. Go to the **Discovery Control Panel** page (System > Manage > Discovery).
2. In the **Discovery Control Panel**, click the **[Create]** button.

- The **Discovery Session Editor** page appears. On this page, define values in the following fields:

- **IP Address Discovery List.** Type the IP addresses for the Linux devices you want to monitor, separated by a comma.
- **Other Credentials.** Select the SSH/Key credentials you created for the Linux devices.
- **Discover Non-SNMP.** Select this checkbox.
- **Model Devices.** Select this checkbox.

- Optionally, you can enter values in the other fields on this page. For more information about the other fields on this page, see the **Discovery & Credentials** manual.

**NOTE:** If you apply a Device Template to the discovery session, the only Dynamic Application that must be aligned to the template is "Linux: Configuration Cache".

- Click the **[Save]** button to save the discovery session and then close the **Discovery Session Editor** window.
- The discovery session you created appears at the top of the **Discovery Control Panel** page. Click its lightning-bolt icon (⚡) to run the discovery session.
- The **Discovery Session** window appears. When the Linux devices are discovered, click their device icons (🖥️) to view the **Device Properties** pages for the Linux devices.

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## Relationships Between Component Devices

The Dynamic Applications in the *Linux Base Pack* PowerPack can automatically build relationships between Linux servers and other associated devices:

- If you discover AppDynamics applications using the Dynamic Applications in the *Cisco: AppDynamics* PowerPack, SL1 will automatically create relationships between Linux Servers and AppDynamics Nodes.
- If you discover Dynatrace environments using the Dynamic Applications in the *Dynatrace* PowerPack, SL1 will automatically create relationships between Linux Servers and Dynatrace Hosts.
- If you discover New Relic devices using the Dynamic Applications in the *New Relic* PowerPack, SL1 will automatically create relationships between Linux Servers and New Relic Servers.

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