Maps

SL1 version 8.12.2, Beta

Table of Contents

Chapter 1

Introduction to Maps

Overview

This manual describes how to create and manage relationship maps for the various elements, also called ***nodes***, in SL1.

Navigation tips for the SL1 user interface:

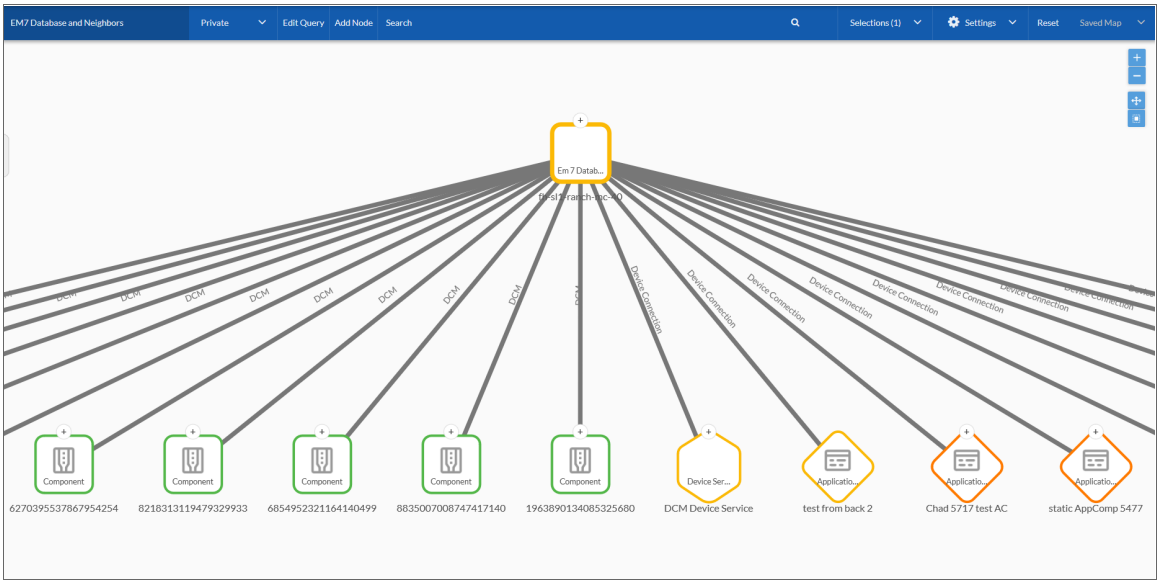
- To access a list of menu options, click the menu icon ( ).
- To view a page containing all of the menu options, click the Advanced menu icon ( ).

This chapter includes the following topics:

What is a Map?

A ***Map*** is a visual representation of the various devices and related elements, also called ***Nodes***, in your environment that have been discovered by SL1. A map displays the important details and relationships associated with those nodes.

To navigate to the **Maps** page, click the Maps icon ( ). The following is an example of a map:



A map includes the following graphical elements:

- ***Nodes***. Shapes that represent Devices, Topology Elements, Applications, Application Components, and Business Services defined in SL1. The shape of the node represents its type.
- ***Edges***. Lines with or without arrows that represent the relationships between nodes.

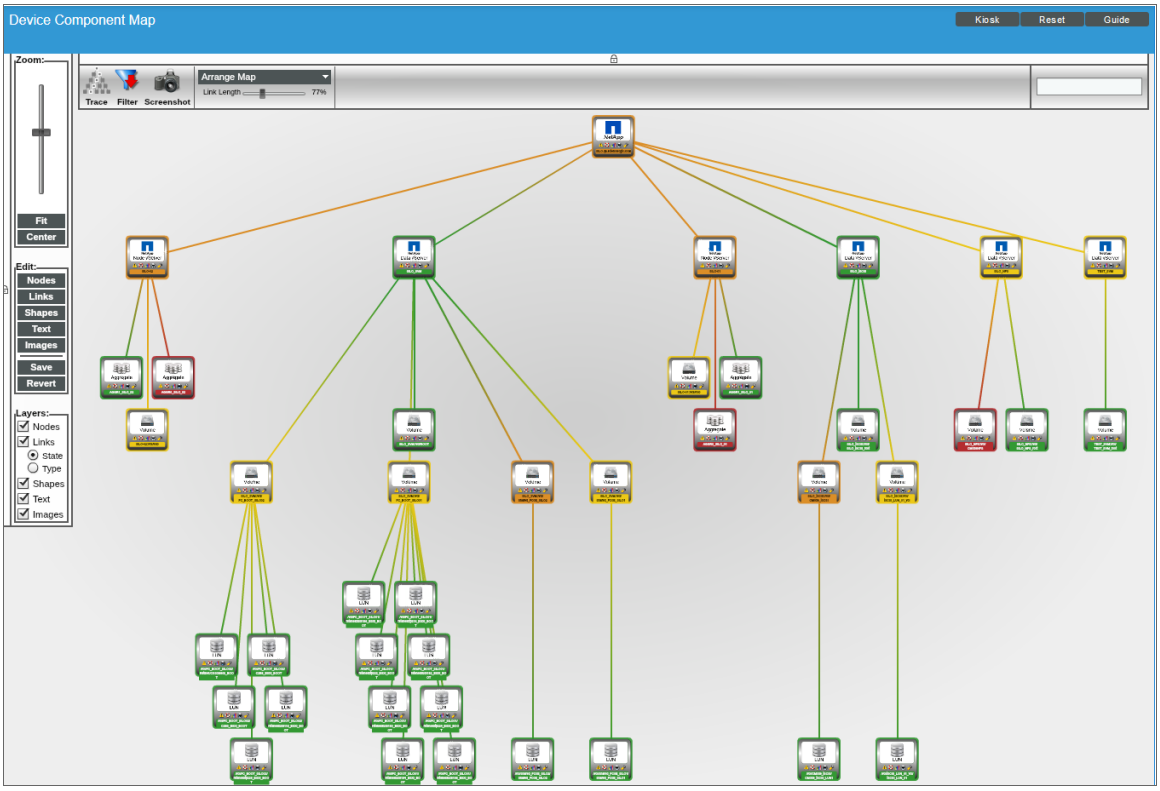
For more information, see *Viewing a Map*.

What is a Classic Map?

A ***Classic Map*** is the same as a **View** in the classic user interface.

A ***View*** is a graphical representation of a group of devices. The **[Views]** tab (Maps > Classic Views) allows you to view, edit, and create maps and relationships between devices and virtual infrastructure. In SL1, views are organized by device group, organization, device category, component maps, Layer-2 topology, CDP topology, LLDP topology, Layer-3 topology, or Virtual Infrastructure (VMware and virtual machines). You can also create your own maps with your most important devices, and add images, text, links, and shapes to customize your maps.

To navigate to the **Classic Maps** page, click the menu icon ( ) and select Maps > Classic Maps. The following is an example of a classic map or view:



For more information, see the ***Views*** manual.

Chapter 2

Installing SL1 Maps on the Database Server

Overview

This chapter describes how to install and run SL1 Maps on a Database Server. This configuration is also sometimes called "Maps on CDB".

Navigation tips for the SL1 user interface:

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

This chapter includes the following sections:

Downloading the SL1 Maps Images Bundle

To download the SL1 Maps images bundle:

1. Access the ScienceLogic Customer Portal.
2. Go to the **Miscellaneous Downloads** page (Downloads > Miscellaneous).
3. Click the title of the SL1 Maps image bundle for the SL1 version you are running. For example, if you are running SL1 version 8.12.0, the image bundle is labeled "sl1-maps-images-8.12.0-bundle.tar.gz".

Transferring the SL1 Maps Images Bundle to the Database Server

CAUTION: This and subsequent sections use the IP address 10.2.17.188 as an example to represent the IP address of the Database Server. When completing these steps, replace 10.2.17.188 with the IP address of your own Database Server.

If you did not download the SL1 Maps images bundle directly onto the Database Server, you must transfer it to a directory on the Database Server with at least 500 MB of free space, such as `/tmp/`. Using a tool like secure copy (SCP), copy the file from the directory on your local computer to the `/tmp` directory on the Database Server. For example:

```
scp Downloads/sl1-maps-images-8.12.0-bundle.tar.gz em7admin@10.2.17.188:/tmp/
```

Loading the Images into Docker on the Database Server

To ensure that you have sufficient disk space, ScienceLogic recommends that you expand the `/var` partition to 6 GB before loading the images. For more information, see the following Knowledge Base article: Increasing System Resources on Appliances.

To load the SL1 Maps images into Docker on the Database Server:

1. Start the Docker service on the Database Server. To do this, start an SSH session into the Database Server.
2. At the shell prompt, type the following:

```
sudo systemctl enable docker.service
sudo systemctl start docker.service
```

3. Load the images into Docker on the Database Server. To do so, enter the following at the shell prompt:

```
gzip -dc /tmp/sl1-maps-images-8.12.0-bundle.tar.gz | sudo docker load
```

4. The list of loaded images appears:

```
Loaded image: sciencelogic-docker.jfrog.io/responder:latest
```

```
Loaded image: sciencelogic-docker.jfrog.io/pipeline:latest
Loaded image: sciencelogic-docker.jfrog.io/queue_manager:latest
Loaded image: dgraph/dgraph:latest
Loaded image: nginx:latest
Loaded image: redis:4.0.10
```

Editing the MySQL Database and SL1 User API Passwords

The SL1 Maps service requires authentication credentials to both MySQL and the SL1 API. If the MySQL username and password value are not "root" and "em7admin", respectively, or if "em7admin" cannot be used as both the username and password to access the SL1 API, then you must update the associated "key" files in the `creds-mdb` or `creds-node-gql` directories with the current password.

NOTE: If you specify an alternate SL1 username and password, that user must have access to all devices on the system.

To edit the MySQL database and the SL1 User API passwords:

1. Start an SSH session into the Database Server.
2. At the shell prompt, type the following:

```
cd /opt/insight/maps_cdb/
```

3. View the list of credentials:

```
ls -1 creds-*/*
```

You will see something like the following:

```
creds-cass/key
creds-cass/user
creds-mdb/key
creds-mdb/user
creds-node-gql/key
creds-node-gql/user
```

NOTE: In the credentials, "mdb" refers to the active MySQL database and "node-gql" refers to the NodeJS GraphQL API, which requires access to the SL1 API. The file that is named "user" refers to the username, and "key" refers to the password.

4. Using the vi editor (or another text editor), edit the `creds-mdb/key` or `creds-node-gql/key` values as necessary and enter the correct password.

TIP: The file **must not include** a trailing newline (`\n`) character at its end. For example, if editing in vim, be sure to use both `:set binary` and `:set noeol` before editing; otherwise, the pipeline containers will fail to read the password. This can be done at any later time as well, if passwords change or if it was forgotten at deployment.

Starting the SL1 Maps Service

After you have loaded the images into Docker on the Database Server and, if necessary, edited the MySQL database and the SL1 API passwords, you must enable and start the SL1 Maps service.

CAUTION: If you have upgraded from a version of SL1 earlier than 8.8, you might run into an issue where the Docker containers run out of space. As a result, the SL1 Maps service will fail to start. For more information, see the following Knowledge Base article: SL1 Map Containers Out of Space.

NOTE: If you are installing maps on an All-In-One Appliance, you must first create a new database on the **DB Tools** page (System > Tools > DB Tools) or with silo_mysql and run the following command:
`silo_mysql -e 'CREATE DATABASE insight_agent;'`

To start the SL1 Maps service:

1. Start an SSH session into the Database Server.
2. At the shell prompt, type the following:

```
sudo systemctl enable sl1-maps.service
sudo systemctl start sl1-maps.service
```

You can use standard systemctl commands to verify that the SL1 Maps service is running and follow its logs. For example, you can enter the following at the shell prompt:

```
sudo systemctl status sl1-maps.service
```

And you should see results like this:

```
sl1-maps.service - SL1 Maps on DB
   Loaded: loaded (/usr/lib/systemd/system/sl1-maps.service; disabled; vendor preset:
   disabled)
   Active: active (running) since Wed 2019-03-27 18:06:47 UTC; 4 days ago
Process: 11477 ExecStartPre=/opt/insight/maps_cdb/ensure-responder-proxy-certs
(code=exited, status=0/SUCCESS)
Process: 11471 ExecStartPre=/opt/insight/maps_cdb/docker-compose rm -fsv
(code=exited, status=0/SUCCESS)
Process: 11468 ExecStartPre=/opt/insight/maps_cdb/set-db-ip (code=exited,
status=0/SUCCESS)
Main PID: 11486 (docker-compose)
```

Editing the NextUI Environment File

After starting the SL1 Maps service, you must edit the NextUI environment file so that it connects to the API proxy over HTTPS. To accomplish this, you must set the `API_PROXY_HOST` value to `https://localhost` and the `RESPONDER` value to `<IP address of the local Database Server>:8443`. (For example, 10.2.17.188:8443.)

> **NOTE:** To access the **Maps** page on an Administrator Portal on the CDB stack, perform the following steps for *each* Administrator Portal.

To edit the nextui.env file:

1. Start an SSH session into the Database Server.
2. Using vi or another text editor, edit the `/opt/em7/nextui/nextui.env` file. To do so, enter the following at the shell prompt:

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

3. In the NextUI environment file, edit the `API_PROXY_HOST` value to `https://localhost`. When you are done, it will look like this:

```
API_PROXY_HOST=https://localhost
```

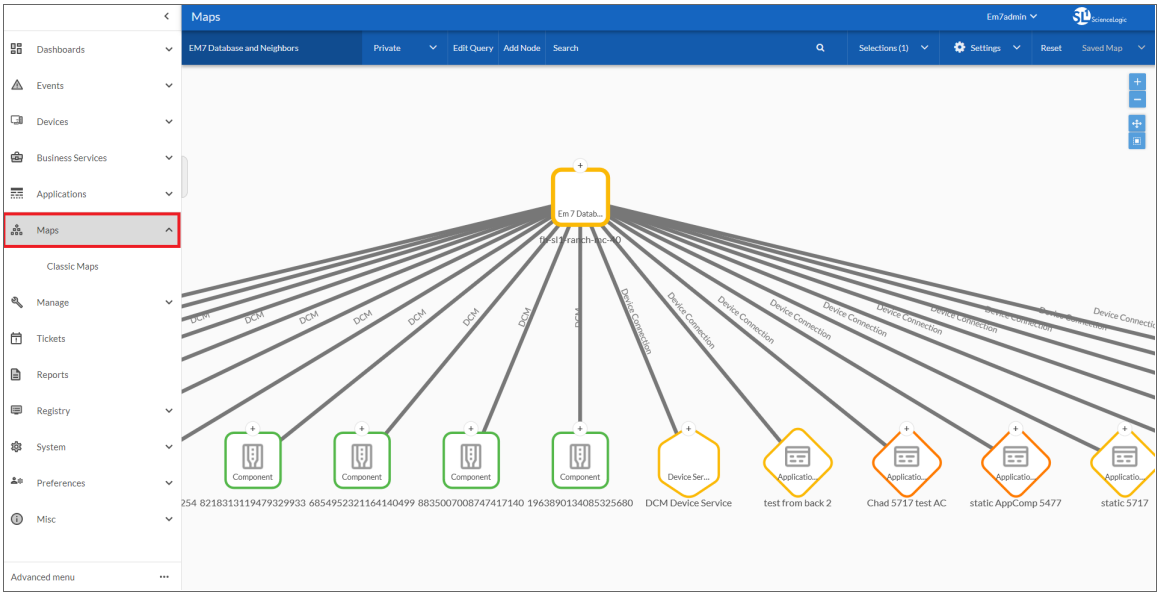
4. In the NextUI environment file, add the following line at the bottom:

```
RESPONDER=<IP address of the local Database Server>:8443
```

5. Restart the NextUI service. To do this, type the following at the shell prompt:

```
sudo systemctl restart nextui.service
```

6. If all of the preceding steps have been successful, when you log in to SL1, you will be able to *view* and *create maps* from the **Maps** page:



For troubleshooting information related to installing SL1 Maps, see the *Troubleshooting chapter*.

Chapter 3

Viewing and Configuring Maps

Overview

This chapter describes how to view and work with relationship maps for the various nodes in SL1.

NOTE: Maps currently display CDP relationships, but not LLDP relationships.

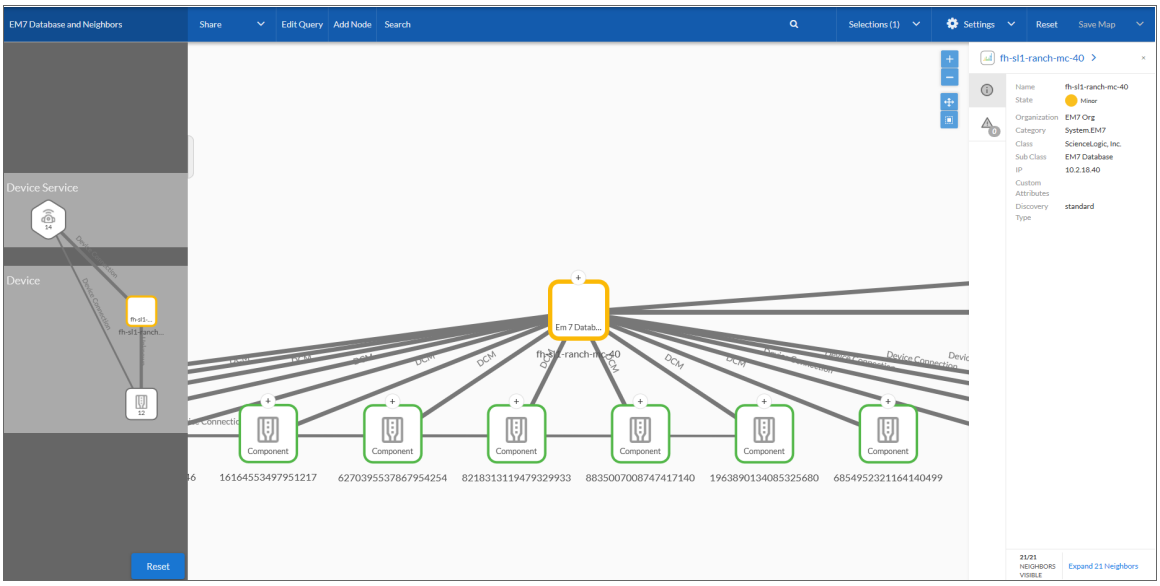
Navigation tips for the SL1 user interface:

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

This chapter includes the following topics:

Viewing a Map

To view a map, click the Maps icon ( ) and click the name of the map from the **Maps** page. The **Map** window for that map appears:



The **Map** window includes the following user interface features:

- A *navigation bar* at the top
- A *viewing pane* in the middle
- A *interactive legend* on the left
- A *Properties pane* on the right

The interactive legend and the **Properties** pane can be hidden to allow more space for the viewing pane.

Navigation Bar

The blue navigation bar at the top of a **Map** window includes the following:

- ***Map Name***. The name of the current map. You can change the name by clicking on it and entering a new name.
- ***Private/Public/Share***. Select the visibility for a map that you created. The default for a new map is *Private*. Your options include:
    - ***Private***. The map is viewable only to you.
    - ***Public***. The map can be shared with users in all organizations that are using SL1.

- ***Specific Organizations***. The map can be viewed only by the organizations that you search for and select from this menu.

- **[Edit Query]**. Click this button to edit the "seed query" (the initial search that the map creator used to find nodes for the map). For more information, see *Editing a Query for a Map*.
- **[Add Node]**. Click this button to add another node to the map. Nodes can represent Devices, Topology Elements, Applications, Application Components, and Services. For more information, see *Adding a Node to a Map*.
- ***Search***. Type some or all of a node name in this field to search for specific nodes on the current map. Nodes that do *not* match the search criteria are grayed out in the map. Delete the search text to clear the search.
- **[Selections]**. After you select one or more nodes, you can click this button to show the details of that node or nodes in a **Properties** pane to the right of the map. You can also view any events and neighbors associated with that node. For more information, see *Viewing Node Details*.

> **NOTE:** The number in parentheses after ***Selections*** on the button shows how many items are currently selected. If you selected more than one node, use the **[Previous]** and **[Next]** buttons at the bottom of the **Properties** pane to view properties for the other nodes.

- ***Settings***. Click this dropdown to select from the following options:
  - *Design*. Opens the **Design** pane, where you can edit the appearance of the map. For more information, see *Changing the Design of Map*.
  - *Filters*. Opens the **Filters** pane, which lets you select and deselect filters that affect which nodes and edges appear in your map. For more information, see *Changing the Filters for a Map*.
- **[Reset]**. Click this button to revert any unsaved changes you have made to your map.
- **[Save Map]**. Click this button to save any changes you have made to your map. The text of the button is grayed out if no changes have been made or if you have already saved your changes. To make a copy of the current map, click the drop-down arrow and select *Save As Copy*.

You can reposition the components of a map, change the design of a map, and filter the contents of a map. For more information, see *Changing the Appearance of a Map*.

Viewing Pane

Under the blue navigation bar is the ***viewing pane*** for the map. Use the following buttons to manipulate the map on the viewing pane:

 : Zoom in on the map.

 : Zoom out on the map.

 : Fit all elements of a map into the viewing pane.

 : Center all selected elements of a map in the viewing pane.

The viewing pane displays the following two types of graphical elements:

1. ***Nodes*** that represent Devices, Topology Elements, Applications, Application Components, and Business Services defined in SL1. The shape of the node represents its type, and the color of the outline specifies the current state of the node:
    - *Devices* are represented by squares:

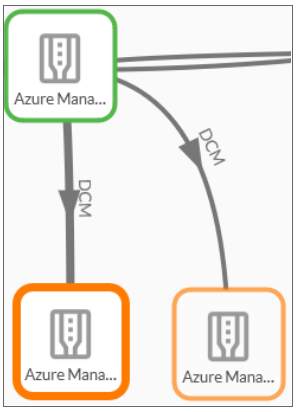
    - *Applications* and *Application Components* are represented by diamonds:

- *Services*, such as business services, IT services, or device services, are represented by hexagons:

TIP: If a node has a plus sign (+) on it, then the node has multiple "neighbors" that are not currently being shown. Double-click that node to show or "expand" its neighbors.

NOTE: When you select a node, the border for the node icon thickens and brightens, and any nodes directly connected to that node are also highlighted. Any nodes *not* directly connected to the selected node appear in a less bright color than their usual color. Also, if you enable history tracking, any nodes that you previously selected will also have a slightly brighter border. For more information about history tracking, see *Changing the Design of a Map*.

2. ***Edges*** are lines that represent the relationships and hierarchies between nodes:

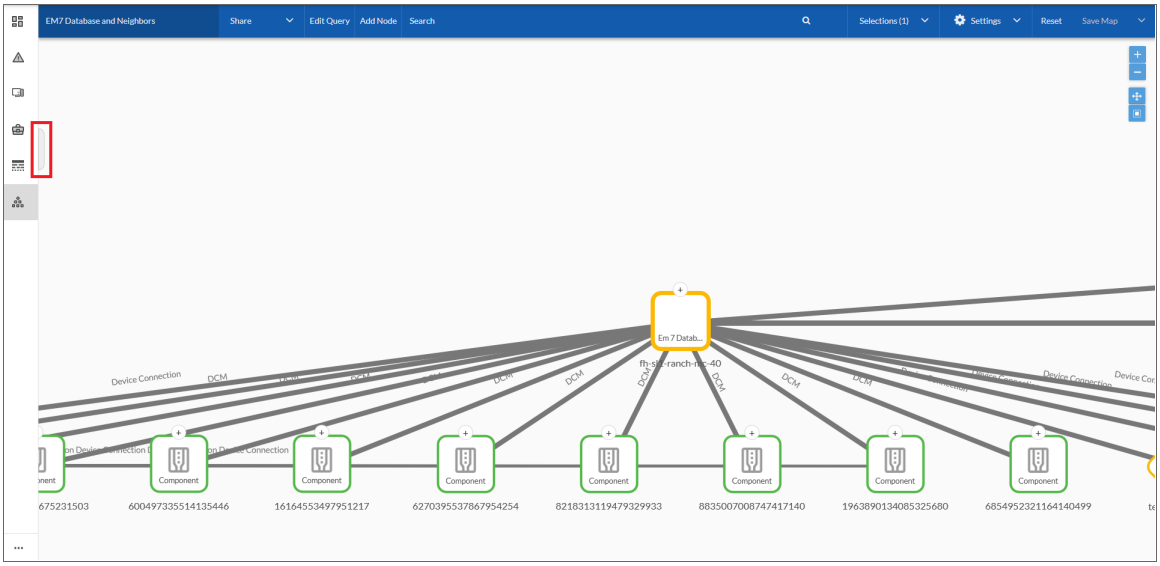


NOTE: SL1 automatically updates the map as new nodes are discovered. SL1 also updates the map with the latest status and event information.

Interactive Legend

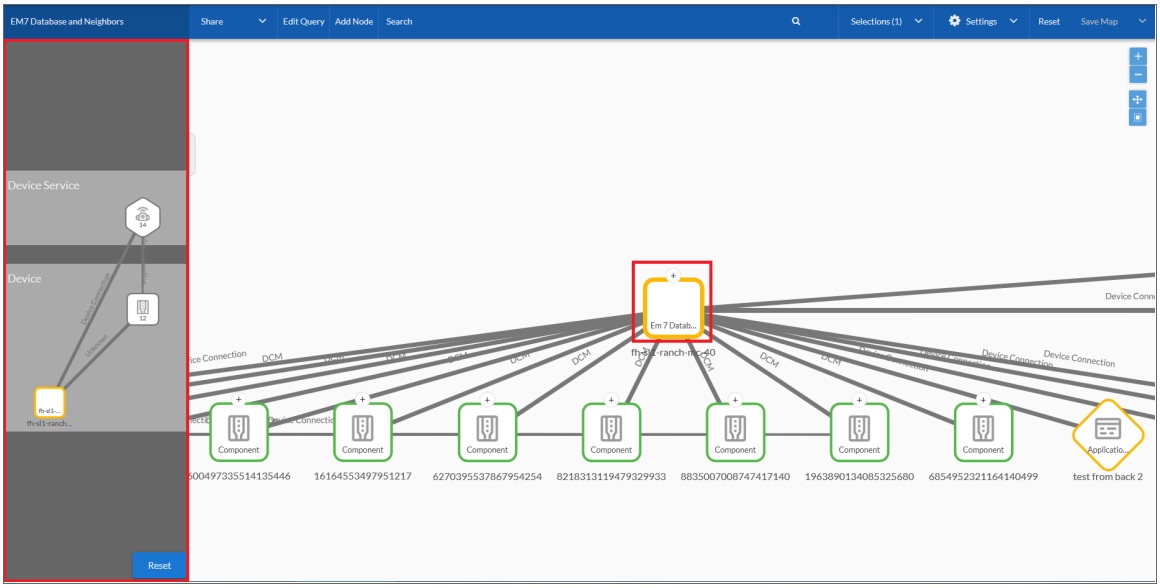
The ***interactive legend*** is available from the left-hand side of a **Map** window. The interactive legend lets you view the hierarchical layout for a single node up close so that you can see clearly how that node relates to other nodes.

By default the legend is collapsed, but you can click the gray button next to the left-hand navigation bar to open the legend:

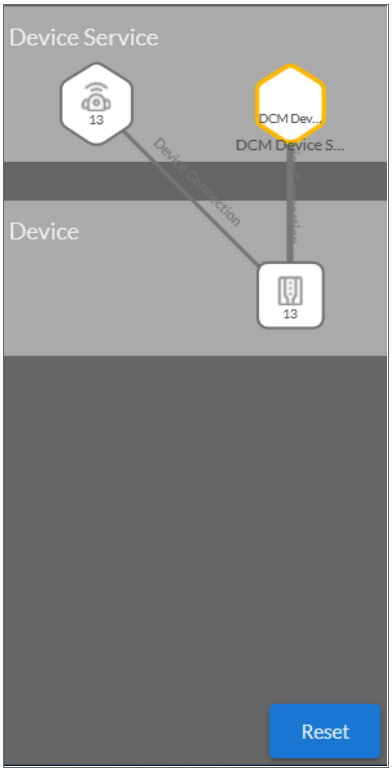


When you select a node on the viewing pane of the map with the legend open, the legend shows a detailed view of that node and the immediate connections for that node. The legend gives you a quick close-up of the hierarchy and context for the selected node.

In the example below, the selected device is connected to a group of device nodes and a group of device services. The numbers on the other nodes represent the number of other connected devices (12) and the number of connected device services (14):



To view details about another node, select that node in the viewing pane. The legend updates with the details for the selected node:



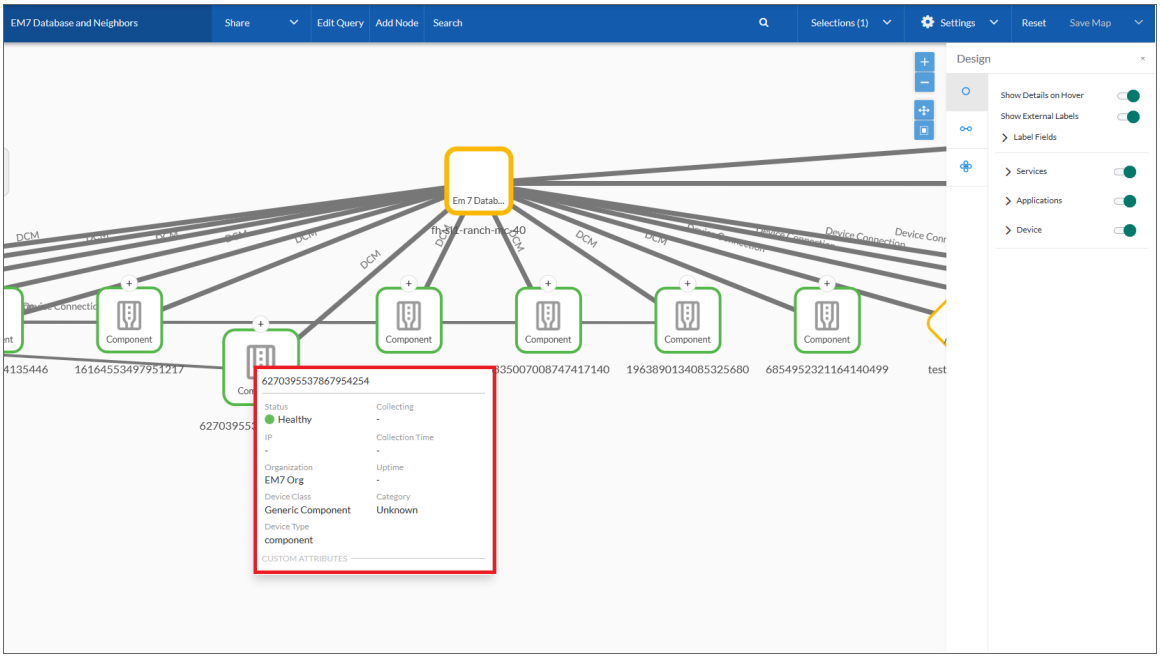
TIP: Click the **[Reset]** button to return the node to its original grouping.

The Properties Pane

There are a variety of ways you can view the properties or ***metadata*** for a specific node on a map.

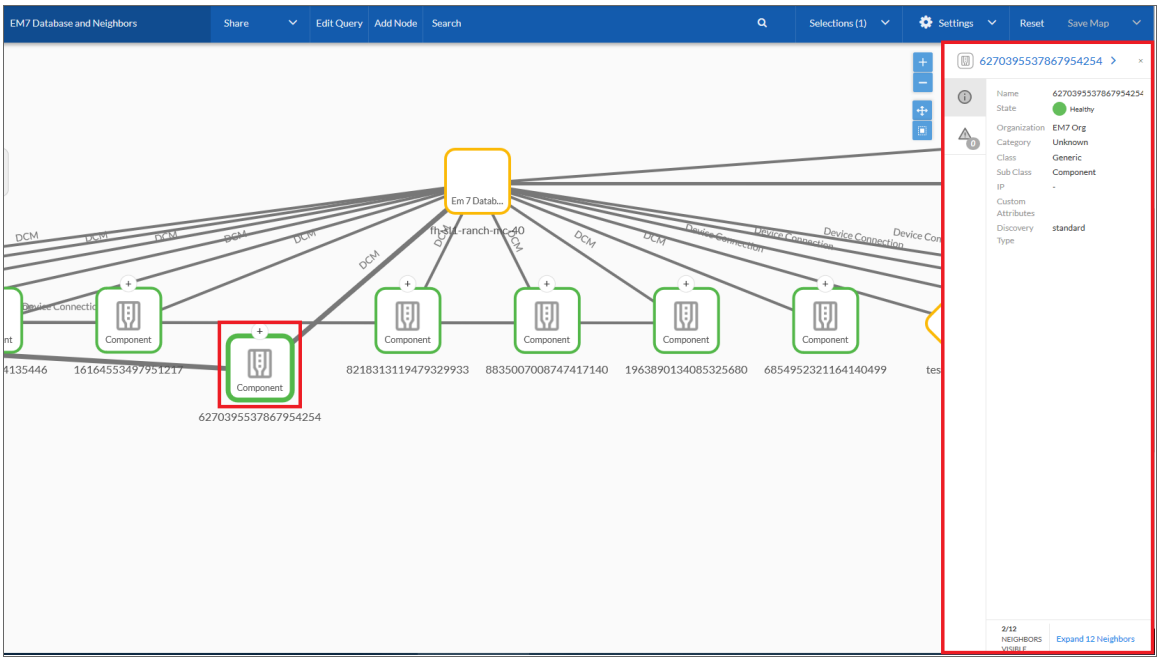
To enable the ability to hover over a node in a map to view metadata:

1. From a **Map** window, click the ***Settings*** drop-down and select *Design*.
2. Enable the ***Show Details on Hover*** option on the **Nodes** menu. When you hover over a node in the viewing pane of a Map window, a pop-up **Properties** pane appears with the metadata for that node:



To view metadata in the **Properties** pane:

1. Select a node and then click the **[Selections]** button. The metadata displays in a new **Properties** pane to the right of the map:



2. To close the **Properties** pane, click the Close icon ( ) to the right of the node name at the top of the pane.

The following items appear in the **Properties** pane to the right of the map:

- ***Name of the node***. Displays the name of the node. If the node is a device, you can click the name of the node to open the **Investigator** page for that node.

WARNING: To avoid losing any edits you made to the map, click the **[Save Map]** button before clicking the device name and leaving the **Map** window.

- **[Properties]** ***tab*** ( ). Displays the name, state, organization, and other "metadata" for the selected node, including any Custom Attributes you created for the node. For a Service node or an Application node, the latest Availability, Health, and Risk values appear on this tab. The pop-up **Properties** pane displays a similar set of metadata.
- **[Events]** ***tab*** ( ). Displays a list of each event associated with the node.
- ***Neighbors Visible.*** Indicates how many out of the total number of neighbors are visible, such as "1/2 Neighbors Visible".
- ***Expand/Contract # Neighbors***. Clicking this link expands or contracts the neighbors of the selected node. Alternatively, double-clicking the node will expand and contract the neighbors of the node.

NOTE: If you selected more than one node, use the **[Previous]** and **[Next]** buttons at the bottom of the **Properties** pane to view properties for the other nodes.

Repositioning Nodes on a Map

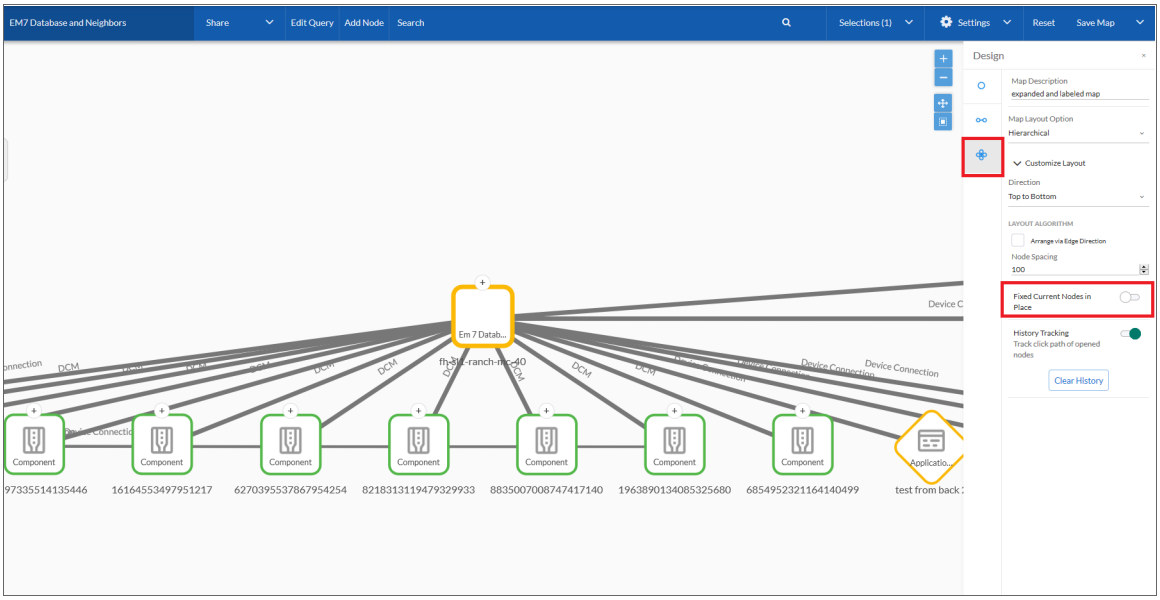
You can drag and drop nodes to reposition them on the map to make viewing and managing them easier. When you reposition a node, it retains its links to other nodes.

You can also rearrange a map in the following ways:

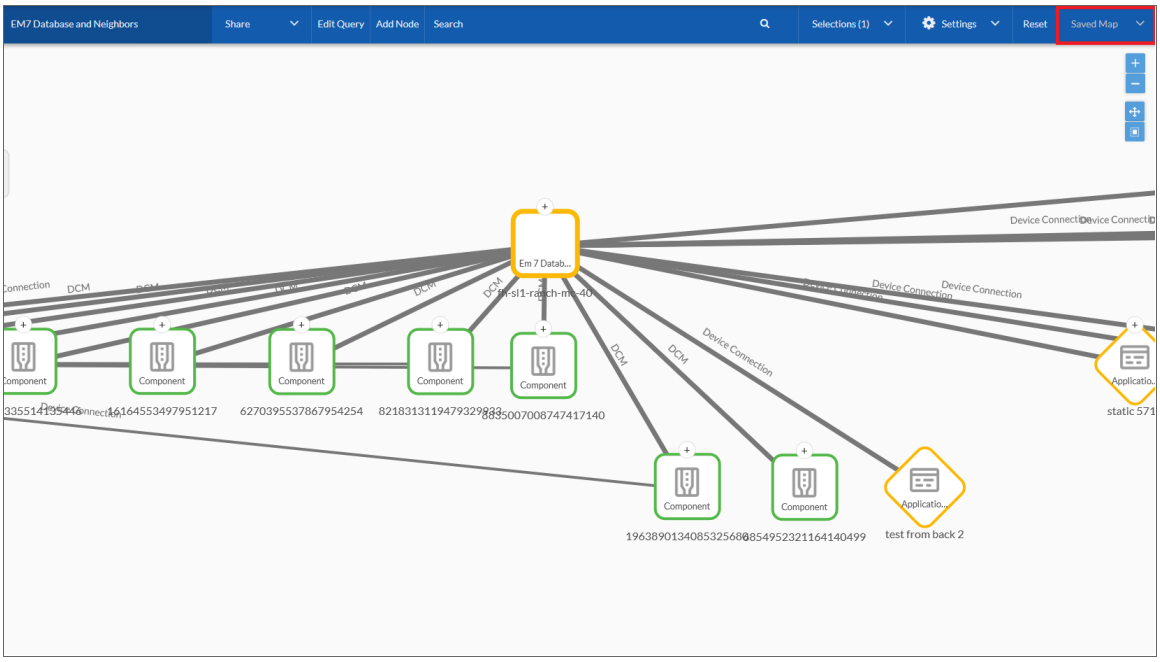
- ***To move the entire map***, click in any spot in the background, hold down the mouse button, and drag the mouse to the new location.
- ***To zoom in and out***, use the wheel of your mouse or two fingers on a Trackpad. You can also click the Zoom In (+) and Zoom Out (−) icons.
- ***To move a node***, drag and drop the node to the new location.

To save the new layout:

1. Click the **[Settings]** button and select *Design*. The **Design** pane appears.



2. Click the **[Map]** tab ( ) on the **Design** pane and select the ***Fixed Current Nodes in Place*** toggle.
3. After you finish moving the map and its nodes, or zooming in or out, click the **[Save Map]** button. The next time you open the map, the nodes will display in the same layout.



Chapter 4

Creating and Editing Maps

Overview

This manual describes how to create and edit relationship maps for the various nodes in SL1.

Navigation tips for the SL1 user interface:

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

This chapter includes the following topics:

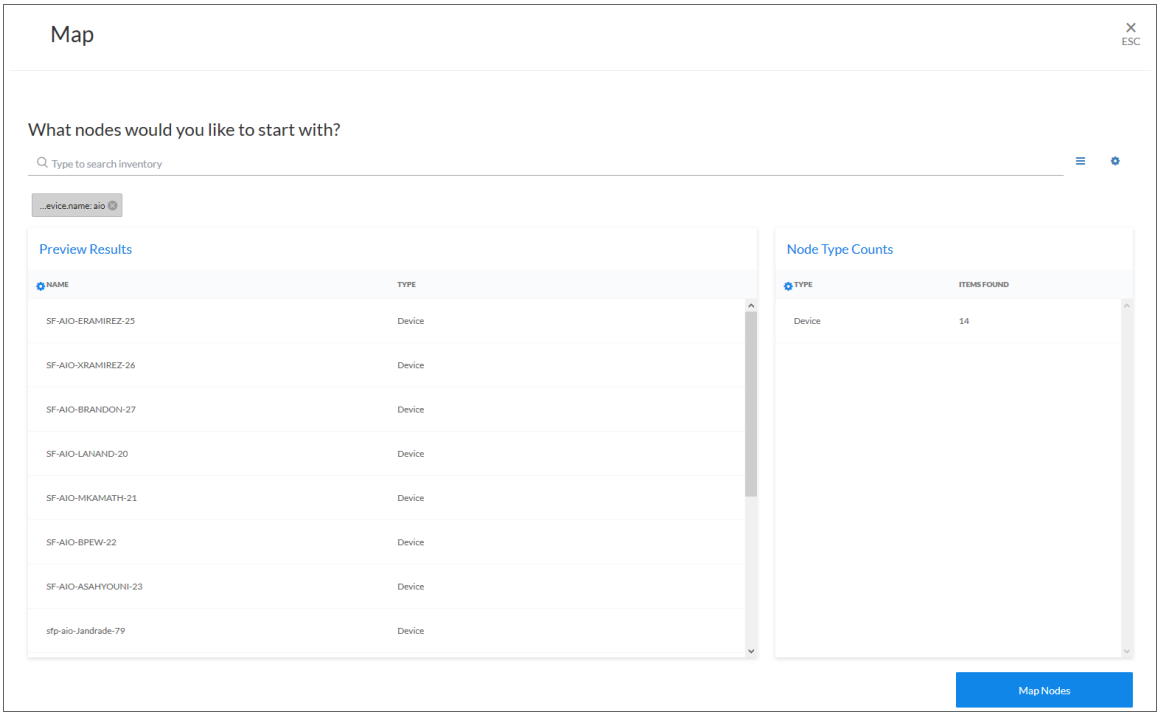
Creating a Map

Depending on the permissions assigned to users, some users will be able to create and edit maps and select the default layout. Meanwhile, other users will only be able to view and filter existing maps and update the layout of existing maps. If you do not see the **[Create Map]** button at the top right of the **Maps** page, then you do not have the permissions needed to create a map.

TIP: To create a copy of an existing map, select the map you want to copy from the **Maps** page, click the **[Actions]** button (⋯), and select *Duplicate*. If you are already in a **Map** window for a map, you can click the ***Save Map*** drop-down and select *Save As Copy*.

To create a map:

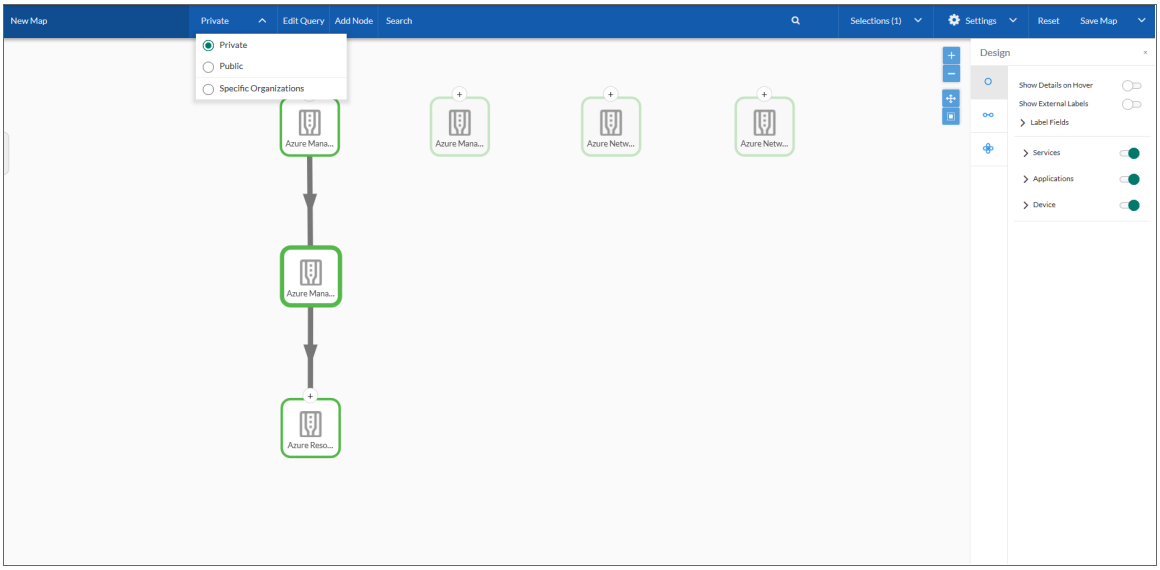
1. Click the Maps icon ( ) to go to the **Maps** page.
2. Click the **[Create Map]** button. A **New Map** window appears:



3. In the ***Search*** field, type search criteria for nodes using a "seed query" in Basic or Advanced mode. You can search for Devices, Topology Elements, Applications, Application Components, and Business Services. The nodes that fit your search display in the **Preview Results** pane, and the number of each type of node displays in the **Node Type Counts** pane.

TIP: If you are looking for a very specific set of nodes, click the gear icon ( ) to the right of the **Search** field and select *Advanced*. In this mode you can create an advanced search using AND or OR for multiple search criteria. For more information, see the "Advanced Search" chapter in the ***Introduction to SL1*** manual.

4. After you define a seed query, click the **[Map Nodes]** button. The nodes that match your seed query appear in the map:



TIP: If a node has a plus sign (+) on it, then the node has multiple "neighbors" that are not currently being shown. Double-click that node to show or "expand" its neighbors.

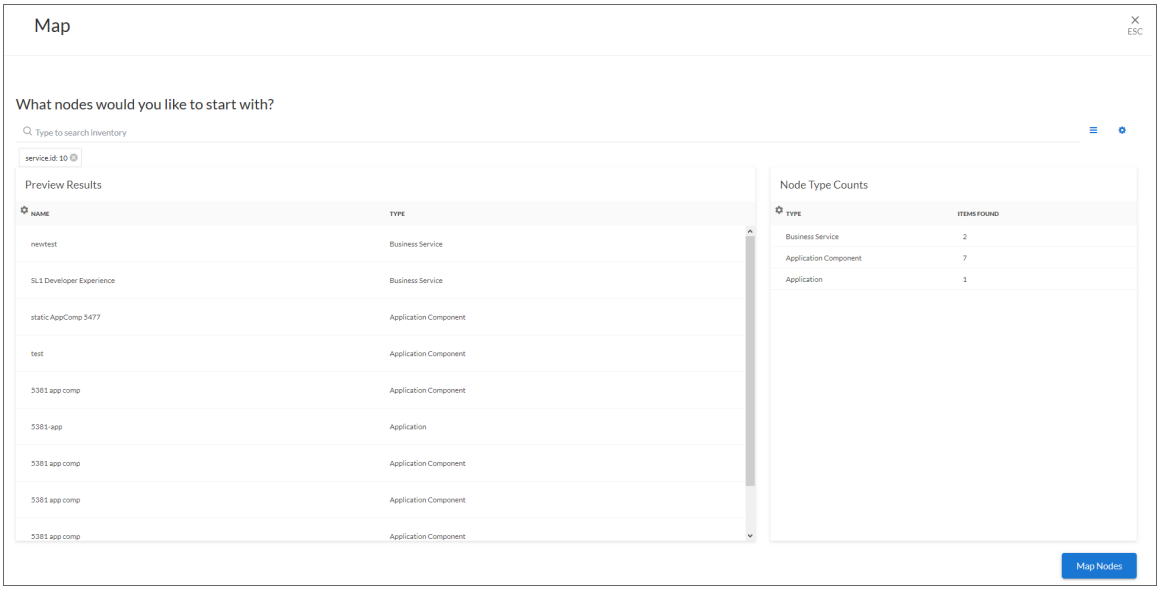
5. Click the map name (*New Map*) in the upper-left corner and type a new name.
6. The default visibility for the new map is *Private*, which means only you can view it. You can change the visibility by clicking the ***Private*** drop-down and selecting *Public* or *Specific Organizations*.
7. Update the appearance of the map by clicking the ***Settings***drop-down and selecting *Design*. For more information, see *Changing the Appearance of a Map*.
8. Click the **[Save Map]** button to save the map.

Editing a Query for a Map

If a map does not display the nodes and relationships you need, you can edit the "seed query" for a map by changing the nodes used by the map.

To edit a seed query:

1. Click the Maps icon ( ) to go to the **Maps** page.
2. Select the map you want to edit and then click the **[Edit Query]** button on the **Map** window. The **Edit Map** window appears:



3. Edit the existing search criteria by clicking the criteria button that appears under the ***Search*** field an updating the existing criteria. Click the Close icon ( ) on the criteria button to remove that search criteria altogether.
4. In the ***Search*** field, type new search criteria in Basic or Advanced mode. You can search for Devices, Topology Elements, Applications, Application Components, and Business Services. The nodes that fit your search display in the **Preview Results** pane, and the number of each type of node displays in the **Node Type Counts** pane.

TIP: If you are looking for a very specific set of nodes, click the gear icon ( ) to the right of the **Search** field and select *Advanced*. In this mode you can create an advanced search using AND or OR for multiple search criteria. For more information, see the "Advanced Search" chapter in the ***Introduction to SL1*** manual.

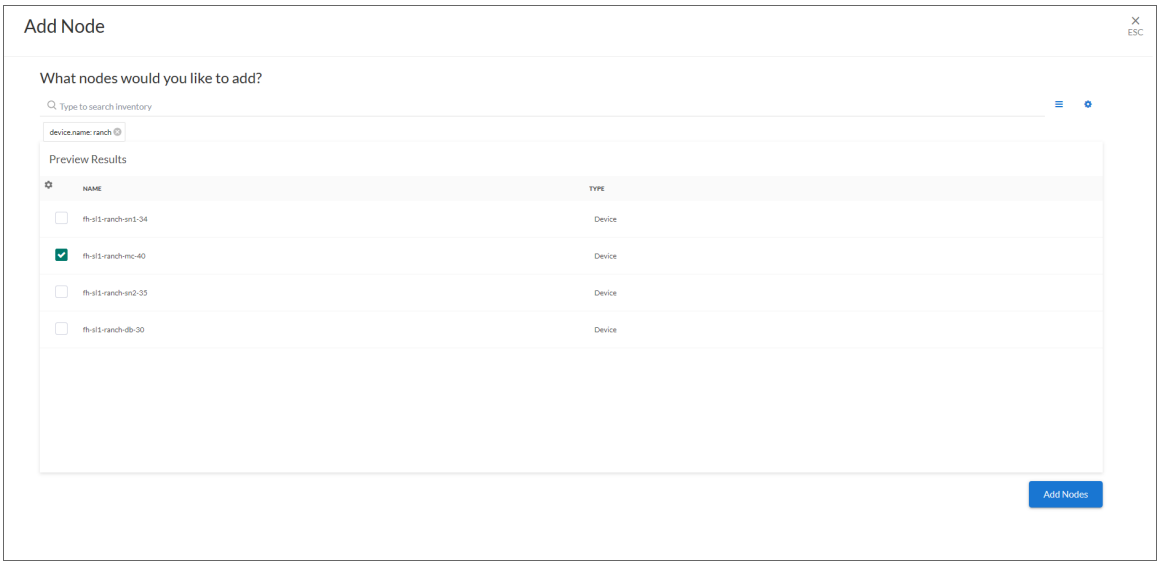
5. After you update your seed query, click the **[Map Nodes]** button. The nodes that match your seed query appear in the **Map** window.
6. Update the appearance of the map by clicking the ***Settings***drop-down and selecting *Design*. For more information, see *Changing the Appearance of a Map*.
7. Click the **[Save Map]** button to save the map.

Adding a Node to a Map

If you want to quickly add one or more nodes to map without *editing the query* for the map, you can simply click the **[Add Node]** button on a **Map** window.

To add a node to a map:

1. Click the Maps icon ( ) to go to the **Maps** page.
2. Select the map you want to edit and then click the **[Add Node]** button on the **Map** window. The **Add Node** window appears.



3. In the ***Search*** field, type search criteria using a "seed query" in Basic or Advanced mode. You can search for Devices, Topology Elements, Applications, Application Components, and Business Services. The nodes that fit your search display in the **Preview Results** pane.

TIP: If you are looking for a very specific set of nodes, click the gear icon ( ) to the right of the **Search** field and select *Advanced*. In this mode you can create an advanced search using AND or OR for multiple search criteria. For more information, see the "Advanced Search" chapter in the ***Introduction to SL1*** manual.

4. Select one or more nodes to add to the map and click the **[Map Nodes]** button. The node or nodes are added to the **Map** window.
5. Update the appearance of the map by clicking the ***Settings***drop-down and selecting *Design*. For more information, see *Changing the Appearance of a Map*.
6. Click the **[Save Map]** button to save the map.

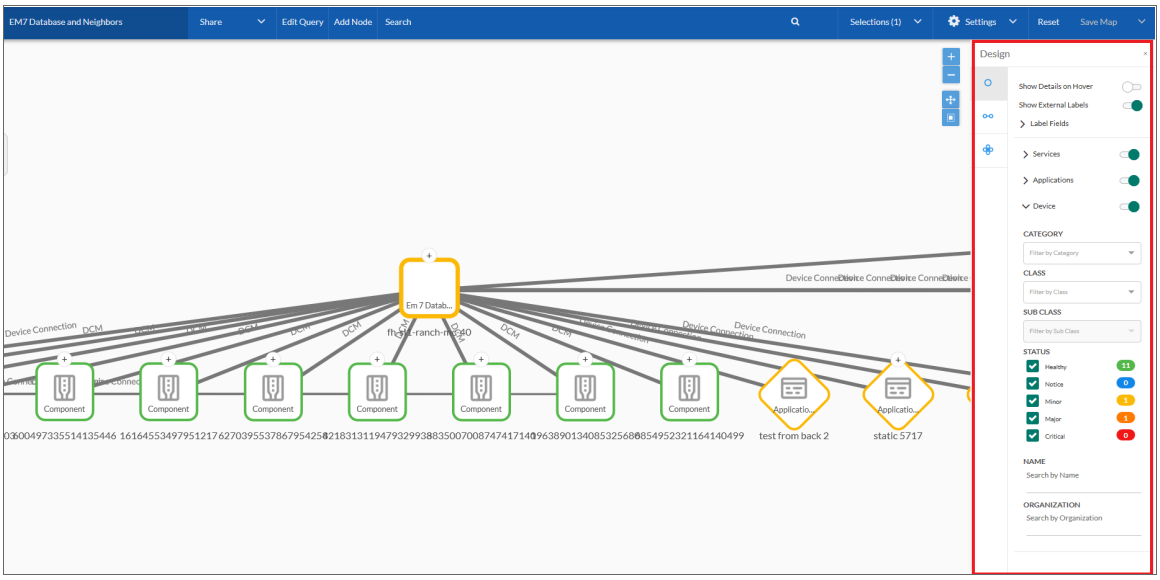
Changing the Appearance of a Map

You can use the **Design** pane and the **Filters** pane on a **Map** window to change the appearance of a map.

Changing the Design of a Map

To use the **Design** pane for a map:

1. Select the map from the **Maps** page. The **Map** window appears.
2. Click the ***Settings*** drop-down and select *Design*. The **Design** pane appears to the right of the viewing pane for the map:



The **Design** pane contains three tabs: **[Nodes]**, **[Edges]**, and **[Map]**.

3. On the **[Nodes]** tab ( ), you can edit the following options related to nodes:

   - ***Show Details on Hover Labels***. Toggle this option to enable or disable the pop-up **Properties** pane that appears when you hover over a node in the map.
   - ***Show External Labels***. Toggle this option to show or hide a user-defined label field for the node. If you enable this option, the external label appears *under* the node icon in the map.
   - ***Label Fields***. If you selected the ***Show External Labels*** toggle, you can expand this section and edit the type of label that displays under each node type: devices, services (sometimes called "Har providers" in the user interface), applications, and topology elements. For example, you could edit the external labels to display the device class or organization name under each device node.
   - ***Services***. You can toggle off services to hide services in the map. You can also expand this section to filter the map by Service Type, Name, Organization, Availability, Health, and Risk.
   - ***Applications***. You can toggle off applications to hide applications in the map. You can also expand this section to filter the map by Application Type, Name, and Organization.
   - ***Device***. You can toggle off devices to hide devices in the map. You can also expand this section to filter the map by Category, Class, Sub-class, Status, Name, and Organization.

4. On the **[Edges]** tab ( ), you can edit the following options related to edges:

   - ***Labels***. Lets you show or hide the labels for the type of relation next to the edge.
   - ***Arrowheads***. Lets you show or hide arrows to represent the direction of the relationships.
   - ***Arrow Spacing Ratio***. If you selected the ***Arrowheads*** toggle, you can use this option to set where you want the arrows to appear on the edges. For example, a ratio setting of ".5" would place the arrow at the halfway point between two connected nodes. A ratio setting of ".7" (or 70%) is the maximum.
   - ***Curved Edges***. Lets you show curved lines or straight lines connecting nodes.

> **TIP:** The options below the ***Curved Edges*** option let you view the number of various node types along with a toggle button you can use to show or hide that specific node type. These options are the same as the options on the **[Edges]** tab of the **Filters** pane.

5. On the **[Maps]** tab ( ), you can edit the following options related to maps in general:

   - ***Map Description***. Type a description of the map. When you save this map, this description appears in the ***Description*** column of the **[Maps]** tab.
   - ***Map Layout Option***. Select the layout for your map from the following options:

     - *Hierarchical*. This top-to-bottom layout works best for a map that flows in a single direction. You can further customize this layout by clicking ***Customize Layout***. These options include:

       - ***Direction***. Select the direction in which you want your hierarchy to flow. Your options include *Top to Bottom*, *Bottom to Top*, *Left to Right*, and *Right to Left*.

- ***Arrange via Edge Direction*** Select this option to arrange nodes based on the direction of the edges connecting the nodes. If this option is selected, the direction of the edges is from right to left.
- ***Node Spacing***. Increase this value to create more white space to the left and right of each node. Decrease to lessen the white space between nodes. The default is 100.

- *Tiered Hierarchical*. This layout explicitly calls out the different tiers of a hierarchy in a map using labels.
- *Force Atlas*. This is a force-directed layout close to other algorithms used for network spatialization that integrates different techniques, including the Barnes Hut simulation. You can further customize this layout by clicking ***Customize Layout***. An option is updated in the map as soon as you change that option. These options include:
  - ***Gravitational Constant***. Increase or decrease this value to adjust the gravitational constant. A smaller value results in more dispersed maps. The default is 7.
  - **Slowdown**. Increase or decrease this value to adjust slowdown (damping) on the map. The default is 100.
  - ***LinLog Mode (large datasets)***. Select this option to enable ***linear-log*** mode instead of the default of ***linear-linear*** (attraction and repulsion is proportional to the distance between nodes) to make the clusters tighter in maps. The default is unselected.
  - ***Adjust Sizes?*** Select this option to change the default forced-directed map layout.
  - ***Outbound Attraction?*** Select this option to show nodes as extended with short edges connecting them instead of contracted with no edges showing. This option is selected by default.
  - ***Strong Gravity Mode?*** Select this option if you want to attract nodes to the center and keep nodes on the periphery from "floating" away.
  - ***Barnes Hut Optimization?*** This option improves the scalability of the repulsion of nodes in a map. Enabling this option can help improve performance with large maps, but might not be as effective for small map.
  - ***Barnes Hut Theta***. Increase or decrease this value if you selected the *Barnes Hut Optimization* option and want to adjust the spacing of the map. The default is 1.
  - ***Edge Weight Influence***. The default is 0.
  - ***Scaling Ratio***. Specify the overall size of your map and the length of the edges connecting the nodes. The default is 30.
  - ***Iterations Per Render***. Specify the number of iterations to be run before each render of the map. The default is 5.
  - ***Iterations Per Refresh***. The default is 2000.

- ***Fixed Current Nodes in Place***. When this option is toggled off, all nodes can be dragged. When it is toggled on, only **new** nodes can be dragged.

- ***History Tracking***. When this option is enabled, SL1 tracks the click path of opened or expanded nodes. History tracking provides context for the actions that you and other users have taken in the maps in SL1. If you enable history tracking, any nodes that you previously selected will have a slightly brighter border than usual. Click the **[Clear History]** button to clear the click path history.

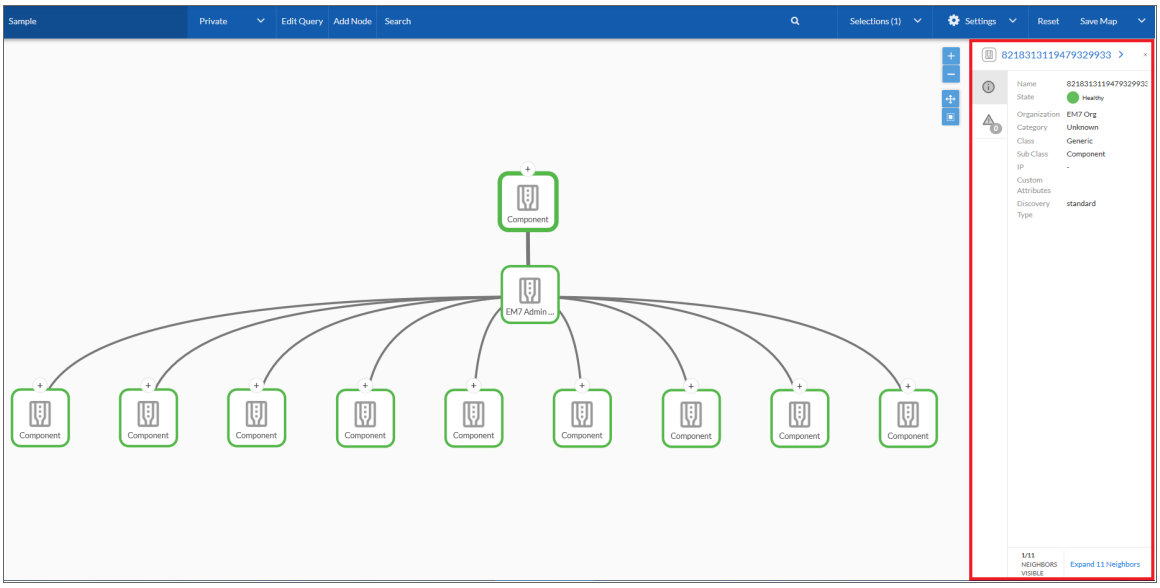
6. Click the **[Save Map]** button on the top navigation bar to save the map.

NOTE: For more information on map layouts, see http://visjs.org/docs/network/index.html and https://en.wikipedia.org/wiki/Force-directed_graph_drawing.

Changing the Filters for a Map

To use the **Filters** pane for a map:

1. Select the map from the **Maps** page. The **Map** window appears.
2. Click the ***Settings*** drop-down and select *Filters*. The **Filter** pane appears to the right of the map:



NOTE: The counts for each node type display in a badge on each tab.

3. On the **[Devices]** tab ( ), you can toggle off devices to hide devices in the map. You can also expand this section to filter the map by Category, Class, Sub-class, Status, Name, and Organization. This tab does not display if you do not have devices in the current map.

4. On the **[Services]** tab ( ), you can toggle off services to hide services in the map. You can also expand this section to filter the map by Service Type, Name, Organization, Availability, Health, and Risk. This tab does not display if you do not have services in the current map.

5. On the **[Edges]** tab ( ), you can edit a variety of display options related to edges. These options are the same as the options on the **[Edges]** tab of the **Design** pane.

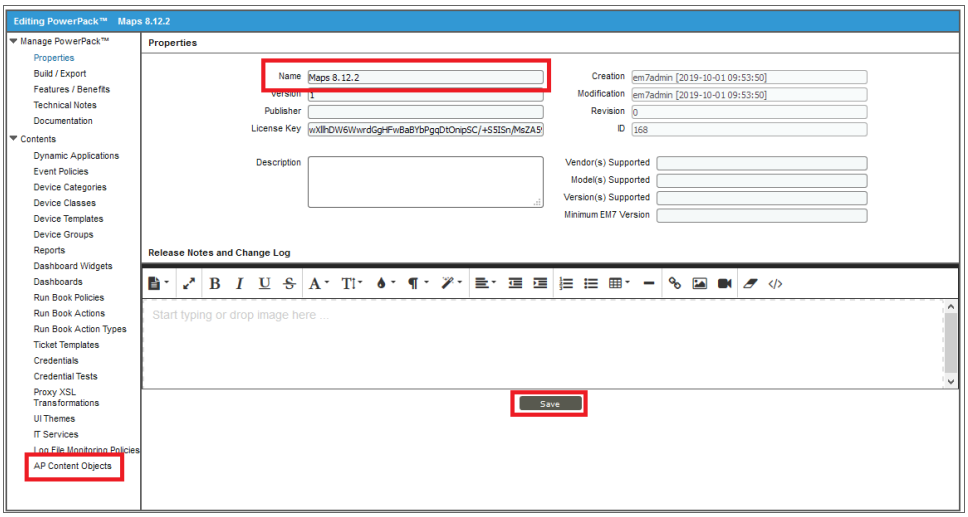
6. Click the **[Save Map]** button to save the map.

Exporting a Map

If you want to use maps on another SL1 system, you can package one or maps into a PowerPack and export it to the other system. Make sure that the map or maps you want to export are set to *Specific Organizations*, and you have selected the organization to which you want to export the maps.

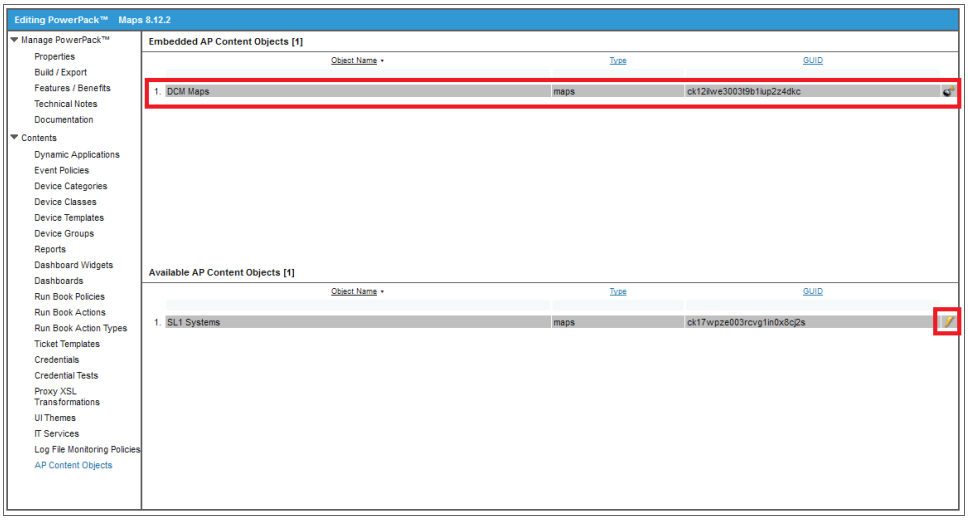
To package and export maps:

1. Go to **The PowerPack Manager** page (System > Manage > PowerPacks).
2. Click the **[Actions]** button and select *Create a New PowerPack*.
3. On the **PowerPack Properties** page, type a name for the PowerPack in the ***Name*** field and click **[Save]**.

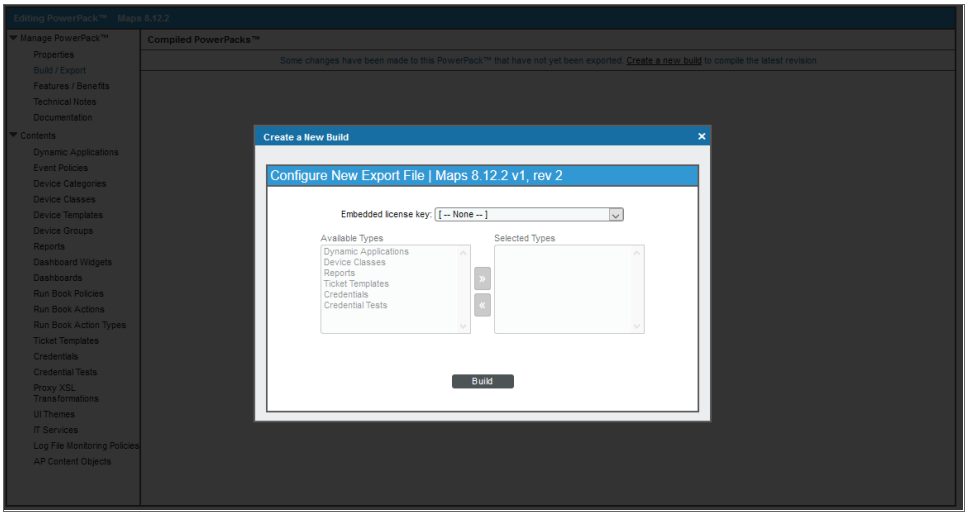


4. Select *AP Content Objects* from the left-nav on the **PowerPack Properties** page. Your maps appear in the **Available AP Content Objects** pane.

5. Click the lightning bolt icon ( ) next to the maps to add them to the PowerPack. The selected map or maps move up to the **Embedded AP Content Objects** pane:



6. Select *Build/Export* from the left-nav to open the **Compiled PowerPacks** window, and then click the *Create a new build* link:



7. In the **Configure New Export File** window, select *Administrative (including export & license)* from the ***Embedded license key*** drop-down list. Click **[Build]**.

8. When the PowerPack finishes building, you can download the build with the download icon ( ) and use that file to upload the map to a new SL1 system.

Installing a Map from a PowerPack

1. On the SL1 system where you want to install the maps, import the PowerPack on the **PowerPack Manager** page (System > Manage > PowerPacks).
2. After you have imported the PowerPack, click the **[Actions]** button and select *Install PowerPack*.
3. Locate the PowerPack you created in the **Imported PowerPacks** window and click its lightning bolt icon ().
4. When the **Install PowerPack** window appears, click the **[Install]** button.
5. After you install the PowerPack, you can access the maps on the **Maps** page.

/nonChapter

5

Troubleshooting SL1 Maps on the Database Server

Overview

SL1 Maps on a Database Server (or "Maps on CDB") are managed with Docker and docker-compose commands. This chapter contains troubleshooting processes that you can use to address issues with SL1 Maps on a Database Server.

Navigation tips for the SL1 user interface:

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

This chapter includes steps to troubleshoot the following issues:

Initial Troubleshooting Steps

The first step you should take when troubleshooting SL1 Maps is to verify the configuration values in the `/etc/sysconfig/sl1-maps` file. In most cases, the issue is that the **CDB_IP** value is not correct for the containers.

To troubleshoot SL1 Maps:

1. Verify that **CDB_IP** and **NODE_GQL_IP** values are correct in the `/etc/sysconfig/sl1-maps` file. Correct these values as needed.
2. Verify that the **RESPONDER** value is correct in `/usr/local/silo/nextui/nextui.env`. Correct this value as needed.
3. To make sure that any lingering connections are killed, restart the user interface with the following command:

```
systemctl restart nextui
```

4. Restart the sl1-maps service with the following command:

```
systemctl restart sl1-maps
```

5. Wait five to ten minutes to allow the Graph database to populate, and then use the SL1 user interface to validate that the **Maps** page is working as intended.

TIP: Restart the sl1-maps service as needed if you continue encountering issues. Running this command clears the Graph database and kills any stale connections that might exist. The maps data will always attempt to re-populate within the next five to ten minutes.

If the steps above do not address your issue, gather the following logs and information:

```
# SL1 Maps sysconfg.
cat /etc/sysconfig/sl1-maps

# Docker compose file.
cat /opt/insight/maps_cdb/docker-compose.yml

# The docker logs.
docker-compose -f /opt/insight/maps_cdb/docker-compose.yml logs --tail 500 >
/home/em7admin/docker_log

# The following involve going into containers and obtaining information.

# CDB user / password.
docker exec -it maps_cdb_graph-manager_1 cat /opt/insight/creds-mdb/user
docker exec -it maps_cdb_graph-manager_1 cat /opt/insight/creds-mdb/key

# Node gql user / password (only applicable to 8.12 and newer).
docker exec -it maps_cdb_graph-manager_1 cat /opt/insight/creds-node-gql/user
docker exec -it maps_cdb_graph-manager_1 cat /opt/insight/creds-node-gql/key
```

```
# Verify that the containers can actually reach the cdb and node gql (again, only
applicable to 8.12 and newer).
1. docker exec -it maps_cdb_graph-manager_1 bash
2. apt-get update && apt-get install -y dnsutils
3. ping sl1-mdb
4. ping sl1-node-gql

# Gather the ap2 logs.
journalctl -u nextui

# Determine the fstype of your partition (this is where var/lib/docker/ is located)
xfs_info /dev/sda1 | grep ftype
```

NOTE: Use these logs and related information to help you troubleshoot the remaining situations in this chapter.

The Maps Page Does Not Display in SL1

If the **Maps** page does not show up in the SL1 user interface:

1. Check the status of the sl1-maps service:

   ```
   sudo systemctl status sl1-maps
   ```

2. Make sure the responder and graphdb containers are up:

   ```
   docker ps -a
   ```

3. If the status of the containers is "ended":

   - Remove the old containers by running: `docker rm -f $(docker ps -qa)`
   - `cd` to **/opt/insight/maps_cdb/**
   - Set the **CDB_IP** parameter: `export CDB_IP=<CDB IP>`
   - Start the containers again by running: `docker-compose up -d`

4. Check logs for errors; the output is color-coded based on container:

   ```
   source /etc/sysconfig/sl1-maps
   cd /opt/insight/maps_cdb
   sudo CDB_IP=$CDB_IP docker-compose logs --tail=20 --follow
   ```

5. You can `grep` on this command to look specifically for responder or graph containers.
6. Verify correct localhost setting in **nextui.env**. Edit and restart nextui service if settings are not correct:

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

7. Verify the following settings:

   - **API_PROXY_HOST=https://localhost**
   - **RESPONDER=<*CDB IP*>:8443**

8. Ports 8080 and 8443 must be available for the Maps service to run. If Responder fails to start, check the logs with the following command:

   ```
   journalctl -xeu sl1-maps
   ```

   Below are examples of logs from this command:

   ```
   May 10 22:03:45 guardians-75 docker-compose[27762]: ERROR: for maps_cdb_responder-
   proxy_1 Cannot start service responder-proxy: driver failed programming external
   connectivity on endpoint maps_cdb_responder-proxy_1
   (972064f617f57a863df5dbf52730634d5aaa546e0f4cae675716f5d6d325acc6): Error starting
   userland proxy: listen tcp 0.0.0.0:8443: bind: address already in use

   May 10 22:03:45 guardians-75 docker-compose[27762]: ERROR: for alpha Cannot start
   service alpha: driver failed programming external connectivity on endpoint maps_
   cdb_alpha_1 (4fd6c1ab71c45a81298c60ca56e7359da683f3c6e802a598ce84a39b140a5aa0):
   Error starting userland proxy: listen tcp 0.0.0.0:8080: bind: address already in
   use

   May 10 22:03:45 guardians-75 docker-compose[27762]: ERROR: for responder-proxy
   Cannot start service responder-proxy: driver failed programming external
   connectivity on endpoint maps_cdb_responder-proxy_1
   (972064f617f57a863df5dbf52730634d5aaa546e0f4cae675716f5d6d325acc6): Error starting
   userland proxy: listen tcp 0.0.0.0:8443: bind: address already in use
   (972064f617f57a863df5dbf52730634d5aaa546e0f4cae675716

   May 10 22:03:45 guardians-75 docker-compose[27762]: Encountered errors while
   bringing up the project.

   May 10 22:03:45 guardians-75 systemd[1]: sl1-maps.service: main process exited,
   code=exited, status=1/FAILURE
   ```

9. Disable anything that is listening on those ports and restart sl1-maps:

   ```
   cd /opt/em7/share/config/nginx.d
   for f in agentil_api*.conf; do mv $f $f.ORIG; done
   systemctl restart nginx
   systemctl start sl1-maps
   ```

10. The **/var** partition might grow towards 100% utilization, which can cause failure. To prevent this, check the usage with the following commands:

    ```
    # cd /var/lib/docker/
    # sudo du -h --max-depth=1
    ```

TIP: For more information, see *The /var Partition is at 100% After Enabling Maps*.

11. Add the following to **/etc/docker/daemon.json**:

```
{
"log-driver": "json-file",
"log-opts": {
"max-size": "10m",
"max-file": "5"
}
}
```

NOTE: The daemon.json file mst contain well-formed JSON, so if there is already content in the file, you need to merge the content. You can use a tool like " jq" to verify the syntax.

12. Restart Docker service:

```
# systemctl restart docker.service
```

13. Restart the sl1-maps service:

```
# systemctl stop sl1-maps.service
# journalctl -xeu sl1-maps.service -f
(...wait for
...logs to
...show it's down)
^C
# systemctl start sl1-maps.service
```

14. Re-check usage to make sure usage has reduced, which will mostly be in **/containers**.

The /var Partition is at 100% After Enabling Maps

If you have upgraded from a version of SL1 earlier than 8.8.0, you might run into an issue where the Docker containers run out of space. As a result, the SL1 Maps service will fail to start. For more information, see the following Knowledge Base article: SL1 Map Containers Out of Space.

Additional details:

- If your SL1 system has an upgrade path starting with SL1 version prior to 8.8.0 (which preceded Oracle Linux 7.4), and you install Maps on CDB, the devicemapper storage driver will be chosen, but it will not have sufficient volume group space to actually use it under devicemapper's default configuration.
- The SL1 system will also be unable to use the overlay2 storage driver, because XFS filesystems prior to Oracle Linux 7.4 are created with **ftype=0**, which is incompatible with the overlay.
- **ftype=0** does not support the overlay2 storage driver used by Docker.

To ensure that you have sufficient disk space, ScienceLogic recommends that you expand the `/var` partition to 6 GB before loading the images. For more information, see the following Knowledge Base article: Increasing System Resources on Appliances.

The Maps Page Does Not Display Maps

In this situation, perform the following steps:

1. Check the settings in the nextui.env file on the Admin Portal and ensure that the settings are correct. The **RESPONDER** value is *<CDB IP>:8443*.
2. Restart the nextui service and the **Maps** page will appear.
3. If error messages in the logs include an `[object Object]` response similar to the following:

   ```
   | 20190430:160908|IN_MGE:1|logger:log_error:132|ERROR|GQL Exception: [{'path':
   ['devices'], 'message': '[object Object]'}]
   graph-manager_1 |
   ```

   Then the **nextui.env** entry for **API_PROXY_HOST** might not be configured correctly.

4. Also, be sure to include **NODE_TLS_REJECT_UNAUTHORIZED=0** in the **nextui.env** file if it is not already there.

The Maps Page Displays Incorrect Data

If a map on the **Maps** page displays incorrect data, check the graphql and dgraph user interfaces for the correct responses:

1. Go to the graphql user interface at **http://<*CDB IP*>/gql** and run the following query:

```
{
deviceRelationships(first: 500) {
  edges {
    node {
      id
      override
      parentDevice {
        id
        ip
        name
      }
      parentInterface {
        id
      }
      childDevice {
        id
        ip
        name
      }
      childInterface {
        id
      }
      deviceRelationshipType {
        type
```

```
        description
      }
      dcmrRelationshipType {
        id
      }
    }
  }
}
}
```

TIP: When reviewing a map in the SL1 user interface, you can double-click on individual device icons on a map to expose its relationships.

2. Go to the dgraph user interface at **http://<*CDB IP*>:8000/?dev**.
3. Update the dgraph server URL in the ***Enter Dgraph server URL*** field on the left. Use the following format: **http://<*CDB IP*>:8080/**.
4. Click **[Update]** to get to the console.
5. Run the following device query:

```
query Devices {
  devices(func: has(Device)) {
    name
    device_id
    org_id
    time
    uid
  }
}
```

6. If data is incorrect or not available in either the graphql or dgraph user interfaces, gather information about any errors found when querying and in responder and graph logs.

   For example, with an error message like the following:

   ```
   graph-manager_1 | 20190503:184609|IN_MGE:1|logger:log_
   error:132|ERROR|AF.BE.AGG.UNCAUGHT:etl_trigger_message#!# ::: *** EXCEPTION:
   Traceback (most recent call last): - File "/opt/insight/apl_topology/loaders/cdb_
   data_loader.py", line 691, in __read_dynamic_app_name - return raw_data[2] -
   TypeError: 'NoneType' object is not subscriptable -
   ```

   `NoneType` usually happens when the code does not know how to handle a NULL response.

Maps Service Issue After System Was Unresponsive

If an SL1 system becomes unresponsive and has to be force rebooted, the Docker cleanup might fail. In that situation, the sl1-maps service will not start, and the following messages will appear when checking status:

```
sl1-maps.service - SL1 Maps on DB
```

```
Loaded: loaded (/usr/lib/systemd/system/sl1-maps.service; enabled; vendor preset:
disabled)
Active: failed (Result: exit-code) since Wed 2019-05-22 14:40:27 UTC; 32min ago

...

May 22 14:40:26 em7-setest docker-compose[2896]: ERROR: for maps_cdb_queue-manager_1
driver "devicemapper" failed to remove root filesystem for
ae3987fad8c3b6ab919358b8fba536...
May 22 14:40:26 em7-setest docker-compose[2896]: ERROR: for maps_cdb_responder_1
driver "devicemapper" failed to remove root filesystem for
2de55c30e7a5bac8cc464308e063e36c79...
```

The same error appears for each container. When the containers are checked using `docker ps -a`, the containers are stuck at "Removal In Process" status.

The **/var/log/messages** reports the following error for each container:

```
ERROR: for maps_cdb_zero_1 driver "devicemapper" failed to remove root filesystem for
bf64eeca094d709c22c4f5794b35d93360944bb9908a4ecbbcab70823613066d: failed to remove
device 94a8cc4d7ba2503b7537523bae3a83c33504ec52e5e4ae1babe2d43d9482c72c: devicemapper:
Error running DeleteDevice dm_task_run failed
```

Also, running `docker system prune` will not recover any space.

To address this issue, run the following commands:

```
systemctl stop docker
thin_check /var/lib/docker/devicemapper/devicemapper/metadata
thin_check --clear-needs-check-flag /var/lib/docker/devicemapper/devicemapper/metadata
systemctl start docker
docker system prune
systemctl start sl1-maps
```

For more information, see https://stackoverflow.com/questions/30719896/docker-dm-task-run-failed-error.

Issues in the Graph Database: Names/Keys with Trailing Characters

To avoid issues with the Graph database used for SL1 Maps, ScienceLogic strongly recommends that you closely follow the ***steps for changing user names or passwords*** in the Installation chapter. If the Graph database keeps restarting when checking with `ps -a`, or if you see Graph database errors in the logs, you might have extraneous characters in the user name or password.

To address this issue:

1. `cd` to **/opt/insight/maps_cdb**.
2. Run the following commands for the relevant key file, depending on the error:

   ```
   xxd /opt/insight/maps_cdb/creds-node-gql/key
   ```

   You might see results like the following:

```
[root@ip-172-31-20-172 maps_cdb]# xxd /opt/insight/maps_cdb/creds-node-gql/key
0000000: 6433 6d30 7379 7331 3233 0a d3m0sys123.
```

In this example, `0a` is a quote character, which is causing the issue.

The correct entry would look like this:

```
[root@ip-172-31-20-172 maps_cdb]# xxd /opt/insight/maps_cdb/creds-node-gql/key
0000000: 6433 6d30 7379 7331 3233 d3m0sys123
```

3. Run the following command to remove extraneous characters:

```
echo -n d3m0sys123 > /opt/insight/maps_cdb/creds-node-gql/key
```

Adding the `-n` option to `echo` prevents writing the newline at the end. Run the `xxd` command from step 2 again to verify that the incorrect characters were removed.

4. Check all of the credential files using the following command:

```
for f in creds*/*; do xxd $f; done
```

The output will look similar to the following:

```
[root@ip-172-31-20-172 maps_cdb]# for f in creds*/*; do xxd $f; done
0000000: 656d 3761 646d 696e em7admin
0000000: 656d 3761 646d 696e em7admin
0000000: 656d 3761 646d 696e em7admin
0000000: 726f 6f74 root
0000000: 6433 6d30 7379 7331 3233 d3m0sys123
0000000: 6771 6c75 7365 720a gqluser.
```

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