Red Hat CloudForms 4.7

Configuring the Lenovo Physical Infrastructure Provider for Red Hat CloudForms

Adding and configuring the Lenovo physical infrastructure provider in Red Hat CloudForms

Last Updated: 2019-08-02

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Abstract

Adding and configuring the Lenovo physical infrastructure provider in Red Hat CloudForms. If you have a suggestion for improving this guide or have found an error, please submit a Bugzilla report at http://bugzilla.redhat.com against Red Hat CloudForms Management Engine for the Documentation component. Please provide specific details, such as the section number, guide name, and CloudForms version so we can easily locate the content.

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CHAPTER 1. OVERVIEW

The Lenovo® Physical Infrastructure Provider provides IT administrators the ability to integrate the management features of Lenovo XClarity Administrator with the hybrid-cloud management capabilities of Red Hat CloudForms. Lenovo expands the physical-infrastructure management for on-premise cloud configurations by leveraging Lenovo hardware management. It provides the configuration, monitoring, event management, and power monitoring needed to reduce cost and complexity through server consolidation and simplified management.

Key features include:

- Seamlessly integrates with one or more XClarity Administrator virtual appliances, providing a summary view of the Lenovo infrastructure, relationship views of physical servers and virtual hosts, and configuration of servers using Configuration Patterns. In addition, there is a dashboard view that displays the following:
  - The number of servers, switches, racks, and storage systems being mangaged
  - Widgets that display information about server health, availability, and recently discovered servers
- Provides a single interface to monitor Lenovo hardware that is managed by multiple instances of XClarity Administrator
- Automatically discovers hardware that is managed by XClarity Administrator
- Manage devices for use in on-premise cloud deployments
- Provides a timeline of server events
- Uses customizable filters to organize views of managed devices across the data center
- Generates relationships between physical servers and the virtual hosts (such as ESXI, ovirt, KVM, and Red Hat OpenStack)
- Manages current system settings (such as BMC, uEFI, and boot order settings) on the managed devices
- Simplifies system management through custom policies and automation that respond to the health status of hardware devices

CHAPTER 2. CONFIGURING XCLARITY ADMINISTRATOR

XClarity Administrator virtual appliances are connected to CloudForms by adding physical-infrastructure providers. Physical-infrastructure providers enable you to manage and interact with devices that are managed by XClarity Administrator. After the physical-infrastructure provider is added, the devices that are managed by the XClarity Administrator are registered in CloudForms. Managed devices can be monitored, configured, and updated using XClarity Administrator. The physical-infrastructure provider surfaces information about these managed devices and the XClarity Administrator instance.

2.1. SETTING UP XCLARITY ADMINISTRATOR

For information about downloading and setting up XClarity Administrator, see Installing and setting up Lenovo XClarity Administrator in the XClarity Administrator online documentation.

Note: You can use all available features in XClarity Administrator for free for up to 90 days. After 90 days, you can continue to use XClarity Administrator to manage and monitor your hardware for free; however, you must purchase a full-function-enablement license to continue using XClarity Administrator to configure your hardware using Configuration Patterns and to deploy operating systems. Lenovo XClarity Pro provides entitlement to service and support and the full-function-enablement license for XClarity Administrator. For more information about purchasing Lenovo XClarity Pro, contact your Lenovo representative or authorized business partner.

2.2. DISCOVERING AND MANAGING HARDWARE USING XCLARITY ADMINISTRATOR

XClarity Administrator can discover manageable devices in your environment by performing an SLP discovery for devices that are on the same IP subnet as XClarity Administrator. A specified IP address or range of IP addresses also can be used, or information can be imported from a spreadsheet, a process that is known as a *bulk import*. Discovery options can be accessed by clicking **Hardware > Discover and Manage New Devices** from the menu bar. Discovered devices can then be managed by XClarity Administrator. During the management process, you are asked for login credentials for the management controller of the target servers and given the option to create a recovery account for the servers. For more information about discovering and managing devices, see the XClarity Administrator online documentation.

Note:

- Ensure that the devices that you intend to manage are supported by XClarity Administrator. For information about supported devices, see Supported devices in the XClarity Administrator online documentation.
- Ensure that firmware for all devices that you intend to manage using XClarity Administrator are at the required levels. For more information about supported firmware levels, see Supported firmware in the XClarity Administrator online documentation.

CHAPTER 3. MANAGING PHYSICAL-INFRASTRUCTURE PROVIDERS

3.1. ADDING A PHYSICAL-INFRASTRUCTURE PROVIDER

XClarity Administrator virtual appliances are connected to CloudForms by adding physical-infrastructure providers. Physical-infrastructure providers enable you to manage and interact with devices that are managed by XClarity Administrator.

Note: You must be logged in to CloudForms as a user with permission to add providers. The default user is admin, password smartvm.

Complete the following steps for each XClarity Administrator instance that you want to connect to CloudForms.

To connect to a specific XClarity Administrator instance:

1. Navigate to **Compute > Physical Infrastructure > Providers.**
2. Click **Configuration**, then click **Add a New Infrastructure Provider**.
3. Enter a **Name** for the provider (for example, Physical Infrastructure Manager).
4. From the **Type** list, select "Lenovo XClarity".
5. Accept the default **Zone**.
6. In the credentials area, provide the following:
    a. Enter the hostname, IPv4 address, or IPv6 address of the XClarity Administrator instance.
    b. Enter “443” for the API port.
    c. Enter the username and password used to log in to the XClarity Administrator instance.
7. Click **Validate** to confirm that you can connect to the XClarity Administrator instance.
8. Click **Add**.

To discover and then connect to a range of XClarity Administrator instances:

1. Discover XClarity Administrator instances:
    a. Navigate to **Compute > Physical Infrastructure > Providers**
    b. Click **Configuration**, then click **Discover Physical Infrastructure Providers**.
    c. From the **Type** list, select “Lenovo XClarity Administrator.”
    d. Enter the IP address range starting with **From Address** and ending with **To Address**.
    e. Enter the port.
    f. Click **Start** to begin the discovery process.

2. Update credentials for each discovered physical-infrastructure provider (XClarity Administrator instance):

    a. Navigate to **Compute > Physical Infrastructure > Providers**

    b. Select the providers to be edited.

    c. Click the **Configuration** button in the menu.

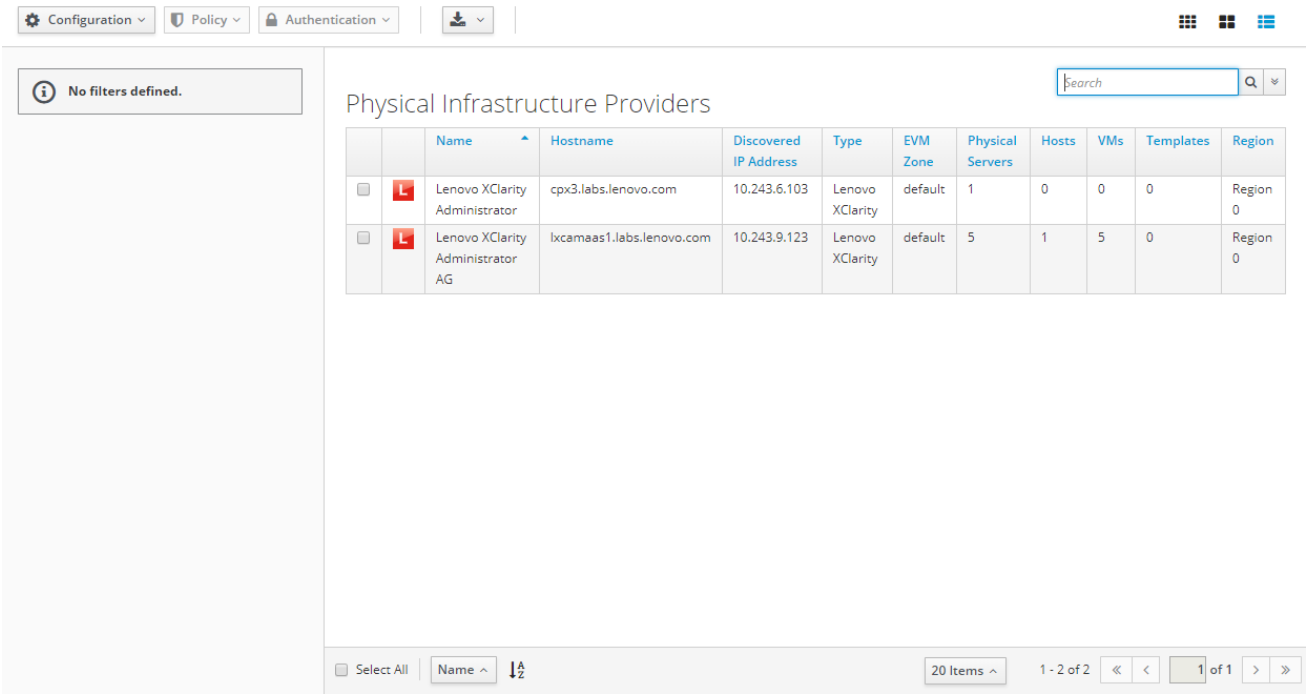
    d. Click **Edit selected infrastructure providers**.

    e. Enter the username and password used to log in to the XClarity Administrator instance.

    f. Click **Validate** to confirm that you can connect to the XClarity Administrator instance.

    g. Click **Save**. A flash message is displayed, confirming your changes were performed successfully.

After adding the physical-infrastructure providers, you can view all available providers by navigating to **Compute > Physical Infrastructure > Providers**as shown below.



3.2. REFRESHING PHYSICAL-INFRASTRUCTURE PROVIDERS

CloudForms regularly polls the physical-infrastructure providers to retrieve the latest data, including managed devices, relationships, and power states. You can manually retrieve the latest data by completing the following steps.

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Select a physical-infrastructure provider to be refreshed.
3. Click **Configuration**, then click **Refresh Relationships and Power States**
4. Click **OK**.

3.3. REMOVING A PHYSICAL-INFRASTRUCTURE PROVIDER

You can delete a physical-infrastructure provider by completing the following steps.

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Select the physical-infrastructure provider to be removed.
3. Click **Configuration**, then click **Remove Infrastructure Providers from Inventory**.
4. Click **OK**.

3.4. EDITING A PHYSICAL-INFRASTRUCTURE PROVIDER

You can modify system settings for a physical-infrastructure provider by completing the following steps.

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Select the physical-infrastructure provider to be modified.
3. Click the **Configuration** button in the menu.
4. Click **Edit selected infrastructure providers**.
5. Make the required changes, and revalidate credentials if necessary.
6. Click **Save**. A flash message is displayed, confirming your changes were performed successfully.

3.5. CHANGING THE PASSWORD OF THE XCLARITY ADMINISTRATOR INSTANCE THROUGH ITS PHYSICAL-INFRASTRUCTURE PROVIDER

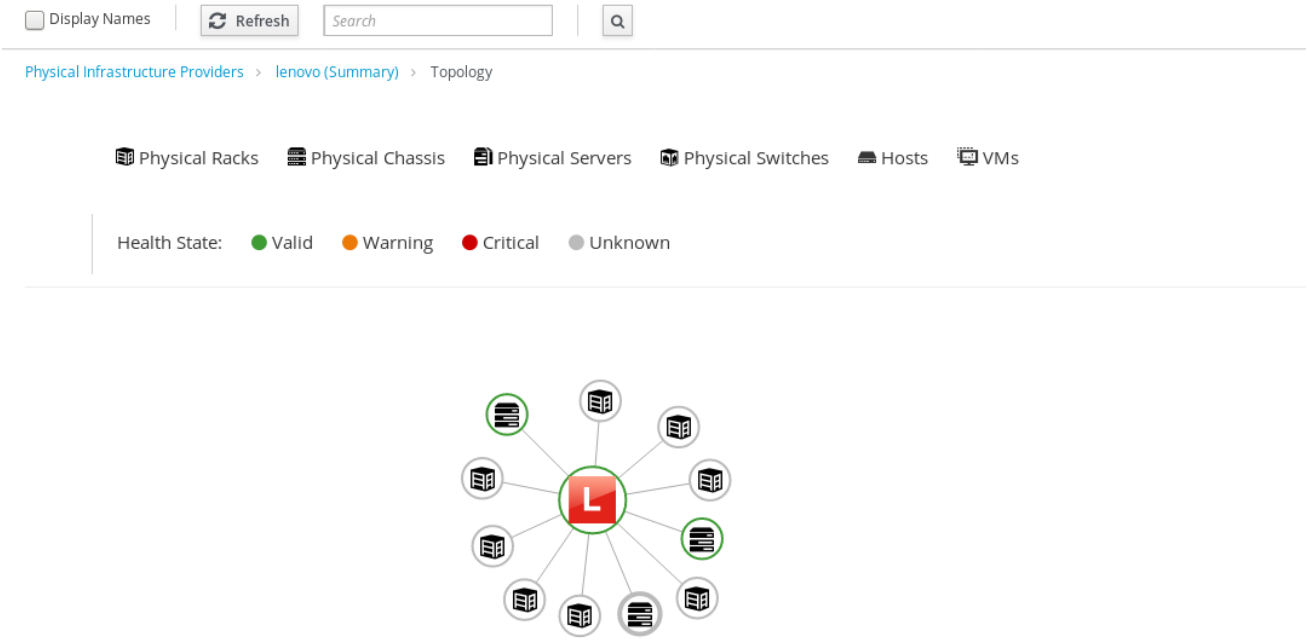
Within CloudForms, you can change the password of an XClarity Administrator instance through the physical-infrastructure provider with which it is associated. Changing the password this way also changes the password in CloudForms so that they match.

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be modified.
3. Click on the **Authentication** button in the top menu and select **Change password**. The Change Password for Physical Infrastructure Provider page is displayed.
4. Enter the current password for the XClarity Administrator instance in the **Current Password** field.
5. Enter the new password in the **New Password** and **Confirm New Password** fields.
6. Click **Save**.

CHAPTER 4. VIEWING RELATIONSHIPS

4.1. VIEWING RELATIONSHIPS BETWEEN PHYSICAL SERVERS AND VIRTUAL HOSTS

CloudForms shows relationships between virtual host systems and physical servers and the virtual hosts for each physical-infrastructure provider. The topology view provides a graphical representation of the relationships, allowing you to easily navigate between connected nodes (see the following figure).



To display the topology view for a specific physical-infrastructure provider, complete the following steps.

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. Once the page loads, ensure that the summary view is being used.
4. Click on **Topology** in the **Overview** table to display the Topology page. From this page, you can perform the following actions:
   - Hide or show all physical server by clicking **Physical Servers**.
   - Hide or show all hosts by clicking **Hosts**.
   - Hide or show all VMs by clicking **VMs**.
   - Hide or show nodes in the graph that have a particular health state by clicking on one of the following states: **Valid**, **Warning**, **Critical**, or **Unknown**.
   - Double-click or right-click a node in the graph to navigate to the summary pages for that node.

4.2. VIEWING SERVER RELATIONSHIPS

You can view a list of all physical servers that are managed by a specific physical-infrastructure provider.

4.2.1. From the physical-infrastructure provider summary view

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the summary view is being used.
4. Click on **Physical Servers** in the **Relationships** table.

4.2.2. From the physical-infrastructure provider dashboard view

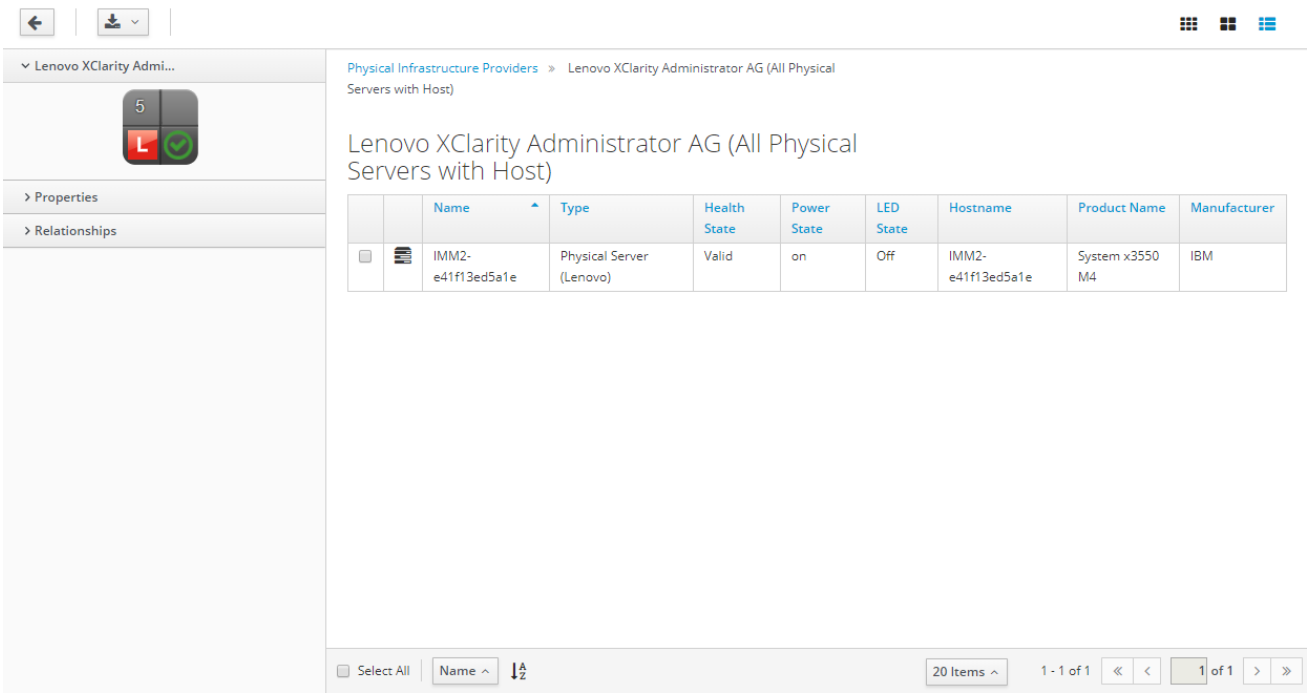
1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the dashboard view is being used.
4. Click on the number of servers that is displayed displayed in the **Servers** card.

4.3. VIEWING VIRTUAL-HOST RELATIONSHIPS

You can view a list of physical servers that are associated with hosts that are managed by a specific physical-infrastructure provider.

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the summary view is being used.
4. Click on **Physical Servers with Host** in the **Relationships** table.

A list of physical servers that are associated with hosts are displayed as shown below.



4.4. VIEWING STORAGE RELATIONSHIPS

You can view a list of all storage systems that are managed by a specific physical-infrastructure provider.

4.4.1. From the physical-infrastructure provider summary view

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the summary view is being used.
4. Click on **Physical Storages** in the **Relationships** table.

4.4.2. From the physical-infrastructure provider dashboard view

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the dashboard view is being used.
4. Click on the number of storage systems that is displayed in the **Storages** card.

4.5. VIEWING SWITCH RELATIONSHIPS

You can view a list of all switches that are managed by a specific physical-infrastructure provider.

4.5.1. From the physical-infrastructure provider summary view

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.

3. After the page loads, ensure that the summary view is being used.
4. Click on **Physical Switches** in the **Relationships** table.

4.5.2. From the physical-infrastructure provider dashboard view

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the dashboard view is being used.
4. Click on the number of switches that is displayed in the **Switches** card.

4.6. VIEWING CHASSIS RELATIONSHIPS

You can view a list of chassis that are managed by a specific physical-infrastructure provider.

4.6.1. From the physical-infrastructure provider summary view

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the summary view is being used.
4. Click on **Physical Chassis** in the **Relationships** table.

4.6.2. From the physical-infrastructure provider dashboard view

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the dashboard view is being used.
4. Click on the number of chassis that is displayed in the **Chassis** card.

4.7. VIEWING RACK RELATIONSHIPS

You can view a list of all racks that are managed by a specific physical-infrastructure provider.

4.7.1. From the physical-infrastructure provider summary view

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the summary view is being used.
4. Click on **Physical Racks** in the **Relationships** table.

4.7.2. From the physical-infrastructure provider dashboard view

1. Navigate to **Compute > Physical Infrastructure > Providers**
2. Click on the physical-infrastructure provider to be viewed.
3. After the page loads, ensure that the dashboard view is being used.
4. Click on the number of racks that is displayed in the **Racks** card.

CHAPTER 5. MANAGING PHYSICAL SERVERS

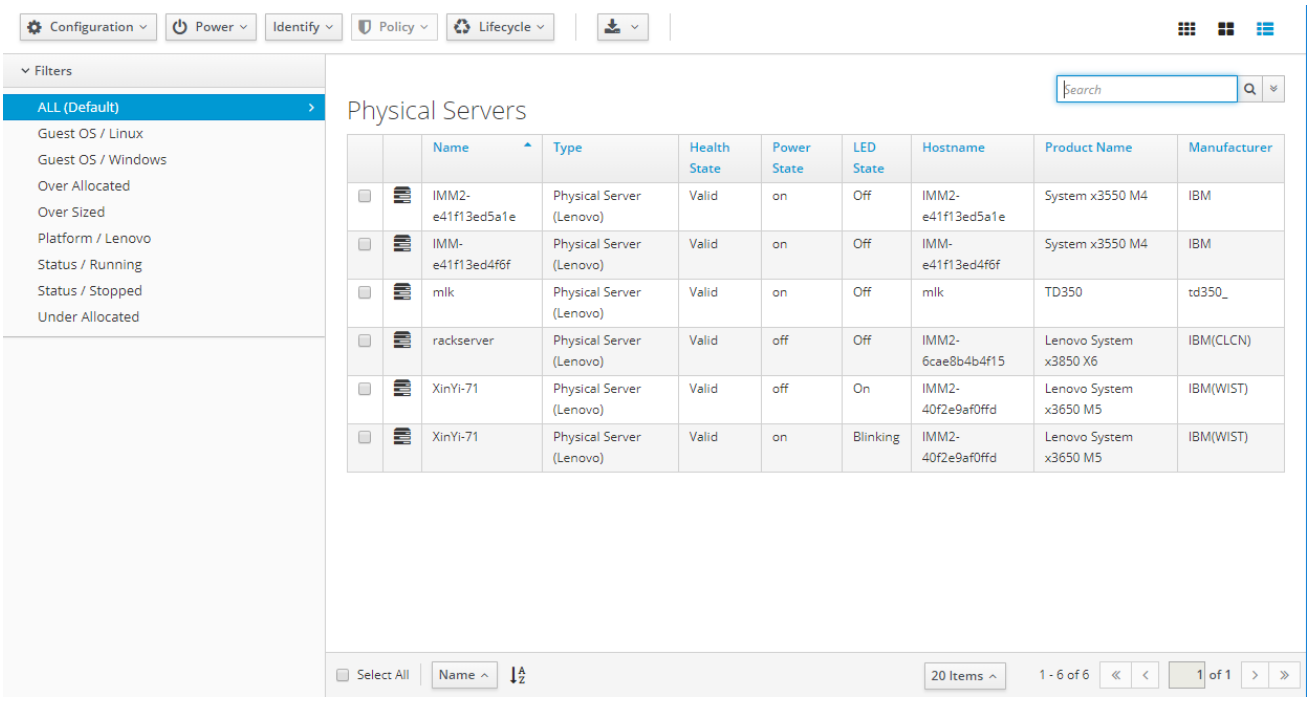
After the Lenovo physical-infrastructure provider is added, the servers that are managed by XClarity Administrator are registered in CloudForms. You can then view and manage those servers.

Note: It may take a few seconds or so for the servers to appear after adding a physical-infrasturcture provider.

5.1. VIEWING A PHYSICAL SERVER

To view a list of all physical servers that are managed by all physical-infrastructure providers, navigate to **Compute > Physical Infrastructure > Servers**The Physical Servers page is displayed (see the following figure).

Tip: You can sort the table columns to make it easier to find specific servers. In addition, you can choose the types of servers to display by selecting server types from the **Filters** drop-down list or entering text (such as a name or IP address) in the **Search** field.



5.2. VIEWING THE TIMELINE FOR A PHYSICAL SERVER

A *timeline* is a tool that enables you to track the state of a physical server over a period of time. This includes power activity, device additions and removals, and firmware changes. The timeline is useful to identify critical failures, identify behavior patterns, audit user actions, and troubleshoot problems.

Note: Timelines are available only for physical servers that have associated events.

To view the timeline with events for a specific physical server, complete the following steps

1. Navigate to **Compute > Physical Infrastructure > Servers**
2. Select the physical server that has events.
3. Click the **Monitoring > Timelines** from the top menu.

4. Select the event types and the period in the options filter. Filters can be used to focus attention on specific messages of interest in a specific time interval.

5. Click **Apply**. The timeline is displayed with events that match the specified filters. You can click an event to view the event details.

5.3. POWERING ON AND OFF A PHYSICAL SERVER

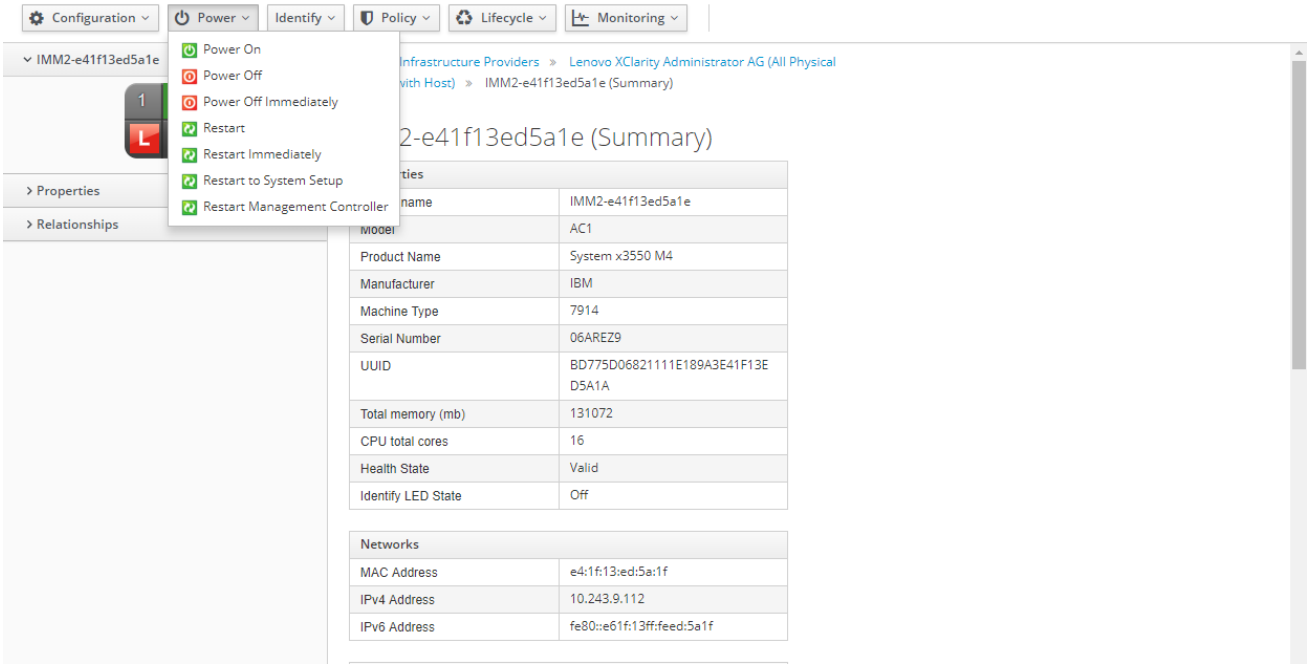
You can perform power operations on the physical servers by completing the following steps.

1. Navigate to **Compute > Physical Infrastructure > Servers**

2. Select the physical server.

3. Click **Power** from the top menu, and then click one of the following power actions:

   - **Power on** - Powers on the server.
   - **Power off** - Shuts down the operating system and powers off the server.
   - **Power off immediately** - Powers off the server.
   - **Restart** - Shuts down the operating system and restarts the server.
   - **Restart immediately** - Restarts the server.
   - **Restart to System Setup** - Restarts the server back to default BIOS/UEFI (F1) Setup.
   - **Restart Management Controller** - Restarts the baseboard management controller in the sever.



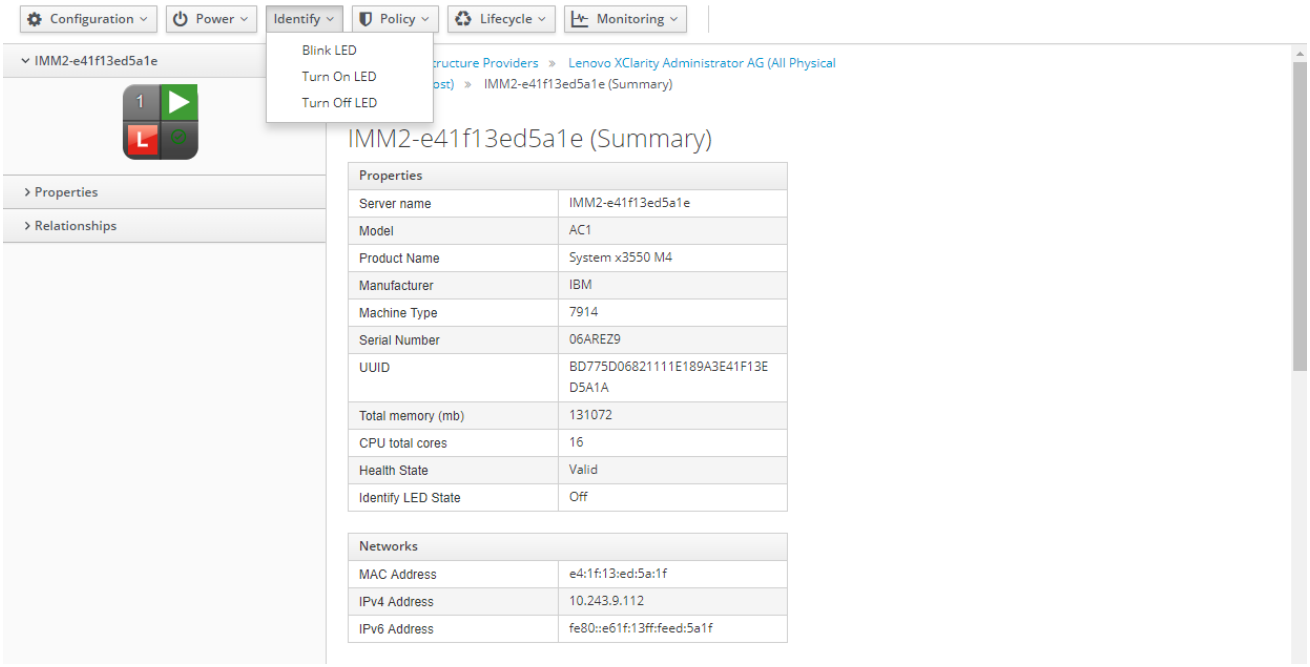
5.4. LOCATING A PHYSICAL SERVER

You can change the Location LED state on a physical server to locate the sever in the data center.

1. Navigate to **Compute > Physical Infrastructure > Servers**

2. Select the physical server.

3. Click **Identify** from the top menu, and then click the appropriate action: **Blink LED**, **Turn On LED**, or **Turn Off LED**.

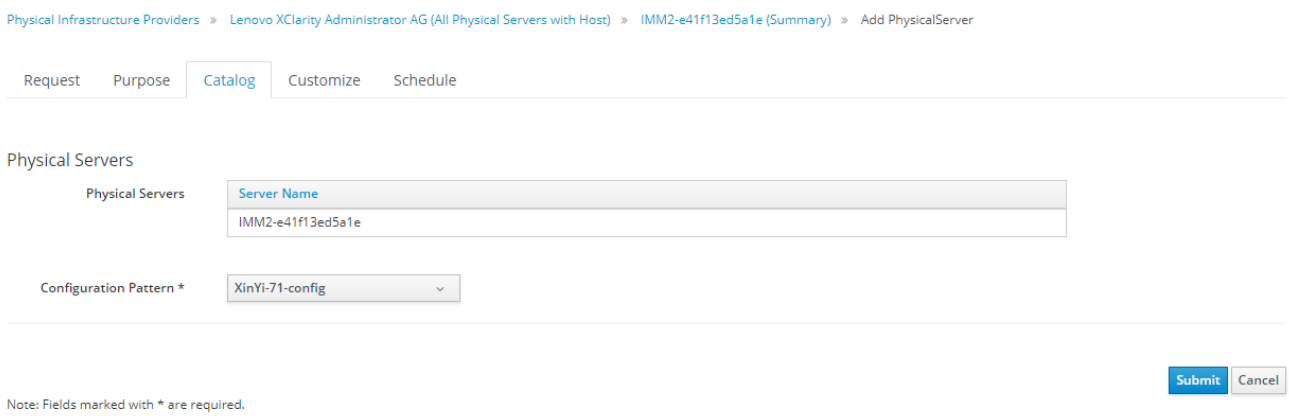


5.5. PROVISIONING PHYSICAL SERVERS USING CONFIGURATION PATTERNS

You can use configuration patterns in XClarity Administrator to quickly provision or preprovision multiple servers from a single set of defined configuration settings. Configuration patterns act as templates for configuring logical storage, I/O adapters, boot order, and other baseboard management controller and Unified Extensible Firmware Interface (UEFI) settings.

A physical-infrastructure provider can discover configuration patterns that are defined on the associated XClarity Administrator instance. A configuration pattern can then be applied to a single or multiple physical servers.

Note: Configuration patterns can be assigned only to physical servers that do not have a pattern assigned to them.



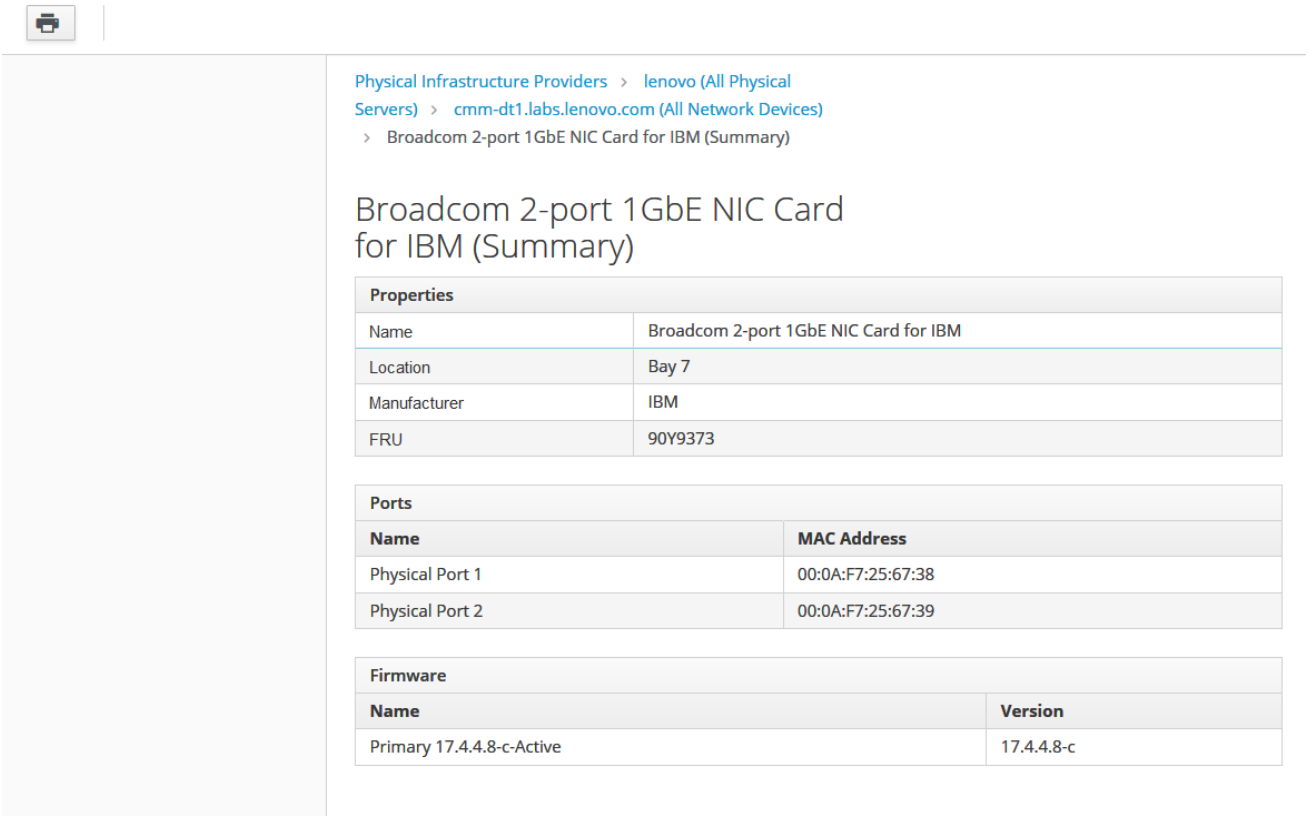
You can deploy a configuration pattern to one or more physical server by completing the following steps.

1. Navigate to **Compute** > **Physical Infrastructure** > **Servers** to display the Physical Servers page.
2. Click a server (to display the server details page) or select multiple servers that you want to provision.
3. Click **Lifecycle** > **Provision Physical Server** from the top menu to display the Add Physical Server page.
4. On the **Request** tab, enter an email address into the **E-Mail** field.
5. On the **Catalog** tab, select the configuration pattern that you want to deploy from the **Configuration Pattern** drop-down menu, and then click **Submit**. The Requests page is displayed.
6. Click the request that was created to deploy the configuration pattern from the **Requests** table. The Apply Configuration Pattern page is displayed.
7. Click the check mark button.
8. Enter the reason for performing this action in the **Reason** field.
9. Click **Submit** to deploy the configuration pattern to the specified server. You can monitor the status of the action in the **Requests** table.

5.6. VIEWING NETWORK DEVICES THAT ARE ASSOCIATED WITH A PHYSICAL SERVER

From the Physical Server Summary page, you can access details about network devices such as network interface cards.

1. Access the Physical Servers page, as described in the Section 5.1, “Viewing a Physical Server” section, and then select a physical server. The Physical Server Summary page is displayed.
2. Click on the **Network Devices** count in the **Properties** table. A list of network devices is displayed.
3. Select a network device from the list. The Network Device Summary page is displayed.



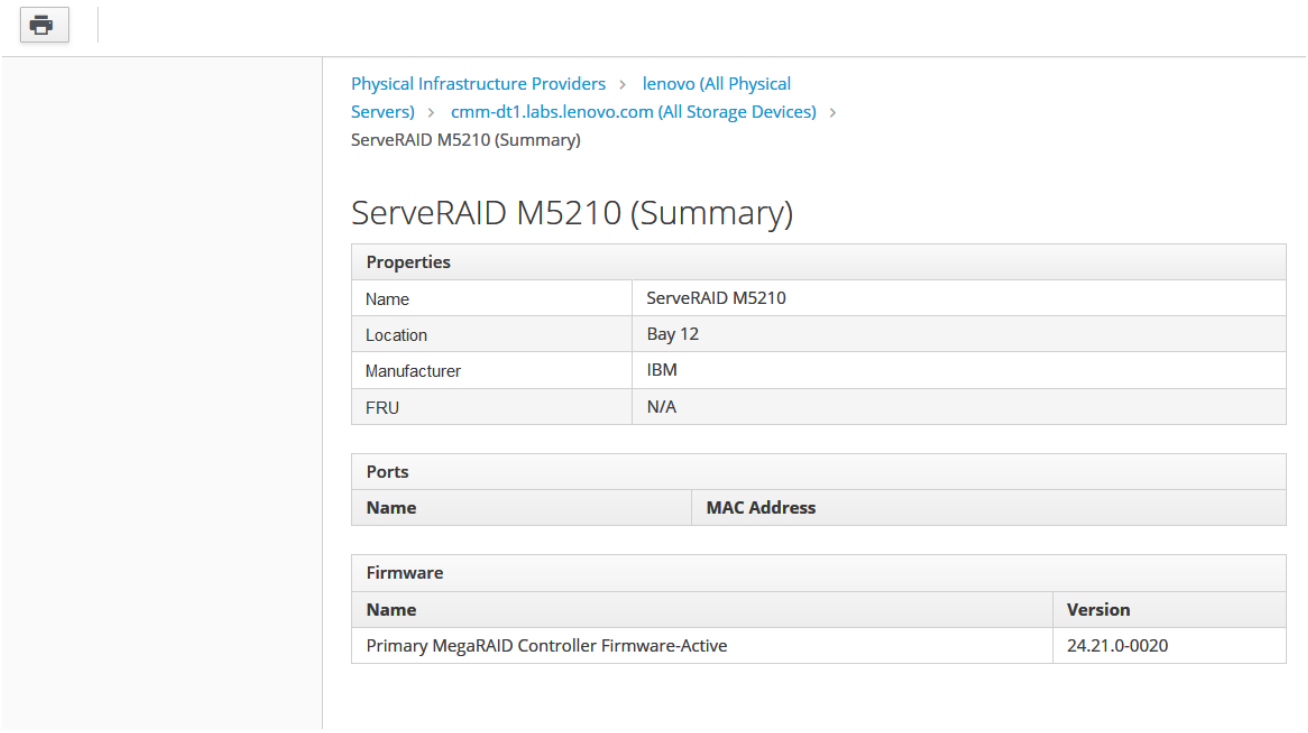
5.7. VIEWING STORAGE DEVICES THAT ARE ASSOCIATED WITH A PHYSICAL SERVER

From the Physical Server Summary page, you can access details about storage devices, such as RAID cards.

1. Access the Physical Servers page, as described in the Section 5.1, "Viewing a Physical Server" section, and then select a physical server. The Physical Server Summary page is displayed.

2. Click on the **Storage Devices** count in the **Properties** table. A list of storage devices is displayed.

3. Select a storage device from the list. The Storage Device Summary page is displayed.



5.8. ADDING PHYSICAL SERVER WIDGETS TO THE DASHBOARD

You can add widgets that display information about physical servers to the default dashboard.

1. Navigate to **Cloud Intel > Dashboard**
2. Click on the **+** button from the top menu, and select one of the following widgets:
   - **Physical Server Availability**
   - **Physical Server Health**
   - **Recently Discovered Physical Servers**

The widget is now displayed on the default dashboard.

5.9. CREATING A USER THAT BELONGS TO THE PHYSICAL INFRASTRUCTURE USERGROUP

You can use the physical infrastructure usergroup to manage physical infrastructures. Users that belong to this group have a default dashboard that contains physical server widgets. The physical server widgets show useful information, such as server health, availability, and recently discovered servers.

To gain the benefits of this usergroup, you must create a new user that belongs to the physical infrastructure group.

1. Follow the steps described in the *Creating a User* section in the *CloudForms General Configuration* documentation. For the group, choose *EvmGroup-physical_infrastructure*.

After the user is created, log in as the new user, and the default dashboard containing physical server widgets is displayed.

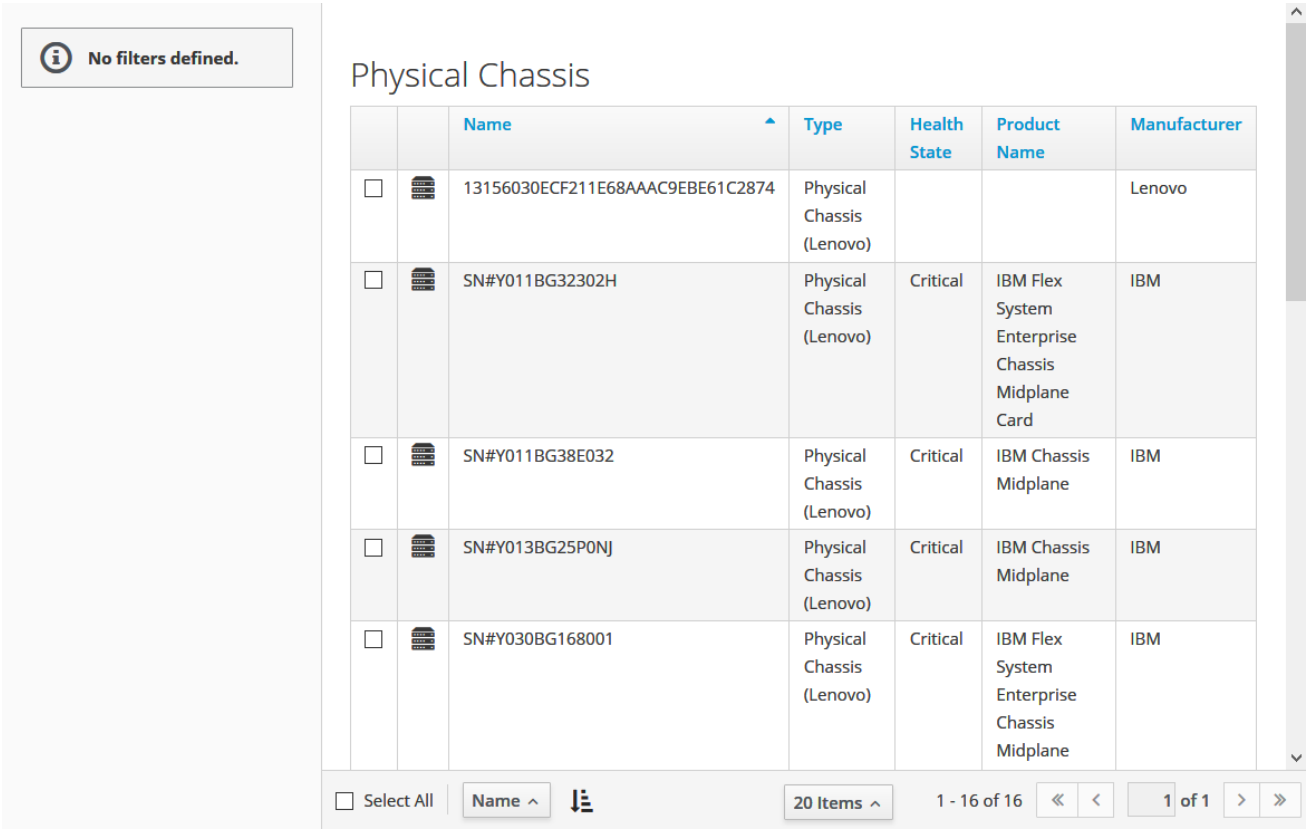
CHAPTER 6. MANAGING PHYSICAL CHASSIS

After the Lenovo physical-infrastructure provider is added, the physical chassis that are managed by XClarity Administrator are registered in CloudForms. You can then view and manage the chassis.

6.1. VIEWING PHYSICAL CHASSIS

To view a list of all physical chassis that are managed by all physical-infrastructure providers, navigate to **Compute** > **Physical Infrastructure** > **Chassis** The Physical Chassis page is displayed (see the following figure).

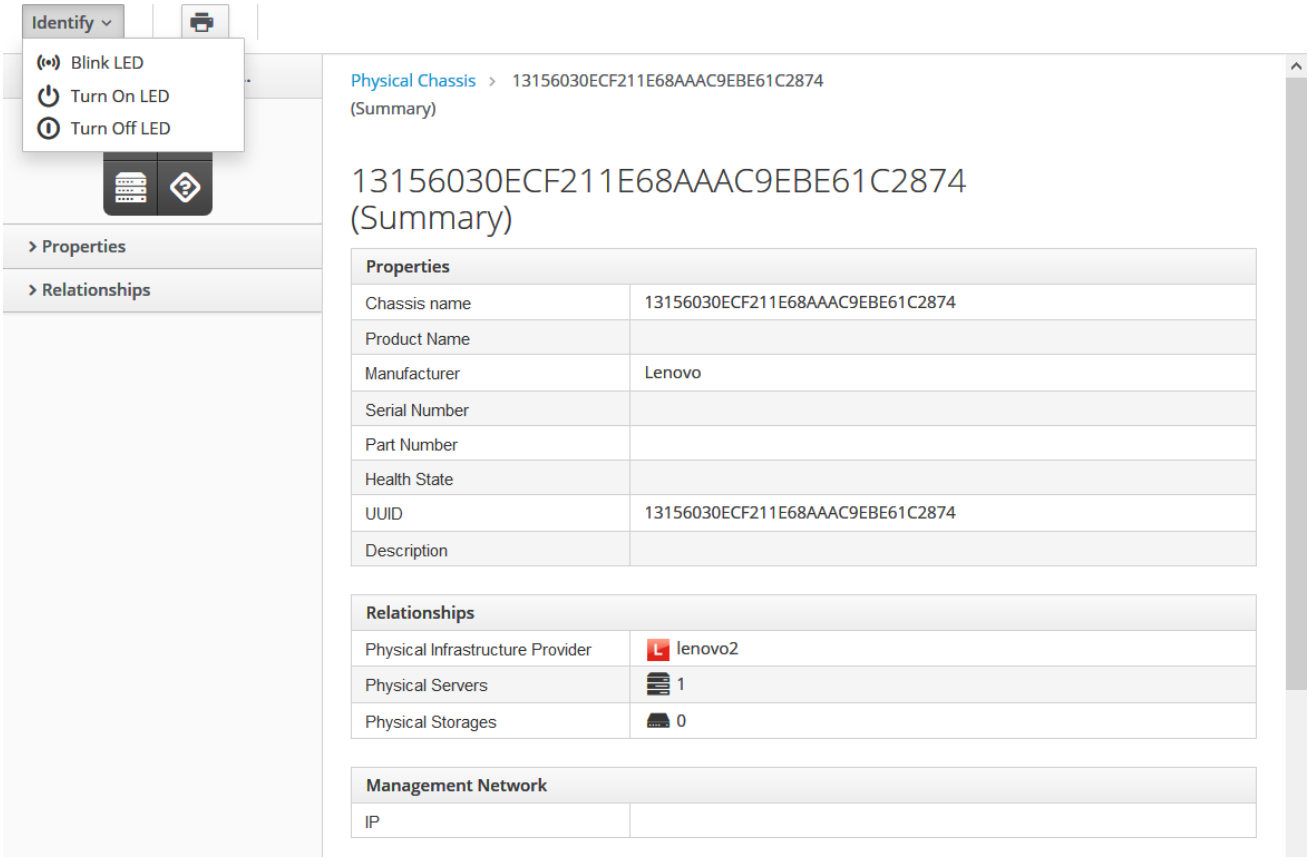
Tip: You can sort the table columns to make it easier to find a specific chassis.



6.2. LOCATING A PHYSICAL CHASSIS

You can change the Location LED state on a physical chassis to locate a chassis in the data center.

1. Navigate to **Compute** > **Physical Infrastructure** > **Chassis**
2. Select the physical chassis. The Physical Chassis Summary page is displayed.
3. Click on **Identify** in the top menu, and then click on the appropriate action: **Blink LED**, **Turn On LED**, or **Turn Off LED**.


Identify
Blink LED
Turn On LED
Turn Off LED
Physical Chassis > 13156030ECF211E68AAAC9EBE61C2874
(Summary)
13156030ECF211E68AAAC9EBE61C2874
(Summary)
> Properties
> Relationships
Properties
Chassis name 13156030ECF211E68AAAC9EBE61C2874
Product Name
Manufacturer Lenovo
Serial Number
Part Number
Health State
UUID 13156030ECF211E68AAAC9EBE61C2874
Description
Relationships
Physical Infrastructure Provider lenovo2
Physical Servers 1
Physical Storages 0
Management Network
IP

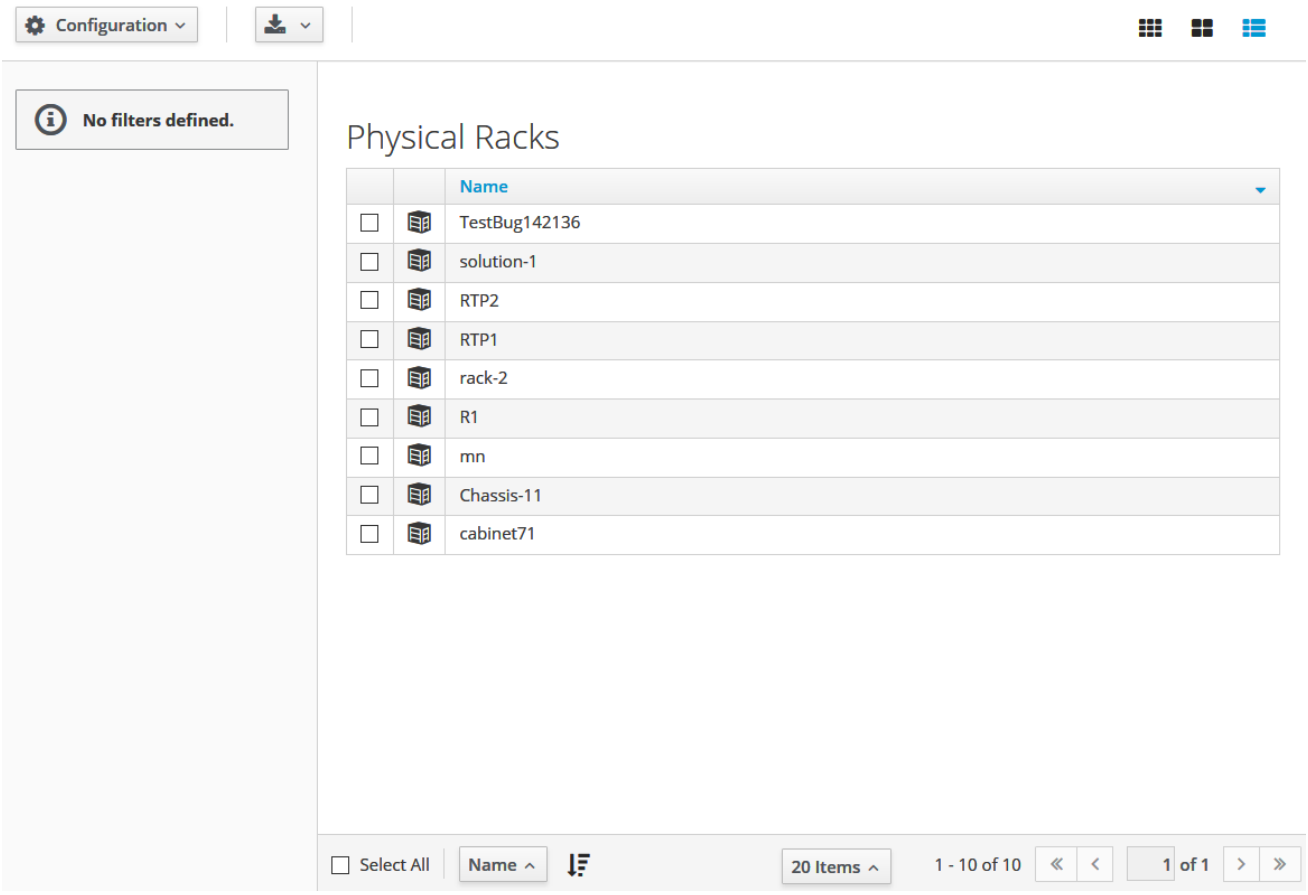
CHAPTER 7. MANAGING PHYSICAL RACKS

After the Lenovo physical-infrastructure provider is added, the physical racks that are managed by XClarity Administrator are registered in CloudForms. You can then view and manage the racks.

7.1. VIEWING PHYSICAL RACKS

To view a list of all physical racks that are managed by all physical-infrastructure providers, navigate to **Compute** > **Physical Infrastructure** > **Racks**The Physical Racks page is displayed (see the following figure).

Tip: You can sort the table columns to make it easier to find a specific rack.



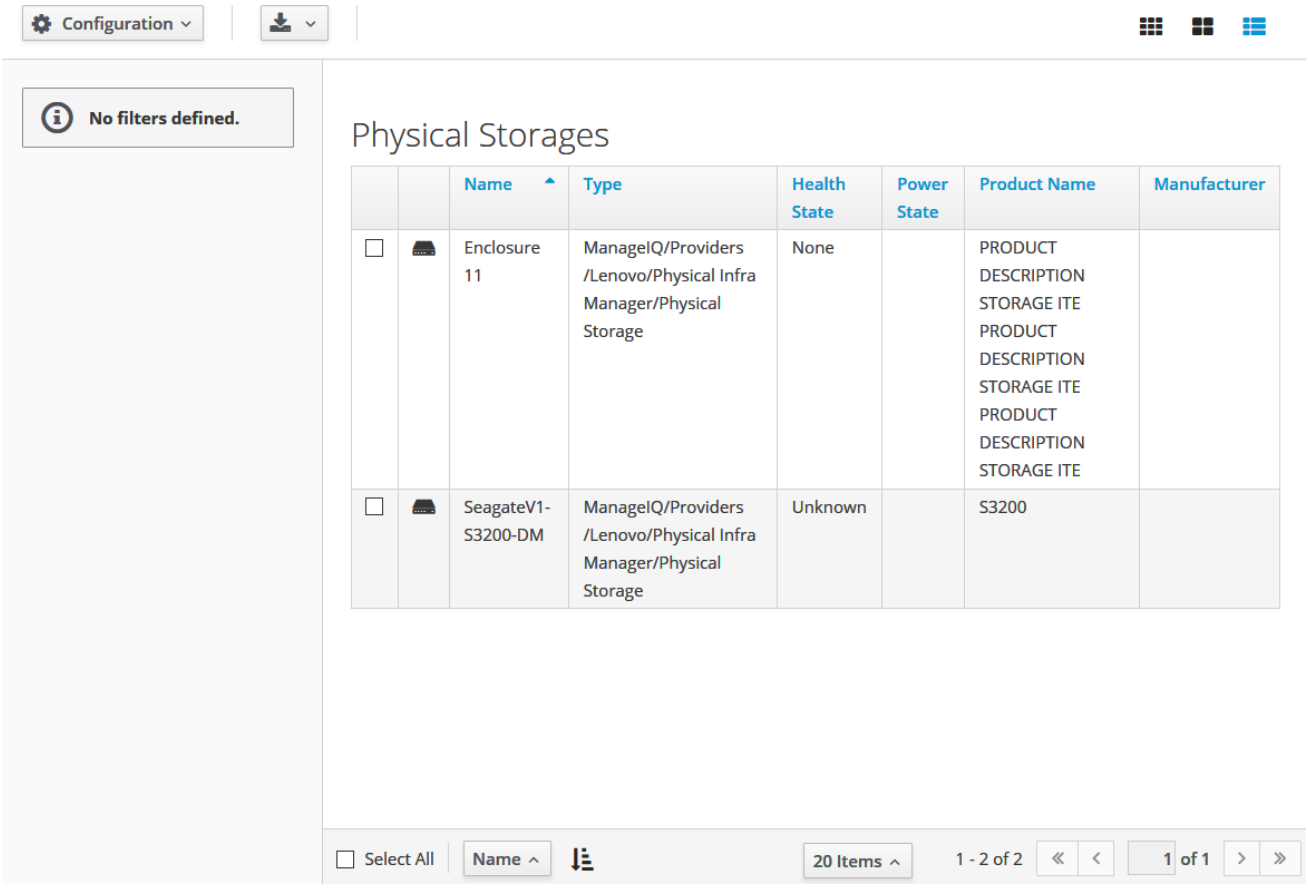
CHAPTER 8. MANAGING PHYSICAL STORAGE SYSTEMS

After the Lenovo physical-infrastructure provider is added, the physical storage systems that are managed by XClarity Administrator are registered in CloudForms. You can then view and manage the storage systems.

8.1. VIEWING PHYSICAL STORAGE SYSTEMS

To view a list of all physical storage systems that are managed by all physical-infrastructure providers, navigate to **Compute > Physical Infrastructure > Storages** The Physical Storages page is displayed (see the following figure).

Tip: You can sort the table columns to make it easier to find a specific storage system.



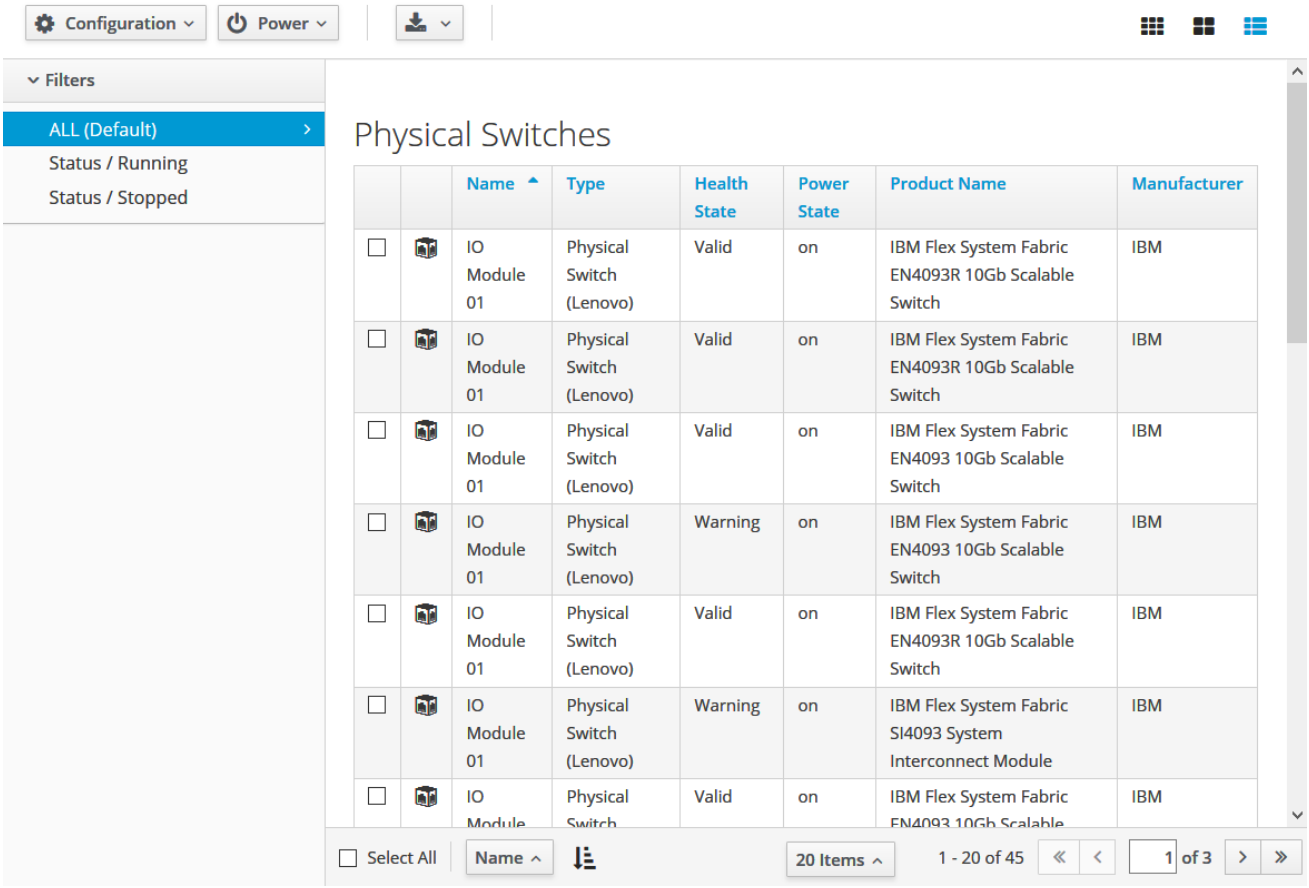
CHAPTER 9. MANAGING PHYSICAL SWITCHES

After the Lenovo physical-infrastructure provider is added, the physical switches that are managed by XClarity Administrator are registered in CloudForms. You can then view and manage the switches.

9.1. VIEWING PHYSICAL SWITCHES

To view a list of all physical switches that are managed by all physical-infrastructure providers, navigate to **Compute > Physical Infrastructure > Switches** The Physical Switches page is displayed (see the following figure).

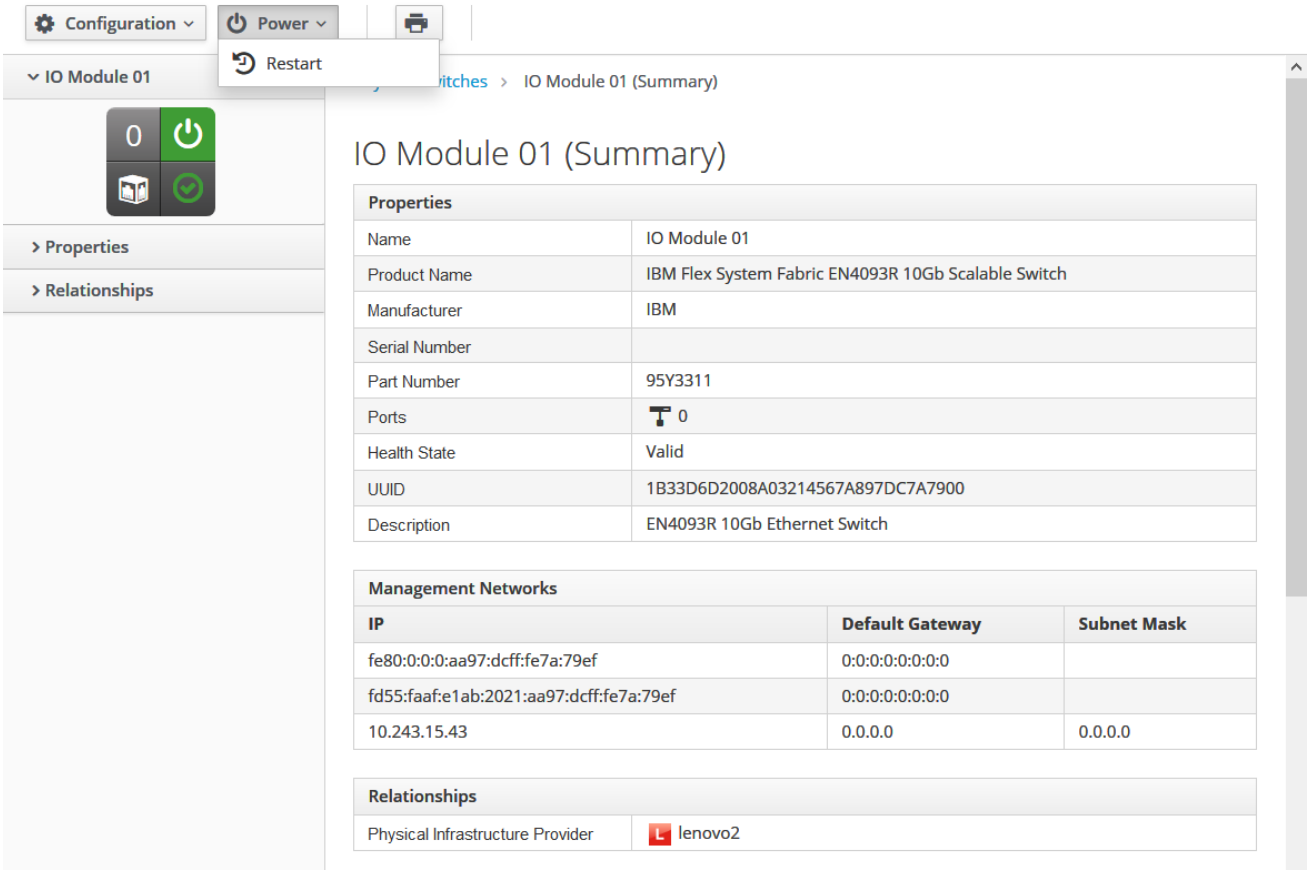
Tip: You can sort the table columns to make it easier to find a specific switch.



9.2. RESTARTING PHYSICAL SWITCHES

You can restart a physical switch that is managed by the physical-infrastructure provider.

1. Navigate to **Compute > Physical Infrastructure > Switches**
2. Select a physical switch. The Physical Switches Summary page is displayed.
3. Click on **Power** in the top menu, and then click on **Restart**.


Configuration
Power
Restart
IO Module 01
0
Properties
Relationships
itches › IO Module 01 (Summary)
IO Module 01 (Summary)
Properties
Name
IO Module 01
Product Name
IBM Flex System Fabric EN4093R 10Gb Scalable Switch
Manufacturer
IBM
Serial Number
Part Number
95Y3311
Ports
0
Health State
Valid
UUID
1B33D6D2008A03214567A897DC7A7900
Description
EN4093R 10Gb Ethernet Switch
Management Networks
IP
Default Gateway
Subnet Mask
fe80:0:0:0:aa97:dcff:fe7a:79ef
0:0:0:0:0:0:0:0
fd55:faaf:e1ab:2021:aa97:dcff:fe7a:79ef
0:0:0:0:0:0:0:0
10.243.15.43
0.0.0.0
0.0.0.0
Relationships
Physical Infrastructure Provider
lenovo2

CHAPTER 10. AUTOMATING TASKS BASED ON EVENTS

You can use CloudForms to automatically perform specific tasks when certain events occur on servers that are managed by XClarity Administrator through a Lenovo physical-infrastructure provider. To create an automation task, you must create and configure a custom domain. To automatically invoke the task when a certain event occurs, you must create, configure and assign a custom policy.

For more information about the CloudForms automation function, see Scripting Actions in CloudForms website.

10.1. CREATING AN AUTOMATED TASK

To create an automated task, you must first create and configure a custom domain.

A *domain* is a collection of tasks that can be automated. The tasks are run in a sequence that is defined by the domain priority. A task in a domain with a higher priority overrides the same task in a lower-priority domain. In this way, CloudForms provides core domains and allows you to override automated tasks using your own custom domains.

Each domain contains a set of namespaces. A *namespace* is a container that organizes and categorizes tasks. A namespace can contain child namespaces as well as classes.

A *class* is a template for a specific task. A class uses a schema to populate a class instance with default values. A class instance can contain attributes, calls to methods, and relationships.

The *methods* define the task that you want to perform. It uses Ruby code to run the various operations.

As an example, the following steps describe how to create an automated task for performing a power action (such as powering on, power off, or restarting the server) on the physical server which is first detected by the Lenovo physical-infrastructure provider.

Note: You must be logged in to CloudForms as a user with permission to create domains. The default user is admin, password smartvm.

10.1.1. Step 1. Create a custom domain.

1. Navigate to **Automation > Automate > Explorer**.
2. Click **Configuration > Add a New Domain** from the top menu.
3. Enter a domain name (for example, Lenovo).
4. Select **Enable** to enable the domain.
5. Click **Add**.

10.1.2. Step 2. Add the LenovoXclarity and Event Handler class to the custom domain.

1. Copy the LenovoXclarity class to the custom domain.
   a. Select the **ManageIQ** core domain.
   b. Navigate to **ManageIQ > System > Event > EmsEvent > LenovoXclarity**

c. Click **Configuration > Copy this Class**from the top menu.

d. Select the custom domain from the **To Domain** drop-down menu.

e. Click **Copy**.

2. Copy the Event Handler class to the custom domain.

a. Select the **ManageIQ** core domain.

b. Navigate to **ManageIQ > System > Event Handlers**

c. Select the instance that you wish (for example, event_action_policy).

d. Click **Configuration > Copy this Instance**from the top menu.

e. Select the custom domain from the **To Domain** drop-down menu.

f. Click **Copy**.

g. Select the **event_action_policy** method.

h. Click the **Configuration** icon, and then click the **Copy this method** icon.

i. Click **Copy**.

3. Create a new instance of the LenovoXclarity class.

a. Select the **ManageIQ** core domain.

b. Navigation to name of the custom domain (for example, Lenovo), and click **System > Event > EmsEvent >LenovoXclarity**.

c. Click **Configuration > Add a new Instance**from the top menu.

d. Enter a name for the new class instance (for example, FQXHMTS0003G, which is the event that is generated when inventory data cannot be retrieved from a device).
Important: The class-instance name must be the same as the name of the event that triggers the task to be invoked. CloudForms matches the class instance with the event by this name. To find the event name, see Messages in the XClarity Administrator online documentation.

e. Add the path to the event handlers copied in the field's **rel3**.
There are three available policy operations:

- Physical Server Reset
- Physical Server Start
- Physical Server Shutdown
  There are three available policy events:
- physical_server_reset
- physical_server_start
- physical_server_shutdown

The policy actions and the policy events must match. For example, use the following path to the policy operation **Physical Server Shutdown**:

```
/System/event_handlers/event_action_policy?
target=physical_server&policy_event=physical_server_shutdown&param=
```

The policy_event value is matched with the policy operation applied.

f. Click **Add**.

10.1.3. Step 3. Create a namespace.

1. Select the custom domain (**Lenovo**) .
2. Click **Configuration > Add a New Namespace**from the top menu.
3. Enter a unique name for the namespace (for example, Functions).
4. Click **Add**.

10.1.4. Step 4. Create a class.

1. Select the namespace that you created in the previous step (for example, Functions).
2. Click **Configuration > Add a New Class**from the top menu.
3. Enter a unique name for the class (for example, Power_actions).
4. Click **Add**.

10.1.5. Step 5. Create a method for the class.

1. Create a method.
   a. Select the class that you created (for example, Power_actions).
   b. Click the **Methods** tab.
   c. Click **Configuration > Add a new method**from the top menu.
   d. Select **“inline”** for the type.
   e. Enter a name for the method (for example, power_off).
   f. Enter the following script in the **Data** field:

```
server = $evm.vmdb('PhysicalServer').first
$evm.log(:info, "Powering Server #{server.name} OFF")
server.power_off
exit MIQ_OK
```

   g. Click **Validate** to verify the syntax.
   h. Click **Add**.

2. Add a schema to the class.
    a. Select the class that you created (for example, Power_actions).
    b. Select the **Schema** tab.
    c. Click **Configuration > Edit selected Schema**from the top menu.
    d. Click the **+** icon to add a field to the schema.
    e. Enter **"execute"** for the name.
    f. Select **"Method"** for the type.
    g. Select **"String"** for the data type.
    h. Enter **"Power_actions"** for the default value.
    i. Click the check mark icon.
    j. Click **Save**.
3. Add the method to the class.
    a. Select the **Instances** tab.
    b. Enter the name of the method that you created earlier (for example, power_off).
    c. Click **Add**.

10.2. INVOKING AN AUTOMATED TASK WHEN AN EVENT OCCURS

To automatically invoke the task when a certain event occurs, you must create, configure and assign a custom policy.

As an example, the following steps describe how to perform a specific automated task when CloudForms receives certain events (that you define).

Note: You must be logged in to CloudForms as a user with permission to create policies. The default user is admin, password smartvm.

10.2.1. Step 1. Create and configure a policy.

1. Navigate to **Control > Explorer**.
2. Click **Policies > All Policies > Control Policies > Physical Infrastructure Control Policies**
3. Click **Configuration > Add a new Physical Server Control Policy**from the top menu.
4. Enter a description (for example, Lenovo_Policy).
5. Click **Add**.

10.2.2. Step 2. Create a custom action.

1. Create a custom action.

a. Navigation to **Action > All Actions**.

b. Click **Configuration > Add a new action** from the top menu.

c. Enter a description (for example, Power_Off_Server).

d. For Action Type select **Invoke a custom Automation**.

e. Enter a message (for example, create).

f. Fill the Request field with **Call_Instance**.

g. Specify the following attributes in the order give:

- Specify the **Namespace** attribute, and set the value to the new domain and namespace (<domain_name>/<namespace>) (for example, Lenovo/Functions).
- Specify the **Class** attribute, and set the value to the class (for example, Power_actions).
- Specify the **Instance** attribute, and set the value to the instance (for example, Physical_Server_PowerOff).

h. Click **Add**.

2. Configure the policy that you created.

a. Select the new policy (for example, Lenovo_Policy).

b. Click **Configuration > Edit this policy's Event assignments** from the top menu.

c. Find Physical Server operation, and select the **Physical Server Shutdown** option.

d. Click **Save**.

e. Select the new policy event.

f. Click **Configuration > Edit Actions for this policy Event** from the top menu.

g. From the **Order of Actions if All Conditions are True** field, select the custom action that you created in the previous step (for example, Power_Off_Server).

h. Click **Save**.

10.2.3. Step 3. Create and assign a policy profile.

1. Create a policy profile.

a. Click **Policy Profiles > All Policy Profiles**

b. Click **Configuration > Add a new Policy Profile** from the top menu.

c. Enter a description for the policy (for example, Lenovo_Policy_Profile).

d. Select your policy and drag it to the right.

e. Click **Add**.

2. Assign the policy profile to the Lenovo physical-infrastructure providers:

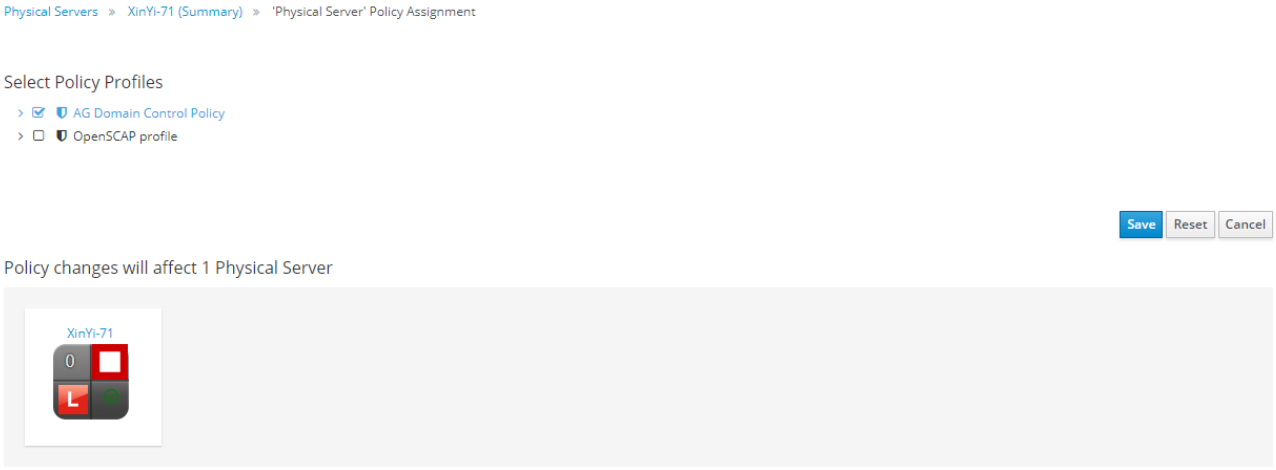
a. Navigate to **Compute > Physical Infrastructure > Providers**

b. Select the physical-infrastructure providers to which you want to assign the policy profile.

c. Click **Policy > Manage Policies** form the top menu.

d. Select the policy profile that you just created (for example, Lenovo_Policy_Profile).

e. Click **Save**.



CHAPTER 11. CREATING AN ALERT TO MONITOR PHYSICAL SERVER HEALTH

Note: For this alert to work correctly, you must first configure the SMTP settings in CloudForms by following instructions in the *Outgoing SMTP Email Settings* section in the *CloudForms Configuration* documentation.

In CloudForms, there is a configurable alert for physical servers that sends an alert email when a server that is assigned to the alert is in an unhealthy state. This alert can be used to notify IT administrators that a server is in an unhealthy state, so that they can investigate and resolve potential issues before the issues lead to downtime.

To enable this alert, you must create a physical server alert profile, assign servers to the profile, and then configure the alert that is associated with the profile.

11.1. STEP 1. CREATE A PHYSICAL SERVER ALERT PROFILE

1. Navigate to **Control** > **Explorer**.
2. Click **Alert Profiles** > **Physical Server Alert Profiles**
3. Click **Configuration** > **Add a New Physical Server Alert Profile** from the top menu.
4. Enter a description into the **Description** field.
5. Select **Physical server has critical health state** from the **Available Physical Server Alerts** list, and click on the > button to add it to the **Profile Alerts** list on the right.
6. Click **Add**.

11.2. STEP 2. ASSIGN SERVERS TO THE ALERT PROFILE

1. Click **Alert Profiles** > **Physical Server Alert Profiles** > ***ProfileName***, where *ProfileName* is the name of the physical server alert that was previously created.
2. Click **Configuration** > **Edit assignments for this Alert Profile**
3. Choose **Selected Servers** from the **Assign To** dropdown menu.
4. Select the checkboxes next to the servers that you want to assign to the profile from the **Selections** list.
5. Click **Save**.

11.3. STEP 3. CONFIGURE THE ALERT ASSOCIATED WITH THE ALERT PROFILE

1. Click **Alert Profiles** > **Physical Server Alert Profiles** > ***ProfileName*** > **Physical server has critical health state**, where *ProfileName* is the name of the physical server alert profile that was previously created.
2. Click **Configuration** > **Edit this Alert** from the top menu.
3. Select the **Active** checkbox to enable the alert.

4. Optionally, increase the notification frequency by selecting a new value from the **Notification Frequency** dropdown menu. The default frequency is one hour.

5. Ensure that the **Send an E-mail** checkbox is selected.

6. Optionally, enter a value into the **From** field. By default, the *cfadmin@cfserver.com* address is used.

7. Enter the email address that you want to retrieve the alert notification in the **Add** field, and then click the **+** button. The email address is displayed in the **To** field.

8. Click **Save**.

The assigned servers are checked hourly, and a notification is sent through email if the any of the assigned servers have a critical health state.

CHAPTER 12. CREATING A POLICY TO POWER ON SERVERS THAT ARE POWERED OFF

In CloudForms, there is a control policy for physical servers that automatically powers a server back on when it is powered off.

To enable this policy, you must assign the physical infrastructure profile to a server.

1. Navigate to **Compute > Physical Infrastructure > Servers** to display the Physical Servers page.
2. Click a server (to display the Physical Server Summary page), or select multiple servers that you want to provision.
3. Click **Policy > Manage Policies** from the top menu. The Physical Server Policy Assignment page is displayed.
4. Select the **Physical Infrastructure Profile** checkbox.
5. Click **Save**.

The policy is now assigned to the server.

CHAPTER 13. UPDATING PHYSICAL SERVER FIRMWARE USING ANSIBLE PLAYBOOKS

In CloudForms, physical server firmware can be updated using an Ansible playbook.

Note: An Ansible Tower provider that points to an Ansible Tower instance must be added to CloudForms. See the *Adding an Ansible Tower Provider* section in the *CloudForms Managing Providers* documentation.

1. Within Ansible Tower, create a job template for the *config.yml* playbook. Specify *update_firmware* as the job tag and any extra variables that are required by the playbook. Ensure that the option to prompt on launch is enabled. You can use this playbook to upgrade firmware on a physical server. You can get this playbook from the web at https://galaxy.ansible.com/lenovo/lxca-config.

2. Follow the steps that are described in the *Executing an Ansible Tower Job Template from a Service Catalog* section in the *CloudForms Managing Providers* documentation. Use the job template that you created in the previous step.

CHAPTER 14. PROVISIONING PHYSICAL SERVERS USING ANSIBLE PLAYBOOKS

In CloudForms, XClarity Administrator configuration patterns can be used to provision physical servers through the use of an Ansible playbook. Configuration patterns act as templates for configuring logical storage, I/O adapters, boot order, and other baseboard management controller and Unified Extensible Firmware Interface (UEFI) settings.

Note: An Ansible Tower provider that points to an Ansible Tower instance must be added to CloudForms. See the *Adding an Ansible Tower Provider* section in the *CloudForms Managing Providers* documentation.

1. Within Ansible Tower, create a job template for the *config.yml* playbook. Specify *apply_configpatterns* as the job tag and any extra variables that are required by the playbook. Ensure that the option to prompt on launch is enabled. You can use this playbook to apply a configuration pattern to a physical server. You can get this playbook from the web at https://galaxy.ansible.com/lenovo/lxca-config.

2. Follow the steps that are described in the *Executing an Ansible Tower Job Template from a Service Catalog* section in the *CloudForms Managing Providers* documentation. Use the job template that you created in the previous step.