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<th>Changes</th>
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<tr>
<td>2016/09/05</td>
<td>2.0</td>
<td>First release of new version.</td>
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Preface

This preface includes the following sections:

- About This Manual
- Audience
- Conventions
- Related Document
- More Information

About This Manual

Wiwynn Cluster Manager is a rack solution software that features auto/manual configuration and deployment of hardware, operating system, network and software.

This user manual contains information on how to install and use the Cluster Manager functions.

Audience

This manual is intended primarily for data center administrators with responsibilities and expertise in server, storage and network aspects.
Conventions

<table>
<thead>
<tr>
<th>Text Type</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>GUI elements</td>
<td>GUI elements such as tab titles, area names, and field labels appear in this font.</td>
</tr>
<tr>
<td></td>
<td>Main titles such as window, dialog box, and wizard titles appear in this font.</td>
</tr>
<tr>
<td>Documents/files</td>
<td>Documents/files appear in this font.</td>
</tr>
<tr>
<td>Variables/Parameters</td>
<td>Variables/Parameters appear in this font.</td>
</tr>
<tr>
<td>Notes</td>
<td>Notes appear in this font</td>
</tr>
<tr>
<td>Commands</td>
<td>Commands appear in this font</td>
</tr>
<tr>
<td>Protocols</td>
<td>Protocols appear in this font</td>
</tr>
</tbody>
</table>

Related Document

- Wiwynn Cluster Manager Installation Guide - refer to this document if you need to install Cluster Manager.

More Information

For more information and related news regarding Cluster Manager, please visit our website: http://www.wiwynn.com/
1. Overview

This user manual introduces the functions of Wiwynn Cluster Manager and the operations of its web-based graphical user interface (Cluster Manager Dashboard), including asset management, health monitoring, and firmware management. This document is still under development to cover more functions, such as OS deployment, resource provisioning, orchestration, and diagnosis. Check with Wiwynn if you are interested in these parts.

Cluster Manager provides RESTful API as well as a web-based GUI. This user manual focuses on the GUI operations. Refer to the Cluster Manager API Programming Guide if you intend to integrate Wiwynn Cluster Manager with other systems.
1.1 Product Description

Cluster Manager is a suite of software modules realizing the so-called software-defined datacenter (SDDC). As shown in Figure 1, Cluster Manager comprises 11 modules and can be installed incrementally as long as the modules in the lower layers are fulfilled first before installing those in the upper layer. This manual is focused on the following modules: Fundamental, Image/package management, Deployment, Orchestration, Notification and Monitoring.

![Figure 1 Modules of Cluster Manager](image-url)
1.2 Key Features

- **Asset Management**

  Cluster Manager tracks your hardware assets through their operation cycles. The assets include racks, blades (physical machines), chassis, switches and JBODs. Cluster Manager also provides maintenance functions for upgrading and recovering firmware like BMC and BIOS.

- **Health Monitoring**

  Cluster Manager helps you to monitor and log hardware health. Two kinds of health are monitored: sensors controlled by BMC (Out-Of-Band data) and system utilization of blade (In-Band data). All user actions in Cluster Manager are logged to facilitate monitoring all of mal-behavior by data center administrators.

- **Image Management**

  Cluster Manager provides an interface for uploading and managing image files used for operating system deployment and virtual machine creation.

- **User Management**

  Cluster Manager provides functions for managing users and groups.

- **Settings**

  **Settings** provides system configuration such as updating the user password.
1.3 Target Audience

This user manual is intended primarily for data center administrators, infrastructure managers and system operators.

1.4 Abbreviation and Terminology

- **Pod** - a collection of racks in a management domain. A pod belongs to a company, an organization, or a person, who owns or rents the hardware assets in the racks.

- **Blade** - a bare metal server node in which an operating system or **hypervisor** can be running. Here, a blade is composed of CPU(s), system memory, mainboard and necessary devices but does not imply any form factor. A chassis may contain multiple blades.
2. Getting Started

This chapter covers the prerequisites to access the Cluster Manager Dashboard and a quick guide of Cluster Manager. Cluster Manager must be properly installed before you can access and use it. If you have not yet installed Cluster Manager, please refer to the Wiwynn Cluster Manager Installation Guide.

2.1 Preparation

If the racks to be managed are from Wiwynn, you could ask our representatives for the rack configuration file which contains detailed information of the hardware assets and can be imported into Cluster Manager to greatly simplify the initialization processes. A rack configuration file is optional for running Cluster Manager.
2.2 Login

After installing Cluster Manager, the installer shows you the URL for the Cluster Manager Dashboard. After opening the URL, you see the login page as shown in Figure 2.

The default root account of Cluster Manager is as follows.

User name: cm_cloud_admin

Password: password

![Figure 2 Login Screen](image-url)
2.3 Web UI Layout

The Cluster Manager Dashboard contains three blocks as shown in Figure 3. The top pane (marked in yellow) shows the current user’s information. The left pane (marked in red) is the Cluster Manager Dashboard main menu. The right pane (marked in green) is the main display area.

![Dashboard Web UI Layout](image.png)

Figure 3 Dashboard Web UI Layout

As shown in Figure 4, the main menu is organized by object classes. If you click a class name in the main menu, for example Physical Resources | Blades, the main display area shows a list of objects in that class. Refer to Figure 4 for the Cluster Manager “list view” descriptions.

1. **Universal Filter**: Universal filter is a handy tool that quickly filters the set of objects you want. After selecting the first filter attribute, a second filter box appears. After selecting the second filter attribute, a third one appears.
2. **Search Bar**: Type the **keywords** here to quickly find the desired objects.

3. **Action Buttons**: **Includes** adding/deleting an object and commonly used batch actions. These buttons are enabled if applicable.

4. **Actions Menu**: At the rightmost of each object is an action menu containing **actions** applicable to the object, e.g., view details of the object or edit its attributes.

5. **Event List**: When you select an object in the list, the event list shows the events associated with this object.

---

Figure 4 Layout of Cluster Manager List View
2.4 Commonly Used Cases

This section lists a few commonly used cases that you may carry out frequently while managing your data center with Cluster Manager.

- **Add more machines to Cluster Manager’s territory**
  - If you bought full racks from Wiwynn, you can import Datasheet to establish your asset data. For more information about the datasheet files, please contact our sales representatives. Refer to Section 3.1 for details on how to import a datasheet.
  - If the blades are in your management network, Cluster Manager identifies them by regular network scanning. You can add these candidates to Cluster Manager’s territory. Once you do it, Cluster Manager checks the inventory information about the blades, monitors their health, and adds them to the resource pools. Refer to Section 3.1 for the detailed steps.

- **Monitor power consumption**
  - To view the power consumption of a particular rack, just open Racks page and find Current Power for each rack.

- **Check blade health status**
  - To check the health status of a blade, find the blade and click on the View Details button. Then click on Sensor Info or SEL tab.
- **Form a dedicated Hadoop or Spark cluster**
  - Create a server fleet by adding the necessary physical and/or virtual machines to the fleet, deploy software to the machines, and get your Hadoop/Spark cluster up and running. For details on fleet management, please refer to Section 4.1.

- **Update BMC/BIOS firmware for a bunch of blades**
  - First of all, you may need to upload a firmware package to Cluster Manager, if it is not yet present in Cluster Manager. Then go to Physical Resources | Blades, select all the blades that need BMC/BIOS updating and click on the Upgrade Firmware button. Just follow the on-screen instructions to complete the update. Refer to Section 3.2.4 for more details.
3. Physical Resources

This chapter is about asset management in Cluster Manager. As shown in Figure 5, there are six assets in the menu: Racks, Blades, Storage, Switches, Firmware and Templates.

Figure 5 Physical Resources in the Main Menu
3.1 Racks

As shown in Figure 6, the Racks page lists all the racks in your data center. The rack operations are described in the subsequent sections.

![Figure 6 Rack Management](image)

The Actions drop-down menu as shown below contains actions applicable to a rack.

![Actions Menu](image)

The actions are explained as follows:
View Details

To check out the detailed information of a rack, click on the Actions menu of the rack and select View Details. Figure 7 shows the Rack Details page. The rack configuration is in the Overview tab.

![Figure 7 Rack Details](image-url)
To check out the actions performed on a rack, click on the **Activity Log** tab (see Figure 8) in **Rack Details**. **Activity Log** page shows the log of the operations to the rack, such as creation, deletion, and modification of an object in the rack.

![Activity Log in Rack Details](image)

**Figure 8 Activity Log in Rack Details**

**Edit Rack**

To modify a rack, click on **Edit Rack** in the **Actions** menu. The **Edit Rack** dialog box (see Figure 9) allows you to update the rack location (Room, Row and Column).

![Edit Rack](image)

**Figure 9 Edit Rack**
Assign to Pod

To assign the rack to a pod, click on **Assign to Pod** and a dialog box as shown in Figure 10 will pop up.

![Assign to Pod](image)

Figure 10 Assign to Pod

**Upgrade Firmware**

Upgrade the firmware for the selected rack.

**Delete Rack**

Delete the selected rack from the list.

**Set Power Capping**

Set the power capping mode for the selected rack.
3.1.1 Rack View

Rack View represents the rack configuration of a pod in graphics form.
3.1.2 Import Datasheet

Initially, your racks list may be empty but you can expand it by adding racks through **Import Datasheet**.

Rack information showed in the **Import Datasheet** page can be imported from the rack configuration file (datasheet) provided by Wiwynn Corporation. To import a datasheet, click on the **Import Datasheet** button and select the rack configuration file to be uploaded (see Figure 12).

![Figure 12 Import Datasheet](image-url)
The rack configuration file contains the following information (see Table 1).

<table>
<thead>
<tr>
<th>Column</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>rack_serial_number</td>
<td>Serial number of the rack</td>
</tr>
<tr>
<td>rack_model</td>
<td>Model number of the rack</td>
</tr>
<tr>
<td>rack_location</td>
<td>Location of the rack</td>
</tr>
<tr>
<td>chassis_serial_number</td>
<td>Serial number of the chassis</td>
</tr>
<tr>
<td>chassis_height</td>
<td>Height of the chassis</td>
</tr>
<tr>
<td>chassis_deep</td>
<td>Depth of the chassis</td>
</tr>
<tr>
<td>chassis_weight</td>
<td>Weight of the chassis</td>
</tr>
<tr>
<td>chassis_slot_count</td>
<td>Slot count of the chassis</td>
</tr>
<tr>
<td>machine</td>
<td>Target devices including node, switch, jbod</td>
</tr>
<tr>
<td>serial_number</td>
<td>Serial number of the target device</td>
</tr>
<tr>
<td>position</td>
<td>Position of the target device in chassis or rack</td>
</tr>
<tr>
<td>model</td>
<td>Model number of the target device</td>
</tr>
<tr>
<td>vendor</td>
<td>Vendor of the target device</td>
</tr>
<tr>
<td>power_budget</td>
<td>Default power consumption of the target device</td>
</tr>
</tbody>
</table>

Table 1 Rack Configuration
3.1.3 Export Datasheet

To archive your rack data, export it to a file by clicking **Export Datasheet** button (see Figure 13).

![Export Datasheet image]

*Figure 13 Export Datasheet*
3.1.4 Set Power Capping

Set Power Capping – Smart Mode

By default, a rack is set to smart mode by Cluster Manager. It is a power capping mode which dynamically adjusts the power limit for each blade in a rack according to the power policy and the priority of each blade. Power policy is a table that defines the power limit of each blade, represented as percentages (power limit / power budget), as shown in Figure 14. Cluster Manager will find out the suitable policy based on the rack power limit so that the power consumption of the rack will fall below the rack power limit.
To enable smart power capping, choose a rack and click on the Set Power Capping button in the Actions menu. Choose Enabled, select Smart mode, input the power limit of the rack and then click on the OK button. Figure 15 shows the Set Power Capping Smart mode.

![Set Power Capping](image-url)

**Figure 15 Set Power Capping – Smart Mode**
Set Power Capping – Fixed Mode

**Fixed Mode** in *Set Power Capping* allows the user to choose the power limit for each blade model by rack. To set fixed mode, select racks and click on the *Set Power Capping* button above the table (or choose a rack by clicking the *Set Power Capping* button in the *Actions* menu). To fine-tune the power limit configuration, you can expand the *Advanced settings* and adjust the slider to set the power limit for the rack or input the power limit for each blade model. Refer to Figure 16.

![Figure 16 Set Power Capping – Fixed Mode](image)

Note that different blade models have different lower power limits. For example, the power capping limit for the Wiwynn Leopard is 150 Watts.
3.1.5 Delete Racks

To remove racks from the list, just select the target rack(s) and click on the Delete Racks button. You can export rack data before deleting a rack.
3.2 Blades

The **Blades** page lists all the bare-metal server nodes in your data center. It shows the system model, BMC information, power state and the utilization statistics, as well as the rack post slot (U number) of the blade and where the rack is.

![Figure 17 Blades](image)

### 3.2.1 Add Blades

The discovery mechanism of Cluster Manager will scan and list all unmanaged blades in specific network segments assigned by the user. The user can decide which blades to manage.

![Figure 18 Add Blades](image)
Click on the **Add Blades** button to list the unmanaged blades. Select the blades to be managed and click on the **Add** button. Selected blades would be pulled into **Blades** table. **Bootable** lets you configure whether the blade could be reboot.

Note that Cluster Manager scans your management LAN every 15 minutes (depends on the setting of the **Scan** Interval for the network segment, please refer to the **Settings** -> **Managed Network Segments** page).

### 3.2.2 Power Action

You can apply different power actions by selecting blades and clicking on the **Power Action** button. The power actions include **Power on**, **Power off**, **Power off gracefully** and **Power cycle**. These actions can be applied immediately or by schedule.

![Blades Table](image)

**Figure 19 Power Action**
You can also power off/on a blade directly by switching the power switch button in the **Power State** column as shown in Figure 21.

You also can power cycle a blade directly through Power Cycle button under Actions (see Figure 28).
3.2.3 Deploy OS

Cluster Manager provides bare-metal provisioning. Cluster Manager allows you to deploy operating system to blades through leveraging the open source project Cobbler (http://cobbler.github.io). The OS deployment is automated by kick-start/pre-seed mechanism. Currently, Cluster Manager fully supports Ubuntu distribution and provides a default pre-seed file for Ubuntu distribution.

Use the Deploy OS button to deploy multiple bare-metals at the same time. You also can deploy a specific blade through the Deploy OS button under Actions.

Caution: To prevent blades from booting into NFS after deploying and rebooting, make sure that the first boot priority setting in BIOS is set to boot from local disk rather than network boot before deploying blades.

If multiple blades are selected, you can deploy each blade with different OS images as shown in Figure 23.
Cluster Manager creates a default user account after OS deployment is completed as follows:

**User name:** user

**Password:** password
3.2.4 Upgrade Firmware

Upgrade Firmware allows users to upgrade the blade BMC and BIOS. To update firmware, you need to upload the firmware image beforehand. Please refer to Section 3.5 for uploading firmware images.

To update the firmware for a blade, select the target blades and click on the Upgrade Firmware button. Select the firmware type and version, then click on OK to start upgrading as shown in Figure 25.

Updating a large number of blades may take a long time. You can check the progress in the Task State column in the blade list.
Set Sensor Threshold

You can adjust the sensor thresholds of the BMC. This will directly change the BMC sensor thresholds accordingly after you press the **OK** button.

![Figure 26 Sensor Threshold Settings](image-url)
3.2.5 Delete Blades

To stop managing a particular blade, just select the blade and click on the Delete Blades button above the blade table. After deleting a blade, you can add it back again as long as it is still in your management LAN (it will be re-discovered by the Cluster Manager discovery mechanism).

3.2.6 Blade Actions

Actions menu includes the operations for a blade as in Figure 28. The description for each operation is listed in Table 2 Blade Actions.
### Actions

<table>
<thead>
<tr>
<th>Actions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>View Details</td>
<td>View detailed blade information.</td>
</tr>
<tr>
<td>View Sensor Reading</td>
<td>View the graphical sensor reading from the blade BMC.</td>
</tr>
<tr>
<td>View Utilization</td>
<td>View the graphical blade CPU, memory, disk and networking usages.</td>
</tr>
<tr>
<td>View Events</td>
<td>View events from the blade BMC.</td>
</tr>
<tr>
<td>Upgrade Firmware</td>
<td>Upgrade blade firmware including BMC and BIOS.</td>
</tr>
<tr>
<td>Change BMC Password</td>
<td>Change BMC password for blade.</td>
</tr>
<tr>
<td>Sensor Threshold Settings</td>
<td>Adjust sensor thresholds (LNR, LC, LNC, UNC, UC, and UNR) in BMC.</td>
</tr>
<tr>
<td>Delete Blade</td>
<td>Delete a blade.</td>
</tr>
<tr>
<td>Deploy OS</td>
<td>Deployment of operating system.</td>
</tr>
</tbody>
</table>

**Table 2 Blade Actions**

### View Details

Check the detailed information of a blade, such as the health, logs, and key components. Click on **View Details** in the **Actions** menu of a specific blade to display the **Blade Details** screen as shown in Figure 29.

- **Overview**: shows the hardware overview
- **Sensor Info** and **SEL**: shows the BMC sensors and sensor event log data.
- **Activity Log**: shows operating log for the blade in descending time order.
- **Serial Console**: shows the blade BMC console.
Replace FRU Parts

For maintenance in a data center, Cluster Manager provides functions to add and remove FRU parts for blades. As shown in Figure 30, you can manage FRU parts for a blade through View Details in the Actions menu,
For instance, after replacing a physical hard drive from a blade, you need to update this drive information to Cluster Manager through **Remove HDD** and **Add HDD** in **Blade Details** dialog.

![Add HDD](image1)

**Figure 31 Add HDD**

![Remove HDD](image2)

**Figure 32 Remove HDD**
View Sensor Reading

Cluster Manager provides the sensor statistics (such as CPU temperature, fan speed, voltage/current and inlet temperature) of a blade from the IPMI protocol as shown in Figure 33. You can specify the time interval and see the data plot accordingly.

Figure 33 Sensor Reading Diagrams
View Utilization

**View Utilization** shows the OS information of a blade, including CPU utilization, memory usage and disk utilization.

![Utilization Diagrams](image)

**Figure 34 Utilization Diagrams**
View Event

**View Event** shows the BMC SEL records related with a blade in descending time order.

![Event List](image)

**Figure 35 Event List**

### 3.3 Storage

Storage appliances in racks are also discovered and imported (from rack configuration files) to be managed. For storage management, Cluster Manager currently supports JBODs, as shown in Figure 36.

![Storage](image)

**Figure 36 Storage**
Figure 37 shows the storage operations (View Details and View Monitoring) in the **Actions** menu.

![Figure 37 Storage Actions](image)

**View Details** lists storage drive information that a JBOD equips (see Figure 38).

![Figure 38 Drive List](image)
View Monitoring shows the monitoring information for storage, including ambient temperature, expander temperature and total power consumption (see Figure 39).

![View Monitoring](image)

Figure 39 View Monitoring
### 3.4 Switches

When you import a rack configuration file to Cluster Manager, the switch information is added. In the background, Cluster Manager’s discovery mechanism also finds out switches and grasps useful data, such as ports status and connectivity. You can find out switch information in **Switches** under **Asset Management**.

![Switches](image)

**Figure 40 Switches**

In **Switch Info** under **Actions**, link state and network traffic data for each switch port are presented. Figure 41 shows the simulated switch port panel and link state for each port. Different light colors mean different networking cables are used.

![Switch Port Panel](image)

**Figure 41 Switch Port Panel**

- Blue light: Using 10 Gb networking cable.
- Green light: Using 1 Gb networking cable.
- Orange light: Using 100 Mb networking cable.
- Black light: No networking cable connected.
As for the network traffic diagram, you can select the switch ports for showing the traffic flow.

Figure 42 Switch Info
3.5 Firmware

In the firmware list as shown in Figure 43, you can see all the firmware image files that you have uploaded to Cluster Manager.

![Figure 43 Firmware](image)

Currently, Cluster Manager supports BMC and BIOS firmware for blades. When uploading firmware, specify the firmware type and associated metadata as shown in Figure 44.

![Figure 44 Upload Firmware](image)
3.6 Templates

In **Templates** page, select a policy type to display all its policy templates, as shown in Figure 45. Cluster Manager allows you to create all kinds of templates for different policy types and manage them.

![Templates for Physical Resources](image)

Figure 45 Templates for Physical Resources
You can create templates with the following policy types:

- **Boot Option Policies**: allows you to apply the next boot device for blades as shown in Figure 46.

  ![Figure 46 Create Template for Boot Option Policies](image)

- **Power Restore Policies**: allows you to set power restore for blades when plugging in power core.

  ![Figure 47 Create Template for Power Restore Policies](image)
- **Sensor Threshold Policies**: sets sensor threshold to BMC by blade model, as shown in Figure 48.

![Create Template for Sensor Threshold]

Figure 48 Create Template for Sensor Threshold
4. Logical Resources

Logical Resources refer to instances such as servers, storage volumes, networks that are created by domain users/tenants. In contrast, physical resources are hardware assets owned by pod or data center owners. When a logical instance is running, it is provisioned with the needed physical resources. In case of hardware failure, a running logic instance failovers to other physical resources. When a logical instance is at rest, its context is stored in a repository, but no physical resource is allocated for it. In the following table, we summarize the concept and terminology we use throughout this document and Cluster Manager GUI.

<table>
<thead>
<tr>
<th>Resource type</th>
<th>Compute (server)</th>
<th>Storage</th>
<th>Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical instances</td>
<td>Virtual machine</td>
<td>VHD (virtual hard disk) instance</td>
<td>Virtual network</td>
</tr>
<tr>
<td></td>
<td>Physical machine</td>
<td>PHD (physical hard disk) instance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PSSD (physical solid state drive) instance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>NVMe instance</td>
<td></td>
</tr>
<tr>
<td>Physical resources provisioned</td>
<td>Virtual machine: a hypervisor running in</td>
<td>VHD instance: a virtual disk volume (e.g., an</td>
<td>Virtual network: an overlay</td>
</tr>
<tr>
<td>for a logical instance</td>
<td>a blade</td>
<td>iSCSI volume)</td>
<td>network (e.g., VLAN or VxLAN) or an</td>
</tr>
<tr>
<td></td>
<td>Physical machine: a blade</td>
<td>PHD instance: a HDD</td>
<td>OpenFlow-based virtual network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PSSD instance: an SSD</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>NVMe instance: a NVMe drive</td>
<td></td>
</tr>
<tr>
<td>Physical resources</td>
<td>Blades</td>
<td>HDDs</td>
<td>Switches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SSDs</td>
<td>Routers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NVMe drives</td>
<td>Cables</td>
</tr>
</tbody>
</table>

Wiwynn Cluster Manager User Manual
Logical Resources include Fleets, Servers, Networks, Images and Templates. Currently, only **Images** is available. The other functions will be available in the near future.

4.1 Fleets

A fleet is a group of logical servers. As defined above, a logical server is either a virtual machine (VM) or a physical machine (PM). Actually, your fleet can have both VMs and PMs at the same time.

This function will be available soon.

4.2 Servers

As depicted at the beginning of this chapter, a logical server is either a physical machine (PM) or a virtual machine (VM).

This function will be available soon.

4.3 Networks

Depending on your networking environment, a logical network may be mapped to an overlay network or an OpenFlow virtual network.

This function will be available soon.

4.4 Images

Images are operating system images bundled with Cluster Manager or uploaded by users. After uploading the image to Cluster Manager, this is used for OS deployment for blades (please refer to Section 3.2 Blades) or a virtual machine in logical resource.
When deploying OS, Cluster Manager detects and identifies the image by its image file name to assign a suitable kick-start/pre-seed file for deployment. If an image name does not contain any OS distribution keywords, such as Ubuntu or CentOS, Cluster Manager shows a warning message, such as ‘Could not find mirror section according to the image name…’ after uploading this image. For OS deployment for blades, please refer to Section 3.2 Blades.

4.5 Templates

You can store a set of configuration and settings as a template and apply it to a bunch of logical instances.

This function will be available soon.
5. Notifications

The Cluster Manager notification service alerts and notifies the user when something went wrong in the data center. The issues may come from service error, abnormal CPU temperature, BMC unreachable, hard-drive issue, etc. The notification service is based on user-predefined event rules named policies. The policy is a rule to compose relevant events to an incident.

Cluster Manager also provides notifying mechanism through email and SMS to let administrators be able to be alerted immediately. Furthermore, in the meantime the incident sends the issue to the Cluster Manager’s diagnosis service which will find out the root cause(s) of the issue. The diagnosis result will give in the incident afterward.
5.1 Incidents

An incident is a set of events that could lead to the loss of or disruption to an organization’s operations, services or functions. The Incidents page shows all the incidents that Cluster Manager collected. In addition, you can also view the detailed information and historical graphics.

![Incidents](image)

**Figure 49 Incidents**

![Incident Detail](image)

**Figure 50 Incident Details**
5.2 Correlation Policies

A policy is a set of event rules. The policy is used to generate incidents. When events are triggered, Cluster Manager correlates events to generate incidents according to policies. Cluster Manager provides some default policies and allows users to define their own event rules. The Policies of Event Correlation page illustrates the different correlation types.

![Figure 51 Correlation Policies](image)

Create Policy

1. Define the basic information about this policy and choose its correlation type. Currently, Cluster Manager supports these three types of correlation:

   - Combination
   - Repetition
   - Missing Recurrence
2. Add event sources and their severity for the incident. Cluster Manager provides several filter categories such as BMC Availability and others.
3. Define the correlation rules for the event filters.

Figure 54 Event Operator – Create Policy

4. Define the description, severity and priority for the incident.

Figure 55 Incident Information – Create Policy
5. To alert about the incidents, you need choose the media type in this step.

![Figure 56 Alarm – Create Policy](image1)

6. Finally, a summary of the policy.

![Figure 57 Finish – Create Policy](image2)
5.3 Alarms

You can choose the media to notify the user in the Alarms page when an incident is generated. Cluster Manager supports two media types: E-mail and API.

Create Alarm

Before sending an incident to users, you need to define the media type by clicking on the Create Alarm button and fill in the E-mail/API information. After that, you can associate a policy with the alarm template when creating a policy.
Figure 59 Create Alarm
6. Users and Tenants

With Cluster Manager, your data centers can have multiple tenants in different layers simultaneously. Section 6.1 is about the tenancy hierarchy while the rest of the chapter is about managing tenants, users and user groups.

![Figure 60 Tenants and Users](image)

6.1 Tenancy Hierarchy

Cluster Manager provides three layers of multi-tenancy as follows:

- **Pod** - In physical layer, hardware assets can be divided into pods. Each pod is owned or rented by a person or organization. Resources in a pod are isolated from other pods and can be used to create a public/private/hybrid cloud, bare-metal server farm, HPC cluster, etc.

- **Domain** (not supported yet) - Above a pod, there can be multiple domains. A domain may be mapped to a company, a department or a person.
• Fleet (not supported yet) - In a domain, users can divide their resources into server fleets. A fleet may have multiple physical machines and virtual machines associated with one or more virtual networks. Usually, a user may want to divide servers of different purposes into different fleets to reduce influences between them.

Pod Management

If you are a data center administrator, you can create a new pod, assign racks to a pod, modify a pod, and delete a pod. To manage pods, click **Pods** in **Tenants and Users** of the left-hand side menu.

![Figure 61 Pods](image)

Domain Management

If you login as a pod manager of a pod, you have the privileges to manage domains in that pod. To manage domains, click **Domains** in **Tenants and Users** of the left-hand side menu.

This function will be available soon.
6.2 Users

You can manage user accounts in **Users**. Apart from basic data items, you need to specify a role when you create a new user, as shown in Figure 62. If you select **Datacenter Admin**, the user has the privilege to manage whole data center. If you select **Pod Admin**, the user only has privilege to manage the specified pods.

![Figure 62 Users](image)

Figure 62 Users
If you are the **Datacenter Admin**, you can assign the user role when creating a new user as shown in Figure 63.

![Create User](image)

**Figure 63 Create User**

For an existing user, you can edit user information, delete user and change user password by using the **Actions** menu of the user as shown in Figure 64.

![User Actions](image)

**Figure 64 User Actions**
6.3 Groups

You can group users to simplify access control management. To create a new group, click on the **Create Group** button.

After creating a group, you can add members by clicking on **Actions > Manage Members** for the group (see Figure 65).

![Figure 65 Groups](image-url)
7. Settings

This section describes intrinsic settings of Cluster Manager.

7.1 Managed Network Segments

The Cluster Manager discovery mechanism runs in the background. You must specify IP ranges to discover and provide BMC authentication information to retrieve hardware information via IPMI for blades. You can input up to ten groups of IP ranges.

![Managed Network Segments](image)

Figure 66 Managed Network Segments
Figure 67 Add IP Range
## 7.2 Housekeeper

Cluster Manager collects monitoring data and generates log all the time. **Housekeeper** cleans the data and log history periodically. You can decide how long to keep old data and log (see Figure 68). The minimum purging period is six months. The purging interval is 24 hours.

![Log Archive Policy](image)

**Figure 68 Log Archive Policy**
7.3 Change Password

Use **Change Password** to change your login password. After changing the password successfully, Cluster Manager will log out automatically because you need to re-authenticate for further operation.

![Change Password](image)

Figure 69 Change Password