Intel® Data Center Manager

Console User Guide

Revision 3.3

Table of Contents

Getting Started

Getting Started: Overview

Intel® DCM Console is a power and temperature management solution for the data center. It enables you to monitor and manage power consumption and temperature in your data center through the management console.

Software Requirements

Intel® DCM Console has been validated on the following operating systems:

- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2016
- Red Hat Enterprise Linux 6.9 Server x86_64
- Red Hat Enterprise Linux 7.5 Server x86_64
- Novell SUSE Linux Enterprise Server 11 SP4 x86_64
- Novell SUSE Linux Enterprise Server 12 SP3 x86_64
- Ubuntu Server 16.04 x86_64
- Ubuntu Server 18.04 x86_64
- CentOS 6.9 x86_64
- CentOS 7.5 x86_64
- Debian 8.11 x86_64

Hardware Requirements

For best performance, install the Intel® DCM Console on a system with at least:

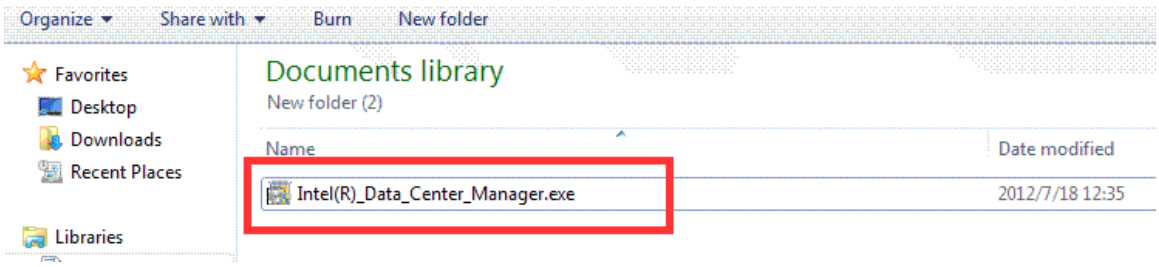
- A dual-core processor of 2.6GHz or higher
- 8GB RAM
- 80GB of hard drive space

Below is recommended comfiguration for a scaled environment (e.g. managing up to 20,000 IPMI based nodes):

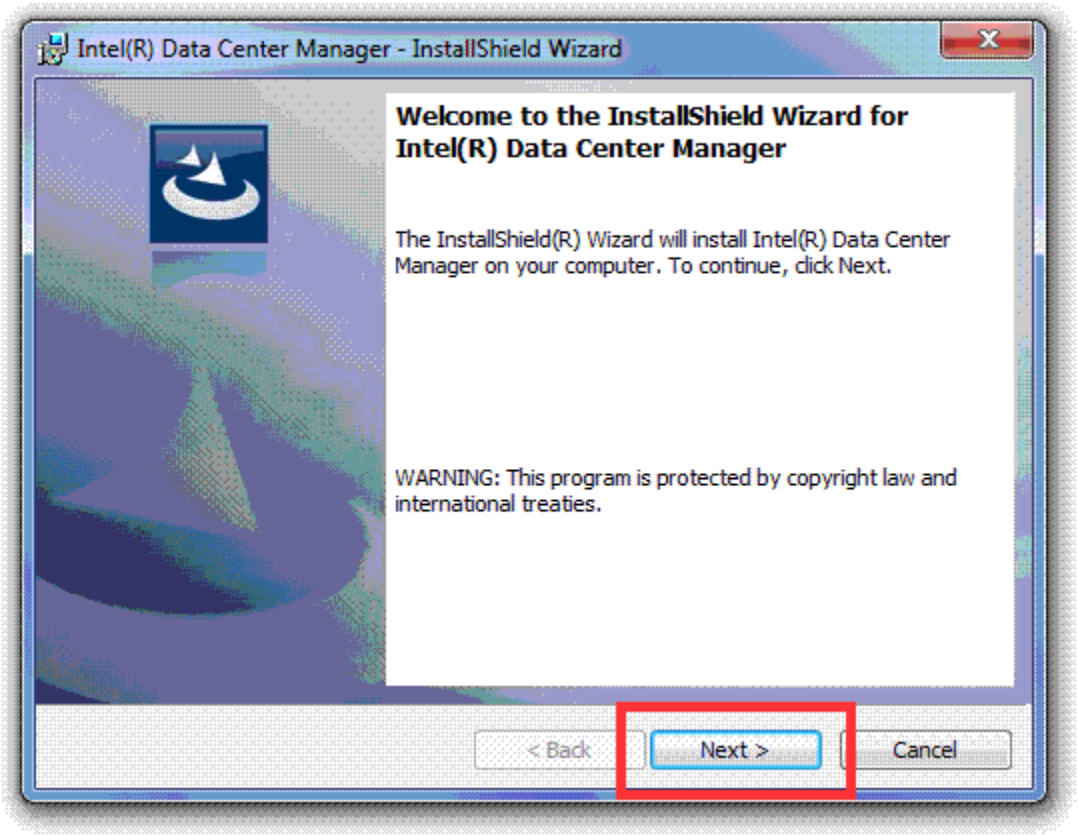
- 2 * Intel(R) Xeon(R) CPU E5645 @ 2.40GHz
- 24GB RAM
- 400GB SSD

Installing DCM Console

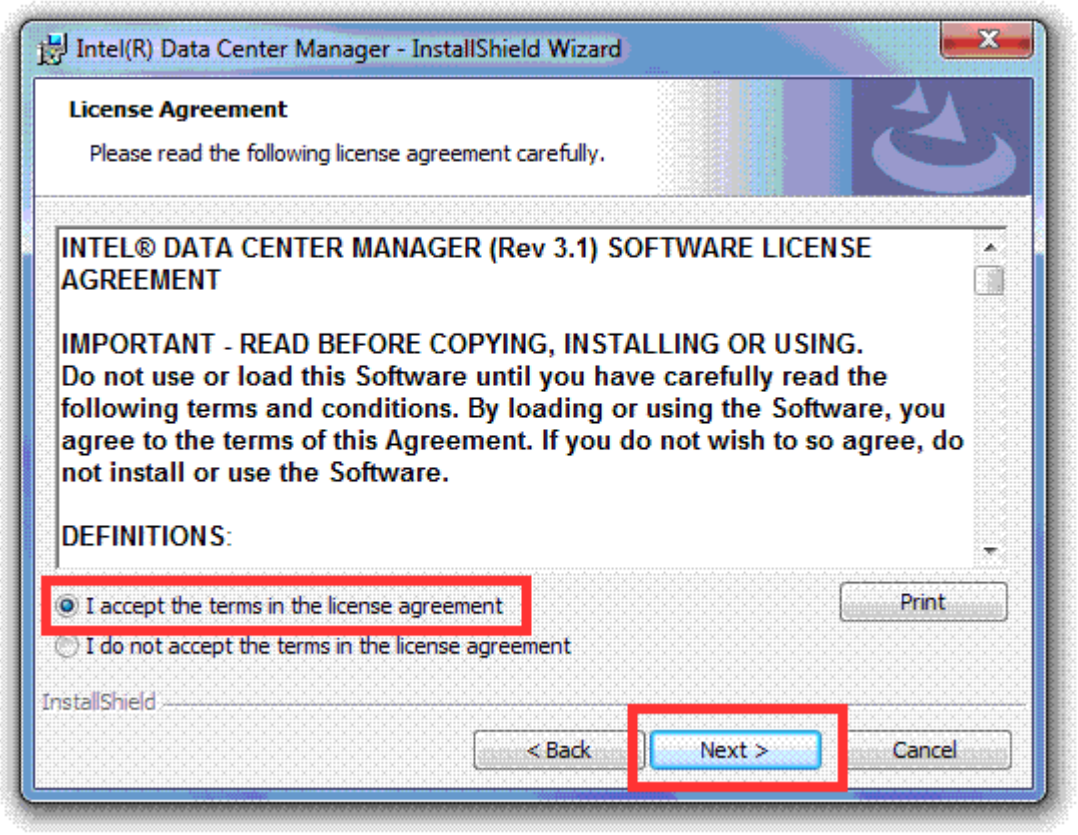
Navigate to the directory containing the installation package, and double-click the package to launch the installation program.



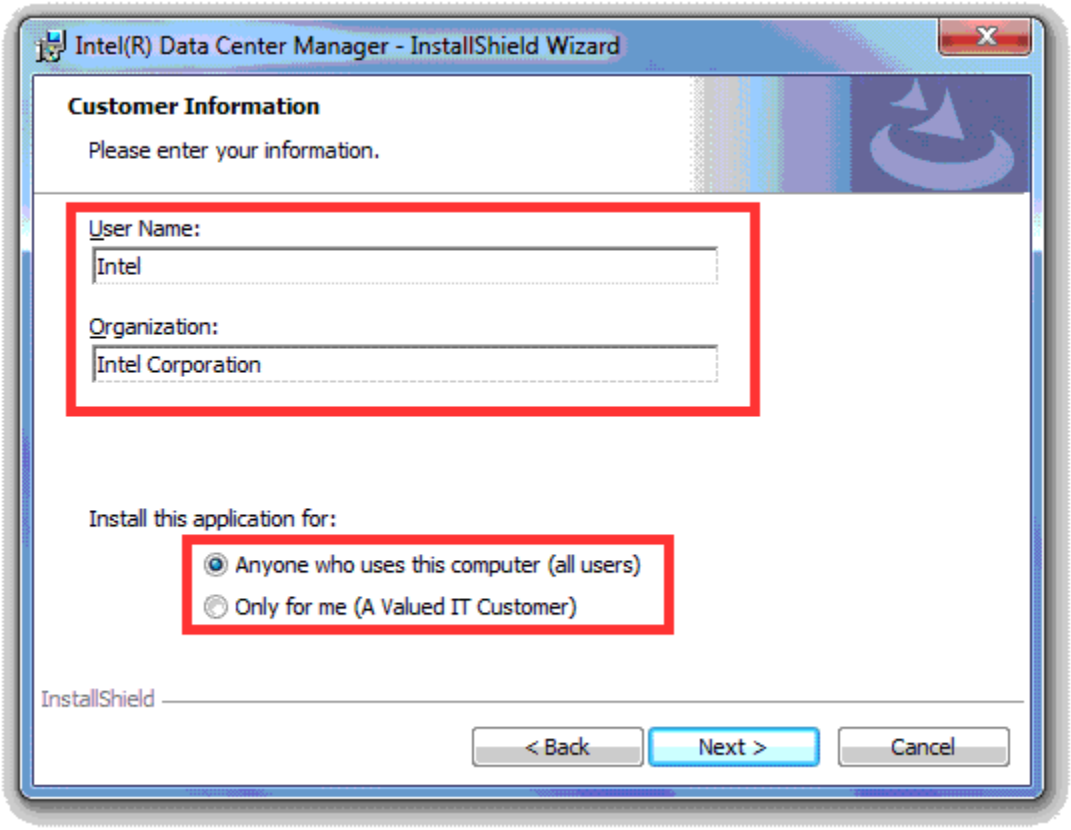
Click **Next**.



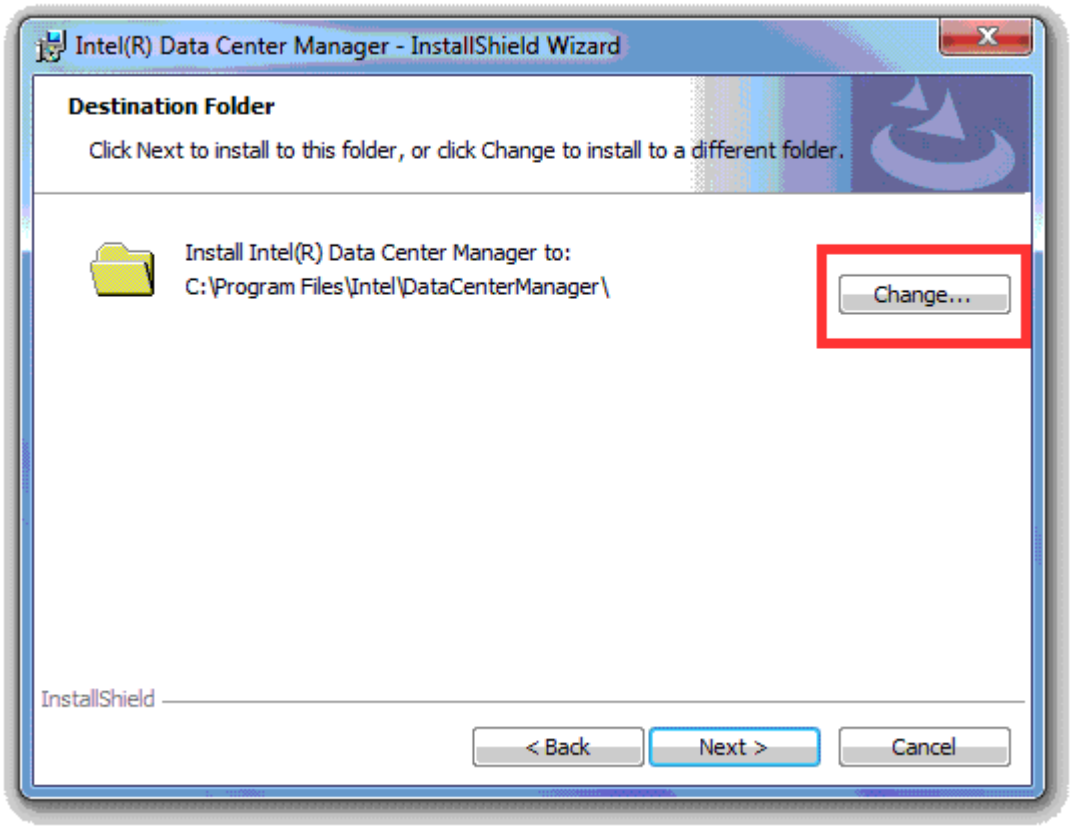
Choose **I accept the terms in the license agreement**, and then click **Next**.



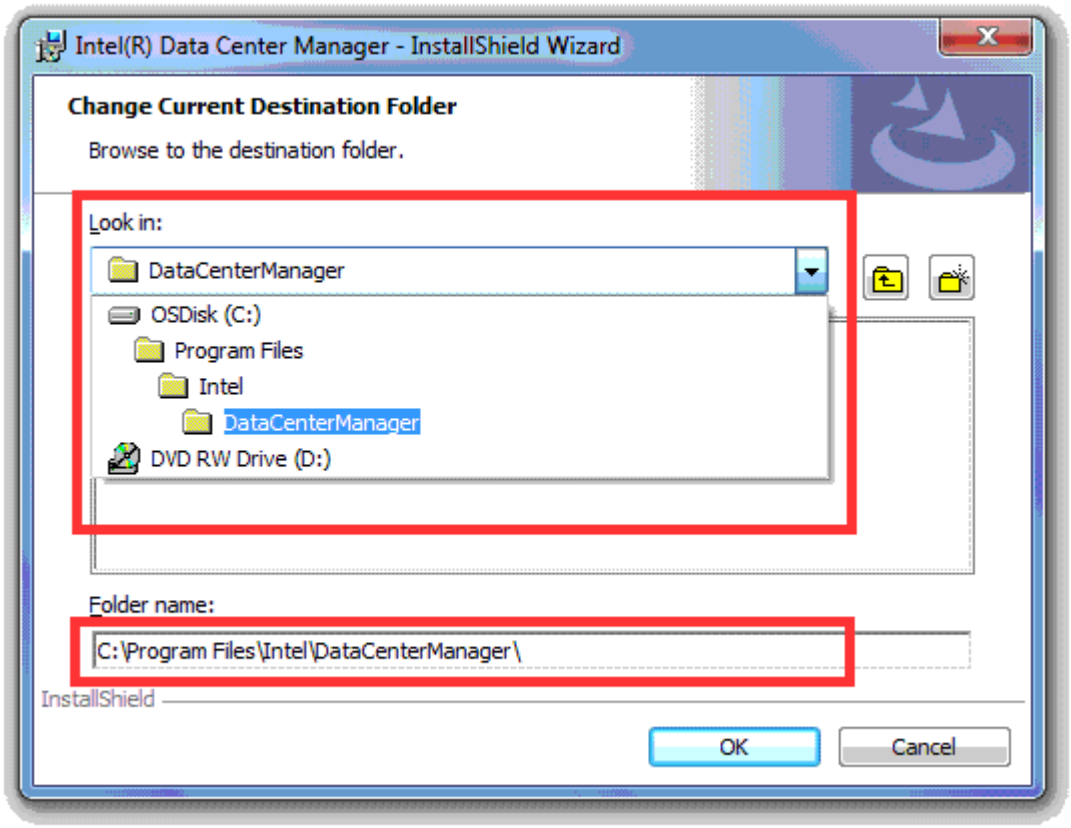
Fill in the **User Name** and **Organization** fields; choose whether to install for all users or only the current user, and then click **Next**.



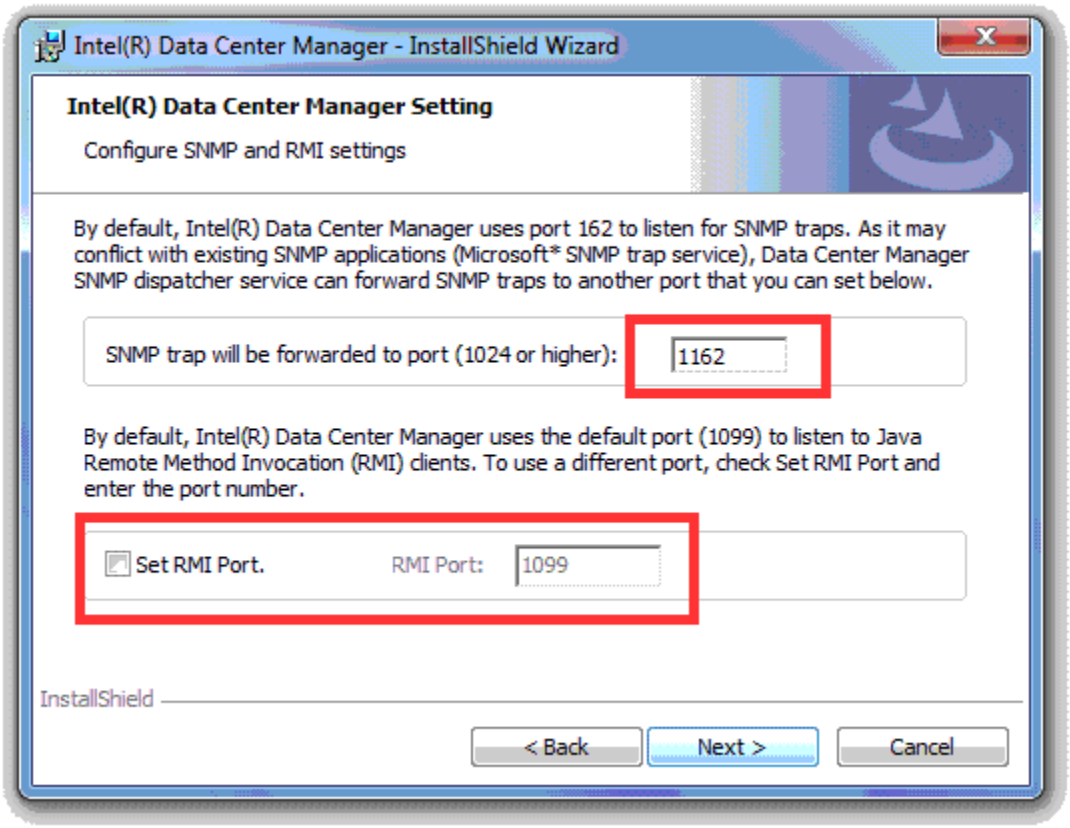
For ease of trouble-shooting while installing and running the product, we recommend that you use the default installation path and click **Next** directly. If you want to change the location to install, click **Change**.



If you clicked **Change** in the previous step, you can browse through the drop-down list or type the exact path in the text box. Click **OK** to return to the previous window, and then click **Next** to continue the installation.



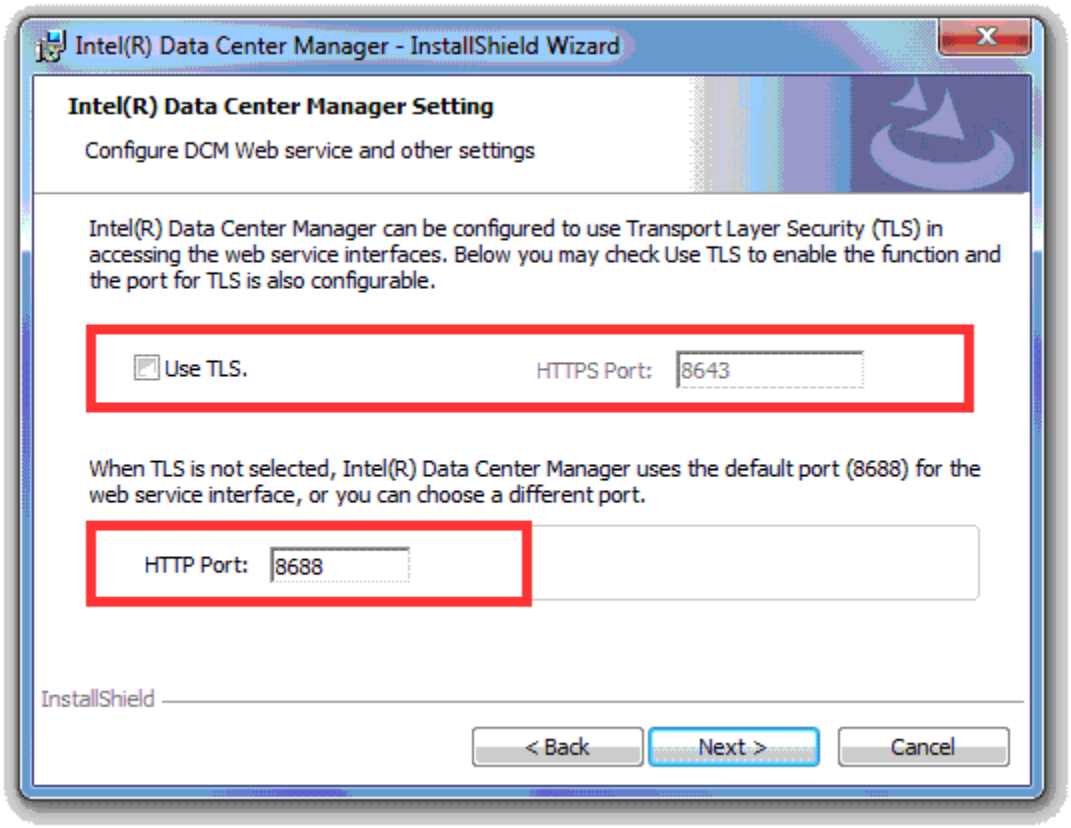
Choose the port for SNMP traps, and then click **Next** (recommended). If you need to change the **RMI Port**, click the check box first and then configure the port number on the right side.



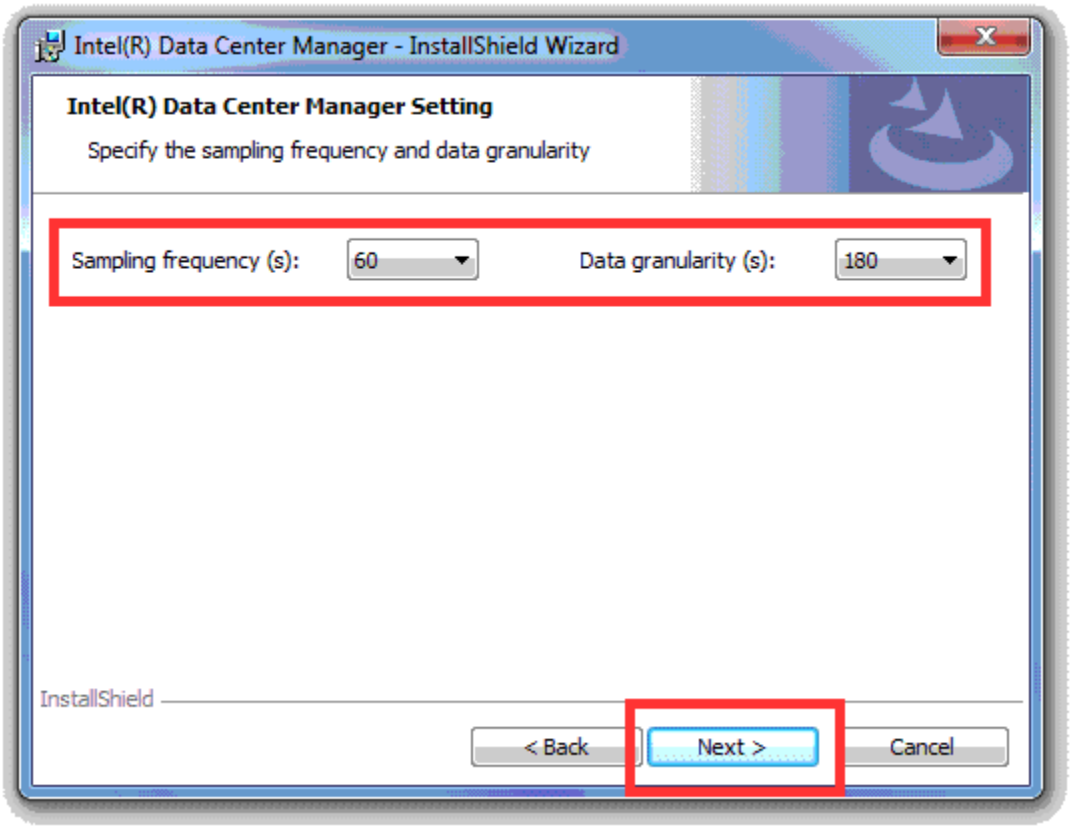
NOTE

Generally, each port has a default value during installation and configuration. You need to make sure that other processes do not occupy the port you're setting before you change the value.

You may choose to enable TLS and configure the TLS port by clicking the check box and configuring the port number on the right side. You may also use another HTTP port number for the web service interface.



Configure the **Sampling Frequency** and **Data Granularity** settings, and then click **Next**.

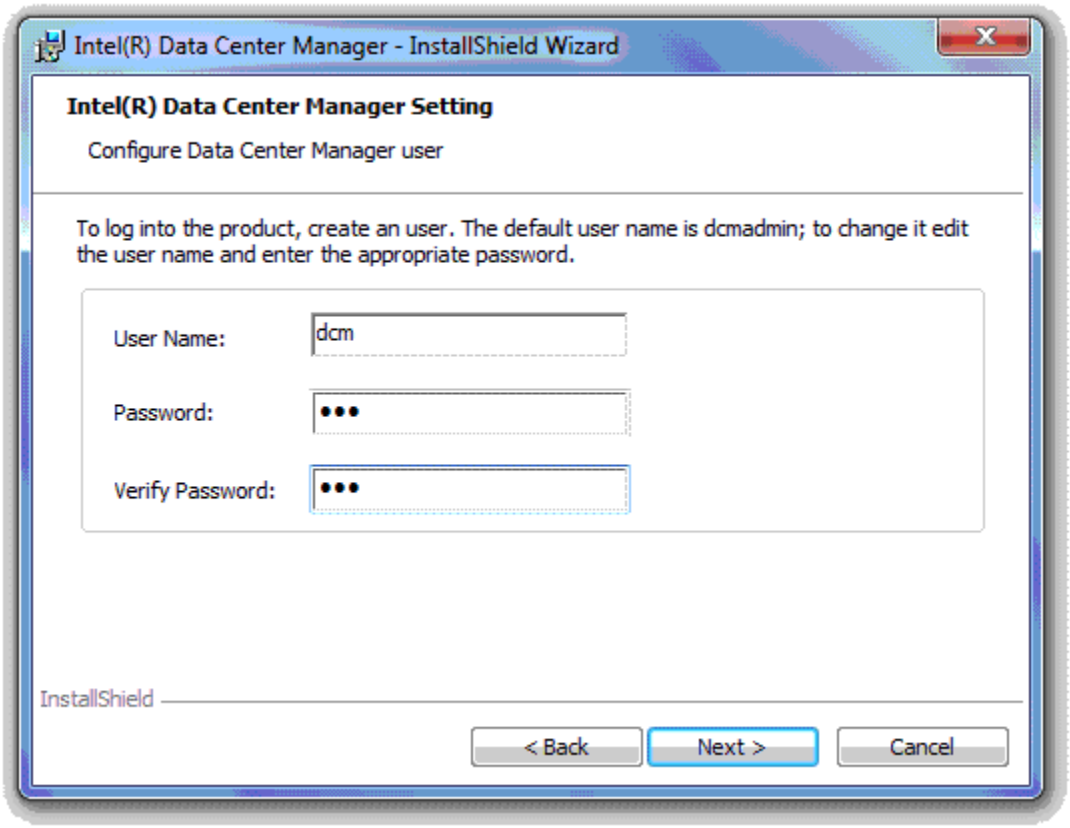


NOTE

The **Sampling Frequency** is the time interval between power and thermal measurements that DCM collects from the devices managed. The default value is 60 seconds, and you need to make sure that the device supports the sampling frequency you set.

The **Data Granularity** is the resolution of power/thermal data measurements that are stored in DCM database for query/metric usages. Valid measurement data granularity includes 30, 60, 180, 360, 600, 1800, and 3600 seconds, and it must be a multiple of the **Sampling Frequency**.

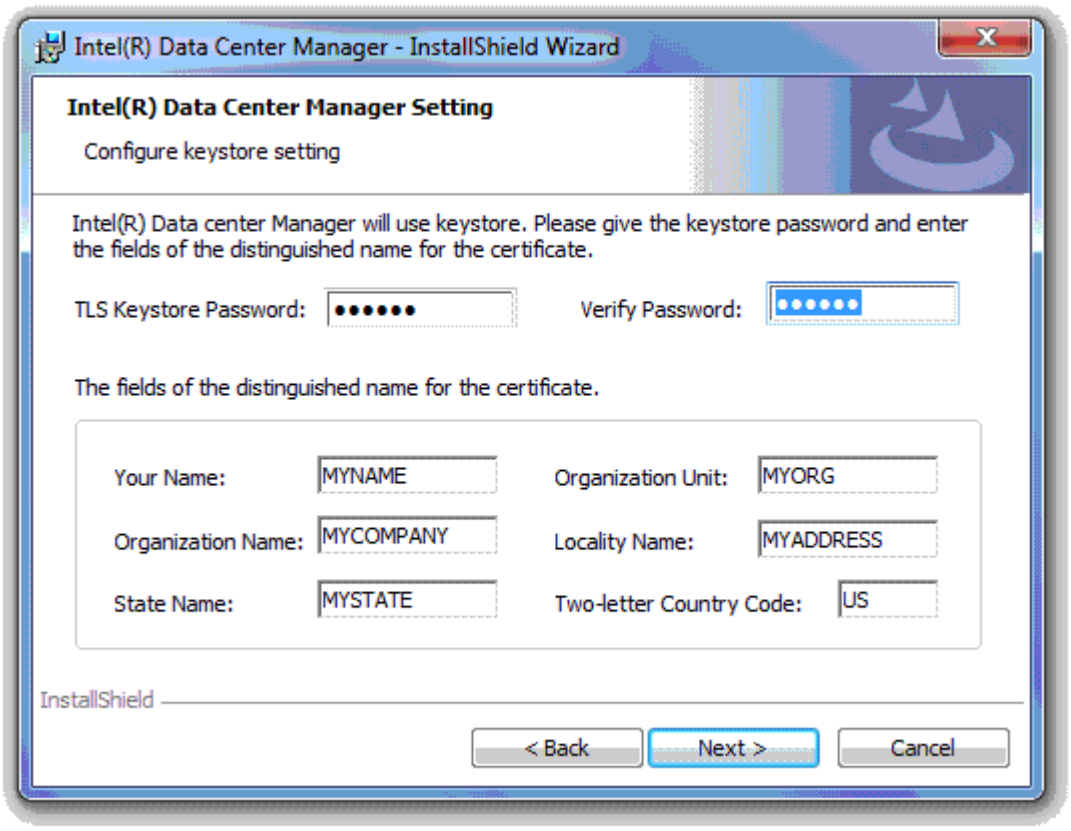
Then configure **User Name** and **Password** for login, and click **Next**.



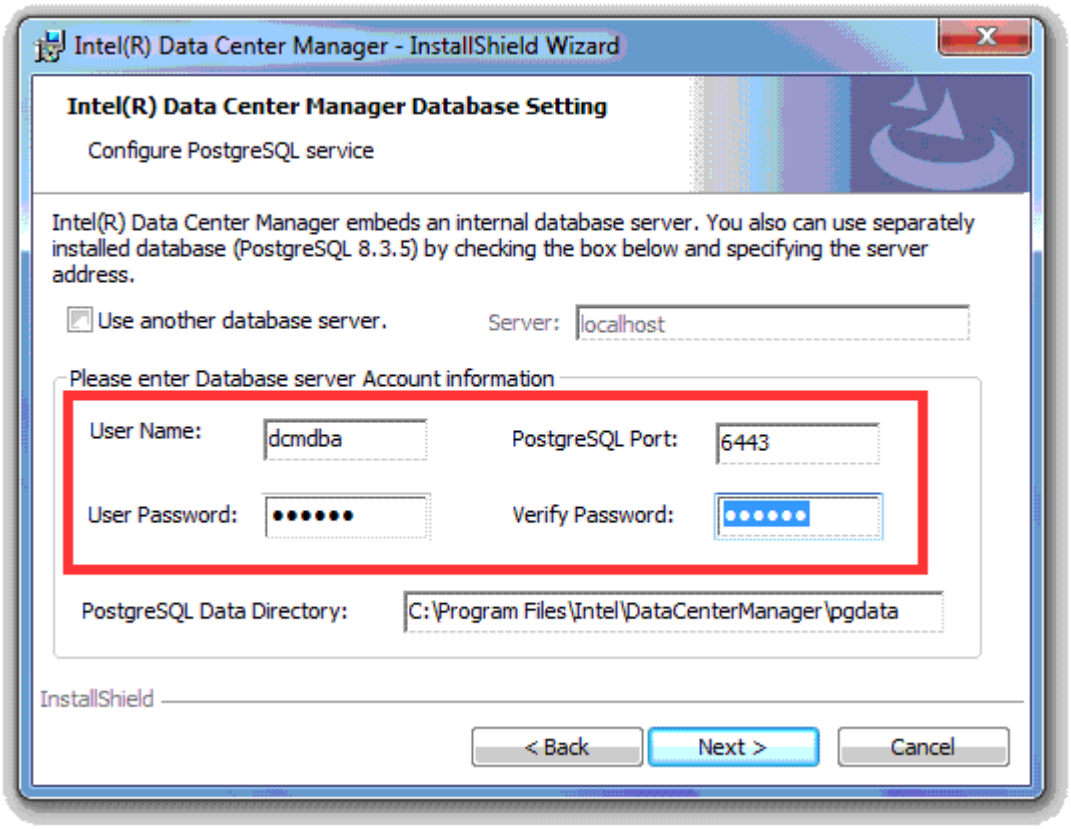
NOTE

Special characters are not recommended in a password.

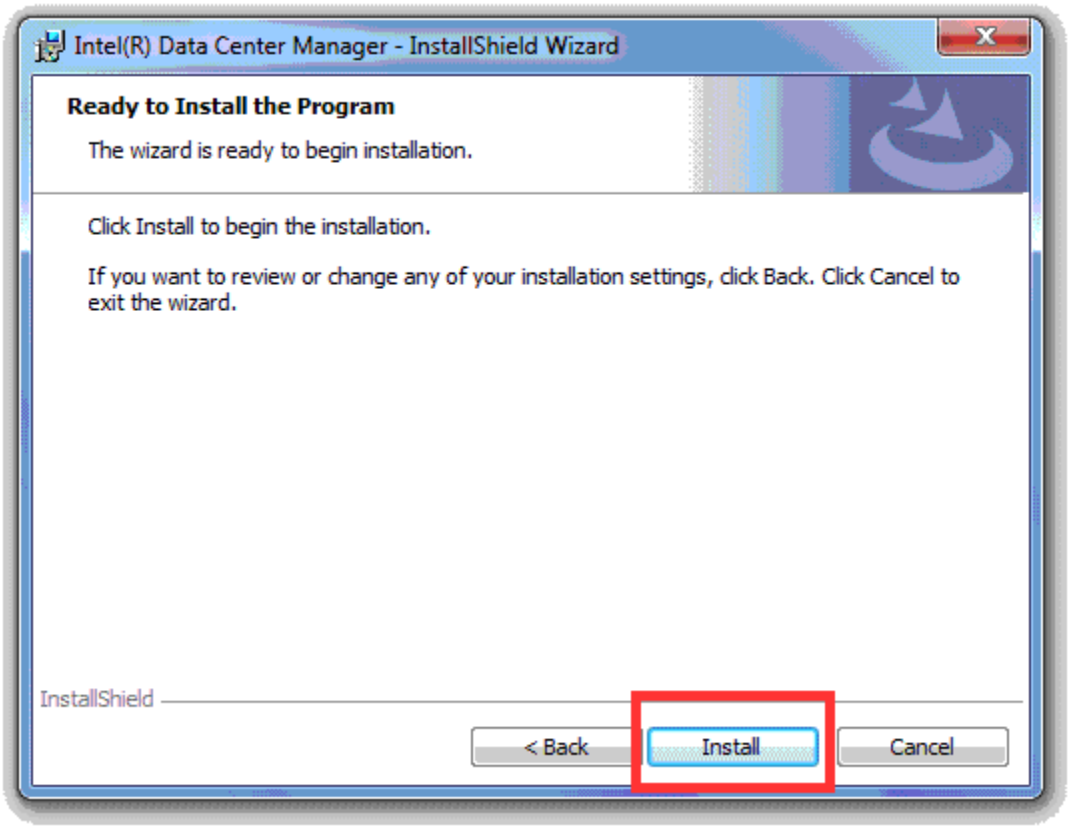
Enter **TLS Keystore Password**, which will be used to access the keystore file. Then enter the corresponding information for the certificate, and click **Next**.



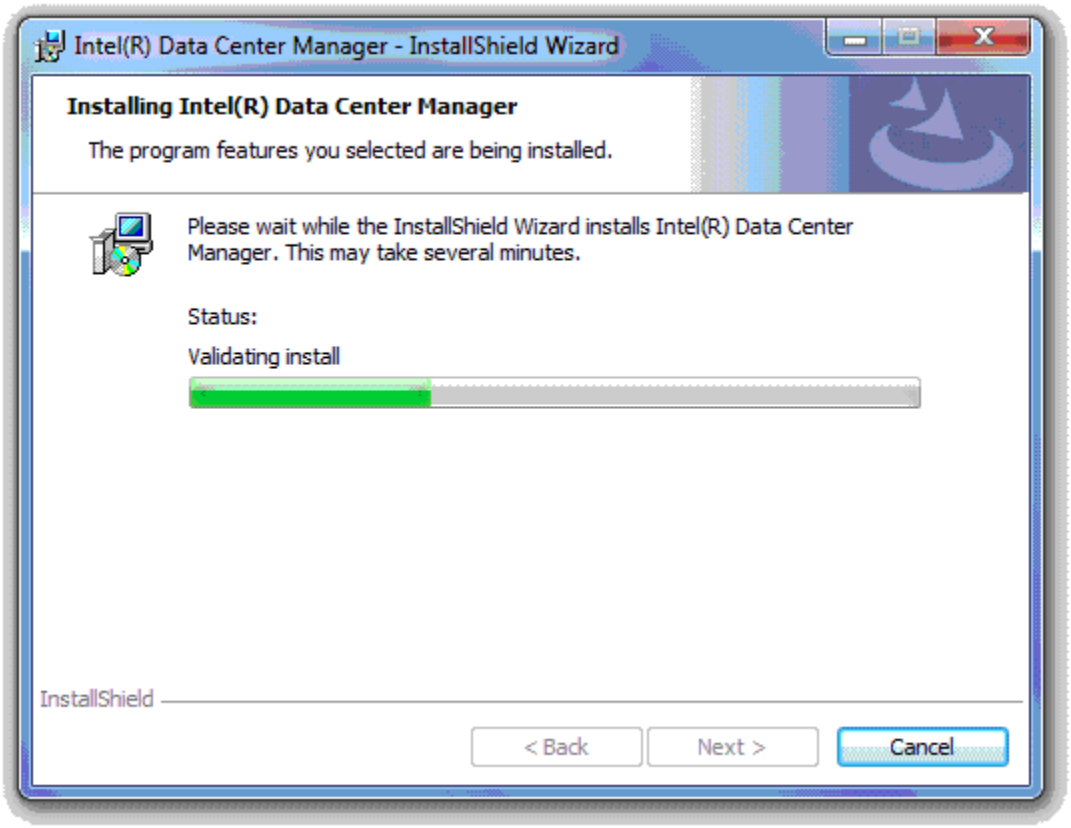
In the form, you need to complete the database settings, including **User Name**, **PostgreSQL Port**, **User Password**, and the directory of the database. The default value of **PostgreSQL Port** is 6443. If another process is already using that default port, enter a different one. Then click **Next**.



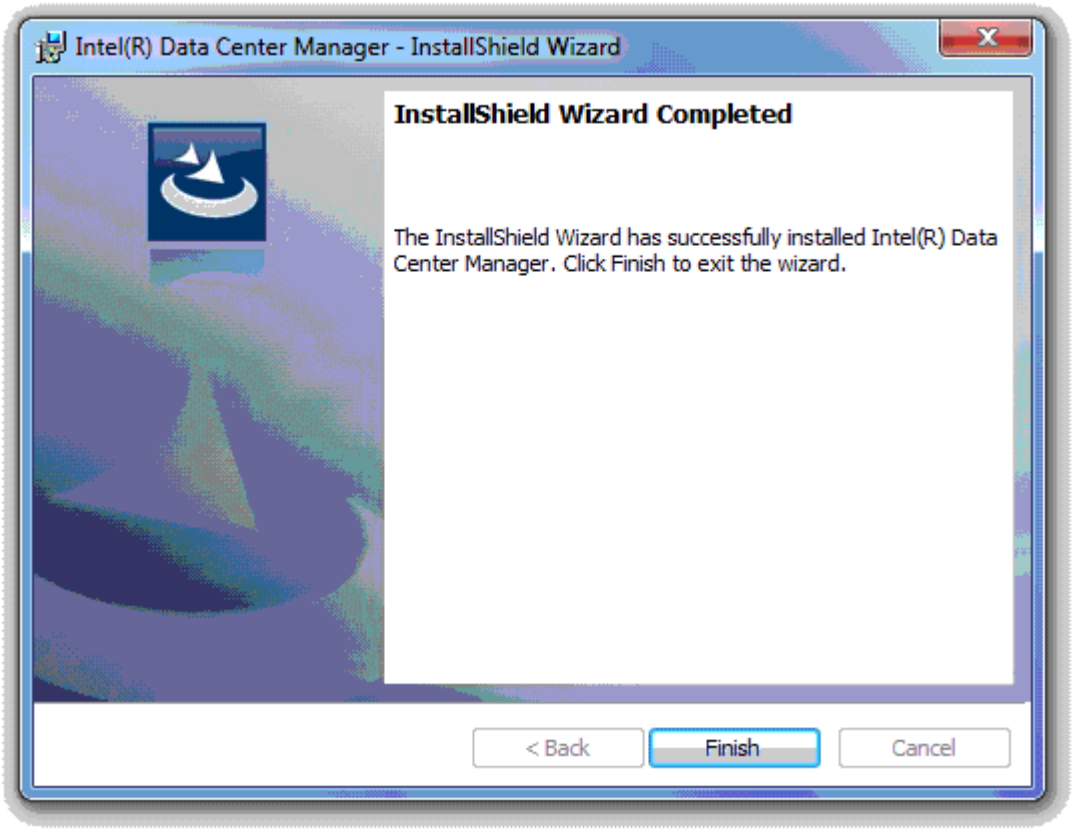
On the **Ready to Install the Program** page, click **Back** if you want to change the installation settings, or click **Install** to begin the installation process.



Once you click **Install**, you will see a status screen that notes the progress.



After clicking **Finish**, DCM Console has been installed successfully.



Launching DCM Console

There are two ways to launch DCM Console.

1. By typing the URL directly in address bar of browsers.

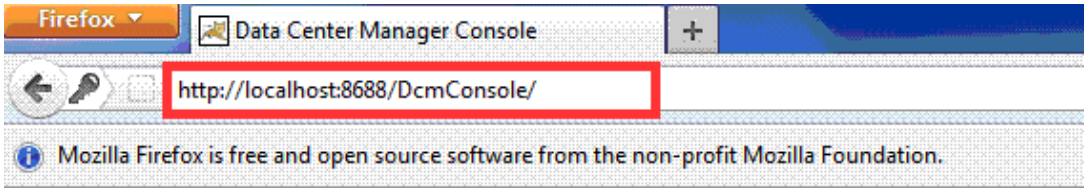
Enter the following default URL in your web browser to launch the DCM Console:

https://localhost:8643/DcmConsole/

or the URL below if TLS is not enabled:

http://localhost:8688/DcmConsole/

We suggest using **Firefox** as the web browser, since some functions of the console may not work properly in other browsers.



Enter the **User Name** and **Password** you configured during installation to login.

Dashboard provides an overview of data center power and temperature status.

NOTE

The letters of 'D' and 'C' in the default address are in capitals.

2. By clicking the shortcut in the Start menu.

- Click Start --All Programs.
- Find the **Intel Datacenter Manager** folder.
- Click on **Datacenter Manager Console**.

Set up Hierarchy

Intel® DCM Console provides several ways to set up data center hierarchy (data centers, rooms, rows, racks, and devices):

1. Hierarchy: To create a data center hierarchy manually from scratch, you may start from “Hierarchy” (left navigation menu). You may view power and temperature data by selecting items in hierarchy once devices are added.

2. Discovery: To discover devices in the network, you may start from “Devices” (left navigation menu). After discovery you may check devices in “All Devices” and add them to hierarchy in “Hierarchy”.

3. Import devices or hierarchy: To import devices or hierarchy from an excel file, you may start from “Discovery and Import” tab in “Devices”. Please refer Importing Devices to know how to create excel file.

To manage power and temperature of devices, you must add the devices into the hierarchy (in racks).

License

DCM Console can be used at no charge for 30 days. You can click **About** on the top right of the interface to check license **Status** and **Expire Date**.

If a new license is not imported after the expiration date, the **Status** changes from **Valid** to **Expired**. DCM Console stops working, and any operation in DCM Console will lead to an **Invalid license** notice.

If you want to continue using DCM Console after the expiration date, you can request a license from Intel Corporation to extend your use period.

To request a license:

- Click **About** on the top right of the interface.
- Copy your **Request ID** in the popup dialog and email it to dcmsales@intel.com.
- Contact Intel Corporation to sign an agreement and complete payment correctly.
- Obtain license from Intel.

To import new license:

- Click **About**.
- Click **Import new license** in the popup dialog.
- Select license file and then click **Open**.

Then your **Status** changes to **Valid** and the **Expire Date** is extended automatically.

Using DCM Console

Dashboard

The Dashboard provides the overall health status of the data center. It shows the current power and cooling status, the historical power and temperature trend, the hot rooms and hotspots, the power and space capacity information, devices status, and the critical events.

You may customize the dashboard by adding, deleting, or moving gadgets in it.

To add a gadget to the dashboard, click the 'Gear' icon on the top right corner. In the popup dialog, check the gadget you need and then click the 'OK' button.

To delete a gadget, move your mouse over the gadget and click the button on its top corner.

To move a gadget, move your mouse to the title of the gadget. When the mouse pointer changes to the cursor of the moving icon, you may drag the gadget and drop it to the desire location.

To reset the dashboard to the default status, click the 'Gear' icon on the top right corner. In the popup dialog, click the 'Reset to default' link.

If you want to see the dashboard for only one datacenter, you may choose the datacenter from the dropdown list "Dashboard for datacenter" in the "Dashboard Options" dialog.

To specify gadget option, you may move your mouse to the gadget and click the button of the spanner icon (which will be shown if the gadget is configurable) on the top of the gadget. Then specify the gadget options in the popup dialog.

Most of the data in the dashboard are refreshed automatically each minute.

Hierarchy

Hierarchy displays all managed entities in DCM Console.

DCM Console manages entities with the following hierarchy structure:

Data Center > Room > Row > Rack > Device > Blade

When you are creating a hierarchy:

- A room can only be added to a data center.
- A row can only be added to a room.
- A rack can only be added to a row.
- A device can only be added to a rack.
- A blade can be added to either a rack or a chassis (displayed in Device list).

Creating Hierarchy

On the **Hierarchy** page, click **+** in the **Data Center** list to add a DC. Specify the name in the popup dialog, and then click **OK**.

Select a DC and click **+** in the **Room** list to add a room to it. Specify the name of the room in the popup dialog, and then click **OK**.

Similarly, you may add rows to a room.

Select a row and click **+** in the **Rack** list to add a rack to it. Specify the name of the rack in the popup dialog, configure the space capacity and total power capacity, and check the box "**PDU Power as Rack Power**" if you want to use the power reading of PDU(s) in the rack as the IT equipment power of the rack, and click **OK** to add the rack.

NOTE

Name and **Total Power Capacity** are mandatory when you are adding a rack.

If **Total Power Capacity** is specified at Data Center, Room, or Row level, DCM Console would use it to calculate the utilization percentage instead of the aggregated capacity from rack level.

PUE (Power Usage Effectiveness) is an optional property for data center and room to calculate "Facility Energy" and "Energy Consumed (Total)" metrics. If it is not specified, DCM Console would use PUE specified in the settings page.

Adding Devices

Select a rack and click **+** in the **Device** tab.

The popup dialog shows "Devices not in Hierarchy". Select the devices you want to add to the rack, and then click **OK**.

You may also add a new device to a rack by navigating to the **Add New Device** tab in the popup dialog, and specifying the information of the device as described in Adding a Device Manually.

NOTE

If you do not specify **Size of Device** and **Derated Power**, default values (1 for **Size of Device** and 400 for **Derated Power**) are set for the server after you click **OK**. Default values for different device types are different.

Hierarchy Management

In the **Hierarchy** tab on the **Hierarchy** page, each entity can be edited or deleted (recursively with the sub-groups and devices) using the **Edit** icon or the **Delete** icon.

To edit an entity:

- Select the entity.
- Click the **Edit** icon in the list.
- Edit its information.
- Click **OK**.

To delete one or more entities:

- Select the entity/entities.
- Click the **Delete** icon in the list.

You may also click the **Move** icon to change the hierarchy:

- Select the entity/entities.
- Click the **Move** icon in the list.

- In the popup dialog, select the group as the destination.
- Click **OK**.

NOTE

You can refer to the **Hierarchy** tab by clicking the hyperlinks on entities. Almost all the entities are equipped with hyperlinks to the **Hierarchy** tab**.**

Summary

The Summary widget on the **Hierarchy** tab displays detailed information about each entity, including temperature, power, space and events, etc. You may export the selected hierarchy to an excel file at any level.

Summary of a DC

The **Summary** widget of the DC selected on the **Hierarchy** tab displays the following information:

- The highest inlet temperature
- The power capacity currently consumed against the power unused
- The space capacity currently consumed against the space unused
- The total number of racks and devices in the DC
- The device status in the DC

The **Events** tab lists all the events for the DC.

NOTE

The thermometer in the **Temperature** graph may turn red if the **Highest Inlet Temperature** becomes higher than 27 degrees.

The pie charts in the **Power** and **Space** graphs may turn red if the amount in use is greater than the capacity configured.

Summary of a Room

The **Summary** widget of the room selected on the **Hierarchy** tab displays the information below:

- The highest inlet temperature
- The power capacity currently consumed against the power unused
- The space capacity currently consumed against the space unused

- The total number of racks and devices in the room
- The device status in the room

The Summary of a room is similar to the **Summary** of a DC.

The **Events** widget lists all the events for the room.

Summary of a Row

The **Summary** widget of the row selected on the **Hierarchy** page displays the information below:

- The highest inlet temperature
- The power capacity currently consumed against the power unused
- The space capacity currently consumed against the space unused
- The total number of racks and devices in the row
- The device status in the row

The **Summary** of a row is similar to the **Summary** of a DC.

The **Events** widget lists all the events for the row.

Summary of a Rack

The **Summary** widget of the rack selected on the **Hierarchy** tab displays the information below:

- The highest inlet temperature
- The power capacity currently consumed against the power unused
- The space capacity currently consumed against the space unused
- The total number of devices in the rack

The **Summary** of a rack is similar to the **Summary** of a DC, while the total number of the racks is not listed. You may click 'Rack Front View' to see a visualized rack figure.

The **Lowest Inlet Temperature** and the **Highest Inlet Temperature** of all the devices in the rack are shown in 'Rack Front View'. Colored rectangles represent the devices in the rack you've selected, and rectangles with no colors represent the free

space. When the inlet temperature of a device is higher than 27 degrees, the color of the device turns yellow.

When you hover your mouse over a device, the color changes and the details of the selected device are shown.

You can select a device by clicking on the corresponding rectangle in the 'Rack Front View', and then the information for the selected device will appear on the tabs. The selected rectangle will be light gray (or yellow if the inlet temperature higher than 27 degrees), while the others will be dark gray.

The **Events** widget lists all the events for the rack.

Summary of a Device

The **Summary** widget of the device selected on the **Hierarchy** tab displays the information below:

- The highest inlet temperature
- Power
- Space
- The details of the device

The **Summary** of a device is different from that of a group.

- The **Temperature** graph displays its highest inlet temperature.
- The **Power** graph shows its current power.
- The **Space** graph displays the space that it occupies.

The light gray rectangle in the visualized rack highlights the device selected. The dark gray rectangles represent the other devices of the rack and the empty rectangles with no color represent the free space.

The **Events** widget lists all the events for the device.

NOTE

To refresh the properties and status of the selected device, you can click **Reconnect** on the Device Table widget.

Power/Temperature

Select an entity on the **Hierarchy** page and then check the **Power/Temperature** widget to see its power and temperature details.

Power and temperature data is plotted in the figures with the corresponding data granularities. CPU utilization data is plotted if in-band OS information is specified for the given server.

In the temperature figure:

- The **Highest Inlet Temperature**.
- The **Lowest Inlet Temperature**.
- The **Average Inlet Temperature**.

In the power figure:

- The **Highest Power Consumption**.
- The **Lowest Power Consumption**
- The **IT Equipment Power**.

You can view the power/temperature values by hovering your mouse over the data points in the curves.

By default, the power and temperature figures display the trending data of the recent hour. You can click the arrow buttons "**<**" and "**>**" to view the data in the previous and next time window, or switch to display the data in different time windows by clicking the corresponding buttons.

You can save the measurement data in an excel file so that the managers can analyze the data more conveniently. Click the **Export Data** link on the top of the **Temperature/Power** widget.

Choose the start and end time for data exporting. Then click **OK.**

NOTE

The corresponding data granularity of a different time window size is different, and is explicitly shown in the figures.

The **Power/Temperature** widget also provides energy consumption metrics for the selected entity:

- **IT Equipment Energy** gives the total energy consumption of all the IT devices.

- **Facility Energy**, obtained by multiplying **IT Equipment Energy** with a multiplier, estimates the energy consumption for cooling.
- **Energy Consumed (Total)** gives the total energy consumption from the IT devices and the cooling system.

NOTE

After a policy is enforced on the entity selected, **Requested Power Cap** is plotted in the power trending graph.

Layout

The layout tab demonstrates how the racks are distributed in the room. Each small check in the layout represents one corresponding rack in the room, red ones declaring the rack being hot. Detailed information about the rack, including **Name**, **Capacity**, and **Total power capacity**, **Temperature**, **Power**, **Grid X** and **Y** and so on, will appear once you move your cursor onto it. Through right clicking the rack in the layout and choosing **Go to the rack**, you'll get detailed information about the rack.

To add rack into the layout, you can either click **Add** in **Rack**, **Row**, **Room**, **Data center** in **Hierarchy** and input information like **Grid X** and **Y**, or Right click the blank space in the Layout, and choose **Move rack to the grid**.

There are mainly two ways to change the rack location in the layout. You can choose the specific rack in **Rack**, **Row**, **Room**, **Data center** in **Hierarchy** and edit its **Grid X** and **Y**. And besides, you can also right click the rack in the layout and choose **Move the rack**, and then a location icon will appear, which indicates that you can drag or move the rack according to its current location in the room.

You may rotate the entire layout view of a room by editing the "Layout Original Position" of the room.

You may specify the "Rack Orientation" at the row level by editing a row in the hierarchy.

You may switch layer of data by clicking "Layer" icon. The temperature/ power/ capacity data is color coded for the entire layout view.

When you select a row in the hierarchy, you can switch angle of the layout view to Front (panel) view by clicking the "Eye" icon. In the "**Front view**" you may check all the devices front panel temperature distribution for the selected row. By switching the angle, you have the **2D orthogonal thermal map** for your datacenter.

You may check the **historical data in the layout view** by clicking the "Clock" icon. A new web browser window/ tab would be popped up after you select an available timestamp. You may compare the data (temperature/ power/ capacity) to get the hint to optimize your datacenter energy efficiency.

What's more, you can zoom in or out the layout by sliding the mouse up or down. Right clicking in the blank space and choosing **Toggle full screen** will help you get a full and clear layout picture. Whenever you go too far away around the layout, you can always get back to the original point by simply clicking **Go to the origin**.

Capacity

The current power capacity and space capacity status is shown in "**Capacity**" tab.

You may specify device information to search for racks to install the device.

Type in **Size** and **Derated Power**, and then click **Search**.

Then the racks matching your requirements will be listed below.

You may plan (a what-if analysis) how to install your new devices to racks by clicking the planning button.

Devices

All Devices

The **All Devices** tab contains all the devices discovered, imported, and manually added.

On this page, you can edit the device information to change the **Name**, **Description**, etc. You can also delete a device from the list, or apply a filter to show only specific devices.

Adding a Device Manually

Click **Add** to add a new device to the Device List.

Choose device type in the drop-down list

Specify **Name** and **IP Address** or **Hostname** of the new device in the popup dialog. You may also need to provide some additional information based on the **Device Type** you selected. For servers managed through IPMI protocol, you may specify in-band OS information to retrieve CPU utilization data along with the power and temperature data.

For example, if you chose **Server** as the **Device Type**, you have to choose a protocol from IPMI, SSH, and WMI, then type in the related information.

NOTE

- You need to enter either the **IP Address** or the **Hostname**, but not both.
- If you choose **Server** as the device type and **SSH** or **WMI** as the protocol, DCM will login the OS with the username and password. Then DCM gets workload information from the OS to estimate power consumption dynamically.
- For **Network Device**, DCM supports Cisco switches with Cisco EnergyWise technology enabled.

Redfish Supported Servers

If the server is Redfish enabled and you plan on monitoring the device with this protocol, select HTTPs and then provide the authentication credentials during discovery or in the Add New Device tab.

PDU Configuration

If you add a PDU with outlet level power monitoring capability, you can specify unmanaged devices as associate devices. By doing this, you can get the power information of the devices without power monitoring capability from the PDU outlet power.

Click the **Associate Device** link on the **Device** tab of the PDU summary page. Click the drop-down list and choose an unmanaged device for the corresponding outlet. Then click **OK**.

Adding an Unmanaged Device

If you choose **Unmanaged server**, **Unmanaged network device**, **Unmanaged storage device, or Unmanaged Chassis** as the device type, you may specify Power Estimator(s) for the device(s) because these unmanaged devices do not have power monitoring capabilities. You can assign parameters to the estimator by specifying typical power or looking up the power profile.

To look it up go to the **Hierarchy** page, select the **Hierarchy** tab, then add the unmanaged device to a rack and select the device.

Click the **Edit** link on the **Summary** widget and a popup dialog box appears. Then you can select the device from the list and DCM will fill in the **peak power** and **active idle power** automatically according to the device selected. Click **OK** to finish configuring **Power Estimator**.

If your device is not in the list, or you know the typical power of your device, you can:

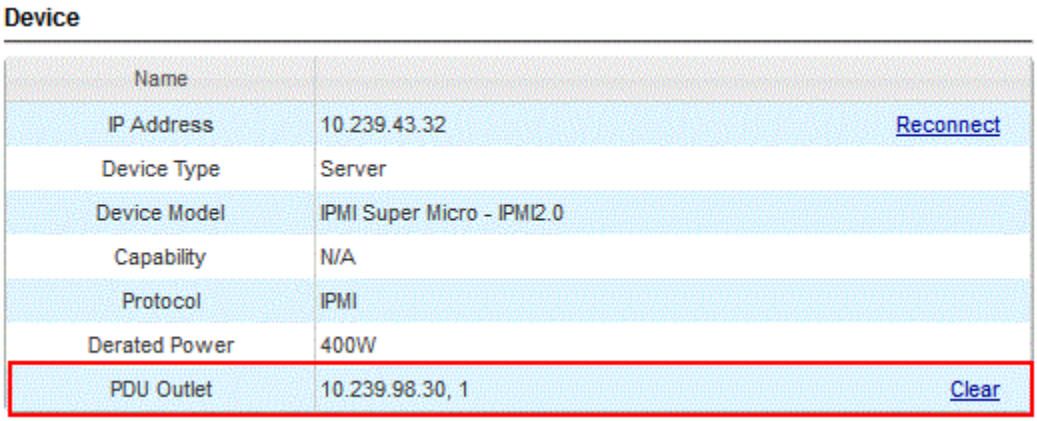
- Fill in the **peak power** and **active idle power** blanks directly.
- Click **Add** in the popup dialog to add a power profile:

You can **Edit** or **Delete** a power profile by clicking the corresponding button.

You can also check, edit and delete all the power profiles on the **Power Profile** tab of the **Settings** page.

NOTE

- After adding an unmanaged device into a rack, an event will appear in the Events list to remind you to specify a power estimator for it.
- You can configure the Power Estimator for devices of the same type in batches.
- If you have specified an unmanaged device for a PDU, you can see the information for the PDU on the last line of the Device list. For example, the screenshot below shows that you can get its power information from Outlet1 of PDU with an IP address of 10.239.98.30. You can click the **Clear** link to disassociate this information.



Filtering Devices

You can apply a filter to show only specific devices:

- Go to the **All Devices** tab on **Devices** page.
- Specify device name/address (partial or full).
- Click **Search**.

Advanced Search

You may search devices with combined condition in the "Advanced Search" dialog by clicking the "Advanced Search" button. The search result will satisfy all the conditions you specified.

Editing Devices

Click **Edit** to edit devices. Select the devices you want to edit, and then click **OK**.

You can change the name and optional information of the devices being edited. Only common property of devices could be edited if you need to edit multiple devices.

NOTE

IP Address/**Hostname**, **Device Type**, and **Protocol information** are based on device configuration, which cannot be changed arbitrarily.

Deleting Devices

To delete a single device or multiple devices:

- Go to the **All Devices** tab on the **Devices** page.
- Click **Delete**.
- Select the check boxes to specify which devices to delete.
- Click **OK**.

Discovery and Import

Discovering Devices

Click 'Add Discovery Task' in the 'Discovery and Import' tab.

Select the protocol type from the drop-down list, and input the IP range. The default 'Subnet Mask' is 255.255.255.0. You may provide some additional information based on the 'Protocol type' you choose.

Choose from 7 protocol types available in the drop-down list: IPMI, SNMPv1v2c, SNMPv3, WS-MAN, HTTPS, SSH, and INBAND_PROTOCOL.

Click OK to run the discovery task.

DCM Console supports to run multiple discovery tasks at the same time. If you have too many discovery tasks running at the same time, the performance of DCM Console would be impact potentially.

After the discovery progress reaches 100%, you may restart or remove the task by clicking the 'Run Again' or 'Remove' button;.

The devices discovered will be added to the 'Device List' automatically.

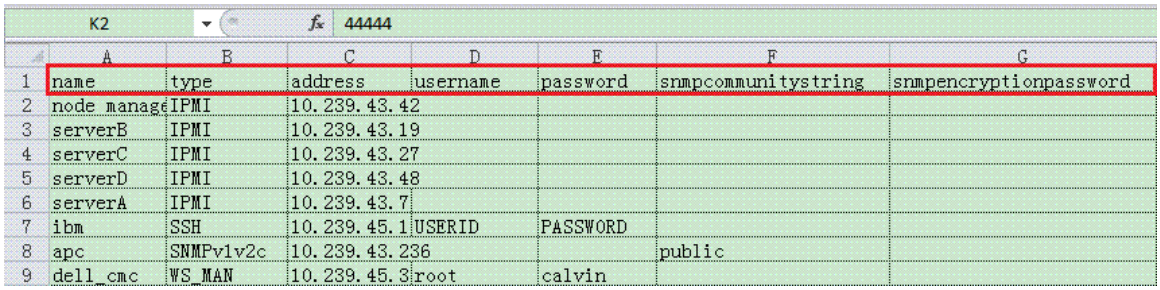
NOTE

If some devices are in the network you specified and are not discovered or imported by DCM Console, check the following:

- Network connectivity
- Device status
- Device credential you specified.

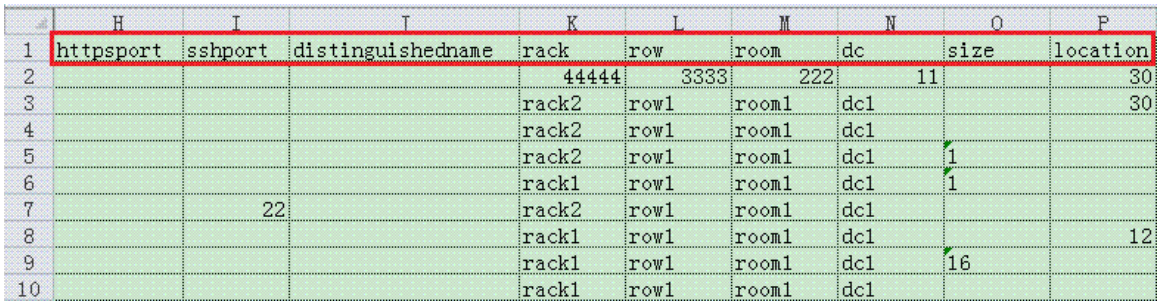
Importing Devices

You may import devices with or without hierarchy information to DCM Console. To import devices, you need to compile an Excel file which contains device and hierarchy information. Depending on device type, some columns are required. For example: Name, type, and address would be required for any IPMI based servers. Other columns would be optional.



K2 fx 44444

	A	B	C	D	E	F	G
1	name	type	address	username	password	snmpcommunitystring	snmpencryptionpassword
2	node manage	IPMI	10.239.43.42				
3	serverB	IPMI	10.239.43.19				
4	serverC	IPMI	10.239.43.27				
5	serverD	IPMI	10.239.43.48				
6	serverA	IPMI	10.239.43.7				
7	ibm	SSH	10.239.45.1	USERID	PASSWORD		
8	apc	SNMPv1v2c	10.239.43.236			public	
9	dell_cmc	WS_MAN	10.239.45.3	root	calvin		



	H	I	J	K	L	M	N	O	P
1	httpsport	sshport	distinguishedname	rack	row	room	dc	size	location
2				44444	3333	222	11		30
3				rack2	row1	room1	dc1		30
4				rack2	row1	room1	dc1		
5				rack2	row1	room1	dc1	1	
6				rack1	row1	room1	dc1	1	
7		22		rack2	row1	room1	dc1		
8				rack1	row1	room1	dc1		12
9				rack1	row1	room1	dc1	16	
10				rack1	row1	room1	dc1		

The following table lists the description of each item.

Item	Description
name	Entity display name
type	Supported protocol types include IPMI, SNMPv1v2c, SNMPv3, WS_MAN, SSH, and INBAND_PROTOCOL. For unmanaged device, it should be “Unmanaged server”, “Unmanaged network device”, or “Unmanaged storage device”.
address	IP address
username	Username to login
password	Password to login
snmpcommunitystring	Community string for accessing the SNMP-based platform via V1
snmpencryptionpassword	The SNMP-based platform user account password for encryption
httpsport	The HTTPS port for the entity
sshport	The SSH port for the entity
distinguishedname	The UCS DN of the entity (used for identifying and discriminating UCS devices in DCM)
key	The IPMI key for the node
deratedpower	De-rated power for both managed and unmanaged nodes

size	Size of the entity
location	Location of the physical entity
authenticateentity	To decide whether to authenticate Dell CMC in WSMAN connection. Valid value: true, false
model	Device model for unmanaged devices
ostype	OS type for IPMI devices. Valid values: Windows, Linux, Xen, ESX
osaddress	OS IP address
osusername	OS user name
ospassword	OS password
typicalpower	Typical power used in power estimation
idlepower	Idle power used in power estimation
peakpower	Peak power used in power estimation
gridx	The x axis of a rack in the room layout coordinate
gridy	The y axis of a rack in the room layout coordinate
dc	Data center
room	A physical group that includes all the rows in a physical room in the data center
rack	A physical group that includes all the devices in a physical rack in the physical data center.
row	A physical group that includes all the racks in a physical row in the physical data center
enclosure	An enclosure containing blade servers

For a running import task, you may check the progress or stop the task. For a completed import task, you may check result or remove the task by click corresponding link and button.

Groups

On the **Groups** tab, the devices you are interested in can be sorted and put into one custom group. You can manage, monitor, and configure the devices in the groups the same way as in the **Hierarchy**.

Operations on Groups

1. Adding groups

On the **Groups** page, click **+** under **Group List** to add a group. Specify the name and an optional description in the popup dialog, and then click **OK**.

You'll see your group added to the **Group List**.

Select a group and click **+** under **Device Name** to add a device to it. Specify the name and an optional description in the popup dialog, and then click **OK**.

Then devices are added successfully and the IP Addresses and the hierarchical structures are listed in the form.

NOTE

If you want to add all the devices of a given Data Center/Room/Row/Rack to a group, you can check the box for that Data Center/Room/Row/Rack, and then click **OK**.

2. Editing/deleting groups

In the Group List, you may click corresponding to edit or delete a group.

Summary/Power/Temperature/Events

These widgets are similar to that of **Hierarchy** page.

Power On/Off

You may schedule power on/ off tasks for a group of devices in this widget.

Firmware Update

It is an experimental feature introduced in version 3.4 of Intel® DCM Console. It provides the capability to review and update firmware for Intel S2600WFT, S2600ST, S2600BP servers. So far, it supports Linux only.

By default this feature is disabled. Below is the steps to enable it:

1. Install Intel® DCM Console
2. Download and Install Intel® SDP Tool
3. Update configuration file for Intel® SDP Tool
4. Copy the file FirmwareProvisioningConfig.xml into the DCM console conf folder (/opt/intel/datacentermanager/conf) and change its owner to dcm.
5. Set the right value for SDPTool_SetupLocation and SDPTool_ConfigLocation in this configuration file.
6. Run GrantExternalTool.sh (as root) from Intel® DCM Console to configure the access right.
7. Append into the file /opt/intel/datacentermanager/bin/allpermit.policy: permission java.io.FilePermission "<<ALL FILES>>", "execute";
8. To avoid exposing sensitive information, mount /proc with hidepid option (refer to this link for details)
9. Restart DCM services: /opt/intel/datacentermanager/startdcm.sh restart

NOTE

This is an experimental feature. Please contact dcmsales@intel.com on how to generate FirmwareProvisioningConfig.xml file to enable this feature.

Reliability

Unhealthy Devices

All devices which has healthy issues are listed in the “Unhealthy Devices” table. When you move the mouse to the state icon, the detail info is shown in tooltip. You may also click the device hyperlink to go to Hierarchy to see the detailed device health info.

Devices with unhealthy SSDs are listed in the second table. Intel® DCM Console can monitor some key attributes for SSDs, if any of them goes below corresponding failure thresholds, the SSD is regarded as unhealthy, then the device with such SSD will be listed in this Unhealthy SSDs table.

Predictive Failure
After changing some configuration and restarting DCM service, you may enable this feature to monitor the server fans predictive failure.

Anomaly Detection

Server Firmware Outlier

This table is used to show the firmware version outlier of the same server models.

Cooling Anomaly

This table is used to show the cooling anomaly info if any cooling anomaly happens in your room.

SNMP Alerts
This tab will appear only when "Receive SNMP alerts" is selected in "Settings" page.

SNMP alerts from managed devices can be viewed, acknowledged, and disabled in this table.

Server Failure Indicator
Server Failure Indicator is used for estimating the probability of being unhealthy for different server models. It is calculated through counting the observed system unhealthy status against the number of attemps of observation, and aggregated for each server model.

Energy

Cooling Analysis
In the **Cooling Analysis** tab, the **Temperature Histogram** figure for the room selected provides real-time monitoring data of the inlet temperatures. The X-axis shows the temperature values and the Y-axis gives the percentages of servers with the corresponding temperature values. **Sample Size** shows the number of the devices whose temperature can be monitored in the selected room.

The current cooling status is evaluated with suggestions given, along with **possible actions** and the **Benefits** of taking these actions.

For example, when servers with inlet temperatures higher than 27 degrees are detected, they will be displayed in the **Hotspots** list.

If you need to refresh the temperature data, click **Refresh** on the top right.

Low-Utilization Servers
On the **Low-Utilization Servers** tab, by clicking **Analyze**, low utilization servers will be identified and listed as potential targets for consolidation to optimize energy

efficiency. The time that the analysis was done is shown in the bottom left of the screen.

If there are a large number of servers, utilization analysis may take a long time. You may leave this page and perform other operations while the analysis runs in the background.

The **Daily Utilization Pattern** shows the result of analyzing server utilization patterns based on the historical monitoring data. This can help with server consolidation. For example, if one server is busy at night and idle in the daytime, while another is busy in the daytime and idle at night, you may consider migrating workload and shutting down one of these 2 servers.

Server Power Characteristics

Click **Server Power Characteristics** tab on the **Energy** page. You will see the bar diagram. The X-axis shows the power values and the Y-axis shows the server model. The power values next to the bars present the power ranges measured for different server models.

For example, **128 – 139** means that, for all managed servers with given model, the lowest power observed was 128 watt and the highest power observed was 139 watt.

Advanced Power Model

The power model for a certain server takes its utilization data as the input to predict its power consumption. To add a power model, you need to select a server with both monitored power and utilization data. At least 100 monitored data points are required. Once a power model is added, you can predict its power consumption for given workload (a combination of utilization data).

Policies

You can view the policies in this tab.

You can use policies to limit the amount of power that an entity consumes. Each policy applies to one entity, either a group or a device.

DCM Console provides several policy types:

- **Custom Power Limit** limits the total power consumption of an entity. When the policy applies to a group, DCM Console actively reallocates the power budgets to the individual servers within the group in each monitoring cycle. It attempts to minimize the gap between the power demands of each entity and the overall power allocation for the group, in order to minimize the performance impact of the group power capping. DCM Console monitors the

power consumption data of the servers, estimates the power demand of the servers, and reallocates the power budgets with a sophisticated approach by applying a heuristic discriminative approach to solve a probabilistic model. In general, DCM Console reacts quickly by allocating more power to servers to get new tasks running properly. If the total power demand of the group exceeds the group power constraint, DCM Console implements a balanced power allocation. The policies are commonly applied to increase the server density with respect to power or cooling capacity.

- **Minimum Power** throttles power consumption of an entity as much as possible. Use this policy to prolong business continuity in the case of an emergency.

Creating a Policy for Device

You may set a policy on a device. In the popup dialog, specify the policy name and select the policy type from the drop-down list:

- If you choose **Custom Power Limit**, DCM will generate an alert when the actual power consumption is higher than the threshold you configured.
- If you choose **Minimum Power**, DCM throttles the device power to the minimum (so you do not need to specify a threshold).

Navigate to the **Schedule** tab to schedule the policy, and then click **OK**.

You may check the policy in the **Policies** tab or on the **Policies** page.

NOTE

Reserve Budget is used for devices without power capping capability and is discounted from the total power limit.

Creating a Policy for a Group

When enforcing a **Custom Power Limit** at the group level, you may configure the priorities of its members. Excess power is distributed to the devices according to their priorities.

For each member, you can choose one of the priority levels:

- Low
- Medium (Default)

- High
- Critical: DCM reserves the de-rated power for this entity.

Priority lists are policy-specific and an entity may have different priorities in different policies. However, during policy calculation, a higher priority of an entity in one policy may override a lower priority set to the same entity in another policy.

You may view all the policies on the **Policies** page to disable, edit, or delete policies.

Enabling/Disabling Policy

To enable/disable a policy:

- Click the policy's **Enable**/**Disable** link.
- The **Status** of the policy turns green/red.

Editing Policies

To edit a policy:

- Click **Edit** for the selected policy.
- Update policy details in the popup dialog.
- Click **OK**.

Deleting Policies

To delete a policy:

- Choose the policies to delete by selecting the check boxes.
- Click **OK**.

Events

The **Events** and **Thresholds** tabs enables you to view the predefined events or custom events for DC management and all the thresholds of entities. Clicking **Events** on the left side of the interface will bring up the **Events** page, which shows lists of all events and thresholds. The **Events** list can be further filtered by time or severity level, as defined below.

Severity	Icon	Description

Level		
Custom		Associated with all custom events.
Critical		For errors that may cause DCM to stop working properly.
Error		For errors on specific nodes, or non-critical errors in Intel(R) DCM.
Warning		For events that warn that an error may soon occur.
Informative		For events that do not report errors.

NOTE

There are different **Events** tabs in DCM console:

- The **Events** page lists all the predefined events and custom events.
- The **Events** tab on the **Dashboard** page only lists the critical events and custom events.
- The **Events** tab in the **Hierarchy** page lists all the events applying to the specific group or device.

You can specify an e-mail address to receive messages when an event is triggered. Add an e-mail address on the **E-mail Subscription** tab of the **Settings** page.

Filtering Events

To view specific events, you can filter the events by specified time period or severity level.

To filter events by data range:

- Go to the **Events** page.
- Select **Date Range**.
- Specify start time and end time.
- Click **Search**

To filter events by severity levels:

- Go to the **Events** page.
- Select **Severity**.
- Select one or more severity levels.

- Click **Search**.

Deleting Events
DCM Console automatically deletes old events if there are more than 20,000 events listed. You can also manually delete events.

To delete events:

- Go to the **Events** page.
- Click **Delete**.
- Choose the event to delete by selecting the check boxes.
- Click **OK**.

To delete all events:

- Go to the **Events** page.
- Click **Delete All**.

Thresholds
All thresholds are displayed in a table. You may manipulate these thresholds in the table. DCM Console would not validate input when you edit threshold in the table considering that these thresholds might be showed in multiple pages.

Custom events are triggered when a power or temperature threshold is configured on groups or devices. An event will be triggered when the 'Condition' is met.

To configure a power threshold:

- Got to Thresholds tab and click '+' button
- Specify the entity
- Select 'IT Equipment Power' as 'Threshold Type'.
- Select the right value for 'Condition'
- Enter the value of Threshold, and then click OK.
- Once the power draw of the entity increases over the threshold you configured, an event is triggered and listed in 'Summary' tab. You can check the details by moving your mouse over its 'Description'.

Configuring temperature thresholds is similar.

Settings

User Management

In the User Management tab, you can create, edit, or delete users. Administrator role and guest role could be granted to a user. A user of guest role does not have permissions to modify anything in DCM. DCM Console supports Microsoft Active Directory user and group. You may assign a role for a Microsoft Active Directory user or group, and then login to DCM Console with the Active Directory account. You need to specify domain name and credentials to access the Active Directory server. DCM Console supports LDAP authentication. You need to specify correct LDAP configuration in the settings to enable LDAP authentication.

Password

On the **Password** tab, you can change your login password once you fill in the correct old password.

To change the login password:

- Go to the **Settings** page.
- Fill in the old password.
- Fill in the new password.
- Confirm the new password.
- Click **Save**.

SNMP Trap

In the **SNMP Trap** tab you can assign a recipient to receive the events triggered, making it easier to manage the events in 3rd-party event management systems. DCM events are defined in the Management Information Base (MIB) file. And the MIB file is installed at "<installation path>\Intel\DatacenterManager\conf\DCMConsole-MIB-V1.mib".

To add a trap receiver:

- Go to the **Settings** page.
- Click **Add Receiver**.
- Fill in the Destination IP/Host, Port, and Community Name.
- Click **OK**.

To edit/delete/test a trap receiver:

- Go to the **Settings** page.
- Click the links **Edit/Delete/Test** in the **Action** column.

Email Subscription
In "Email Subscription" tab you can subscribe DCM Console event through email, making it easier to get DCM alert.

To subscribe event:

- Go to the 'Settings' page.
- Click 'Add Subscription'.
- Fill in email server configuration.
- Check "Subscribe threshold-based events only" if you only care about threshold based event
- Click OK.

To edit/delete/test a subscription:

- Go to the 'Settings' page.
- Click the links Edit/Delete/Test in the Action column.

Predefined Event
The **Predefined Event** tab integrates all the events predefined by DCM in a form. It includes the **Predefined Event Type** and **Severity** of events. You can select the predefined events you are interested in by checking the corresponding boxes and clicking **Save**.

Power Profile
All the power profiles are listed in **Power Profile** tab on the **Settings** page. You can manage the power profiles conveniently in this tab.

Click the **Add** or **Delete** button to add a new power profile or delete an existing power profile.

Click the **More** hyperlink to edit the corresponding power profile.

LDAP
DCM Console supports LDAP authentication. You need to specify correct LDAP configuration in the settings to enable LDAP authentication. You may need to consult your LDAP administrator to get the configuration information for the settings.

Emergency Power Reduction
In the event of an emergency, such as a DC-level power failure forcing the DC to run on a backup power supply, you can enable **Emergency Power Reduction** to throttle the power of the devices down to an extremely low level to prolong the service time.

Also, you can specify the emergency power reduction (EPR) for a device when it is added. You can also modify this EPR action by editing the device if it has been added. So when a room is in emergency power reduction, different devices can be in different states.

There are three actions you can choose from the drop-down list: **Minimize power consumption** (default**)**, **Shut down** and **No action**. You can choose **No action** for very critical devices, but **Minimize power consumption** or even **Shutdown** for others.

NOTE

Applying **Emergency Power Reduction** may throttle the power consumption of the devices down to an extremely low level, or even shut the devices down, which will impact performance. Use this function only in emergencies. Please check the EPR action carefully before applying EPR.

Enabling EPR

Choose a data center or a room, and then click **Save**.

Click **OK** to confirm the operation in the popup dialog.

All the devices with power capping capability in this group are throttled to the state specified by the manager. You can specify **EPR action** by editing the devices.

Then an icon for EPR appears on top right of the page.

You can check the device list in EPR by clicking the icon.

Disabling EPR

To disable emergency power reduction, uncheck the specified groups, and then click **Save**.

Click **OK** to confirm the operation in the popup dialog.

Miscellaneous

You may configure the following options for your preferences:

- Maximum Healthy Temperature: The color (blue or orange) in dashboard would be affected by this option. Recommended value is 27 °C. This setting option does not impact all the temperature based thresholds.

- Specify 'Power Usage Effectiveness' of your datacenter. PUE=Total Facility Energy / IT Equipment Energy. It is used to estimate Metrics in Temperature / Power page.
- Specify "Show monitoring status of devices in visualized rack". If it is checked, the visualized rack in "Datacenter Manager" would show an orange dot to indicate the servers are not monitored.
- Specify "Temperature Unit"
- Specify" "Show advanced telemetry". The advanced telemetry is available for some NM enabled servers.

NOTE

The blink of the browser title may behave differently in different web browsers and operating system settings.

Command Line Tool

Intel® DCM Console provides a command line tool to manipulate hierarchy. The tool should be run on the same server as DCM Console installed. You may find the corresponding executable hman.bat (for Windows) and hman.sh (for Linux) in DCM bin folder. Please make sure that no EPR (Emergency Power Reduction) is enabled when you manipulate hierarchy with the command line tool.

Six commands are supported:

add, delete, update, list, move, and help.

For each command, there should be command options and command target.

help

command target: add, delete, update, list, and move. Help command shows the usage of the commands. The tool shows the usages of all the commands if the command target is not specified.

add

command options:

-hierarchylevel (data center, room, row, rack, device, blade)

-name

-description

-capacity (for rack only)

-powercapacity (for rack only)

-pdupowerasrackpower (for rack only)

-type (options below are the same as column items in import, please refer to Importing Devices)

-address

-username

-password

-snmpcommunitystring

-snmpencryptionpassword

-httpsport

-sshport

-distinguishedname

-key

-deratedpower

-size

-location

-authenticateentity

-model

-ostype

-osaddress

-osusername

-ospassword

-typicalpower

-idlepower

-peakpower

-gridx

-gridy

command target: full path name (Unix like full path name style, e.g., /dc1/room1/row1/rack1/) of the entity to which end user wants to add a new entity. If the command target is not specified for add command, root (/) would be used by default. It implies that you can only add a data center entity if the command target is not specified.

delete

command target: full path name of the entity to be deleted.

update

command options:

-name

-description

-capacity

-powercapacity

-pdupowerasrackpower

-address

-username

-password

-snmpcommunitystring

-snmpencryptionpassword

-httpsport

-sshport

-distinguishedname

-key

-deratedpower

-size

-location

-authenticateentity

-model

-ostype

-osaddress

-osusername

-ospassword

-typicalpower

-idlepower

-peakpower

-gridx

-gridy

command target: full path name of the entity to be updated.

Examples:

1. Set up hierarchy, create hierarchy "/DC9 SHANGHAI/Real Lab/Row/TmpRack”

C:\Program Files\Intel\DataCenterManager\bin>hman.bat add -hierarchylevel dc –name “DC 9 SHANGHAI”

C:\Program Files\Intel\DataCenterManager\bin>hman.bat add -hierarchylevel room –name “Real Lab” “/DC 9 SHANGHAI”

C:\Program Files\Intel\DataCenterManager\bin>hman.bat add -hierarchylevel row –name “Row” “/DC 9 SHANGHAI/Real Lab”

C:\Program Files\Intel\DataCenterManager\bin>hman.bat add -hierarchylevel rack –name “TmpRack” “/DC 9 SHANGHAI/Real Lab/Row”

2. Add an HP iLO rack server to a rack

C:\Program Files\Intel\DataCenterManager\bin>hman.bat add -hierarchylevel device -name "My iLO" -type IPMI -address 192.168.0.1 -username myname -password mypassword "/DC9 SHANGHAI/Real Lab/Row/TmpRack"

3. Add an HP enclosure to DCM to a rack

C:\Program Files\Intel\DataCenterManager\bin>hman.bat add -hierarchylevel device -name "My Enclosure" -type SSH -address 192.168.0.2 -username myname -password mypassword "/DC9 SHANGHAI/Real Lab/Row/TmpRack"

4. Add an HP blade to an Enclosure ("My Enclosure")

C:\Program Files\Intel\DataCenterManager\bin>hman.bat add -hierarchylevel blade -name "My iLO blade to enclosure" -type IPMI -address 192.168.0.1 -username myusername -password mypassword "/DC9 SHANGHAI/Real Lab/Row/TmpRack/My Enclosure"

list

command target: full path name of the entity to be listed. The command lists all direct children of the command target. If the command target is not specified for the "list" command, root (/) would be used by default. It implies that you can list all data centers if the command target is not specified.

move

command target: the command takes two arguments, source and destination. "Source" means the full path of an existing entity. "Destination" means the full path to specify where to move 'source'. The rule of the hierarchy needs to be followed when an entity is moved.

Glossary

BMC	Board Management Controller
DC	Data Center
DCM	Datacenter Manager
NM	Intelligent Power Node Manager
PDU	Power Distribution Unit
RMI	Remote Method Invocation
RAM	Random Access Memory
SNMP	Simple Network Management Protocol

SSH	Secure Shell
TLS	Transport Layer Security
UI	User Interface
UPS	Uninterruptible Power Supply
UCS	Universal Character Set