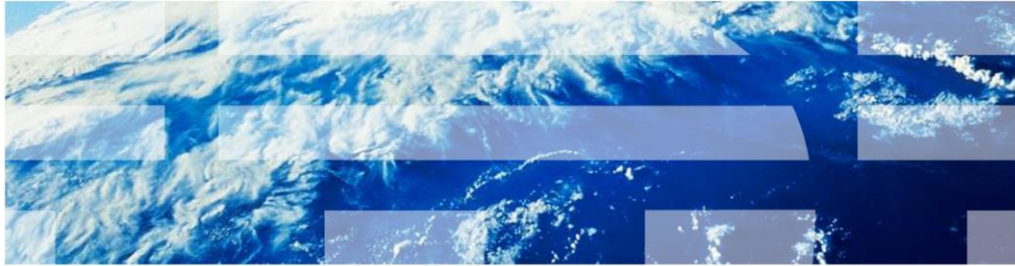


IBM PureApplication System

Hardware management



This presentation will cover the hardware management functions in IBM PureApplication System.

Table of contents

- Overview
- Infrastructure map
- Compute nodes
- Management nodes
- Storage devices
- Network devices

This presentation covers the infrastructure map, compute nodes, management nodes, storage devices and network devices in PureApplication System.

Overview

The first section of this presentation is a brief overview of the managed hardware components.

Overview

- Hardware related information, operations and configurations
 - Infrastructure map
 - Compute nodes
 - Management nodes
 - Storage devices
 - Network devices
- Requires Hardware Permission (Read or Full)
- Compute and management node panels allow some operations
- Infrastructure map, storage devices, and network device panels only display information



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IBM PureApplication System - Hardware Management

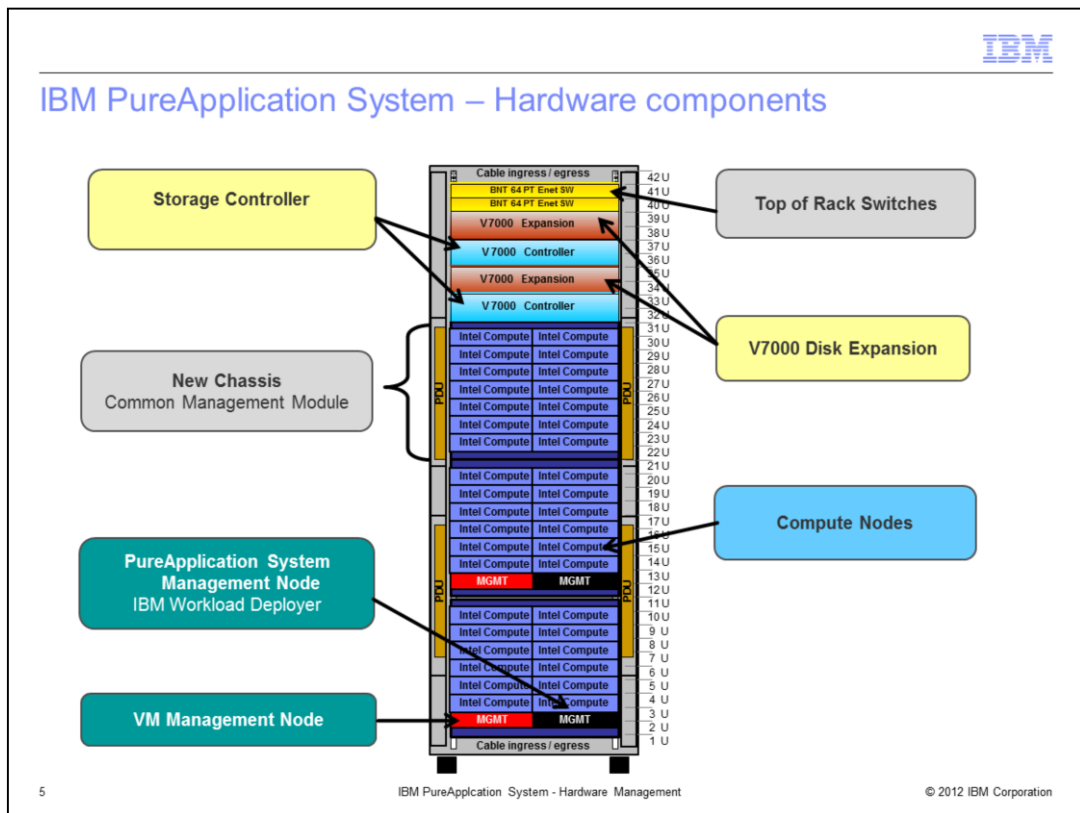
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The five mentioned hardware components are accessed from the administrative console by navigating to the system console, and then selecting the Hardware tab. Here you will see the options for the infrastructure map, compute nodes, management nodes, storage devices, and network devices.

The permission required to see these options is Hardware Permission. Hardware Read Permission allows you to view these resources, and Hardware Full Permission allows you to update these resources. Note however that even with Hardware Full Permission, there are a very limited number of operations that you are allowed to access.

For the infrastructure map, storage devices, and network devices, there are no operations available to the user outside of viewing information. For compute nodes and management nodes, there are some update capabilities available to the user, and they are discussed later in this presentation.

IBM PureApplication System – Hardware components



Seen here is a high-level visual overview of the hardware components of the PureApplication System. There are the storage and storage expansion controllers, top of rack switches, management nodes, compute nodes, and three chassis. All components have redundancy for high availability. This presentation will review the panels available to you to manage each of these hardware components. Additionally it will discuss the infrastructure map that is available to view the status of all these components.

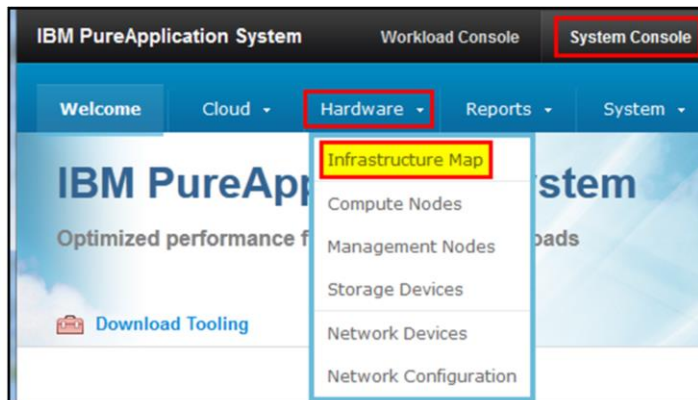
Section

Infrastructure map

This section covers the infrastructure map.

Hardware infrastructure map (1 of 6)

- Hardware infrastructure map graphically shows the entire rack and its components with overlays of important information that helps in some troubleshooting and performance issues
- Navigate to **System Console** → **Hardware** → **Infrastructure Map**
- Graphics view and tree view available



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IBM PureApplication System - Hardware Management

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The hardware infrastructure map provides a graphical view of the entire rack and its components, providing critical information about the state of the rack. There are two views available, a graphics view and a tree view.

To view the hardware infrastructure map, navigate to the hardware menu in the system console, and select infrastructure map.

Hardware infrastructure map (2 of 6)

The screenshot displays the IBM PureApplication System Hardware Management interface. At the top, there are tabs for 'Default', 'Status', 'LED', 'Temperature', and 'Performance'. A 'Show Component Name' toggle is set to 'ON'. The main area shows a rack of components with various status indicators. On the left, a legend allows for filtering system information. On the right, a detailed view for a selected 'Storage Expansion' component is shown, listing attributes like capacity and utilization. Annotations with callouts point to these specific features.

The graphical view of the infrastructure map is shown here. It has three sections to it. In the middle is the rack itself, with various system information about all of the compute nodes and other machines components. On the left is the legend, which provides different options for the system information that is overlaid in the middle section. On the right is the detailed system information for the selected component.

On top of the screen are multiple tab options which, when selected, provide customized legends. This view shows the default tab option. When you are in one of these tabs, you can always de-select any of the legend options, but you cannot add new options. Additionally on the same row as the five tab options, there is a show component name button, that can be toggled to either show or remove all the component names on the display.

Hardware infrastructure map (3 of 6)

Infrastructure Map (Graphics View) Refresh

Default **Status** LED Temperature Performance Show Component Name

Legend

- All
- Critical
- Warning
- Information

System: PureApplication System

Storage Node Expansion: 78N02MK

Summary

Status: ✔ Available
Type: ↕ Storage Expansion

Status

Critical: 0
Warning: 0
Information: 0

Detail

Bay State	Capacity	Type
1 ✔	558.411 GB	Hard drive disk
2 ✔	558.411 GB	Hard drive disk
3 ✔	558.411 GB	Hard drive disk
4 ✔	558.411 GB	Hard drive disk
5 ✔	558.411 GB	Hard drive disk
6 ✔	558.411 GB	Hard drive disk
7 ✔	558.411 GB	Hard drive disk
8 ✔	558.411 GB	Hard drive disk
9 ✔	558.411 GB	Hard drive disk
10 ✔	558.411 GB	Hard drive disk
11 ✔	558.411 GB	Hard drive disk
12 ✔	558.411 GB	Hard drive disk
13 ✔	558.411 GB	Hard drive disk
14 ✔	558.411 GB	Hard drive disk
15 ✔	558.411 GB	Hard drive disk
16 ✔	558.411 GB	Hard drive disk
17 ✔	558.411 GB	Hard drive disk
18 ✔	558.411 GB	Hard drive disk
19 ✔	558.411 GB	Hard drive disk
20 ✔	558.411 GB	Hard drive disk
21 ✔	372.111 GB	Solid-state disk

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This view shows the status tab option. A storage node expansion controller is selected in the map itself, and the details of that controller are displayed on the right.

Hardware infrastructure map (4 of 6)

The screenshot displays the 'Infrastructure Map (Graphics View)' in the IBM PureApplication System Hardware Management console. The 'LED' tab is selected and highlighted with a red box. The main view shows a rack of server components, including 'Top of Rack Switch', 'Storage Node Expansion', and 'Storage Node'. A 'Compute Node' is selected, and its details are shown in a sidebar on the right. The sidebar includes a 'Summary' section with status and configuration information, an 'LED' section with power consumption, location, and fault indicators, and a 'Charts' section with a bar chart showing power consumption over time.

System: PureApplication System

Legend:

- All
- Power
- Event
- Location
- Fault

Compute nodes: SN#23AWVD6

Summary

- Status: Available
- Machine type: 8737
- Serial number: SN#23AWVD6
- Architecture: AC1
- Firmware level: 1A0027N - 04/18/2012 - 1.32
- Service processor level: n/a
- Unified extensible firmware interface level: B2E113AUS - 04/12/2012 - 1.00
- In cloud group:
- Health statistics: Successful deploy number: 0
- Virtual machines: 70
- PVU value: 70

LED

- Power consumption:
- Location:
- Fault:

Charts

10 IBM PureApplication System - Hardware Management © 2012 IBM Corporation

This view shows the LED tab option. A compute node is selected and the details are displayed on the right.

Hardware infrastructure map (5 of 6)

The screenshot shows the 'Infrastructure Map (Graphics View)' in the IBM PureApplication System Hardware Management console. The 'Temperature' tab is selected and highlighted with a red box. The main view displays a rack of server components with temperature readings. On the right, a detailed view of a 'Compute nodes SN#23ZYT41' is shown, including a summary of its status (Available), machine type (8737), serial number (SN#23ZYT41), architecture (AC1), firmware level (1A0027N - 04/18/2012 - 1.32), and service processor level (n/a). A temperature chart is also visible at the bottom right of the detailed view.

This view shows the temperature tab option. Temperatures for every compute node and other components are displayed here.

Hardware infrastructure map (6 of 6)

The screenshot displays the 'Infrastructure Map (Graphics View)' for a 'PureApplication System'. The 'Performance' tab is selected and highlighted with a red box. The interface includes a legend on the left with various performance metrics checked, a central rack view showing server components with their respective utilization percentages, and a detailed performance panel on the right for the selected 'Storage controller78N00K3'. The detailed panel shows summary information (Status: Available, Type: Storage controller, Capacity: 21.811 TB, Free: 13.935 TB) and performance metrics (CPU utilization, Memory utilization, Storage utilization: 63.9%, Network utilization: 43.0%, Virtual machines, Volumes, Power consumption). A table of disk details is also visible in the 'Detail' section.

Bay State	Capacity	Type
1	558.411 GB	Hard drive disk
2	558.411 GB	Hard drive disk
3	558.411 GB	Hard drive disk
4	558.411 GB	Hard drive disk
5	558.411 GB	Hard drive disk
6	558.411 GB	Hard drive disk
7	558.411 GB	Hard drive disk
8	558.411 GB	Hard drive disk
9	558.411 GB	Hard drive disk
10	558.411 GB	Hard drive disk
11	558.411 GB	Hard drive disk
12	558.411 GB	Hard drive disk

This view shows the performance tab option. Performance details are displayed on the right when one of the top of rack switches, storage controllers, or compute nodes is selected by the user.

Infrastructure map – tree view

Infrastructure Map (Tree View)

SN#23AWTY7

Switch to Graphics View

- ⊖ Rack 8283/SRVG04
 - ⊖ Rack 8283/SRVG04
 - 🔌 Top of Rack Switch SN#U57116000G Unit 42
 - 🔌 Top of Rack Switch SN#MY212201NZ Unit 41
 - 📦 Storage Node 78N01F2 Unit 37
 - 📦 Storage Node 78N00K3 Unit 33
 - 📦 Flex Chassis SN#23FBX02 Chassis 3
 - 🌿 Chassis Management Module SN#23FBX Management Bay 2
 - 🌿 Chassis Management Module SN#23FBX Management Bay 1
 - 👤 **Compute Node SN#23AWTY7 Node Bay 4**
 - 👤 Compute Node SN#23AWVD6 Node Bay 3
 - 👤 Compute Node SN#23AWTF3 Node Bay 2
 - 👤 Compute Node SN#23AWTV7 Node Bay 1
 - 🔌 Network Switch SN#23FBX0251 Input/Output Bay 1
 - 🔌 Network Switch SN#23FBX0252 Input/Output Bay 2
 - 🔌 SAN Switch SN#23FBX0253 Input/Output Bay 3
 - 🔌 SAN Switch SN#23FBX0254 Input/Output Bay 4
 - ❄️ Chassis Cooling Device SN#23FBX02F1
 - ❄️ Chassis Cooling Device SN#23FBX02F2
 - ❄️ Chassis Cooling Device SN#23FBX02F3
 - ❄️ Chassis Cooling Device SN#23FBX02F4

Events:

Warning : 0 Critical : 0 [View details...](#)

Type: Compute Node

Architecture: AC1

Firmware level: 1A0027N - 04/18/2012 - 1.32

Status: Available

Power status: Powered On

Energy information: Input power range: 112W - 147W Average input: 116W

PVU value: 70

Service processor level: (none)

Unified extensible firmware interface level: B2E113AUS - 04/12/2012 - 1.00

Machine type: 8737

Location: Rack 8283/SRVG04 > Chassis 3 > Node Bay 4

In cloud group:

Temperature: Ambient Temperature: 19°C
Maximum Ambient Temperature: 29°C

Health statistics: Health status: ✔ Normal

- Core temperature warning number: 0
- Error LED number: 0
- Hardware inventory warnings number: 0
- VMS inventory warnings number: 0
- Successful deploy number: 0
- Deploy number: 0

[clear](#)

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IBM PureApplication System - Hardware Management
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In the top right corner is a link to toggle between the graphical view and the tree view. This presents a screen that provides every component available in the expandable sections in the left side of the screen. When a specific component is selected, its details are displayed on the right.

Compute nodes

This section covers the compute nodes.

Compute node panel

- Lists all the compute nodes in the rack
- Select a compute node for its details and operations

The screenshot displays the IBM PureApplication System Hardware Management interface. On the left, a 'Hardware' menu is open, with 'Compute Nodes' highlighted. Below it, a 'Compute Nodes' list shows two entries: 'Compute Node' and 'Compute Node (CloudGroup1)'. The 'Compute Node (CloudGroup1)' entry is selected and highlighted with a red box. A red arrow points from this entry to the detailed view on the right.

The detailed view for 'Compute Node' shows the following information:

- Events:** Warning : 4, Critical : 4, View details...
- Jobs:** pending_jobs : 0, active_jobs : 0, View details...
- Type:** Compute Node
- Power status:** Powered On
- Energy information:** Input power range: 112W - 147W, Average input: 118W
- Location:** Rack 8283/RDX01 > Chassis 3 > Node Bay 2
- In cloud group:** CloudGroup1
- Compute Node Information:** Serial Number: SN#23APPV1
- State Information:** Status: Available
- Temperature:** Ambient Temperature: 21°C, Maximum Ambient Temperature: 29°C
- Health statistics:** Health status: Normal, Core temperature warning number: 0, Error LED number: 0, Hardware inventory warnings number: 3, VMS inventory warnings number: 0, Successful deploy number: 0, Deploy number: 0, Clear
- Physical cores:** 0% (0 / 16 used)
- Physical memory:** 2% (3.161GB / 255.977GB used)
- Virtual machines:** (none)
- LEDs:** 10 total, Available: 10
- Physical IO Adapter:** 2 total

At the bottom of the screenshot, the page number '15' is on the left, 'IBM PureApplication System - Hardware Management' is in the center, and '© 2012 IBM Corporation' is on the right.

The compute nodes are the processors that have the physical CPU and memory required to run the virtual machines that are deployed to a cloud group. Recall that cloud groups consist of one or more compute nodes, and that a cloud group configuration is done as part of the cloud Configuration process.

To view the compute nodes, navigate to the hardware menu in the system console, and select compute nodes. This will present a list of all the compute nodes in the system. The list itself provides the serial number of the compute node along with its location in the form of the rack name, chassis number and node bay number.

When you click a compute node in the list, you will see the details panel for the compute node, shown here on the right. The details are discussed in the next set of slides.

Compute node panel details

Discussed in subsequent slides

Compute Node		Power On	Power Off	Start	Quiesce	Maintain	Report
Events:	Warning : 4	Critical : 4	View details...				
Jobs:	pending_jobs : 0	active_jobs : 0	View details...				
Type:	Compute Node						
Power status:	Powered On						
Energy information:	Input power range: 112W - 147W		Average input: 118W				
Location:	Rack 8283/RDX01 > Chassis 3 > Node Bay 2						
In cloud group:	CloudGroup1						
Compute Node Information:	Serial Number: SN#23APPV1						
State Information:	Status: Available						
Temperature:	Ambient Temperature: 21°C		Maximum Ambient Temperature: 29°C				
Health statistics:	Health status: Normal		Core temperature warning number: 0 Error LED number: 0 Hardware inventory warnings number: 3 VMS inventory warnings number: 0 Successful deploy number: 0 Deploy number: 0 Clear				
Physical cores:	0% (0 / 16 used)						
Physical memory:	2% (3.161GB / 255.977GB used)						
Virtual machines:	2 total						
LEDs:	10 total Available: 10						
Physical IO Adapter:	2 total						

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Here you again see the compute node detail screen, and the fields are discussed here.

The Events field shows the number of warning and critical events for this compute node, with links that take you to the events screen to provide further details about the events.

The Jobs field shows the number of pending and active jobs that are associated with this compute nodes, with links to take you to the job queue screen to provide further details about the jobs.

The Type field identifies this as a compute node.

The Power status field indicates if the node is powered on or off.

The Energy Information field provides you with power consumption statistics.

The Location field tells you where the device is located within the rack.


The In cloud group field tells you which cloud group is associated with this compute node. A link is provided to take you to the detail screen for the cloud group.

The next two Information sections are discussed in subsequent slides.

Below that are the Temperature and Health statistics fields.

The remaining five expandable sections are discussed in subsequent slides.

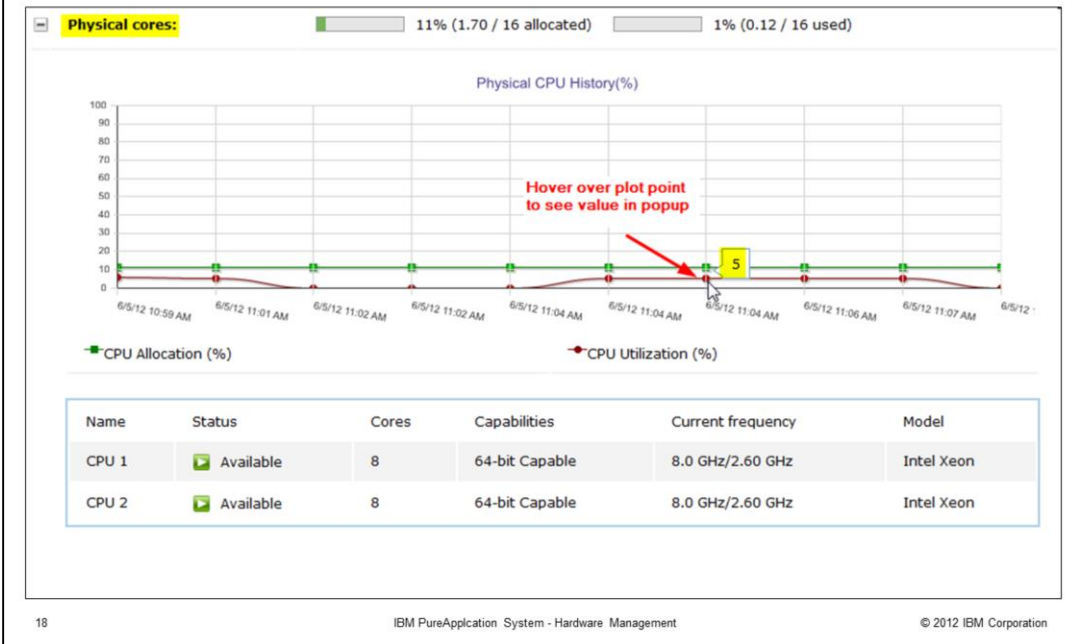
Compute node details – information

In cloud group:	CloudGroup1
Compute Node Information:	Serial Number: SN#23APPV1
Machine type:	8737
Architecture:	AC1
Firmware level:	1A0027Q - 05/04/2012 - 1.34
Service processor level:	n/a
Unified extensible firmware interface level:	B2E113AUS - 04/12/2012 - 1.00
PVU value:	70
State Information:	Status:  Available
Last State Change Reason:	The state was automatically changed to available because the cloud group change for the node is done.

The compute node information section of the detail screen provides the serial number. When expanded, it also provides the machine type, architecture, firmware level, service processor level, unified extensible firmware interface level, and PVU value.

The state Information section provides the state of the compute node. Some example states are available and quiesced. When expanded, it also provides the reason for the last state change.

Compute node details – physical cores

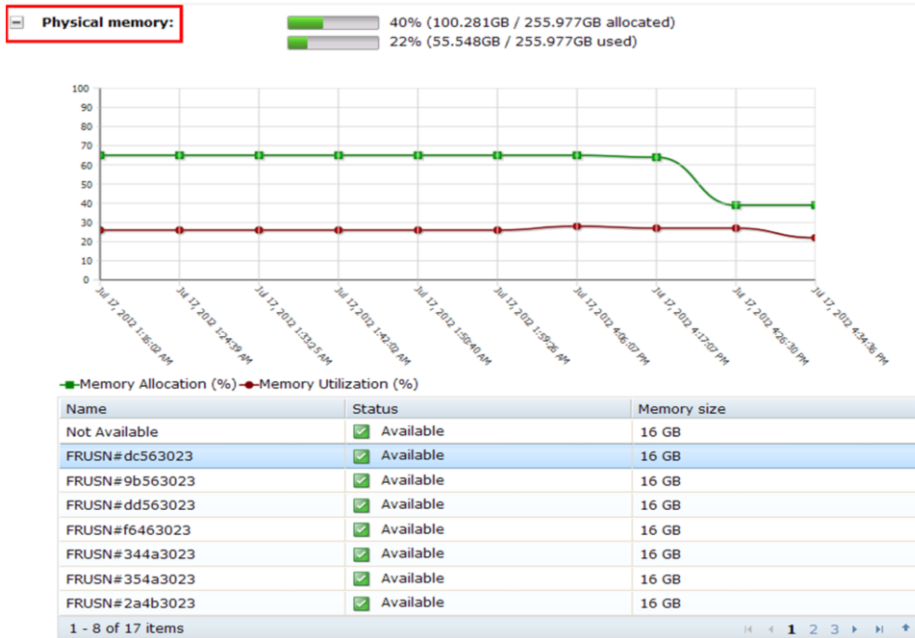


The physical cores section of the compute node screen provides information about the core usage on this compute node.

When expanded, a graph of the CPU allocation and usage is presented. The graph shows the physical allocation of CPUs to virtual machines on this compute node, and the utilization history. The scale of this graph can vary from minimally 1-minute intervals to larger intervals, depending on when changes in allocation and usage occur. You can hover your cursor over any of the plot points to see the actual values.

At the bottom of the expanded screen is information about the individual CPUs in the compute node, including name, status, number of cores, addressing capabilities, current frequency, and model.

Compute node details: physical memory



The physical memory section of the compute node screen provides information about the physical memory allocation and usage on this compute node.

When expanded, a graph of the memory allocation and usage is presented. The scale of this graph is the same as on the physical cores graph seen on the previous slide. You can hover your cursor over any of the plot points to see the actual values.

At the bottom of the expanded screen is a list of memory modules in the compute node, with their name, status and size.

Compute node details: virtual machines

- Lists information about all virtual machines running on this compute node

Name	Status	Virtual memory utilization	Virtual CPU utilization
ipas-lpar-200-041-DB2_ESE_Trial-DB2v10test-471	Running	87%	0%
ipas-lpar-200-005-Standalone-WAS 8.0.0.3 extended for DoubleTake-1.0-445	Stopped	0%	0%

1 - 2 of 2 items

The virtual machines section of the compute node details screen shows you the total number of virtual machines running on that compute node. When expanded, more details about the virtual machines are provided, including virtual machine name, status, virtual memory utilization, and virtual CPU utilization.

Links are provided in the name column to take you directly to the virtual machine detail screen.

Compute node details: LEDs

LEDs:

10 total

Name	Status	Severity
DC Fault	<input type="checkbox"/> Off	
Fault	<input type="checkbox"/> Off	
IMM Fault	<input type="checkbox"/> Off	
CPU 1	<input type="checkbox"/> Off	
CPU 2	<input type="checkbox"/> Off	
Mezz Exp 1	<input type="checkbox"/> Off	
Mezz Exp 2	<input type="checkbox"/> Off	
Power	<input checked="" type="checkbox"/> On	i Informational
Location	<input type="checkbox"/> Off	
Information	<input type="checkbox"/> Off	

The LEDs section of the compute node details panel displays the number of LEDs available. When expanded, more details are provided, the LED name, status of the LED, if the LED is illuminated, and the severity of that specific LED indicator. In this example, only the power LED is illuminated for this compute node, which show a severity of informational.

Compute node details: Physical IO adapter

Physical IO Adapter:
2 total

Network statistics

	Input	Output
Ethernet broadcast packets:	↕ 0 packets	↕ 0 packets
Ethernet bytes:	↕ 0 bytes	↕ 0 bytes
Ethernet interrupts:	↕ 0 bytes	↕ 0 bytes
Ethernet multicast:	↕ 0 bytes	↕ 0 bytes
Ethernet packets:	↕ 0 packets	↕ 0 packets
Fiber channel frames:	↕ 0 bytes	↕ 0 bytes
Fiber channel requests:	↕ 0 requests (0 bytes)	↕ 0 requests (0 bytes)

Type	Name	Status
Ethernet	SN#23FBW70A1	Available
Fiber Channel	SN#23FBW70A2	Available

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In the last section of the compute node details screen, you see the physical IO adapter section that shows the number of adapters. When expanded, you see network statistics for the ethernet broadcast packets, ethernet bytes, ethernet interrupts, ethernet multicast, ethernet packets, fiber channel frames and fiber channel requests. Below that you see a summarized list of the types of connections supported. In this example, you see that ethernet and fiber Channel are supported, along with their connection name and status.

Compute node operations

Compute Node

Power On Power Off Start Quiesce Maintain Report

- Power On
 - Power on the compute node
- Power Off
 - Power off the compute node
- Start
 - Start the compute node to accept workloads
- Quiesce
 - No new workload given to this compute node
 - Existing workload continues to run – not released due to re-balancing
 - Effectively locks the workload running on this node
- Maintain
 - Gets compute node ready for Maintenance; must be quiesced
 - Moves existing virtual machines to other compute nodes (in the same cloud group) based on priorities
 - Warns users if there is not enough capacity on other nodes to move the virtual machine
- Report
 - Shortcut to the **Allocation by compute node** report
 - Can also be accessed from the **Report → Machine Activity** panel

The compute node detail screen has function icons at the top of the screen called power on, power off, start, quiesce, maintain, and report. For compute nodes, these are the only operations a user with full hardware permissions can undertake.

The power on icon allows you to turn the compute node on, but the node will not yet start accepting workload.

The power off icon allows you to turn off the compute node.

The start icon is available only when the compute node is powered on. The start icon will allow the compute node to accept new workloads and be included in the re-balancing process. It will also take a compute node out of quiesce mode.

The quiesce icon indicates that this compute node can continue running existing workloads, but is not to accept any new work loads nor to release any workloads due to re-balancing. An important use case for quiesce is when you are satisfied with the performance of a set of applications on this node and do not want to change the throughput characteristics by adding or releasing any work loads.

The maintain icon allows you to ready the compute node for maintenance, causing PureApplication Server to move existing virtual machines to other compute nodes in the same cloud group, assuming there is capacity to do so. You are warned if there is not enough capacity on other nodes to move the virtual machines. The compute node must be quiesced before it can be put into maintenance mode.

The report icon is a shortcut to the allocation by compute node report, which is also available by navigating to the machine activity option under reports. Further details about what is available in reports is in the reporting presentation.

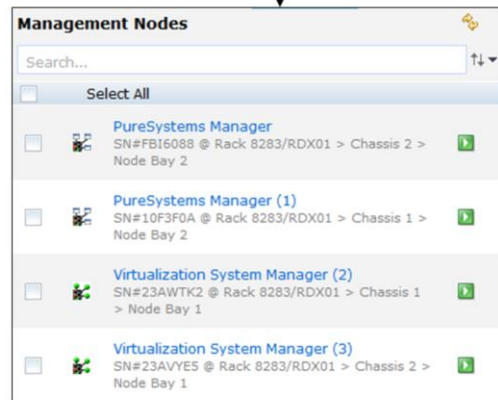
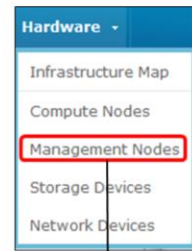
Section

Management nodes

This section covers the management nodes.

Management nodes

- Two types of management nodes:
 - PureSystems® manager – provides the graphical and management access to PureApplication Server
 - Virtualization system manager – provides the deployment engine for creating and managing virtual machines
- Lists the management nodes in the rack
- Selecting a management node gives detailed info related to the node and its operations



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IBM PureApplication System - Hardware Management

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Management nodes are specialized nodes very similar to compute nodes. They control the overall system and provide the administration interfaces.

There are two types of management nodes, the PureSystems manager and the virtualization system manager, each having a redundant backup in case one fails. The PureSystems manager provides the graphical and management access to PureApplication Server. The virtualization system manager provides the deployment engine for creating and managing virtual machines within the cloud groups.

To view the management nodes, navigate to the hardware menu in the system console, and select management nodes. This will present a list of the four management nodes in the system. The list itself provides the serial number of the management node along with its location.

When you click a management node in the list, you will see the details panel for the management node, which is shown in the next slide. The details are very similar to those of a compute node, and therefore only differences from compute nodes are discussed.

Management node: Details

Discussed in subsequent slides


PureSystems Manager		
Events:	Warning : 2	Critical : 495
Jobs:	pending_jobs : 0	active_jobs : 0
Type:	PureSystems Manager	
Status:	Available	
Power status:	Powered On	
Energy information:	Input power range: 20W - 20W Average input: 20W	
Location:	Rack 8283/RDX01 > Chassis 2 > Node Bay 2	
Management Node Information:	Software version: 20120601-1222	
Temperature:	Ambient Temperature:	21°C
	Maximum Ambient Temperature:	29°C
Health statistics:	Health status:	Normal
	Core temperature warning number:	0
	Error LED number:	0
	Hardware inventory warnings number:	68
	VMS inventory warnings number:	0
	Successful deploy number:	0
	Deploy number:	0
	Clear	
Physical cores:	1% (0.16 / 16 used)	
Physical memory:	9% (15.177GB / 189.274GB used)	
LEDs:	10 total Available: 10	

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This slide shows a management node detail screen for a PureSystems manager. A detail screen for a virtualization system manager looks exactly the same, except that the type field is labeled virtualization system manager instead of PureSystems manager.

The screens for both types of management nodes look very similar to the compute node screens. The only differences are that the sections for “in cloud group”, virtual machines, and physical IO Adapters are not required for management nodes. The next slide will describe the management node information section. The physical cores, physical memory and LEDs sections are not described here as they are the same as for compute nodes.

Management node details: Information

 Management Node Information: Software version: 20120601-1222
Machine type: 7955
Architecture: 02P
Firmware level: 1A0027Q - 05/04/2012 - 1.34

The management node Information section is common to both the PureSystems manager and virtualization system manager screens. It shows you the machine type, the architecture, and firmware level of the device.

Management node operations



- Power On
 - power on the management node
- Power Off
 - power off the management node
- Start
 - Start the management node to accept work
- Quiesce
 - No work given to this management node
- Maintain
 - Gets management node ready for Maintenance; must be first quiesced?

The management node detail screen has the same function icons at the top of the screen as for compute nodes, except for the report icon which is not available. As with compute nodes, these are the only actions a user with full hardware permissions can undertake.

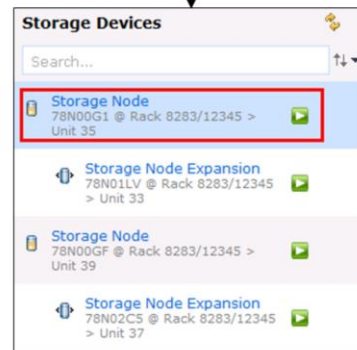
All the icons here are the same as for compute nodes, but note the following difference. Since a management node has a backup, as long as the backup is not powered off, these functions will have no effect on the overall running of PureApplication System.

Storage devices

This section covers the storage devices.

Storage devices

- Storage devices contain storage node and storage node expansion
- These panels display information and status only – no operations on storage devices
- Acquiring storage volumes to attach to virtual machines is performed in cloud panel, as shown below



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IBM PureApplication System - Hardware Management

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To view the storage devices, navigate to the hardware menu in the system console, and select storage devices. This panel will list the two storage node controllers and the two associated storage node expansion controllers. For each node, a serial number and a rack location is provided. Further details are provided by selecting any of the nodes. Note that no operations are available to you from these panels.

As a brief background, a cloud administrator must allocate storage volumes to a cloud group. They are used to provide the space for raw disk add-ons, database storage, application storage, and so on. These storage volumes are created on the storage devices seen on this screen.

Storage node details

Storage Node		
Events:	Error: 0	Warning: 0 View details...
Jobs:	Pending jobs: 0	Started Jobs: 0 View details...
Type:	Storage controller	
Firmware:	(none)	
Status:	Available	
Capacity:	87% (18.77TB / 21.811TB used)	
Location:	Rack 8283/RDX01 > Unit 37	
Temperature:	Ambient Temperature:	46°C
	Exhaust Temperature:	46°C
Physical cores:	(none)	
Disk Drives:	total: 24 Available: 24	
Storage volumes:	total: 60 Available: 60	
Storage controller ports:	total: 8 Available: 8	
Storage node statistics:		
LEDs:	total: 2 Off: 2	

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When a storage node is selected on the previous view, this detailed screen is presented.

The Events field provides a summary of error and warning events associated with this storage node. There is also a view details link to take you to the event detail screen to view the events.

The Jobs field provides a summary of Pending and Started jobs associated with this storage controller. There is also a view details link to take you to the jobs detail screen to view the jobs.

The Type field always is “storage controller.” A Firmware field is provided. There is a status field indicating the status of the controller. The Capacity field indicates the total and percentage of storage used on the controller. Location and Temperature fields are also provided. The remaining expandable sections are discussed in the next set of slides.

Storage node details: Disk drives

Disk Drives: 24 total

Bay	State	Capacity	Type
1	Available	558.411 GB	Hard drive disk
2	Available	558.411 GB	Hard drive disk
3	Available	558.411 GB	Hard drive disk
4	Available	558.411 GB	Hard drive disk
5	Available	558.411 GB	Hard drive disk
6	Available	558.411 GB	Hard drive disk
7	Available	558.411 GB	Hard drive disk
8	Available	558.411 GB	Hard drive disk

1 - 8 of 24 items

The disk drive section shows all the physical hard drives on this storage node, as they came from the manufacturer. The state and capacity are provided for each hard drive.

Storage node details: Storage volumes

Storage volumes: total: 60 Available: 60

Name	Size	State
vm http://fd8c:215d:178e:17e2:5054:91ff:fec/deployment/resources/instances/2ce1a679-ebd8-4bd8-bab7-ab711387a592_disk_0	31 GB	<input checked="" type="checkbox"/> Available
vm http://fd8c:215d:178e:17e2:5054:91ff:fec/deployment/resources/instances/32cf7c11-fbec-427e-82bc-ab9a860a79ef_disk_0	31 GB	<input checked="" type="checkbox"/> Available
vm http://fd8c:215d:178e:17e2:5054:91ff:fec/deployment/resources/instances/2cecab3e-ad03-46cf-baea-730cf7789c5_disk_0	31 GB	<input checked="" type="checkbox"/> Available
vm http://fd8c:215d:178e:17e2:5054:91ff:fec/deployment/resources/instances/b2227edd-aff1-4d74-be55-de0f25f96006_disk_0	4 GB	<input checked="" type="checkbox"/> Available
vm http://fd8c:215d:178e:17e2:5054:91ff:fec/deployment/resources/instances/7af2422c-5b51-4e02-9396-6c5efa0a8df5_disk_0	4 GB	<input checked="" type="checkbox"/> Available
vm http://fd8c:215d:178e:17e2:5054:91ff:fec/deployment/resources/instances/0d86c29e-8b80-43ae-9c28-572399a5c4bc_disk_0	20 GB	<input checked="" type="checkbox"/> Available
vm http://fd8c:215d:178e:17e2:5054:91ff:fec/deployment/resources/instances/cec17999-83c2-4104-af2e-1109524c3e56_disk_0	3 GB	<input checked="" type="checkbox"/> Available
vm http://fd8c:215d:178e:17e2:5054:91ff:fec/deployment/resources/instances/8c5844f1-3216-443a-85eb-4d34a3c165e9_disk_0	31 GB	<input checked="" type="checkbox"/> Available

1 - 8 of 60 items

The storage volumes section provides a list of all the storage volumes on the controller, along with their size and state. A link is provided for each volume to take you to the detail screen for that volume.

Storage node details: Storage controller ports and node statistics

Storage controller ports: total: 8 Available: 8

Port Number	Name	State	Speed
1	78N02YV_Port1	<input checked="" type="checkbox"/> Available	
2	78N02YV_Port2	<input checked="" type="checkbox"/> Available	
3	78N02YV_Port3	<input checked="" type="checkbox"/> Available	
4	78N02YV_Port4	<input checked="" type="checkbox"/> Available	
1	78N02YV_Port1	<input checked="" type="checkbox"/> Available	
2	78N02YV_Port2	<input checked="" type="checkbox"/> Available	
3	78N02YV_Port3	<input checked="" type="checkbox"/> Available	
4	78N02YV_Port4	<input checked="" type="checkbox"/> Available	

1 - 8 of 8 items

Storage node statistics:

	Input	Output
Bytes:	<input checked="" type="checkbox"/> 128,997,877,452	<input checked="" type="checkbox"/> 128,997,877,508
Latency:	<input checked="" type="checkbox"/> 0.092ms	<input checked="" type="checkbox"/> 0.019ms
Number of messages:	<input checked="" type="checkbox"/> 24,447,763	<input checked="" type="checkbox"/> 24,447,764
Total bytes:	<input checked="" type="checkbox"/> 32,101,665,279,270	<input checked="" type="checkbox"/> 32,101,665,279,326
Total latency:	<input checked="" type="checkbox"/> 644,332.13s	<input checked="" type="checkbox"/> 120,468.71s
Total number of messages:	<input checked="" type="checkbox"/> 6,249,446,329	<input checked="" type="checkbox"/> 6,249,446,330

The storage controller ports section lists all the controller ports on the rack, with their names and state.

The storage node statistics section provides details about the node usage from the input and output perspectives.

Storage node details: Storage controller

LEDs: total: 2 Off: 2

Name	Status	Severity
Error	<input type="checkbox"/> Off	
Error	<input type="checkbox"/> Off	

1 - 2 of 2 items

The LED section provides information about the controller LEDs and their status and severity.

Storage node expansion

Storage Node Expansion

Events:	Error: 0	Warning: 0	View details...
Jobs:	Pending jobs: 0	Started Jobs: 0	View details...
Type:	Storage Expansion		
Firmware:	(none)		
Status:	Available		
Location:	Rack 8283/RDX01 > Unit 39		
Temperature:	Ambient Temperature:	44°C	
	Exhaust Temperature:	44°C	
Disk Drives:	total: 24	Available: 24	
LEDs:	total: 2	Off: 2	

Storage Devices

Storage Node
78N00G1 @ Rack 8283/12345 > Unit 35

Storage Node Expansion
78N01LV @ Rack 8283/12345 > Unit 33

Storage Node
78N00GF @ Rack 8283/12345 > Unit 39

Storage Node Expansion
78N02CS @ Rack 8283/12345 > Unit 37

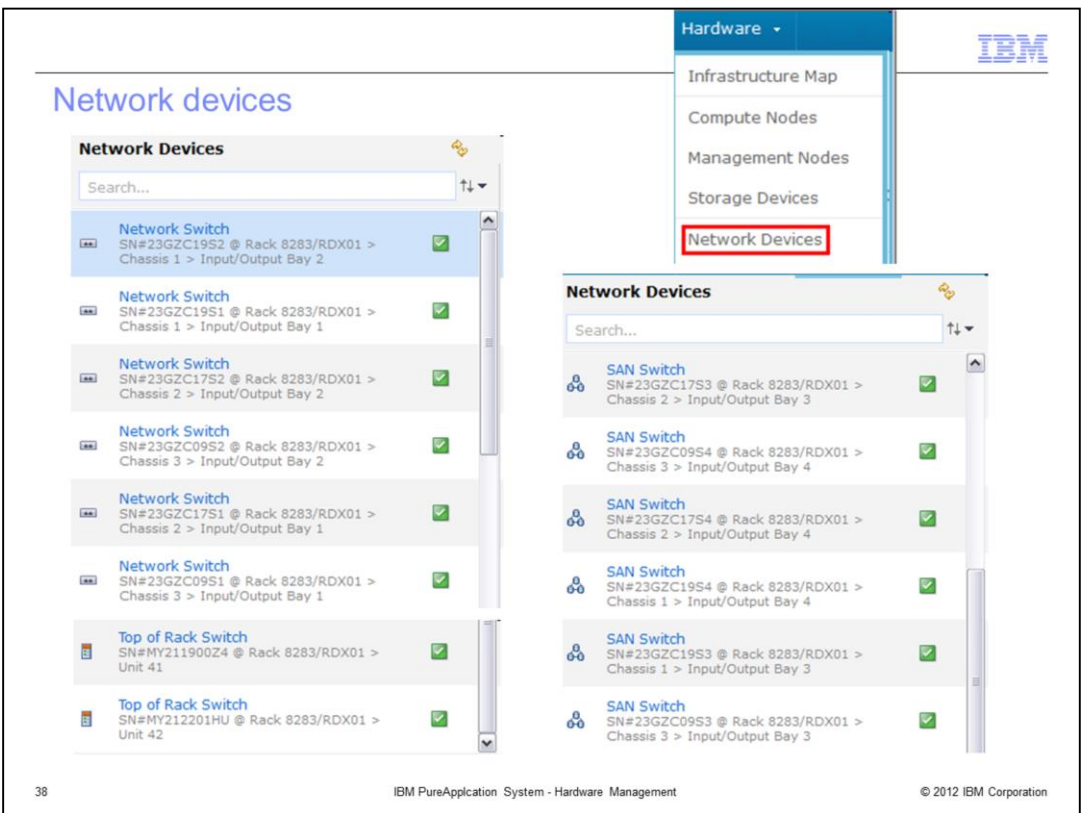
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The storage node expansion detailed screen is very similar to the storage node screen, except that many of the fields are not required.

Section

Network devices

This section covers the network devices.



The network devices panel provides status information about each network device. To get to the network devices panel in the system console, navigate to network devices under the hardware tab. This will present a list of all the network related switches in your system. Every switch is redundant, and thus are displayed as pairs. The user has no authority to modify the settings related to the network devices; they can only view details about the networks.

The top of rack switches provide network connectivity to external and internal networks.

The SAN switches come in pairs for every chassis, and are used for the fiber channel network that connects the storage devices within the system. They are not related to the ethernet networking equipment.

The network switches also come in pairs for every chassis, and are used for the ethernet network within the system. They are not related to the fiber channel networking.

For each switch device, you will see very similar detailed information. The only differences in the detailed views of the three types of switches are that the top of rack switches have an additional temperature field, and the SAN switches do not have any customer ports. The following slides go into more detail about the information available.

Network devices - Details

Top of Rack Switch		
Events:	Error: 0	Warning: 1 View details...
Jobs:	Pending jobs: 0	Started Jobs: 0 View details...
Switch Type:	Top of Rack	
Description:		
Location:	Rack 8283/RDX01 > Unit 42	
Firmware level:	1	
Software Version:	7.2.3.32 (FLASH image2), active configuration.	
Model:		
Temperature:	Ambient Temperature:	32°C
	Exhaust Temperature:	39°C
	Maximum Ambient Temperature:	46°C
	Maximum Exhaust Temperature:	49°C
Customer Ports:	total: 16 Pending: 15 Available: 1	
Network Ports:	total: 49 Pending: 17 Available: 32	

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When a network device is selected on the previous slide, a detailed screen is presented.

The Events field provides a summary of error and warning events associated with this network device. There is also a view details link to take you to the event detail screen to view the events.

The Jobs field provides a summary of pending and started jobs associated with this network device. There is also a view details link to take you to the jobs detail screen to view the jobs.

The Switch Type field is either “top of rack”, “chassis network switch”, or “chassis SAN switch”.

After the Type field is the Description, Location, Firmware level, Software version and Model fields.

The remaining two sections are discussed in the next set of slides.

Network devices: Customer ports

Customer Ports:

total: 16 Available: 2 Pending: 14

Port Number	State	Speed	Input	Output
41	Connected	10 Gb	14064 packets	268227 packets
42	Powered Off	1 Gb	0 packets	0 packets
43	Powered Off	1 Gb	0 packets	0 packets
44	Powered Off	1 Gb	0 packets	0 packets
45	Powered Off	1 Gb	0 packets	0 packets
46	Powered Off	1 Gb	0 packets	0 packets
47	Powered Off	1 Gb	0 packets	0 packets
48	Powered Off	1 Gb	0 packets	0 packets

1 - 8 of 16 items 1 2

Customer ports are the ports on the top of rack switches that can be connected externally of the PureApplication System. The customer ports section provides a status summary of the ports and a list of the port numbers, the state of the port, the speed, and the number of input and output packets.

Network devices: Network ports

Network Ports:

total: 49 Pending: 17 Available: 32

Port Number	State	Speed	Input	Output
1	Connected	40 Gb	2233 packets	281 packets
2	Disconnected	10 Gb	0 packets	0 packets
3	Disconnected	10 Gb	0 packets	0 packets
4	Disconnected	10 Gb	0 packets	0 packets
5	Connected	40 Gb	288414 packets	8123 packets
6	Disconnected	10 Gb	0 packets	0 packets
7	Disconnected	10 Gb	0 packets	0 packets
8	Disconnected	10 Gb	0 packets	0 packets

1 - 8 of 49 items « 1 2 3 4 »

The network ports section has the same fields as the customer ports section on the previous slide.

Section

Summary

This section contains the summary.

Summary

- Overview of rack hardware
- Operational and informational details of
 - Hardware infrastructure map
 - Compute nodes
 - Management nodes
 - Storage devices
 - Storage nodes
 - Expansion nodes
 - Networking devices

In summary, in this presentation you saw an overview of the rack hardware, followed by operational and informational details about the hardware infrastructure map, compute nodes, management nodes, storage nodes, storage expansion nodes, and networking devices.

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