

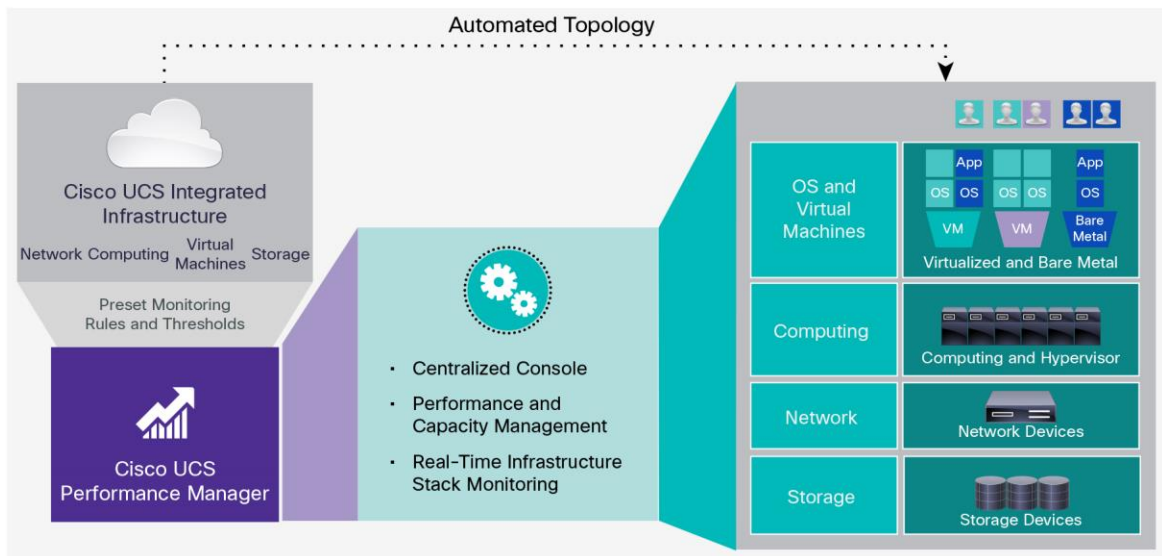
Cisco UCS Performance Manager

Introduction

Today's integrated infrastructure data centers must be highly responsive, with heightened levels of flexibility and visibility. Personnel are responsible for supporting a wide variety of critical, and sometimes competing, business initiatives that require increased IT service. How do you overcome these challenges if you are managing a data center across physical, virtual, and cloud environments?

Whatever your role, Cisco UCS Performance Manager can help you unify the monitoring of critical infrastructure components, network connections, applications, and business services across dynamic heterogeneous physical and virtual data centers powered by the Cisco Unified Computing System (Cisco UCS®) (Figure 1).

Figure 1. Cisco UCS Performance Manager At A Glance



Product Overview

With technology from Zenoss, Cisco UCS Performance Manager delivers detailed monitoring from a single customizable console (Figures 2 and 3). The software uses APIs from Cisco UCS Manager and Cisco UCS Central software and other Cisco® and third-party components to collect data. Then it displays comprehensive, relevant information about your Cisco UCS infrastructure.

With customizable views, your data center staff can see application services and view performance and service availability information. For example, staff can see underused or overused physical and virtual resources in the integrated infrastructure stack. They can also see the performance of an individual network port in a Cisco UCS chassis without having to switch to another tool.

Cisco UCS Performance Manager does the following:

- Unifies performance monitoring and management of Cisco UCS Integrated Infrastructure
- Delivers real-time views of fabric and data center switch bandwidth use and capacity thresholds and forecasts capacity use based on trends
- Discovers and creates relationship models of each system, giving your staff a single, accurate view of all components with dependency mapping (Figure 4)
- Provides coverage for up to 2500 Cisco UCS servers plus Cisco networking and vendor storage solutions, hypervisors, and operating systems
- Allows you to easily navigate to individual components for rapid problem resolution
- Provides northbound APIs for automation and integration
- Provides centralized authentication using Microsoft Active Directory and Lightweight Directory Access Protocol (LDAP)

An Express version of Cisco UCS Performance Manager is also available for Cisco UCS computing platform coverage only (physical and virtual). The Express version covers Cisco UCS servers, hypervisors, and operating systems.

Figure 2. Cisco UCS Performance Manager Dashboard

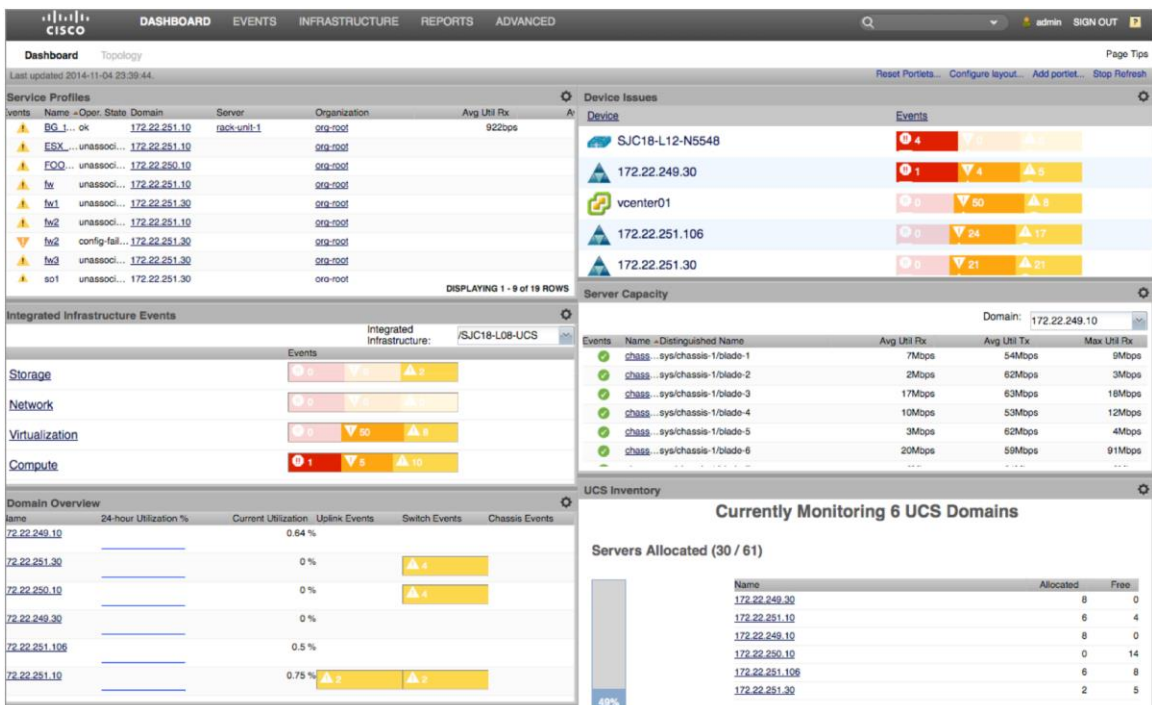


Figure 3. Cisco UCS Performance Manager Topology

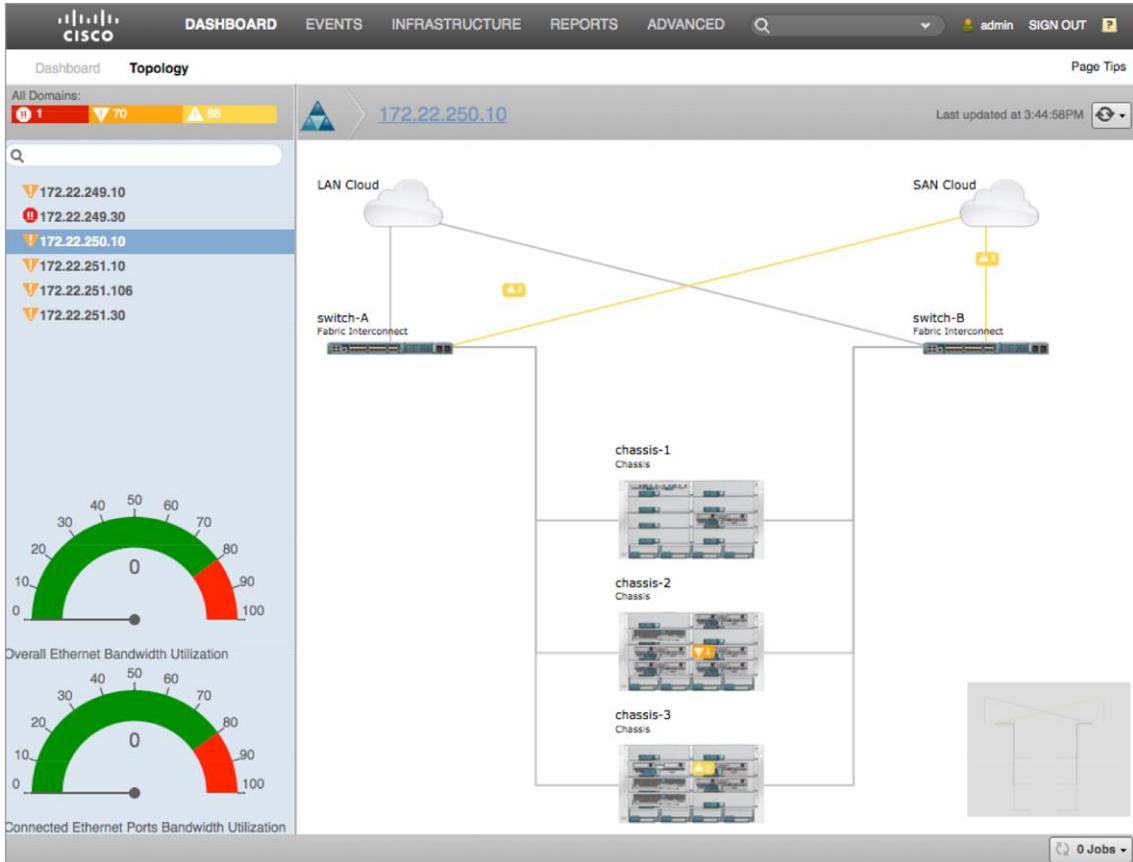
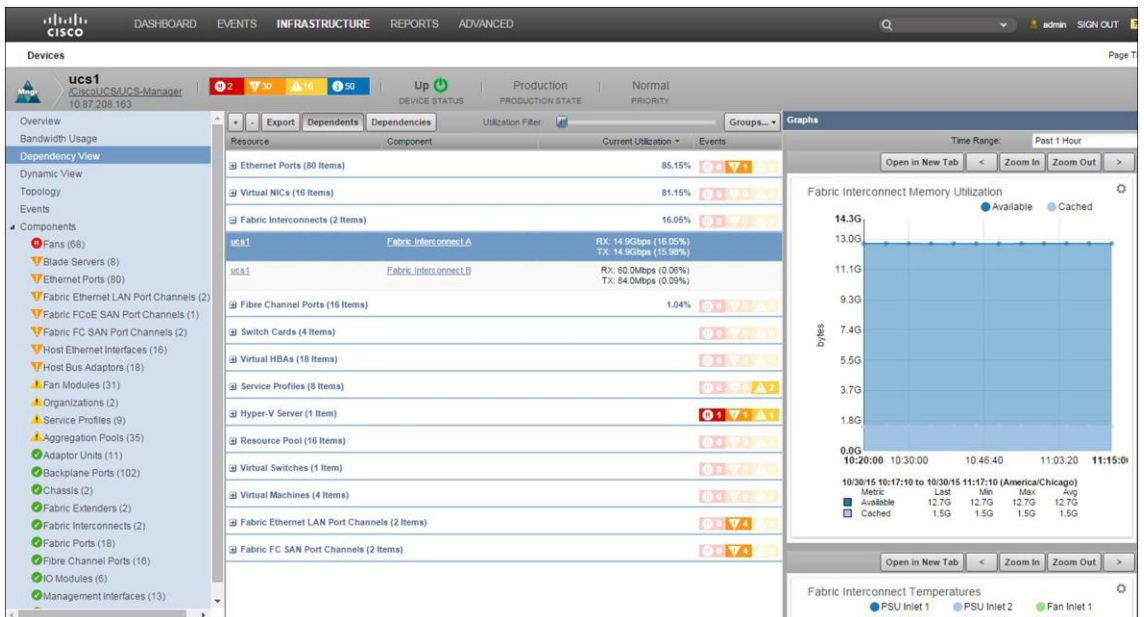


Figure 4. Dependency View



Major Benefits

Cisco UCS Performance Manager offers these main benefits:

- Provides deep visibility into Cisco UCS Integrated Infrastructure performance and capacity for global service profiles, chassis, fabric extenders, adapters, virtual interface cards (VICs), ports, port channels, and all uplinks for detailed data center monitoring
- Helps maintain service-level agreements (SLAs) by managing optimal resource allocation to prevent underprovisioning and avoid performance degradation
- Eliminates the need for multiple tools by enabling administrators to monitor SLA health and performance from a single console by defining component- or application-centric views of critical resources
- Enables administrators to forecast future capacity needs with graphs and trend lines
- Enables customizable reporting across many device categories
- Provides configurable polling intervals for statistics collection

Technical Details

The underlying platform for Cisco UCS Performance Manager is a scalable and highly available architecture. It can be deployed in a distributed environment across geographical locations as needed.

Monitored Cisco devices include the following:

- Cisco Nexus® 1000V Switch and 3000, 5000, 7000, and 9000 Series Switches
- Cisco UCS domain components, including Cisco UCS Mini and Cisco UCS Central software
- Cisco Catalyst® 6500 and 3560 Series Switches
- Cisco Catalyst 6500 Series Virtual Switching System (VSS)
- Cisco MDS 9000 Series Multilayer Switches
- Cisco Nexus 2000 Series Fabric Extenders

Table 1 lists common features available across the supported products (where applicable).

Table 1. Cisco UCS Performance Manager Features Available Across Supported Products

Base Discovery	Base Monitoring	Cisco UCS Discovery	Cisco UCS Performance Monitoring
<ul style="list-style-type: none"> • Chassis • Fans • Line cards • Physical ports and interfaces • Port channels and bundles • Power supplies • Quality-of-service (QoS) class maps • Supervisor modules • Supplementary (other) logical interfaces • Temperature sensors • VLANs • Virtual Routing and Forwarding (VRF) instances 	<ul style="list-style-type: none"> • Event collection from syslog and Simple Network Management Protocol (SNMP) traps • CPU and memory use for chassis and supervisor modules • Power consumption and status for chassis and field-replaceable units (FRUs) • Power available and drawn for power supplies • Temperature for temperature sensors • Use, throughput, error rate, and status for all physical Ethernet interfaces • Use, throughput, and status for all logical Ethernet interfaces • Throughput and status for VLANs 	<ul style="list-style-type: none"> • Adaptor units • Backplane ports • Chassis • Ethernet ports • Fabric extenders • Fabric interconnect I/O modules (IOMs) • Fabric interconnects • Fabric ports • Fans • Fan modules • Fibre Channel ports • Global service profiles • Host bus adapters (HBAs) • Host Ethernet interfaces • IOMs • Management interfaces 	<ul style="list-style-type: none"> • Aggregation pools • Backplane ports • Chassis • Chassis Ethernet ports • Fabric extenders • Fabric interconnect IOMs • Fabric interconnects • Fabric ports • Fibre Channel ports • Global service profiles • HBAs • Host Ethernet interfaces • IOMs • Rack servers • Server blades • vHBAs • vNICs

Base Discovery	Base Monitoring	Cisco UCS Discovery	Cisco UCS Performance Monitoring
		<ul style="list-style-type: none"> • Memory arrays • Organizations • Power supply units (PSUs) • Processor units • Rack servers • Server blades • Switch cards • Virtual HBAs (vHBAs) • Virtual network interface cards (vNICs) 	

Third-Party Devices

Your Cisco UCS Integrated Infrastructure may include other third-party devices and virtualized instances. Following is a partial list of supported devices. See the [Cisco UCS Performance Manager documentation](#) for details.

- EMC VMAX and VNX Storage Arrays using the EMC Solution Enabler
- NetApp FAS storage systems in C- and 7- modes
- Linux server
- Microsoft Windows Server 2003, 2008, 2008 R2, 2012, and 2012 R2
- VMware vSphere (Releases 4.1, 5.0, 5.1, 5.5, and 6.0)
- Microsoft Hyper-V

Event Management

Cisco UCS Performance Manager combines the events it collects for all the devices registered. The fault lifecycles of Cisco UCS Manager and Cisco UCS Central closely match the event lifecycles of the performance manager, so when their faults are cleared, the equivalent events are cleared in the performance manager.

When initially connected to Cisco UCS Manager or Cisco UCS Central, network and storage devices, and hypervisors, the performance manager processes the full list of open faults. Subsequently, it subscribes to and receives only new faults and updates to existing faults. A counter is maintained for those events and for faults that repeat.

Capacity Monitoring and Planning

In addition to monitoring components, Cisco UCS Performance Manager allows you to monitor integrated infrastructure capacity and server resources: for example, network, CPU, memory, and storage capacity. You can also configure graphs with trend lines to forecast future capacity use (Figure 5).

Network capacity is a measure of the maximum amount of data that can be moved between network locations. This measure includes data moving across or between ports, switches, fabric extenders, fabric interconnects, and servers over a link or network path. An additional measure that is directly related to capacity is headroom, which is your system's amount of unused or available bandwidth. This measure includes aggregation pools, ports, fabric interconnects, fabric extenders, switches, servers, and more.

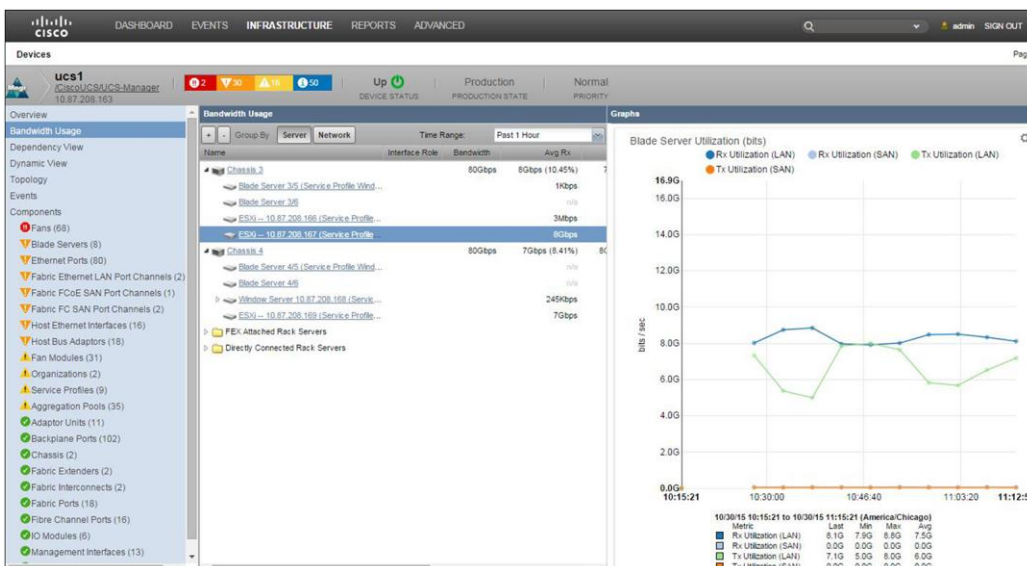
After identifying available headroom with the performance manager, you can allocate resources more proficiently to alleviate the load of any oversubscribed components.

Bandwidth use and available headroom data are available for individual ports, or collectively by role, in the aggregation pools view. Aggregation pools are logical bundles of multiple physical network interfaces, commonly known as port channels. For more information about aggregation pools, see the [Cisco UCS Performance Manager Administration documentation](#).

By using the performance manager to analyze your system and its components, you can identify potential capacities and compare them with actual capacities. This analysis enables you to perform tasks that include the following:

- Determine how close to maximum capacity you are, so that you can plan for potential expansion or restructuring.
- Determine whether a device is oversubscribed or has additional resources that can be used to alleviate oversubscription or help eliminate network pinch points.
- Determine whether IOM server ports and Ethernet and Fibre Channel uplinks are congested now or have been historically; then you can alleviate the congestion, or forecast when the next cyclic congested event might occur.
- Identify congestion sources and explore ways to address them, such as by moving service profiles between chassis.
- Determine whether virtual or physical workloads and applications are affected by Cisco UCS fabric capacity constraints; then you can plan for or make changes to system configurations or hardware components.
- Determine whether virtual or physical workloads and applications are affected by Cisco UCS server CPU and memory configurations; then you can plan for or make changes to server configurations or hardware components.
- Compare current and historical performance across converged infrastructure components to find existing constraints and determine whether and how they can be removed.

Figure 5. Bandwidth (Showing Trend Line)



Using Historical Data

Historical data enables you to determine cyclic and periodic trends in your system. By using historical data with point-of-time information about your Cisco UCS Integrated Infrastructure, you can identify potential problems and analyze any existing problems quickly and efficiently.

For easier monitoring, you can use Cisco UCS Performance Manager to view and analyze collected data about each physical and virtual component according to the way that the components function as one unit. For example, an infrastructure unit can provide information about the following device types:

- Blade and rack servers
- Network switches
- Storage switches and arrays
- Hypervisors

The performance manager provides key performance indicators (KPIs) for your integrated infrastructure components. KPIs enable you to quickly identify system constraints that are contributing to or will eventually result in performance degradation. You can define the scope and time frame for the historical data you want to assess so that you can quickly arrive at conclusions and take action.

The performance manager also lets you view service profiles, virtual machines, and operating systems. You can quickly identify and evaluate current and historical resource-derived constraints and component faults. Finer details about the resources consumed by individual CPUs, interfaces, and memory are also available. For example, you can detect whether a particular virtual machine uses too much of the available resources or just the right amount. By using historical data to evaluate the severity, longevity, and frequency of past problems, you can reassign resources or change profiles to prevent future problems.

Getting the Full Benefits of Cisco UCS Integrated Infrastructure

A single Cisco UCS domain can support thousands of different infrastructure components. Understanding all these physical and virtual components as well as the LAN and SAN resources needed to manage the Cisco UCS Integrated Infrastructure is not easy. Cisco UCS Performance Manager, however, makes the process easier by helping data center administrators identify network faults, bandwidth oversubscription, and resource capacity headroom. This information can help you understand existing capacity, how to best use it, and how to most cost-effectively increase it. You are also empowered to plan for future capacity deficits based on the software's predictions.

IT Operations Management Best Practices

Cisco UCS Performance Manager provides unified server, network, storage, and virtualization visibility, as well as a logical view of application and IT services. This management solution helps you simplify data center operations, reduce costs, and provide all the capabilities needed to monitor today's dynamic, integrated infrastructure environments.

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For More Information

For additional information about Cisco UCS Performance Manager and related products, please visit <http://www.cisco.com/go/ucspfmgr>.



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