Cisco UCS Manager

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Product overview

Cisco UCS® Manager provides unified, embedded management of all software and hardware components of Cisco Unified Computing System™ (Cisco® UCS) and Cisco hyperconverged solutions across multiple chassis and rack servers and thousands of virtual machines. It supports all Cisco UCS product models, including Cisco UCS B-Series Blade Servers, Cisco UCS X-Series Modular Systems, Cisco UCS C-Series Rack Servers, Cisco UCS S-Series Storage Servers, Cisco UCS Mini, and Cisco hyperconverged infrastructure as well as associated storage resources and networks. Cisco UCS Manager is embedded on a pair of Cisco UCS 6500, 6400, 6300, or 6200 Series Fabric Interconnects (FIs) using a clustered, active-standby configuration for high availability. The manager participates in server device discovery, inventory, configuration, provisioning, diagnostics, monitoring, fault detection, auditing, and statistics collection.

An instance of Cisco UCS Manager with all Cisco UCS components managed by it forms a Cisco UCS domain, which can include up to 160 servers. In addition to provisioning Cisco UCS resources, this infrastructure management software provides a model-based foundation for simplifying the day-to-day processes of updating, monitoring, and managing computing resources, local storage, storage connections, and network connections. By enabling better automation of processes, Cisco UCS Manager allows IT organizations to achieve greater agility and scale in their infrastructure operations while reducing complexity and risk. The manager provides flexible Role-Based Access Control (RBAC) and policy-based management using service profiles and templates.

Cisco UCS Manager software manages Cisco UCS systems through an intuitive HTML 5 user interface and a Command-Line Interface (CLI). It can register with Cisco UCS Central Software in a multidomain Cisco UCS environment, enabling centralized management of distributed systems scaling to thousands of servers. Cisco UCS Manager can be integrated with Cisco UCS Director to facilitate orchestration and to provide support for converged infrastructure and Infrastructure as a Service (IaaS). Cisco UCS Manager is also integrated with Cisco Intersight®, which provides a cloud-based management environment that further simplifies and automates IT operations management for Cisco UCS, converged, and hyperconverged solutions.

With Intersight Infrastructure Service, customers get all the benefits of SaaS (software as a service) delivery and full lifecycle management of distributed infrastructure and workloads across data centers, remote sites, branch offices, and edge environments. For Cisco infrastructure, Cisco Intersight Infrastructure Service (IIS) works in conjunction with Cisco UCS Manager and Cisco Integrated Management Controller (IMC). It provides additional capabilities such as Unified Monitoring, Hardware Compliance List (HCL), advisories, automation, and workflow orchestration. In addition, Cisco provides integrations to third-party operations tools, such as ServiceNow, to enable customers to use their existing solutions more efficiently.

The Cisco UCS API provides comprehensive access to all Cisco UCS Manager functions. The unified API provides Cisco UCS system visibility to higher-level systems management tools from Independent Software Vendors (ISVs) such as VMware, Microsoft, and Splunk as well as Ansible and Puppet. ISVs and in-house developers can use the API to enhance the value of the Cisco UCS platform according to their unique requirements. Cisco UCS PowerTool for UCS Manager and the Python Software Development Kit (SDK) help automate and manage configurations in Cisco UCS Manager.

Features and benefits

Service profiles

Service profiles are essential to the automation functions in Cisco UCS Manager. They provision and manage Cisco UCS systems and their I/O properties within a Cisco UCS domain. Infrastructure policies are created by server, network, and storage administrators and are stored in the Cisco UCS Fabric Interconnects. The infrastructure policies needed to deploy applications are encapsulated in the service profile templates, which are collections of policies needed for the specific applications. The service profile templates are then used to create one or more service profiles, which provide the complete definition of the server.

The policies coordinate and automate element management at every layer of the hardware stack, including redundant array of independent disks (RAID) levels, BIOS settings, firmware revisions and settings, server identities, adapter settings, VLAN and virtual storage area network (VSAN) network settings, network Quality of Service (QoS), and data center connectivity.

The service profile consists of a software definition of a server and the associated LAN and SAN connectivity that the server requires. When a service profile is associated with a server, Cisco UCS Manager automatically configures the server, adapters, fabric extenders, and fabric interconnects to match the configuration specified in the service profile. Service profiles improve IT productivity and business agility because they establish the best practices of your subject-matter experts in software. With service profiles, infrastructure can be provisioned in minutes instead of days, shifting the focus of IT staff from maintenance to strategic initiatives. Service profiles allow organizations to pre-provision servers, enabling organizations to configure new servers and associated LAN and SAN access settings even before the servers are physically deployed.

Service profiles benefit both virtualized and nonvirtualized environments. Workloads may need to be moved from one server to another to change the hardware resources assigned to a workload or to take a server offline for maintenance. Service profiles can be used to increase the mobility of nonvirtualized servers. They also can be used in conjunction with virtual clusters to bring new resources online easily, complementing existing virtual machine mobility.

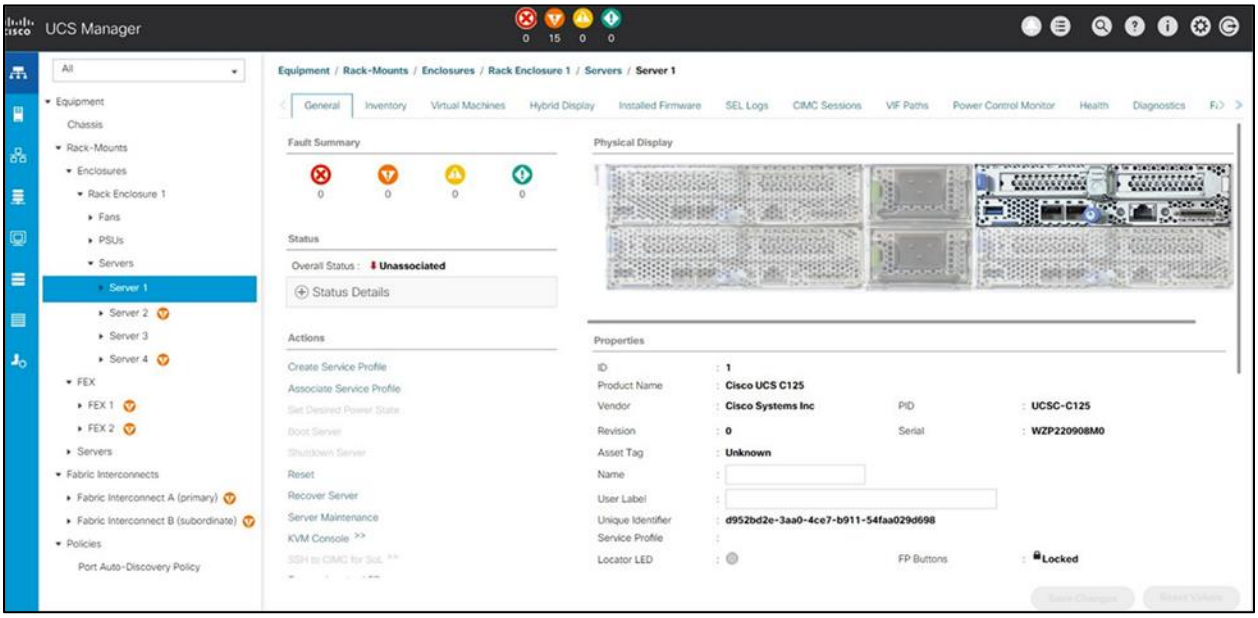

Figure 1.
Cisco UCS Manager provides visibility into all physical and virtual networking, computing, and storage infrastructure in the Cisco UCS C4200 chassis.

Enhanced flexibility through storage profiles and disk groups

Cisco UCS management allows flexibility in defining the number and use of storage disks and roles and other storage parameters through storage profiles. A storage profile encapsulates the storage requirements for one or more service profiles. Local logical unit numbers (LUNs) configured in a storage profile can be used as boot LUNs or data LUNs. Storage profiles can contain multiple virtual drives, each uniquely assigned to its own disk group (RAID group). These profiles enable you to do the following:

- Configure multiple virtual drives and configure the storage capacity of each virtual drive.
- Configure the number, type, and role of disks in a disk group and define a disk group as a RAID group.
- Select the physical drives that are used by a virtual drive and disk group and RAID group.
- Associate a storage profile with a service profile.

A logical collection of these physical disks is called a disk group. Disk groups allow you to organize local disks. The storage controller controls the creation and configuration of disk groups. A disk group configuration policy defines the way that a disk group is created and configured. The policy specifies the RAID level to be used for the disk group. It also specifies either manual or automatic selection of disks for the disk group and roles for the disks.

A disk group can be partitioned into virtual drives. Each virtual drive appears as an individual physical device to the operating system. The RAID level of a disk group specifies how the data is organized in the disk group, helping ensure availability, redundancy of data, and I/O performance. RAID levels 0, 1, 5, 6, 10, 50, and 60 are supported.

Note: Some Cisco UCS X-Series, B-Series, and C-Series servers ship with RAID controllers with no cache, which limits the supported RAID levels to 0, 1, and 10.

A hot spare is an unused extra disk that can be used by a disk group if a disk in the disk group fails. Hot spares can be used only in disk groups that support a fault-tolerant RAID level. In addition, a disk can be allocated as a global hot spare, which means that it can be used by any disk group. The following virtual drive and spare drive options are also supported:

- Nonredundant virtual drives
- Redundant virtual drives with no hot-spare drives
- Redundant virtual drives with hot-spare drives
- Replacement of hot-spare drives

Storage policies enable easy management of a Cisco UCS S3260 Storage Server with many drives. The same Cisco UCS storage policies also support all other Cisco UCS servers, including Cisco UCS X-Series Modular Servers, Cisco UCS B-Series Blade Servers, and Cisco UCS C-Series Rack Servers.

Service profile templates

Service profile templates simplify the creation of new service profiles, helping ensure consistent policies within the system for a given service or application. Whereas a service profile is a description of a logical server and there is a one-to-one relationship between the profile and the physical server, a service profile template can be used to define multiple servers and the associated storage resources. The template approach enables you to configure hundreds of servers with thousands of virtual machines as easily as you can configure one server. This automation reduces the number of manual steps needed, helping reduce the opportunities for human error, improve consistency, and further shorten server and network deployment times.

Service profile templates also help ensure consistency and standardization among multiple servers and storage resources. The relationship between the service profile template and the service profiles helps ensure that the service profiles stay consistent with the template and helps eliminate configuration drift over time. Elimination of configuration drift enables you to reap the benefits of standardization, including decreased number of errors and faster troubleshooting.

Management interface options

Cisco UCS Manager has an HTML 5 GUI as well as a CLI for use by server, network, storage, and virtualization administrators. The manager also provides a powerful XML API for integration with existing data center systems management tools. Some examples of additional management interfaces are Intelligent Platform Management Interface (IPMI); Keyboard, Video, and Mouse (KVM); Serial-over-LAN (SoL); and Simple Network Management Protocol (SNMP). The XML interface allows the entire system to be monitored or configured externally by higher-level systems management tools from Cisco's many ecosystem partners. Figure 1 shows the Cisco UCS Manager GUI displaying the components in a Cisco UCS server chassis.

Table 1 summarizes the key features of Cisco UCS Manager.

Table 1. Features and benefits

Feature	Benefit
Embedded device management	Cisco UCS Manager is delivered embedded in the Cisco UCS 6500, 6400, 6300, or 6200 Series Fabric Interconnects. It is not a separate entity, and no separate management station or associated software is needed.
Cisco Intersight support	Cisco UCS Manager includes a device connector that supports integrating FI-based Cisco UCS Manager with cloud-based Cisco Intersight. Cisco Intersight provides global Cisco UCS and Cisco hyperconverged infrastructure inventory, alerting, dashboard, and policy-based deployment; Connected TAC (Technical Assistance Center) services; and more. Cisco Intersight also enables tunneled sessions of Cisco UCS Manager so that it can be managed from anywhere with an internet connection.
Service profiles	The service profile allows Cisco UCS servers to be treated as raw computing capacity that can be allocated and reallocated among application workloads, enabling a much more dynamic and efficient use of the server capacity than exists in today's data centers. Service profiles, along with remote storage OS install, support true stateless computing and the service profile can be easily unassigned from one compute endpoint and assigned to another. Server deployment with service profiles takes minutes, and the service profile templates help ensure consistent policies within the system for a given service or application.
Service profile templates	Service profile templates provide the logical master template for service profiles, including all the policy, pool, and resource information. Using a service profile template, you can create multiple service profiles with just a few clicks or an API command, allowing server provisioning to be easily automated or integrated into an operations team workflow. Service profile templates also help ensure that the resulting service profiles remain consistent, thereby helping to eliminate configuration drift and ensuring standardization across many servers.

Feature	Benefit
Storage profiles	Storage profiles in combination with disk groups allow Cisco UCS servers to be treated as raw storage capacity that can be allocated and reallocated among application workloads, enabling a much more dynamic and efficient use of the capacity. With a storage profile, the configuration of a storage resource takes minutes and does not require a storage administrator. The profile also helps ensure consistent policies within the system for a given service or application.
Policy-based management	Cisco UCS Manager implements policy-based management of the Cisco UCS server and network resources. Network, storage, and server administrators all participate in creating policies in their areas of domain expertise. Policies are consumed in service profiles, allowing the manager to fully configure the servers, adapters, and fabric extenders and the appropriate isolation, QoS, and uplink connectivity on Cisco UCS 6500, 6400, 6300, and 6200 Series Fabric Interconnects.
Firmware provisioning	Cisco UCS Manager provides an easier and more flexible solution for managing firmware across the entire hardware stack than traditional approaches to server firmware provisioning. Using service profiles, administrators can associate any compatible firmware with any component of the hardware stack. After the firmware versions are downloaded from Cisco, they can be provisioned within minutes on components in the server, fabric interconnect, and fabric extender based on the required network, server, and storage policies for each application and operating system. The firmware's auto-installation capability simplifies the upgrade process by automatically sequencing, pre-staging, and applying upgrades to individual system elements.
Auto discovery and dynamic pooling	Cisco UCS Manager automatically discovers devices that are added, moved, or removed from the system; adds them to its inventory; and applies service profile configurations as appropriate. Using policies, servers can be automatically grouped into dynamic pools based on capacity, scale, location, or performance as they are discovered.
Storage topology flexibility	Cisco UCS Manager supports a variety of storage topologies with multihop Fibre Channel over Ethernet (FCoE), Fibre Channel zoning, and unified connection with NetApp storage.
GUI and CLI	All aspects of Cisco UCS Manager can be controlled through an HTML 5 that is automatically embedded in the Cisco UCS 6500, 6400, 6300, or 6200 Series Fabric Interconnects or through a fully functional CLI.
Unified API	A full-featured API enables integrations with a wide range of IT operations management, configuration, and automation tools. It provides powerful opportunities for service providers, ISVs, and users interested in customizing the behavior of Cisco UCS to enhance its value in their own unique environments.
Integration with leading systems management solutions	Tested, optimized integration with higher-level systems tools covers the entire operation lifecycle, from orchestration through deployment to monitoring and analysis. This integration helps ensure transparent workload migration, simplifies operations, and accelerates service delivery by using familiar processes and tools.
Role-Based Access Control (RBAC)	RBAC simplifies operating tasks that span server, network, and storage administrator teams, while preserving the specialized knowledge that exists in each group. This approach allows subject-matter experts to continue with their normal procedures, but all the configuration data is captured in a single, unified device manager, instead of in the separate, individual device managers that exist in today's data centers.

Feature	Benefit
High availability	Cisco UCS Manager is designed for enterprise data centers that require high availability. Two fully redundant instances of UCS Manager are replicated across a pair of Cisco UCS 6500, 6400, 6300, or 6200 Series Fabric Interconnects, so the loss of a single fabric interconnect will not affect Cisco UCS Manager access or use.
Scalability	One Cisco UCS Manager instance can manage two Cisco UCS 6500, 6400, 6300, or 6200 Series Fabric Interconnects, up to 20 Cisco UCS X9508 Series Server Chassis, 20 Cisco UCS 5100 Series Blade Server Chassis, up to 40 total Cisco UCS 2200, 2300, or 2400 Series Fabric Extenders, and 160 Cisco UCS X-Series Modular Servers, B-Series Blade Servers, or C-Series Rack Servers.
Cisco Call Home support	The Cisco Call Home feature provides proactive diagnostic information and real-time alerts when problems are detected. Anonymous Smart Call Home allows users to anonymously share configuration and usage data with Cisco.

Management scope

Cisco UCS Manager provides end-to-end management of all the devices in the Cisco UCS domain that it manages. Devices that are uplinked from the fabric interconnect must be managed by their respective management applications.

Licensing

Cisco UCS Manager is provided at no additional charge with every Cisco UCS Fabric Interconnect platform.

Cisco UCS X-Series Modular System and servers belonging to the M7 generation and future generations of UCS servers require an Intersight license and Intersight connection. The Intersight license includes the right to use UCS Manager.

No additional system requirements

Cisco UCS Manager resides as embedded software on the Cisco UCS fabric interconnects, fabric extenders, servers, and adapters. No external management server is required, thereby simplifying administration, and reducing Capital Expenditures (CapEx) for the management environment. The communication between the manager on the fabric interconnect and the subsidiary functions found in the fabric extenders, chassis, servers, and adapters is built in and automatic. This feature reduces the challenges and costs associated with implementation and maintenance of connectivity between traditional central management servers and the devices they are tasked with managing.

Why Cisco?

Cisco has significant experience in responding to customer requirements with solid technology innovations for the enterprise data center. Enhancing Cisco's ability to deliver standards-based solutions is a broad ecosystem of industry-leading partners that provide end-to-end customer solutions and services that can accelerate the transition to a unified computing architecture. Unified computing elevates the traditional product classification of network, server, storage, operating system, and application resources to a data center–wide vision. Cisco Unified Computing Services help our customers quickly deploy data center resources, simplify ongoing operations, and optimize infrastructure to better meet business needs. For more information about these and other Cisco Data Center Services offerings, visit https://www.cisco.com/go/unifiedcomputingservices.

Cisco environmental sustainability

Information about Cisco's environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the "Environment Sustainability" section of Cisco's Corporate Social Responsibility (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the "Environment Sustainability" section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

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For more information

- Cisco UCS Manager
- Cisco Unified Computing
- Understanding Cisco UCS Manager Service Profiles
- Manage Cisco UCS C-Series Rack-Mount Servers
- Integrating with Cisco UCS Manager
- Cisco Intersight
- Cisco UCS B-Series Blade Servers
- Cisco UCS X-Series Modular Systems

Our experts recommend

Transition a Cisco UCS Configuration in FlexPod from Cisco UCS Manager to the Cisco Intersight Platform.

Document history

New or revised topic	Described in	Date
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