White Paper

Manage Cisco UCS C-Series Rack-Mount Servers

What You Will Learn

Cisco UCS™ Manager provides unified, embedded management of all software and hardware components of the Cisco Unified Computing System™ (Cisco UCS) across multiple chassis and rack-mount servers and thousands of virtual machines. Cisco UCS Manager manages Cisco UCS as a single entity through an intuitive GUI, a command-line interface (CLI), or an XML API for comprehensive access to all Cisco UCS Manager functions. The Cisco Integrated Management Controller (IMC) is a baseboard management controller (BMC) in Cisco UCS B-Series Blade Servers and C-Series Rack-Mount Servers that is tightly integrated with Cisco UCS Manager. This document provides an overview of the industry-leading features available based on this integration and also describes the capability of the Cisco IMC to function in standalone mode when Cisco UCS C-Series servers are deployed in a standalone environment.

Overview

Most x86-architecture servers today include a management function commonly known as a BMC. The BMC is usually embedded on the motherboard or main circuit board of the server and includes a specialized service processor and firmware. Its job is to monitor the physical state of the server hardware.

BMC functions and standards are defined in the Intelligent Platform Management Interface (IPMI) specifications, originally developed jointly by Intel, Hewlett-Packard, Dell, and NEC. The specification is maintained and published at Intel's corporate Web site, helping ensure that BMC functions are consistently implemented on all x86 managed server platforms. Intel includes BMCs on its customer reference board (CRB) designs, which are given to original equipment manufacturers (OEMs) and original design manufacturers (ODMs) to accelerate time-to-market and help ensure compliance with industry standards such as IPMI.

Cisco has added value to the basic BMC functions by reengineering BMC to make it an important part of the Cisco UCS architecture, with tight integration with Cisco UCS Manager. This integration helps enable powerful, industry-leading unified computing features and the use of service profiles for server provisioning and change management.

Challenge: Efficient, Scalable Server Management

Server OEMs and specialty software vendors offer a range of server management solutions. These products attempt to consolidate the management of servers in both homogeneous and heterogeneous vendor environments. Competing OEMs have combined disjointed hardware, software, host agents, and plug-ins, leading to a high degree of complexity. The software is typically designed and sold by separate business units that lack a unified approach to design. These market dynamics were one of many factors leading to Cisco's market entrance with Cisco UCS, which was designed as an integrated system from the start.

Cisco UCS Manager and Cisco IMC

Cisco UCS Manager runs in the Cisco UCS 6100 and 6200 Series Fabric Interconnects. It provides a wide range of powerful features for the integrated and unified computing, networking, and storage environment of Cisco UCS. The features include the rapid provisioning of infrastructure from shared pools of computing, networking, and

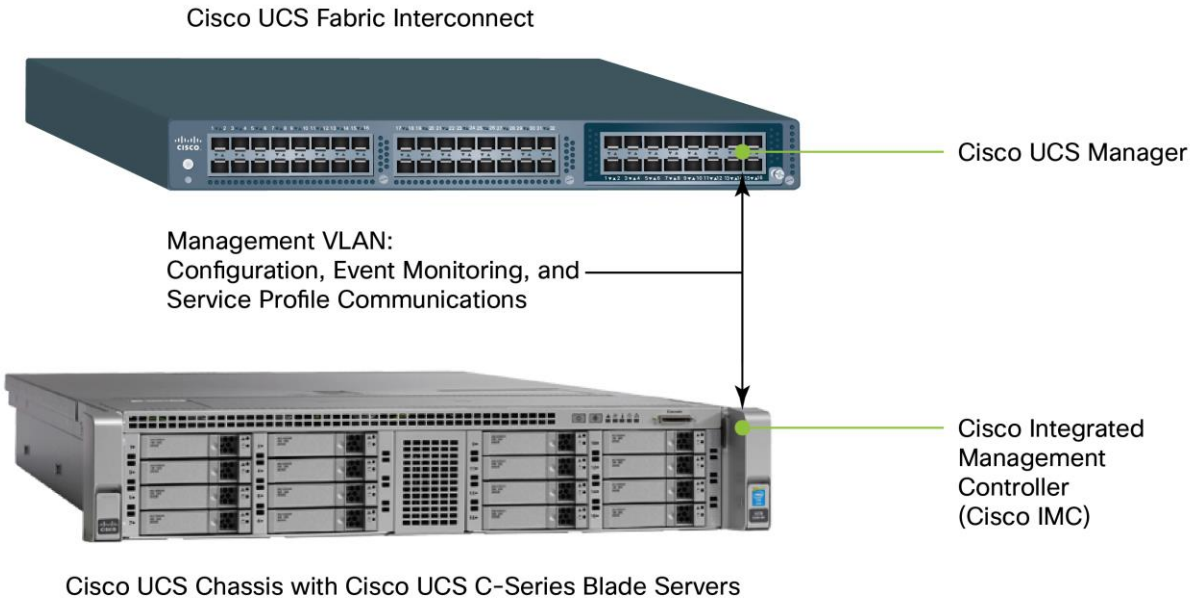
storage resources and the rapid scaling and provisioning of IT infrastructure through the model-based management approach of Cisco service profiles.

Service profiles are used to provision and manage Cisco UCS blade servers and rack-mount servers and their I/O properties within a single management domain. They are created by server, network, and storage administrators and are stored in the Cisco UCS 6100 and 6200 Series Fabric Interconnects. Infrastructure policies needed to deploy applications are encapsulated in the service profile. The policies coordinate and automate element management at every layer of the hardware stack, including RAID levels, BIOS settings, firmware revisions and settings, server identities, adapter settings, VLAN and VSAN network settings, network quality of service (QoS), and data center connectivity.

Service profile templates are used to 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. The template approach makes it just as easy to configure one server or hundreds of servers with perhaps thousands of virtual machines. This automation reduces the number of manual steps needed, helping reduce the opportunities for human error, improving consistency, and further reducing server and network deployment times.

Cisco IMC communicates vital information about each individual server to Cisco UCS Manager, (Figure 1). Cisco IMC provides many diagnostic and health monitoring services that contribute to the holistic management environment enabled by Cisco UCS.

Figure 1. Monitoring Hard Disk Drive (HDD) Health in Cisco UCS C-Series Rack Server

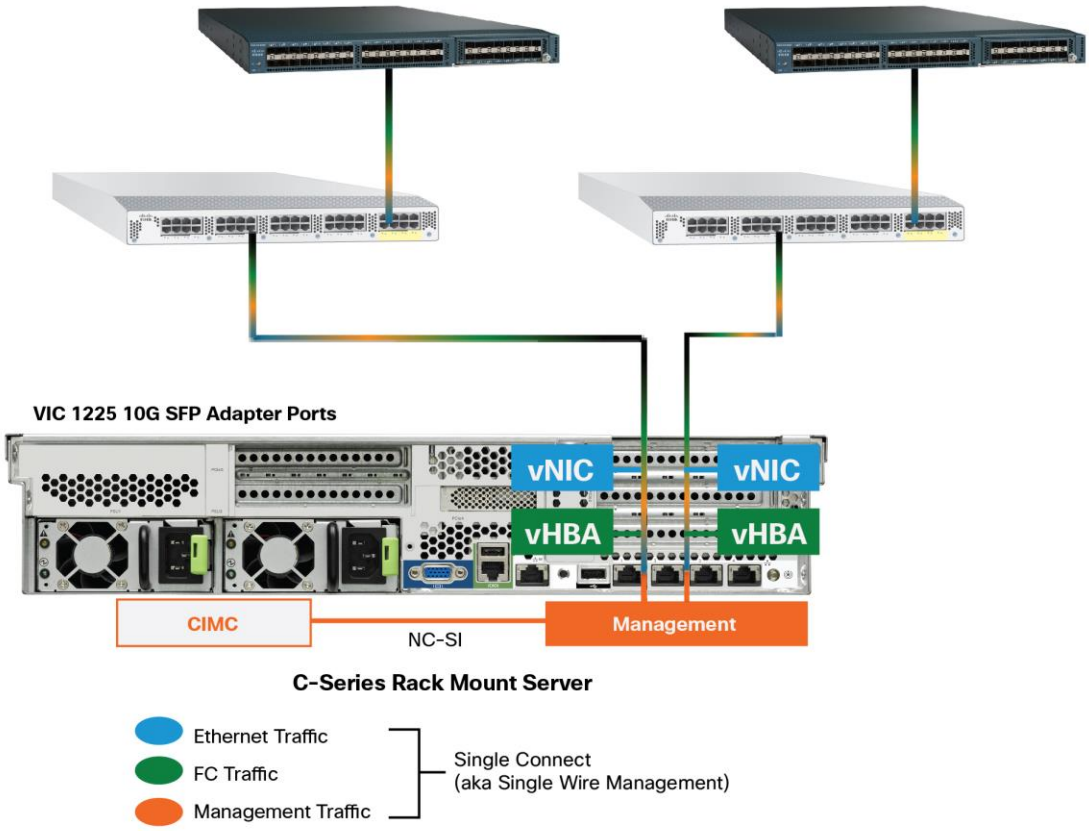


Diagnostic and health monitoring features provided with Cisco IMC include:

- Simple Network Management Protocol (SNMP)
- XML API event subscription and configurable alerts

- System event log
- Audit log
- Monitoring of field-replacable units (FRUs), HDD faults, dual inline memory module (DIMM) faults, network interface card (NIC) MAC addresses, CPU, and thermal faults
- Configurable alerts and thresholds
- Watchdog timer
- RAID configuration and monitoring
- Predictive failure analysis of HDD and DIMM
- Converged network adapters (CNAs)
- Intel reliability, availability, and serviceability (RAS)
- Network Time Protocol (NTP)
- Graphical and command-line client

Figure 2. Cisco C-Series Single Wire Management enables management and data traffic to flow across a single cable



Cisco IMC in Standalone Mode on Cisco UCS C-Series Servers

Customers occasionally deploy Cisco UCS C-Series servers in a standalone environment as x86 servers. In such a deployment, the servers are not integrated with other Cisco UCS components, such as the Cisco UCS fabric interconnects, Cisco UCS fabric extenders, or Cisco UCS Manager.

With Cisco UCS C-Series servers operating in standalone mode, administrators can use Cisco IMC as an industry-standard BMC through a web-based GUI or a secure shell (SSH)–based command-line interface (CLI) to configure, administer, and monitor the server. Cisco IMC does not replace Cisco UCS Manager; instead, it gives administrators the tools to manually control server functions, including remote keyboard, video, and mouse (KVM); power on and off; and standard SNMP traps for system monitoring. Communication of Cisco IMC on Cisco UCS C-Series servers is restricted to separate network ports from the data port.

With Cisco IMC, administrators can perform the following server management tasks:

- Power on, power off, power cycle, reset, and shut down the server
- Toggle the locator LED
- Configure the server boot order
- View server properties and sensors
- Manage remote presence
- Create and manage local user accounts and enable authentication through Active Directory
- Configure network-related settings, including NIC properties, IPv4, VLANs, and network security
- Configure communication services, including HTTP, SSH, and IPMI over LAN
- Manage certificates
- Configure platform event filters
- Update Cisco IMC firmware
- Monitor faults, alarms, and server status

Cisco IMC is included with each Cisco UCS B-Series and C-Series server at no additional cost to customers.

Conclusion

Cisco UCS Manager is an embedded unified manager for Cisco UCS. It enables a policy-based management approach through the use of service profiles and just-in-time provisioning of physical resources. Centralized management through Cisco UCS Manager is one of the major features contributing to a lower total cost of ownership (TCO) and easier and faster operations with Cisco UCS. Cisco IMC is an IPMI-compliant, industry-standard BMC. When used together with Cisco UCS Manager, it contributes a range of server diagnostic and management features to the comprehensive feature set of the Cisco UCS management environment. Used in standalone Cisco UCS C-Series servers, Cisco IMC as a BMC empowers administrators to proactively manage and monitor the servers. Cisco IMC offers many options for integration with industry-leading tools and interfaces and delivers a variety of functions designed to keep traditional or unified computing environments operating reliably and efficiently to handle some of the most demanding enterprise workloads.

For More Information

- Cisco UCS Services: Accelerate Your Transition to a Unified Computing Architecture: http://www.cisco.com/en/US/services/ps2961/ps10312/Unified_Computing_Services_Overview.pdf
- Cisco UCS C-Series Servers Integrated Management Controller CLI Configuration Guide, Release 1.3: http://www.cisco.com/en/US/docs/unified_computing/ucs/c/sw/cli/config/guide/131/b_Cisco_UCS_C-Series_CLI_Configuration_Guide_131.pdf
- Setup for Cisco IMC on Cisco UCS C-Series Servers: http://www.cisco.com/en/US/partner/products/ps10493/products_configuration_example09186a0080b10d66.shtml
- Cisco UCS C-Series Rack-Mount Servers: http://www.cisco.com/en/US/partner/products/ps10493/tsd_products_support_series_home.html
- Unified computing: http://www.cisco.com/en/US/partner/netsol/ns944/index.html
- Intelligent Platform Management Interface (IPMI) Specifications: http://www.intel.com/design/servers/ipmi/spec.htm

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