



Meet the UN/BOX

Cisco UCS X-Series Modular System with Intersight

Every day, every minute, every second, new apps are launching.

The beating heart of innovation, applications are the direct expression of consumer demand and your presence. Apps have forced a whole new way of thinking on IT. The old rules no longer apply. It's not on premises vs. cloud. It's both. It's massive scale and granular control. It's always-on availability enabled by modular components that can be molded and shaped to the needs of your applications. It's a new game where developers are free to write their own rules but where IT must free itself from the burden of managing massive complexity in order to keep up.

Tomorrow thinks differently, wanting hardware that thinks like software. The Cisco UCS® X-Series with Intersight is a modular system managed from the cloud. It is designed to be shaped to meet the needs of modern applications and improve operational efficiency, agility, and scale through an adaptable, future-ready, modular design.

Designed to be managed exclusively from the cloud

- Simplify with cloud-operated infrastructure
- Simplify with an adaptable system designed for modern applications
- Simplify with a system engineered for the future

Think like tomorrow

The Cisco UCS X-Series Modular System simplifies your data center, adapting to the unpredictable needs of modern applications while also providing for traditional scale-out and enterprise workloads. It reduces the number of server types to maintain, helping to improve operational efficiency and agility as it helps reduce complexity. Powered by the Cisco Intersight™ cloud operations platform, it shifts your thinking from administrative details to business outcomes—with hybrid cloud infrastructure that is assembled from the cloud, shaped to your workloads, and continuously optimized. Now that hardware can think and change like software, you are free to think like tomorrow.

Simplify your data center

Since we first delivered the Cisco Unified Computing System™ (Cisco UCS) in 2009, our goal has been to simplify your data center. We pulled management out of servers and into the network. We simplified multiple networks into a single unified fabric. And we eliminated network layers in favor of a flat topology wrapped up into a single unified system. With the Cisco UCS X-Series Modular System we take that simplicity to the next level:

- **Simplify with cloud-operated infrastructure:** We move management from the network into the cloud so that you can respond at the speed and scale of your business and manage all of your infrastructure. Shape Cisco UCS X-Series Modular System resources to

workload requirements with the Cisco Intersight cloud operations platform. Integrate third-party devices including storage from NetApp, Pure Storage, and Hitachi. Gain intelligent visualization, optimization, and orchestration for all of your applications and infrastructure. Automation drives agility and consistency, helping you reduce time to market while lowering cost and risk.

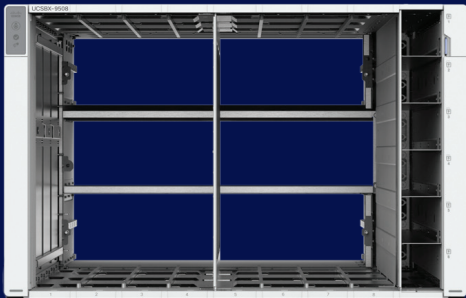
- **Simplify with an adaptable system designed for modern applications:** Today's cloud-native, hybrid applications are inherently unpredictable. They get deployed and redeployed as part of an iterative DevOps practice. Requirements change often and you need a system that doesn't lock you into one set of resources when you find that you need another. For hybrid applications, and a range of traditional data center applications (see sidebar), you can consolidate onto a single platform that combines the density and efficiency of blade servers with the expandability of rack servers. The result: better performance, automation, and efficiency.
- **Simplify with a system engineered for the future:** Embrace emerging technology and reduce risk with a modular system designed to support future generations of processors, storage, nonvolatile memory, accelerators, and interconnects. Gone is the need to purchase, configure, maintain, power, and cool discrete management modules and servers. Cloud-based management is kept up to date automatically with a constant stream of new capabilities delivered by the Intersight software-as-a-service model.

Support a broader range of workloads

A single server type supporting a broader range of workloads means fewer different products to support, reduced training costs, and increased flexibility. The system supports workloads including the following:

- Virtualized workloads
- Private cloud
- Enterprise applications
- Database management systems
- Infrastructure applications
- Cloud-native applications
- In-memory databases
- Big data clusters
- GPU-accelerated AI/ML workloads

It doesn't get simpler than this:



The Cisco UCS X9508 Chassis is ready to house technology for today with an approach that embraces the future. Just slide into the chassis what you need today. Embrace the future without needing a forklift.

Our chassis is free from what we call parasitic hardware—switches and management modules that must be purchased, configured, powered, cooled, and maintained. They draw from the chassis power and cooling budget while reducing the space allocated to servers. The chassis' midplane-free design eliminates limitations on future interconnect technology.

UN/BOX the future

The Cisco UCS X-Series Modular System begins with a chassis engineered to be adaptable and flexible. This makes it ready to power a wider range of workloads and ready to adapt to the future because there is nothing holding it back.

Our chassis has only a power-distribution midplane. For I/O connectivity, vertically oriented compute nodes intersect with horizontally oriented I/O connectivity components with blind-mating connectors (Figure 1). As future networking and I/O standards emerge, they can mate to different connectors, unboxing the future of computing without requiring a new chassis.

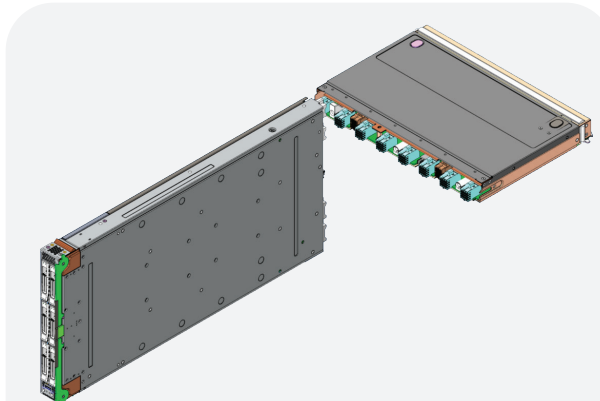


Figure 1. The midplane-free design gives the chassis the capability to adapt to new technology as it emerges

The 7-rack-unit (7RU) chassis has eight flexible slots. These can house a combination of compute nodes and a pool of future I/O resources that may include GPU accelerators, disk storage, and nonvolatile memory.

At the top rear of the chassis are two intelligent fabric modules that connect the chassis to upstream Cisco UCS 6400 Series Fabric Interconnects. At the bottom are slots ready to house future I/O modules that can flexibly connect the compute modules with I/O devices. We call this connectivity Cisco UCS X-Fabric technology because 'X' is a variable that can evolve with new technology developments.

Six 2800W power supply units (PSUs) provide 54V power to the chassis with N, N+1, and N+N redundancy. A higher voltage allows efficient power delivery with less copper and reduced power loss. Efficient, 100mm, dual counter-rotating fans deliver industry-leading airflow and power efficiency. Optimized thermal algorithms enable different cooling modes to best support your environment. Cooling is modular so that future enhancements can potentially handle open- or closed-loop liquid cooling to support even higher-power processors.

Modular networking components

Network connectivity is provided by a pair of Cisco UCS 9108 Intelligent Fabric Modules (IFMs). Similar to the fabric extenders used in the Cisco UCS 5108 Blade Server Chassis, these modules carry all network traffic to a pair of Cisco UCS 6400 Series Fabric Interconnects. Having a single point of network connectivity and control in a system provides deterministic latency. This, in turn, frees you to place workloads without regard

to whether the compute nodes are in the same chassis. Each IFM features (Figure 2):

- **Server ports:** Up to 200 Gbps of unified fabric connectivity per compute node with two IFMs.
- **Uplink ports:** 8x 25-Gbps SFP28 ports. The unified fabric carries management, production, and Fibre Channel over Ethernet (FCoE) traffic to the fabric interconnects. There, management traffic connects to the Cisco Intersight cloud operations platform; FCoE traffic is passed to native Fibre Channel interfaces through universal ports on the fabric interconnects, and production Ethernet traffic is passed upstream to the data center network.

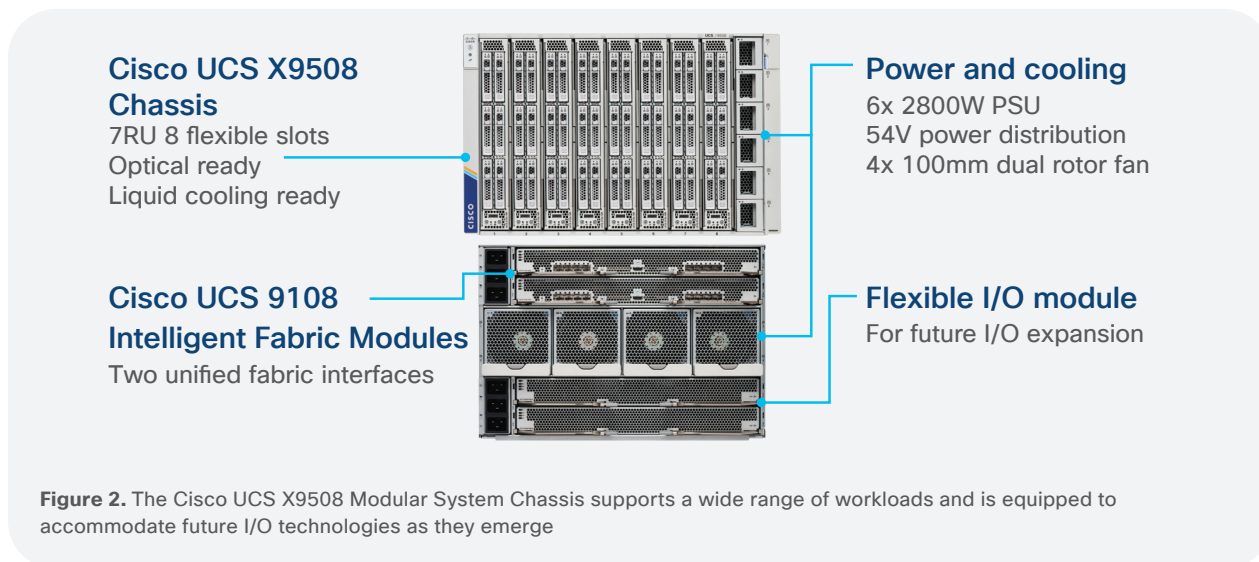
Management consolidation

The IFM connects to the Cisco® Integrated Management Controller on each compute node,

enabling Intersight access to configuration and monitoring capabilities. It also connects to the chassis, power supply, and fan speed and temperature sensors, enabling both zone-based cooling and policy-based power management.

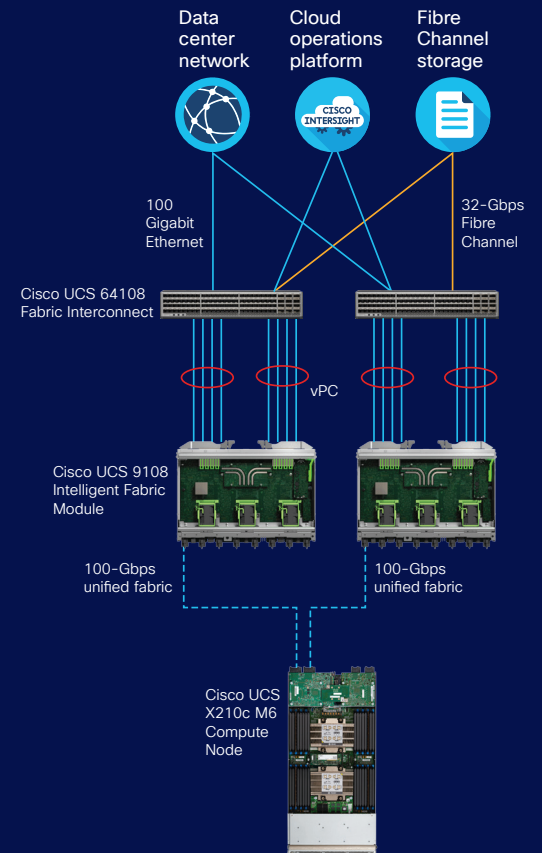
Ready for the future

In contrast to systems with fixed network and I/O traces on a chassis midplane, our midplane-free design enables easy upgrades to new networking technologies as they emerge. Horizontally oriented, the IFM mates with I/O connectors on each vertically oriented compute node's interfaces, making it straightforward to accommodate new network speeds and modalities in the future. What we offer today is just the beginning.



Unified fabric connectivity

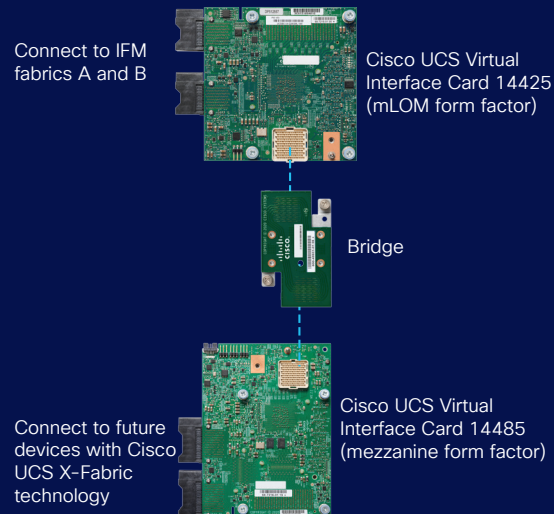
A unified fabric interconnects all devices in the system. It securely carries all traffic to the fabric interconnects where it can be broken out into IP networking, Fibre Channel SAN, and management connectivity.



Cisco UCS virtual interface cards

Configuring your Cisco UCS X210c M6 Compute Node with both mLOM- and mezzanine-form-factor virtual interface cards delivers up to 200 Gbps of network bandwidth to the node and prepares it for future devices with Cisco UCS X-Fabric technology.

The number and types of I/O devices are configured on demand through Intersight management.



Powerful computing capability

The Cisco UCS X9508 Chassis is designed to house and interconnect a variety of computing and I/O devices that will grow over time. Our first compute offering is the Cisco UCS X210c M6 Compute Node. Up to eight nodes can fit into a single chassis. The node features (Figure 3):

- **CPU:** Up to 2x 3rd Gen Intel® Xeon® Scalable Processors with up to 40 cores per processor and 1.5 MB Level 3 cache per core.
- **Memory:** Up to 32x 256 GB DDR4-3200 DIMMs for up to 8 TB of main memory. Configuring up to 16x 512-GB Intel Optane™ persistent memory DIMMs can yield up to 12 TB of memory.

- **Disk storage:** Up to 6 SAS or SATA drives can be configured with an internal RAID controller, or up to 6 NVMe drives can be configured with four lanes each of PCIe Gen4 connectivity, and up to 2 M.2 memory cards can be configured with RAID 1 mirroring. The Cisco UCS X210c's storage configuration delivers the capacity of many rack servers with the convenience of the modular form factor, adding to the system's capability to support a wide range of workloads.
- **mLOM virtual interface card:** The Cisco UCS Virtual Interface Card 14425 can occupy the server's mLOM slot enabling up to 50 Gbps of unified fabric connectivity to each of the chassis IFMs for 100 Gbps of connectivity per server. Cisco® virtual interface cards enable the number and type of I/O devices presented to the operating system to be configured on demand through Cisco Intersight. Connectivity

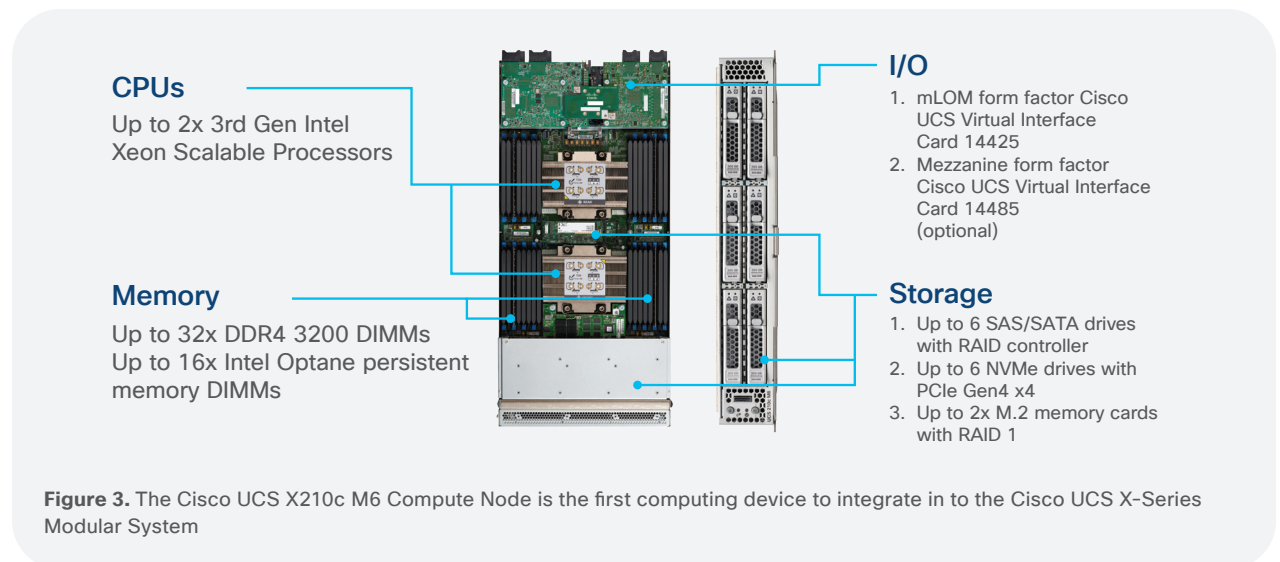


Figure 3. The Cisco UCS X210c M6 Compute Node is the first computing device to integrate in to the Cisco UCS X-Series Modular System

to the IFM and up to the fabric interconnects is delivered through 4x 25-Gbps connections, which are configured automatically as 2x 50-Gbps port channels.

- **Mezzanine virtual interface card:** The optional Cisco UCS Virtual Interface Card 14825 can occupy the server's mezzanine slot at the bottom of the chassis. This card's I/O connectors link to Cisco UCS X-Fabric technology that is planned for future I/O expansion. A bridge card extends this VIC's 2x 50 Gbps of network connections up to the mLOM slot and out through the mLOM's IFM connectors, bringing the total bandwidth to 100 Gbps per fabric—a total of 200 Gbps per server.
- **Security:** The server supports an optional trusted platform module (TPM). Additional features include a secure boot FPGA and ACT2 anti-counterfeit provisions.

Single point of connectivity for the system

Cisco UCS 6400 Series Fabric Interconnects provide a single point of connectivity for the system. Multiple Cisco UCS X9508 Chassis can be connected to the interconnects along with any other servers in the Cisco UCS and Cisco HyperFlex™ product lines, up to a maximum of 160 servers. The fabric interconnects provide line-rate, lossless connectivity for all traffic within a system. Rather than distributing switching functions into the chassis, the fabric interconnects maintain deterministic latency between all compute nodes regardless of whether they reside in the same chassis.

- **Cisco UCS 6454 54-Port Fabric Interconnect:** This 1RU 10/25/40/100 Gigabit Ethernet, FCoE, and Fibre Channel switch includes 28x 10/25-Gbps Ethernet ports, 4x 1/10/25-Gbps Ethernet ports, 6x 40/100-Gbps Ethernet uplink ports, and 16 unified ports that can support 10/25 Gigabit Ethernet or 8/16/32-Gbps Fibre Channel depending on the SFP connector used.
- **Cisco UCS 64108 Fabric Interconnect:** This 2RU 10/25/40/100 Gigabit Ethernet, FCoE, and Fibre Channel switch includes 72x 10/25-Gbps Ethernet ports, 8x 1/10/25-Gbps Ethernet ports, 12x 40/100-Gbps Ethernet uplink ports, and 16 unified ports.

When supporting the Cisco UCS X-Series, the fabric interconnects run in Intersight Managed Mode. This option eliminates local management and replaces it with Cisco Intersight Secure Connect technology. This acts as proxy for management traffic between the chassis and Cisco Intersight. In Intersight Managed Mode the only management function is the implementation of power-management policies established in Intersight.

Cisco Intersight Secure Connect technology

With the Cisco UCS X-Series Modular System, you don't have to host multiple management servers, software, and networks in your data center. Cisco Intersight Secure Connect technology reaches from the cloud to the fabric interconnects with connectivity as secure as when management traffic is on a protected physical network. Once you claim the fabric interconnects in the Intersight GUI, the systems

become self-aware, incorporating any new compute nodes as they are plugged in. Cisco Intersight Secure Connect technology makes it possible for Intersight to manage not just the entire Cisco UCS product line, but also Cisco HyperFlex systems and storage systems from the leading storage vendors, including NetApp, Pure Storage, and Hitachi. This technology is a strategic investment on our part in that it is a thin layer of software that can quickly expand the universe of supported devices, enabling you to stay ahead of new technology developments.

Ready for a hybrid cloud world

The Cisco Intersight cloud operations platform is the force that transforms the Cisco UCS X-Series Modular System from a set of components into a flexible server platform to propel your most important workloads.

The Cisco UCS X-Series with Intersight is built with a common purpose: to make hardware think like software so that you can easily adapt to a rapidly changing world. Through server profiles, Intersight defines the identity, connectivity, and I/O configuration of your servers and automates the entire infrastructure lifecycle. It's easy to imagine how, as more features are released, the modular system supports a pool of I/O resources: banks of nonvolatile memory, GPU accelerators, specialized ASICs, and massive amounts of NVMe storage. Just as the chassis and Cisco UCS X-Fabric technology are designed to incorporate a constant flow of new capabilities, Cisco Intersight is designed to automatically

integrate those technologies into servers along with a constant flow of new, higher-level management capabilities. Software as a service (SaaS) meets modular, infrastructure as code, and the line between hardware and software dissolves.

In its [FutureScape: Worldwide IT Industry 2020 Predictions report](#), IDC predicts that, by 2023, 300 percent more applications will run in the data center and edge locations, 500 million digital applications and services will be developed using cloud-native approaches, and more than 40 percent of new enterprise IT infrastructure will be deployed at the edge. This means that you need a consistent operational approach for all of your infrastructure, wherever it is deployed. With Intersight and the Cisco UCS X-Series you can:

- **Define** desired system configurations based on policies that use pools of resources

provided by the Cisco UCS X-Series. Let Cisco Intersight assemble the components and set up everything from firmware levels to which I/O devices are connected. Infrastructure is code, so your IT organization can use the Intersight GUI and your DevOps teams can use the Intersight API, the Intersight Service for HashiCorp Terraform, or the many API bindings from languages such as Python and PowerShell.

- **Deploy** from the cloud to any location. Anywhere the cloud reaches, Intersight can automate your IT processes. We take the guesswork out of implementing new services with a curated set of services we bundle with the Intersight Kubernetes Service, for example.
- **Visualize** the interdependencies between software components and how they use the infrastructure that supports them with Intersight Workload Optimizer.

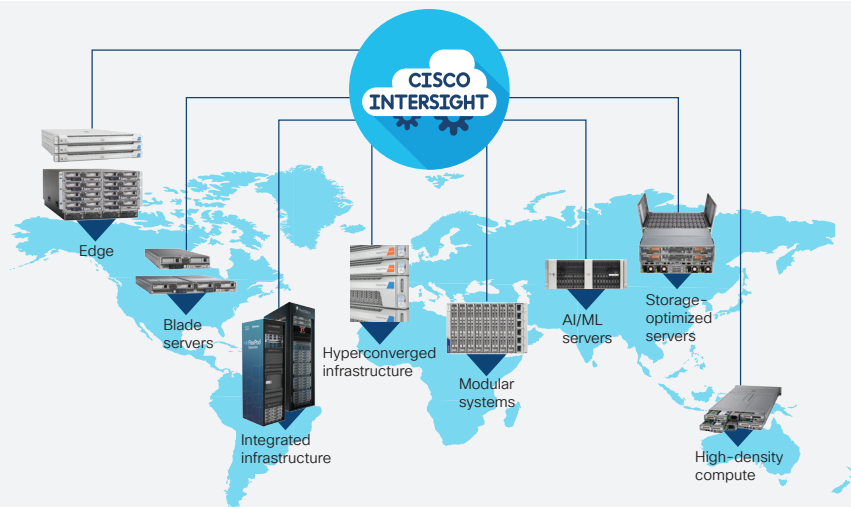


Figure 4. Cisco Intersight reaches from the cloud to all of your infrastructure, regardless of its location

Modular management architecture

Cisco Intersight is a unified, secure, modular platform that consists of a set of services that bridge applications and infrastructure to meet your specific needs, including:

- **Intersight Infrastructure Service:** Manage your infrastructure lifecycle, including Cisco data center products, Cisco converged infrastructure solutions, and third-party endpoints
- **Intersight Workload Optimizer:** Revolutionize how you manage application resources across any environment with real-time, full-stack visibility to help ensure performance and better cost control
- **Intersight Kubernetes Service:** Simplify Kubernetes with automated lifecycle management across your multicloud environment
- **Intersight Virtualization Service:** Deploy and manage virtual machines on premises or in the cloud
- **Intersight Cloud Orchestrator:** Standardize application lifecycle management across multiple clouds

Cisco is a Forrester Wave Leader

In a [Forrester Wave™ report](#) that analyzed vendor products, strategies, roadmaps, and market presence, Cisco is cited as a leader in solutions that go beyond basic automation. Our comprehensive management and strong analytics solutions were noted as key technologies that allow Cisco platforms to tap into knowledge about systems and applications so that automation processes can make better decisions.

Forrester explains the importance of combining infrastructure management, governance, and compliance features—and the success of Cisco’s approach that results in a highly scalable offering that works across on-premises deployments and the cloud.

Testimony to our success is Forrester’s conclusion that Intersight “offers rich infrastructure automation capabilities” and that Cisco is “stronger than most competitors at model creation and editing and application awareness.”



Forrester Research: [The Forrester Wave™: Infrastructure Automation Platforms, Q3 2020—The 13 Providers That Matter Most And How They Stack Up](#), August 10, 2020.

© 2021 Cisco and/or its affiliates. All rights reserved. Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: www.cisco.com/go/trademarks. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

- **Optimize** your workload by analyzing runtime performance and make resource adjustments and workload placements to keep response time within a desired range. If your first attempt at matching resources to workloads doesn’t deliver the results you need, you can reshape the system quickly and easily. Cisco Intersight facilitates deploying workloads into your private cloud and into the public cloud. Now one framework bridges your core, cloud, and edge infrastructure, managing infrastructure and workloads wherever they are deployed.
- **Maintain** your infrastructure with a consolidated dashboard of infrastructure components regardless of location. Ongoing telemetry and analytics give early detection of possible failures. Reduce risk of configuration drift and inconsistent configurations through automation with global policy enforcement.
- **Support** your infrastructure with AI-driven root-cause analysis and automated case support for the always-connected Cisco Technical Assistance Center (Cisco TAC). Intersight watches over you when you update your solution stack, helping to prevent incompatible hardware, firmware, operating system, and hypervisor configurations.

Think like tomorrow

The Cisco UCS X-Series Modular System is ready for your data center today, and ready to serve it well into the future with an architecture designed to support many future processor generations and multiple innovations in server I/O, networking, and infrastructure. With cloud-based lifecycle

management and a simplified yet adaptable system, we continue to help you simplify your data center:

- **Simplify with cloud-operated infrastructure:** Respond at the speed and scale of your business by shaping Cisco UCS X-Series Modular System resources to workload requirements with Intersight. Deliver intelligent visualization, optimization, and orchestration to all your applications and infrastructure.
- **Simplify with an adaptable system designed for modern applications:** Adapt to the unpredictable requirements of modern applications. Consolidate onto a single platform that combines the density and efficiency of blade servers with the expandability of rack servers for better performance, automation, and efficiency.
- **Simplify with a system engineered for the future:** Embrace emerging technology and reduce risk with a modular system engineered to support future generations of processors, accelerators, and interconnects with management enabled by a constant stream of new capabilities delivered as SaaS.

Embrace the future

Visit <https://www.cisco.com/go/ucsx>.