

Cisco UCS Integrated Infrastructure

Evolution and focus areas

Partnering to bring you value

This document describes Cisco UCS® Integrated Infrastructure, the foundation for a number of popular infrastructure-as-a-service (IaaS), intent-based data center, multicloud, and enterprise applications. These Cisco® integrated solutions deliver:

- **Choice and flexibility**, with a portfolio that uses solutions from storage partners and independent software vendors (ISVs) together with service and support
- **Operational simplicity** through validated designs that accelerate deployment and comprehensive, model-based management
- **Multicloud support**, offering solutions that are ready to help you modernize your IT organization
- **Operational efficiency**, helping reduce your total cost of ownership (TCO) through automation and orchestration

This document provides your IT decision makers with context for the industry's shift to integrated systems. It explains Cisco's approach and briefly describes applications and use cases in which Cisco is investing in integrated infrastructure, along with our ecosystem of application and storage technology partners.

Cisco UCS®
Integrated
Infrastructure with
Intel® Xeon®
scalable processors



Contents

Introduction	3
Double-digit growth of integrated systems	3
Evolution of Cisco UCS Integrated Infrastructure	4
Cisco and EMC	4
Cisco and NetApp.....	5
Other storage vendors	5
Our design approach	5
Baseline platform	6
Activity areas	7
Applications	7
Operations	8
Ecosystem	8
Application-related programs and use cases	9
Enterprise applications and databases.....	9
Vertical applications	10
Desktop virtualization	10
Operations-related programs and use cases	10
Secure automated enclaves.....	10
SaaS enablement.....	10
Multicloud enablement.....	10
Ecosystem-related programs and benefits	11
Conclusion	11

How you can benefit

- Free your IT organization to focus on business outcomes
- Dramatically reduce complexity of deployment and continued operations
- Gain from vendor expertise and guidance to improve security, reliability, and performance
- Improve return on investment through increased operational efficiency
- Deploy cloud-ready designs

Introduction

Technology transitions—such as cloud, mobility, big data, and the Internet of Things (IoT)—bring together people, processes, data, and things to make resources and connections more valuable to your business. This digital transformation challenges the role of IT in your enterprise and puts pressure on your IT organization to deliver value faster. Cisco Unified Computing System™ (Cisco UCS) Integrated Infrastructure makes this possible. Our model transforms your data center infrastructure into an environment that delivers flexibility, simplicity, and efficiency and is ready to help you deploy and use multiple clouds. With our innovative solutions, you can break down the IT barriers that are holding your business back.

- CIOs recognize that operations—including people, management, software, and facilities—are the greatest cost in the data center, far greater than the cost of underlying hardware.
- The digital transformation is pushing us to keep up with mobility, social media, collaboration, IoT, big data, in-memory database technologies, and web-scale applications. These platforms and technologies are needed to increase revenue and require a highly responsive and scalable IT infrastructure.
- Data centers are shifting to heavily virtualized, multicloud computing models running on industry-standard IT infrastructure. These environments require uniform design points that can be replicated to support massive scalability and ease IT infrastructure management.

It is not surprising that these factors have led to the need for predesigned computing, networking, and storage building blocks that are optimized to lower initial IT infrastructure design costs, simplify management, and support immense scalability and high levels of availability. These systems are particularly valuable for many common and transitional application environments that currently demand a large amount of IT attention. Much of the integration is performed by integrators who can offer all three system elements, or through a partnership of vendors who each offer different pieces of a solution. In all cases, the primary intention is to make the whole greater than the sum of its parts.

Double-digit growth of integrated systems

Although the number of underlying IT server, network, and storage resources in the data center continues to increase dramatically, investment in these resources is relatively flat due to the reduced cost per unit. However, the number of integrated systems that package and deliver these traditionally separate components as a single solution is growing fast: in the double digits. The trend is strong enough that both Gartner and IDC have started to cover the integrated systems market.

Business value

483%



Five-year
return on investment

7



Months to
break even

46%



Lower IT
infrastructure costs

38%



Less IT staff time spent
keeping the lights on

89%



Less unplanned
downtime

56%



Faster application
development cycles

[Read the report.](#)

While analysts differ slightly on the taxonomy and makeup of the various integrated systems that compose this market segment, they agree that these systems include a combination of servers, networking resources, storage systems, management systems, convenient packaging, and holistic support.

Evolution of Cisco UCS Integrated Infrastructure

We are a primary vendor in the integrated infrastructure systems market segment, with integrated infrastructure systems built on top of Cisco UCS, Cisco Nexus® switches, Cisco UCS Director, Cisco ONE™ Enterprise Cloud Suite, and Cisco Intersight™ solutions. Our integrated systems provide a foundation for a number of popular IaaS offerings, multicloud deployments, and enterprise applications.

We saw the value enabled by integrated infrastructure systems when Cisco UCS was launched in 2009. Since then, we have become a leader in the movement toward integration. We recognize that you value the deep competency of, and have preferences for, many of your suppliers. We want you to be able to keep your valued storage suppliers. That's why we partner with top-tier vendors to create Cisco UCS Integrated Infrastructure (Figure 1).

Cisco and EMC

Cisco and EMC led the way in creating the Virtual Computing Environment (VCE) coalition, initially as a joint technology program and then as a division of EMC Corporation. VCE became the world leader in integrated infrastructure that is designed, purchased, packaged, delivered, and supported as prefixed building blocks called VCE vBlock. When EMC was acquired by Dell, VCE solutions were rebranded as VxBlock with Dell EMC.



Figure 1 Our portfolio of integrated infrastructure solutions

To optimize Cisco UCS Integrated Infrastructure offerings, we typically sort out 50 to 100 different Cisco and partner product releases and hundreds of configurations. Our efforts ultimately translate into reduced cost and time for your design and deployment efforts.

Cisco and NetApp

We partnered with NetApp early on to incorporate NetApp storage products into our integrated infrastructure solutions. Today we offer a broad portfolio of FlexPod reference architectures optimized for IaaS, multicloud, and enterprise application workloads, including Microsoft, SAP, and Oracle applications and databases.

Other storage vendors

Other storage vendors chose to build their integrated solutions on the same underlying Cisco data center platform, including VersaStack Solution with IBM, FlashStack with Pure Storage, and AzureStack with Microsoft.

Our design approach

We provide a range of integrated infrastructure designs, including reference architectures that are fully assembled stacks (for example, FlexPod and FlashStack) and fully assembled appliances with applications preinstalled (for example, SAP HANA on Cisco UCS). The reference architectures are documented as Cisco Validated Designs published at the [Cisco Design Zone](#). Cisco Validated Designs provide an architectural description of a solution along with detailed implementation instructions. Each design is the result of a rigorous process that includes requirements collection, design specification, review with an expert panel, and end-to-end validation in labs against real-world deployment configurations. Testing is done for traffic-load, scaling, and failure scenarios and sometimes for performance. Complete documentation of the components, solution architecture, and testing is contained in Cisco Validated Designs and other related collateral (Figure 2)

In addition to design excellence, we provide, through our Technical Services organization, the option of single-number support for many of the systems based on Cisco UCS Integrated Infrastructure, giving customers a single accountable support structure for all design components.



Figure 2 Design process for Cisco UCS integrated infrastructure.

Baseline platform

The foundation for all Cisco UCS Integrated Infrastructure designs is our [intent-based data center](#), which captures the intent of users and applications. It combines Cisco's computing, networking, management, storage, storage access, and security solutions into a unified and cohesive platform that is designed to automate IT across both physical and virtual environments (Figure 3). The unified data center includes the recent additions described here.

- [Cisco UCS Director](#) unifies and automates end-to-end IT converged infrastructure management processes by abstracting the complexity of individual devices, hypervisors, and virtual machines and automating end-to-end IT converged infrastructure management processes in a unified and easy-to-use set of tools and interfaces. With Cisco UCS Director, integrated infrastructure designs can be further simplified to deliver easy, turnkey deployment and operation.

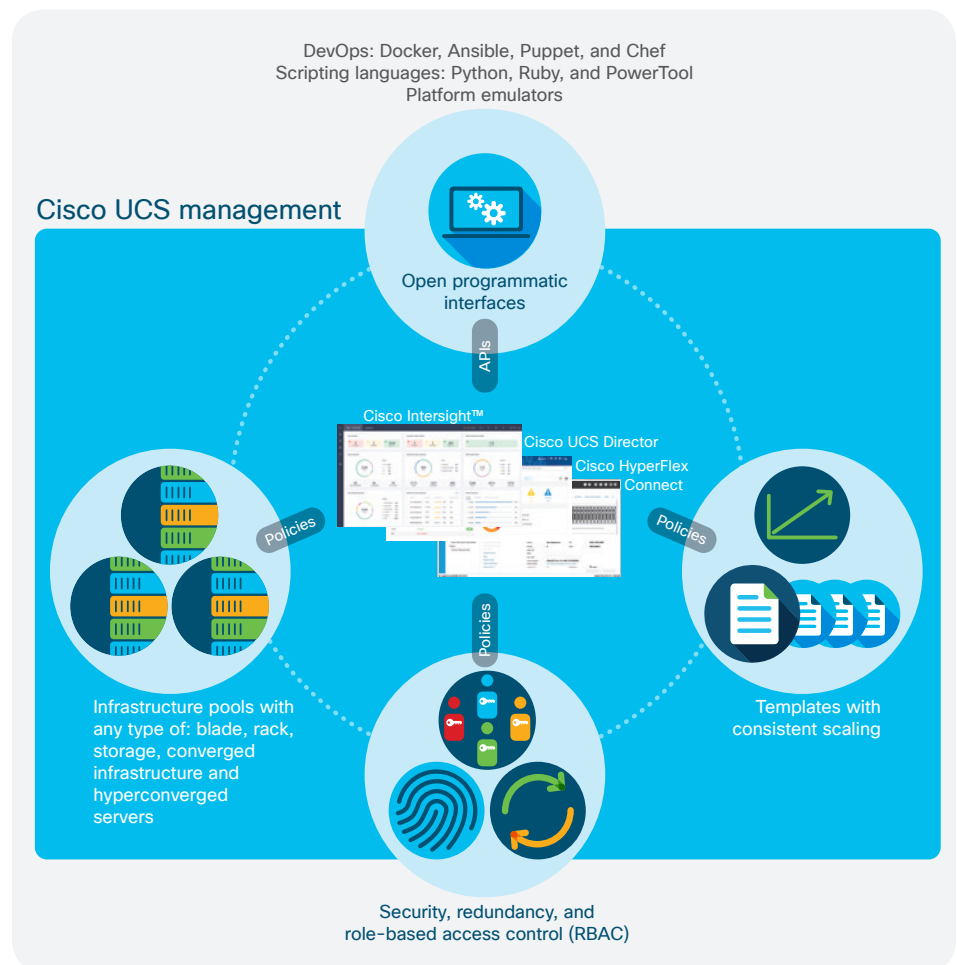


Figure 3 Our integrated infrastructure solutions offer comprehensive and unified management.



Applications

- Enterprise applications and databases
- Vertical applications
- Desktop virtualization
- Analytics and big data



Operations

- Intent-based
- Secure, automated enclaves
- SaaS enablement
- Multicloud enablement
- OpenStack



Ecosystem

- Storage partners
- ISV partnerships
- Premier partner delivery
- Cisco services and support

- [Cisco Application Centric Infrastructure \(ACI\)](#) is a holistic architecture with centralized automation and policy-based application profiles that delivers software flexibility with the scalability of hardware performance for the Cisco Unified Fabric. The architecture consists of Cisco Nexus 9000 Series Switches, Cisco Application Policy Infrastructure Controller (APIC), and Cisco Application Virtual Switch (AVS). Together, these components provide a highly flexible and reliable hardware and software foundation for a data center fabric, achieving the promise of software-defined networks (SDNs) while maintaining the quality and reliability of Cisco's hardware networking solutions.
- [Cisco Intersight](#) is a cloud-based system management platform that is augmented by analytics and machine learning. It helps you achieve a higher level of automation, simplicity, and operational efficiency through a holistic and unified approach to managing distributed computing environments. And it provides global management for Cisco UCS and Cisco HyperFlex™ systems.
- [Cisco Workload Optimization Manager](#) is a real-time decision engine that instantly scales resources up or down in response to workload fluctuations before service levels are affected. It relieves your IT operations staff from complex decision making by combining operation policies and automation to help ensure that workloads can access and consume any resource on demand.
- [Cisco ONE™ Enterprise Cloud Suite](#) allows you to establish a secure connection and coherently share security policies between private and public cloud environments. With this easy-to-manage, open, and flexible environment, you can consistently enforce your data center security, quality-of-service (QoS), and access control policies in both private and public clouds. As a result, you can safely extend your data center and cloud capacity by easily scaling your applications and adapting to changing priorities and moving strategies.

Activity areas

Our solution engineering teams focus on three high-level areas of activity and a series of programs to help ensure that integration efforts are relevant to specific customer use cases and business outcomes (sidebar). Most integrated infrastructure systems include elements from all three areas, and all designs are built using generally available platforms and features to help ensure immediate market relevance and usability.

Applications

We focus on the industry's most common data center applications as well as the more demanding application and technology transition points, such as in-memory databases and big data and analytics. Our goal is to deliver the best performance and quality of experience (QoE) for your enterprise and industry-specific vertical applications and databases.

“Our staff can now provision complete environments in minutes, not months, so we can test new ideas very rapidly. It’s given us a competitive edge.”

Andrew Henderson
CIO, ING Direct Australia

We include:

- Application-specific performance and design
- Heavy-load and destructive testing to help ensure high levels of capability and resiliency
- The capability to run both virtualized and bare-metal systems
- The ability to make strategic use of flash-memory acceleration to enhance application performance

Operations

Operating efficiency and reduced TCO are important focal points of Cisco UCS Integrated Infrastructure solutions. Activities in this area include:

- Aligning the latest system technologies across the full IT technology stack into predesigned building blocks
- Automating deployment and ongoing management processes
- Supporting the optional secure separation of workloads inside building blocks
- Enabling software-as-a-service (SaaS) and multicloud deployment models

Our open and standards-based APIs facilitate easy integration with a multitude of partner platform and management software. This design flexibility helps ensure that the solution continues to address your needs into the future, and supports easy upgrade and maintenance processes.

Ecosystem

Cisco works closely with its partners to design integrated systems that combine the best and newest technologies available. Activities include joint solution engineering across all layers of the stack and joint delivery and support through the multitier distribution channel. These joint solutions effectively provide hundreds of years of combined expertise in each design. Furthermore, we provide the option for single-number support with accountability for trouble ticketing of many Cisco UCS Integrated Infrastructure solutions.

“The biggest strength of the VersaStack is its versatility: it is truly a one-stop shop with everything we need to set us up for a successful future.”

Aaron Coody
Systems administrator,
Scott Equipment

Application-related programs and use cases

We work with partners on a broad range of prevalidated solutions for a variety of environments, applications, and use cases. These solutions are available on almost all systems based on Cisco UCS Integrated Infrastructure.

Enterprise applications and databases

Our enterprise applications and database reference architectures and Cisco Validated Designs include:

- [Oracle database and applications](#): We work directly with Oracle to validate Oracle Linux, Oracle Virtual Machine, Oracle Real Application Clusters, and the Oracle NoSQL Big Data database on Cisco UCS for application-level solutions, including Oracle E-Business Suite, Oracle Peoplesoft, Oracle JD Edwards, Oracle Siebel, and other Oracle enterprise applications.
- [SAP databases and applications](#): We continue to work with SAP to enable Cisco ACI capabilities in SAP landscapes. Our integrated infrastructure also supports SAP HANA, SAP HANA Vora, ASE, and IQ databases, as well as the complete SAP portfolio of business solutions (including Enterprise Resource Planning, Customer Relationship Management, and Supplier Relationship Management), cloud solutions (SuccessFactors), and mobility solutions (Afaría). In addition to supporting a full range of SAP HANA appliances, Cisco works closely with SAP to enable the deployment of SAP HANA on existing network infrastructure within SAP HANA Tailored Datacenter Integration. Cisco also developed a new cloud cell architecture that is used by SAP and service providers to deliver SAP HANA as a service. The cloud cell architecture benefits from Cisco UCS Director as well as Cisco IT Process Automation for SAP, enabling the automated orchestration of multi-SID SAP HANA systems.
- [Microsoft private cloud and applications](#): Cisco UCS Integrated Infrastructure solutions support Microsoft Private Cloud Fast Track and top applications, including Microsoft SQL Server, Exchange, and SharePoint. These solutions benefit from our deep integration between Cisco UCS and the Microsoft System Center management platform, allowing Microsoft System Center to monitor and manage almost every aspect of Cisco UCS Integrated Infrastructure. We also offer a Microsoft PowerShell-based command-line interface, Cisco UCS PowerTool, that you can use to manage your Cisco UCS Integrated Infrastructure. werTool that you can use to manage your Cisco integrated infrastructure.

“This FlexPod implementation lets us move from a standard virtualization play into a true private cloud infrastructure that enables faster allocation of resources to development teams and, in turn, faster rollout of customer-facing services.”

Dave Templeton
CIO, Kelley Blue Book
Company, Inc.

Vertical applications

For [independent software vendors](#) (ISVs), the move to the cloud model is a given. Cisco has a deep focus in the areas of healthcare and service-provider applications and is expanding to other areas based on customer and ISV partner demand. In fact, we run an interoperability verification testing lab tasked with helping ISV partners validate their technologies on Cisco UCS Integrated Infrastructure.

Desktop virtualization

Cisco UCS Integrated Infrastructure makes it easy to deliver virtualized desktops and applications with simplicity, scalability, and a superior user experience. Working with our ecosystem partners, we developed a comprehensive portfolio of reference architectures that offer clear guidance for desktop virtualization deployments. These Cisco Validated Designs focus on on-board, simplified, and scalable architectures as well as converged infrastructure solutions for [desktop virtualization](#).

Operations-related programs and use cases

Secure automated enclaves

CIOs often ask about security when considering cloud deployments. Our [secure enclave designs](#) enable a set of simplified yet highly secure offerings for integrated infrastructure. With these designs, partners and customers can easily build securely separated resource pools on top of existing integrated infrastructure deployments. In addition, Cisco UCS Director brings together all necessary components under a single automation and management framework, enabling single-pane management for all components.

SaaS enablement

SaaS deployments require the underlying infrastructure to deliver a comprehensive set of capabilities, including creation, allocation, and management of scalable resource pools that can be securely separated, and activation and onboarding of the overlay application to be served in each pool. We work with partners to deliver SaaS acceleration solutions, such as the [FlexPod for SAP HANA](#) and [FlashStack for SAP HANA](#) solutions.

Multicloud enablement

Cisco ONE Enterprise Cloud Suite can deploy and manage virtual machines that reside on both on-premises and remote infrastructure. As a result, Cisco UCS Integrated Infrastructure solutions that use Cisco ONE Enterprise Cloud Suite can confidently deploy extensive multicloud capabilities with secure connections and data sovereignty.

For more information

- [Cisco UCS Integrated Infrastructure](#)
- [Cisco UCS](#)

Ecosystem-related programs and benefits

- **Strong storage partnerships:** Cisco supports a robust set of storage [partnerships](#), from engagements with premier partners such as NetApp, Pure Storage, and IBM to emerging and innovative smaller companies that offer various aspects of storage subsystems. We help storage partners effectively integrate their solutions with our computing and networking solutions. One way we do this is by providing resources for interoperability validation through the Cisco Solution Partner Program and the Cisco Interoperability Verification Testing (IVT) Program.
- **ISV partnerships:** We work with ISVs that want to integrate their solutions with systems based on Cisco UCS Integrated Infrastructure. These application-level integration engagements are usually carried out with Cisco, the ISV, and a storage partner. Integration efforts can range from simple interoperability validation to complex multicloud acceleration initiatives.
- **Premier partner delivery:** Cisco has a deep heritage of working with thousands of consulting and reseller partners worldwide for product delivery. In the case of Cisco UCS Integrated Infrastructure, the company has trained many of its partners on the various solution options, including fully integrated designs and reference architecture systems, to provide a wide range of flexibility for end customers.
- **Cisco service and support:** Unified solution-level support is a critical offering for all solutions based on Cisco UCS Integrated Infrastructure. This program enables the Cisco Technical Assistance Center (TAC) and partner support teams to provide single-number support for customers of the joint solution.

Conclusion

Rapidly changing business priorities create challenges for you. As you seek to deploy increasingly complex and distributed IT infrastructure that spans clouds, you can benefit from a new way of deploying your IT systems. Cisco UCS Integrated Infrastructure is the next step in the evolution of the data center. Consisting of prevalidated and tested components from us and our partners, these solutions deliver workload optimization and simplify the design, deployment, and ongoing management of business-critical applications. By evolving the data center with integrated infrastructure, you can deploy and scale applications faster to drive the revenue side of your business while reducing risk and TCO at the same time.