Cisco Unified Data Center

Simplified, Efficient, and Agile Infrastructure for the Data Center

What You Will Learn

The data center is critical to the way that IT generates and delivers value to the business. A variety of business and technology factors are driving changes in the data center, to deliver the new services that users demand. Preparing the data center to be more cost-effective and efficiently support new operating models is essential, but the reality is that IT budgets and resources are fixed, and a majority of resources are consumed by maintenance activities. Cisco's unique approach to creation of a unified data center can help redefine the economics of the data center, so that more resources can be spent delivering value and innovation to the business. This document describes how Cisco® Unified Data Center solutions simplify IT, create operational efficiencies, and enable business agility.

Data Center Challenges

A variety of virtualization, computing, storage, and cloud technologies have entered the market to help increase scalability and flexibility in the data center, but each new technology layer introduced makes the data center more complex and less agile. Today, 70 to 80 percent of all IT expenses are allocated to maintenance - leaving few resources for new projects or technologies that could deliver more innovative and competitive business applications.

Successful IT departments must find opportunities to increase innovation without increasing total overall IT expenses. Most IT professionals today believe that the best way to increase the value of IT is to enable and deliver IT as a service (ITaaS). ITaaS and cloud computing hold great promise, but significant challenges must be overcome in the design of current data centers:

- Technology silos: Historically, infrastructure has been built independently for each business application, resulting in costly redundancies in hardware, software, staff, and processes that fail to achieve economies of scale.
- Inefficient design: By designing data centers to handle peak-level workloads, many costly resources are left underutilized during normal operations.

- Inconsistent IT service delivery: The diverse platforms used to deliver IT services prevent managers from accurately predicting how long new developments will take to implement and the associated costs.
- Incompatible systems: Too often, IT departments spend valuable resources attempting to create compatibility between different data center technologies. These efforts add significant costs and delays to new deployments.

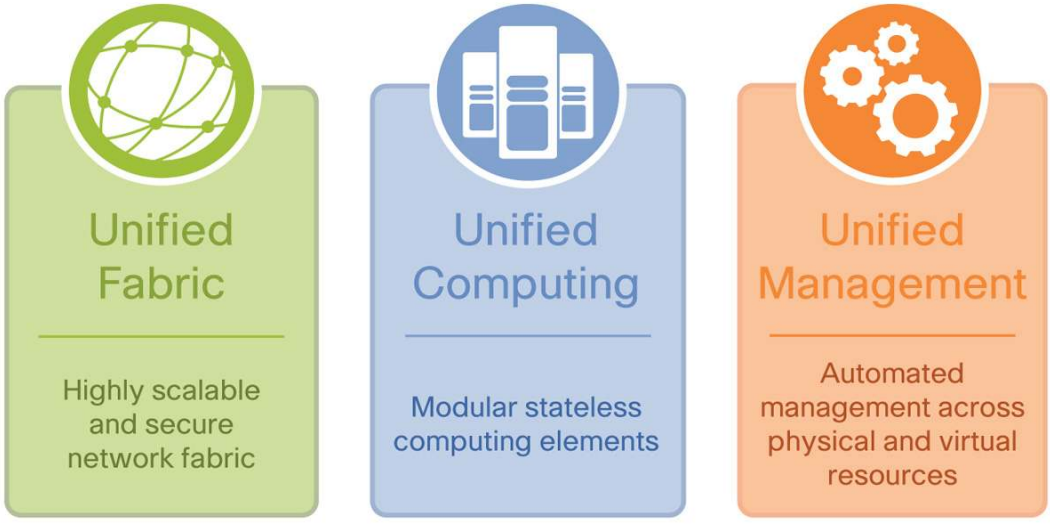
Cisco Unified Data Center Platform

Cisco has a unique approach to data center infrastructure that offers great potential for increased financial efficiency and business agility. The Cisco Unified Data Center is a comprehensive, fabric-based platform that integrates computing, networking, security, virtualization, and management solutions in a single, highly efficient, and simplified architecture. The platform does not just accommodate virtualization; it was designed to build on the advantages of virtualization, increasing the density, performance, mobility, and security of data center resources. The result is a platform that is significantly easier to scale than other solutions, whether you are adding processing power within the data center, expanding geographic coverage by linking multiple data centers, or securely connecting additional users and devices.

This less complex, unified approach also facilitates the introduction of automation, which can dramatically increase data center efficiency, productivity, and agility, including the capability to manage deployment and operations across physical and virtual resources - critical to the delivery of ITaaS. Less complexity means faster time to value, a significant advantage over other data center architectures.

The Cisco Unified Data Center is based on three pillars of Cisco innovation: Cisco Unified Fabric, Unified Computing, and Unified Management (Figure 1).

Figure 1. Cisco Unified Data Center: The Platform for Delivering IT as a Service



Unified Fabric

Cisco's fabric-based approach to data center infrastructure eliminates the tiered silos and inefficiencies of multiple network domains, instead offering a flatter, unified fabric that allows consolidation of LAN, SAN, and network-attached storage (NAS) over one high-performance and fault-tolerant network. Cisco Unified Fabric delivers massive scalability and resiliency to the data center by creating large pools of virtualized network resources that can be easily moved and rapidly reprovisioned. This approach reduces complexity and enables automated deployment of new virtual machines and applications in the future. Deep integration between the architecture of the server and the network enables delivery of secure IT services within the data center, between data centers, or beyond the data center to users from any device. Cisco Unified Fabric delivers network infrastructure and services across all types of workloads and applications, from traditional applications such as those from Oracle, SAP, and Microsoft Exchange, to new virtualized applications using VMware, Microsoft HyperVisor, or Citrix solutions.

Cisco Unified Fabric is based on the Cisco Nexus® family of switches and integrated network services, which provide high-speed connectivity, high-availability, security, and consistent quality of experience for data center applications. Cisco's switching products for LAN, SAN, and converged networks all run on a common operating system, Cisco NX-OS Software, which enables consistency and significantly simplifes operations. Only Cisco Unified Fabric delivers an end-to-end network fabric at half the cost of competitive systems and twice the scalability, making it extremely cost effective.

Unified Computing

The most significant gains in data center efficiency come from the system-level infrastructure of the Cisco Unified Data Center. The innovative Cisco Unified Computing System™ (Cisco UCS™) is the result of true innovation and engineering, not just the integration of existing technologies. Cisco UCS integrates industry-standard x86-architecture servers, access and storage networking, and enterprise-class management into a single system for greater speed, simplicity, and scalability. Cisco UCS eliminates the multiple redundant devices that populate traditional blade servers and add layers of management complexity. When used within the high-bandwidth, low-latency Cisco Unified Fabric framework, Cisco UCS gives IT managers a wire-once platform for providing highly elastic and agile pools of virtualized resources. Cisco Fabric Extender Technology (FEX Technology) directly connects the fabric to servers and virtual machines for increased performance, security, and manageability. Cisco FEX Technology also reduces the number of interfaces, cables, and switches needed to support Cisco blade servers. This consolidation alone cuts the cost of per-server infrastructure in half and reduces energy and cooling requirements.

Cisco UCS is massively scalable to hundreds of blades and thousands of virtual machines, all with a single point of connectivity and management. Every aspect of the system's configuration can be programmed through an intuitive GUI using automated rules and policies and operating across bare-metal, virtualized, and cloud computing environments. Open standards-based APIs offer exceptional flexibility for integration of diverse application, virtualization, storage, and system management solutions. Adopted by data centers in every type of industry and market segment, Cisco UCS has reduced capital expenditures, decreased operating expenses, freed staff from tedious maintenance work, and drastically reduced the time needed to deploy new infrastructure.

Unified Management

Cisco Unified Management is the third component of the Cisco Unified Data Center. It promotes fast, flexible, and cost-effective deployment of infrastructure to support the cloud. Most organizations have dozens of different management solutions, which do not necessarily work all that well together. The inherent complexity of data center infrastructure makes it expensive and difficult to change, making it unsuitable for delivering cloud services.

Cisco offers the industry's only self-service, open platform for centrally managing all data center resources across physical, virtual, and cloud environments. The flexible automation of Cisco Unified Management solutions reduces the time and cost of setting up and provisioning infrastructure. Role- and policy-based provisioning using service profiles and templates simplifies operations. By providing lifecycle management and process automation, Cisco Unified Management solutions deliver greater agility and scalability for the data center while reducing complexity and risk.

Cisco Unified Management solutions include:

- Cisco Network Services Manager: This solution enables dynamic, policy-based provisioning of network services to help ensure fast deployment, reliability, security, and performance for delivery of ITaaS.
- Cisco UCS Manager: This solution offers centralized and embedded management of all computing hardware and software components.
- Cisco Intelligent Automation for Cloud: This solution includes a self-service online portal, service catalog, process orchestration, and lifecycle management for physical and virtual environments. Cisco Intelligent Automation for Cloud is optimized for Cisco UCS and Cisco Nexus infrastructure, but it is designed to work in heterogeneous IT environments, offering sophisticated service management functions such as policy-based governance, service assurance, lifecycle management, and pay-per-use tracking.

Unlike with converged infrastructure systems, with the Cisco Unified Data Center you do not need to replace your existing management tools. Cisco Unified Management solutions are based on an open architecture and can easily integrate with existing management systems and tools.

Journey to the Cloud

Delivery of cloud solutions requires significant changes to IT technology, people, and processes (Table 1). Cisco views this transformation as a journey of multiple stages in which each step increases the readiness to fully support ITaaS and cloud computing. Along the way, IT managers must rethink the way that they deliver services both internally and externally to satisfy users, remain competitive, and provide strategic value to the business. Reliability of the underlying infrastructure is a primary concern, as is end-to-end data management, fast transmission, and secure delivery in a multi-tenant cloud environment. Financial pressures require this IT transformation to be achieved without increasing the overall IT budget. The most daunting challenge is that IT must be ready and willing to tear down and rebuild infrastructure as often as the business environment demands it.

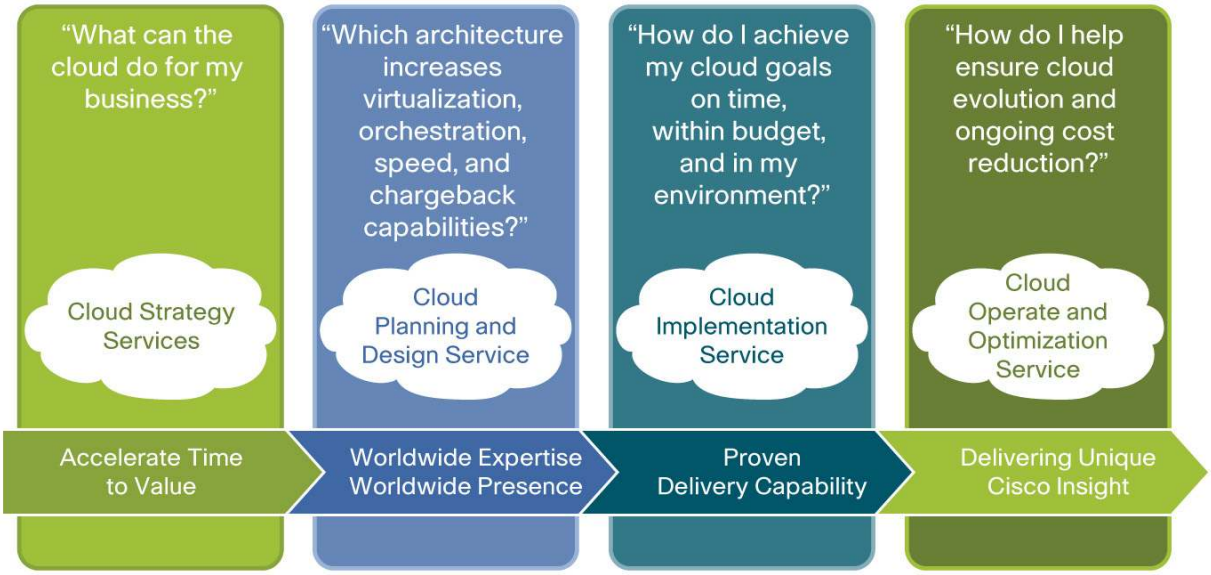
Table 1. Cloud Computing Requirements

• Shared pools of resources • Elastic resource allocation • Low-cost operations • Infrastructure as a service (IaaS) • Automated provisioning and management • Self-service consumption model

Knowing that cloud and ITaaS solutions will ultimately provide your organization with more efficiency and agility, you should not view these stages as completely independent, but as interconnected parts of a longer journey. The technology decisions you make in the consolidation phase can accelerate or impede your success in the virtualization and automation phases. Cisco has worked with enterprises, service providers, and solution partners in every industry and market segment to achieve costs savings and deliver value and innovation to the business.

Cisco provides both a superior infrastructure platform and experienced professional services to guide implementation of a unified data center. Cisco Cloud Enablement Services assist with all the significant challenges and trade-offs of the journey to cloud computing, including the work required to dynamically provision resources, virtualize applications and services, enhance business resiliency, build security into every layer of the infrastructure, and most important, evolve your data center architecture in the future as new opportunities develop. Cisco and its ecosystem of partners address the entire infrastructure lifecycle, offer validated designs and industry best practices, and understand the capabilties and feature sets of all network, computing, and storage devices in the data center (Figure 2).

Figure 2. Cloud Enablement Services Portfolio



To accelerate virtualization and cloud adoption, Cisco has partnered with industry-leading storage vendors such as EMC and NetApp to deliver integrated infrastructure stacks. Cisco, VMware, and EMC have developed a joint venture, the Virtual Computing Environment (VCE) coalition, to deliver Vblock™ Infrastructure Packages, which consist of EMC storage, VMware vSphere, and Cisco Unified Fabric and Computing. Additionally, Cisco is working with NetApp on FlexPod, a validated infrastructure stack that includes NetApp NAS-based storage.

Why Cisco

By unifying the main data center infrastructure components - network fabric, computing systems, and management solutions - the Cisco Unified Data Center provides superior scalability and predictable quality of service (QoS) with a compelling cost structure to enable ITaaS and deliver strategic value to the business.

Cisco Unified Data Center offer these overall benefits:

- Reduces capital expenditures and operating expenses through more efficient design and superior scaling
- Reduces data center complexity and maintenance costs, freeing resources for innovation and accelerating deployment
- Increases agility through automatic provisioning and lifecycle management
- Supports a broad range of ecosystem partners in storage, virtualization, applications, and system management

Unlike the integrated, converged, or smart infrastructure offered by other vendors, the Cisco Unified Data Center has been designed specifically to eliminate redundancies and support automation, giving it a distinct advantage in reducing operating costs and quickly deploying IT services. Cisco is committed to supporting an open ecosystem of partners within the Cisco Unified Data Center, enabling organizations to use existing traditional resources where this makes sense, while also providing the right foundation for delivering ITaaS in private, public, and hybrid cloud environments.

The advantages are significant. Find out more about how the Cisco Unified Data Center has helped organizations in every industry and market segment reduce capital expenditures and operating costs, increase productivity, and accelerate delivery of new infrastructure.

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