Cisco Unified Data Center: The Foundation for Cloud Infrastructure

Providing Agile and Efficient Service Delivery for Sustainable Business Advantage

What You Will Learn

Enterprises are often held back by an inflexible and complex IT infrastructure that cannot keep up with the new application and service demands of an increasingly distributed workforce. These constraints result in slow rollout of critical applications and services, limited resources, poor operation visibility and control, and unpredictable system integration. For many IT groups, cloud computing provides a solution to these challenges.

The Cisco® Unified Data Center platform was designed specifically to overcome the current data center constraints and provide agile, simplified, and efficient IT service delivery and cloud computing. The innovative platform facilitates virtualization, simplification, automation, and accelerated delivery of cloud applications and services to provide a sustainable business advantage. Importantly, the Cisco Unified Data Center provides an open, standards-based data center network architecture and ecosystem that maintains customer choice and increases business value while substantially decreasing the total cost of ownership (TCO).

The Move to Cloud

For chief information officers (CIOs) and IT leaders, the range of cloud computing solutions can be overwhelming. Enterprises have many options for acquiring, building, and consuming IT services. As a central capability of Cisco CloudVerse, the Cisco Unified Data Center provides the fabric-based infrastructure to deliver cloud computing by enabling private cloud services (via internally owned infrastructure), public cloud (services delivered by a cloud provider), and hybrid cloud (a combination of the two), all connected by an intelligent network that delivers performance, security, and availability for the most mission-critical applications.

Cloud computing arose from the need of the largest web service providers to scale to thousands of servers with highly automated management systems. Other web companies with lesser needs immediately adopted these new service offerings due to the pace of business enablement they offered. Eventually, the cost efficiency and IT agility of this approach caught the attention of enterprise CIOs and their IT departments.

Forward-looking CIOs, who in the past may have compared themselves mainly with their peers, now compare their costs with those offering services to the broader cloud market. In many cases, they are finding that their own internal costs are several times greater than those for services provided by cloud service providers. It is this discrepancy that is causing the huge interest by enterprises in private, or on-premises, clouds.

Private clouds are real and are happening today. Many of the operational models developed from running large, web-scale cloud services are being applied within the enterprise. For an IT department, this means moving in the direction of becoming an internal service provider and delivering IT as a service (ITaaS). It also means assessing how resources can be pooled across functional areas to increase efficiency, and potentially restructuring portions of IT to focus on innovative projects for the business.

Challenges

Unlike many public cloud services, which built their infrastructure from the foundation, enterprises face the challenge of maintaining many existing systems, in addition to looking for ways to technologically move IT forward. For many enterprises, the move to a fully automated data center with dynamically allocated resources, self-service provisioning, and service-level chargeback is still a vision for the future. Although IT departments know that 70 to 80 percent of their resources are consumed by maintenance activities, they are constantly looking for new ways to free resources to deliver innovations for the business. This task can be daunting with older technologies and architectures. The Cisco Unified Data Center is uniquely positioned to address these challenges, with networking, computing, storage, and management solutions

A main concern for IT departments is slow responsiveness to business demands. Today, a request to provision an application can take weeks or months. Often infrastructure must be physically provisioned or reprovisioned for each change. Service provisioning is further complicated by the separate infrastructures, decision-making functions, and processes that exist in IT departments. These delays in delivering a requested service can lead to dissatisfaction with internal IT services and cause business units to seek alternative sources for IT services. Forward-looking IT departments are not only trying to respond to business demands more efficiently, but they are also beginning to explore solutions that allow self-service capabilities to extend to segments of the end-user community. This operational model will allow IT to begin to deliver service levels that match or exceed those that public cloud services provide to their users, while also providing them in a secure, controlled environment.

Many IT departments have established cross-functional projects to rapidly virtualize their x86 server platforms and applications, resulting in significant cost savings in power, cooling, and rack space in their data centers. However, virtualization has created new challenges with the need to manage and orchestrate all the virtual machines dynamically moving around the data center and between data centers. Often, IT must redesign the network, security policies, and operation processes to adapt to this new data center model. IT departments are demanding a level of control at the network, security, and policy layers that matches what they had prior to virtualization. They require visibility into the movement of applications between servers and around the data center to enforce compliance, governance, and auditing requirements. At the same time, they are looking for solutions that allow them to use the dynamic new capabilities of virtualization to create more flexible and effective business resilience and disaster recovery models for the business.

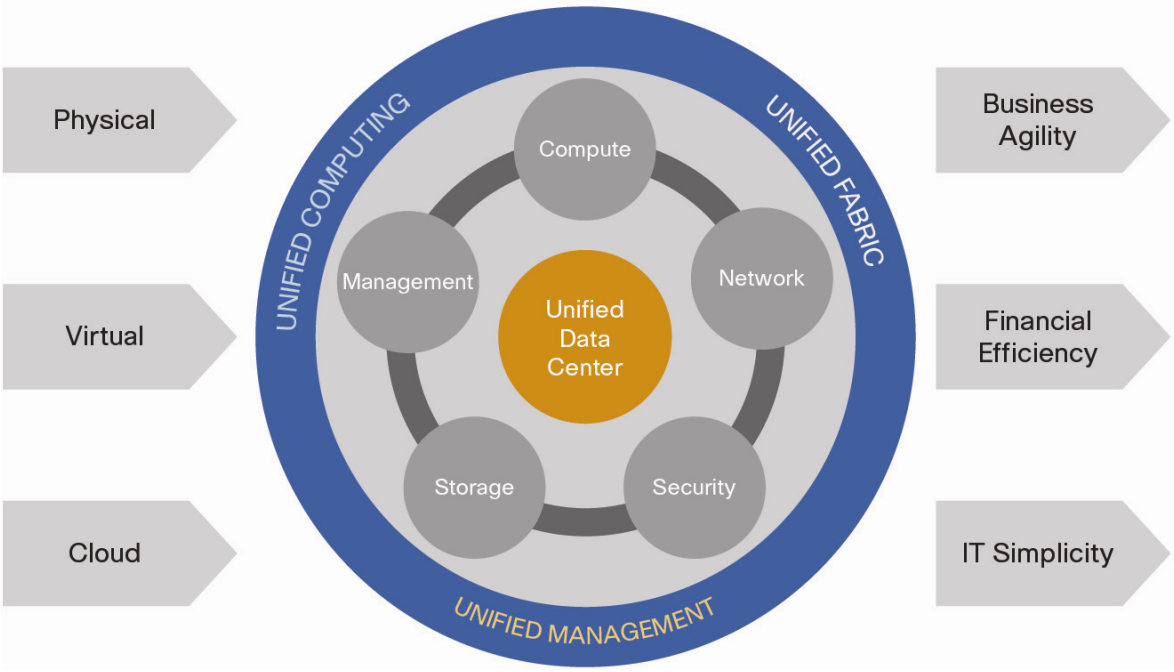
Cost and constrained IT resources are also of great concern in the data center. Most IT departments are faced with stagnant or declining budgets, but are being asked not only to maintain the current environment, but to support critical new initiatives such as revenue growth and regulatory compliance. With 70 to 80 percent of IT resources being consumed by maintenance, not many resources are left for potential new investments. Cloud computing represents a tremendous opportunity to simplify the overall infrastructure - not just by reducing equipment needs, but also by streamlining processes and organizational structure - which translates to more IT budget and resources for new initiatives.

Enterprises also often have a problem with system integration. Whether the barriers are created by technology or by organizational boundaries, difficulties in integrating server, storage, network, and management resources often restrict an enterprise’s capabilities in moving to the cloud. For that reason, a solution must offer ease of deployment while being able to integrate with other best-in-class technologies.

Cisco Unified Data Center for the Cloud

The Cisco Unified Data Center (Figure 1) brings together networking, computing, storage, management, and security resources into a unified platform that provides the core infrastructure for cloud computing. Unlike other solutions, which use layers of management software to stitch together a traditional infrastructure, this platform is designed specifically to enable cloud provisioning from shared pools of infrastructure resources across physical, virtual, and cloud environments. This approach helps integrate cloud services into the overall data center strategy, which is a much simpler and more efficient model for data center operations.

Figure 1. Cisco Unified Data Center Platform



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

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, and beyond the data center to users with any device.

Cisco Unified Fabric is based on the Cisco MDS 9000 Family and 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, enabling consistency and significantly simplifying operations. Only Cisco Unified Fabric delivers an end-to-end network fabric at half the cost of competitive systems and twice the scalability.

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, Cisco UCS gives IT managers a wire-once platform for providing highly elastic and agile pools of virtualized resources.

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 is programmable 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 integrating 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 (CapEx), decreased operating expenses (OpEx), freed staff from tedious maintenance work, and drastically reduced the time needed to deploy new infrastructure.

Unified Management

Cisco Unified Management enables fast, flexible, and cost-effective deployment of infrastructure to support cloud computing. Most organizations have dozens of different solutions with management capabilities that do not necessarily work well together. The inherent complexity makes changing the infrastructure expensive and difficult, 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 Intelligent Automation for Cloud: Automation, orchestration, service-catalog, and self-service user interface for cloud services
- Cisco Network Services Manager: Dynamic, policy-based provisioning of network services to help ensure fast deployment, reliability, security, and performance for delivery of ITaaS
- Cisco UCS Manager: Centralized and embedded management of all computing hardware and software components

Unlike with converged infrastructure systems, you do not need to remove and 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.

The Cisco Unified Data Center platform offers three main benefits to help enterprises move toward private cloud computing and better IT service:

- Business agility: The primary benefit of cloud computing is the capability to deliver services rapidly, in hours or minutes instead of weeks or months. To achieve this goal, the data center requires consistency in infrastructure, management, and operations. The Cisco Unified Data Center provides a standardized platform of networked computing resources and services with programmable APIs that allow integration into any existing management system. When the Cisco Unified Data Center is coupled with Cisco UCS Manager and Cisco Intelligent Automation for Cloud, deployment times can be reduced by up to 90 percent, yielding deployment times of one hour or less.
- IT Simplification: Standardization of architectures and components and multivendor integration simplify deployment and enable a faster response to new requirements and requests. The Cisco Unified Data Center simplifies the data center through consolidation of network and computing resources into a fabric-based infrastructure; a single network operating system from the virtual machine to the network core; and core security, load balancing, and management services.
- Financial Efficiency: A fabric-based infrastructure leads to greater efficiency in the data center infrastructure, including more efficient power, cooling, and cabling and a single point of management and control. This increased efficiency leads to significant (up to 30 percent) savings in CapEx and OpEx while doubling the efficiency of IT staff.

Why Cisco for Your Cloud?

The market is still evolving, but you should remember that cloud computing is ultimately about delivering new business flexibility, agility, and innovation through new uses of technology. Cisco is uniquely positioned to deliver those advantages to enterprises through these features:

- Cost-efficient design: By increasing efficiency and simplicity in the data center, the Cisco Unified Data Center can significantly reduce the overall cost of equipment (through greater density and fewer cables) as well as the staff size required to maintain the overall system. Unified management capabilities simplify the deployment, modification, and scalability of the server platform while facilitating service creation and delivery. This design allows resources to be deployed for innovative projects instead of just maintenance.
- Unified architecture: The Cisco Unified Data Center platform was built from the foundation for virtualization and cloud computing. By completely rethinking the way that infrastructure and applications can be deployed virtually, Cisco is providing innovation to change the way the data center is operated. This innovation extends to unified fabric and unified network services, delivering a secure cloud environment for collaboration, mobility, and video applications and other applications to meet business needs.
- Broad partner ecosystem: The openness of the Cisco Unified Data Center extends to both the standards and the ecosystem. Cisco has taken a leadership role in developing appropriate cloud infrastructure standards for the industry. Cisco also has developed a strong ecosystem of partners that deliver innovative integrated solutions providing customer choice and flexibility. Unlike other solutions, which lock customers into a vertically integrated solution stack or take away control and ownership through outsourcing, the Cisco Unified Data Center allows customers to maintain trust in their data, operation policies, and governance models in place today.

Continuing Your Journey

Deploying an internal cloud is less about changing technology than it is about transforming culture and the way that the IT function is managed. Cisco believes internal private clouds are an interim phase as IT transitions to a world of many clouds: within the data center, between data centers, and beyond the data center to users of many different devices. The Cisco Unified Data Center platform helps IT departments transition from multiple technology silos to a unified platform with the agility, efficiency, and simplicity to help ensure an exceptional user experience for cloud applications and ITaaS.

About Cisco CloudVerse

Cisco CloudVerse is a powerful set of capabilities enabling customers to build public, private, and hybrid clouds and offer new cloud services and applications dynamically and on demand. Cisco CloudVerse uniquely combines the three pillars of the cloud - innovative cloud applications and services, Cisco Unified Data Center, and Cisco Cloud Intelligent Network - into an integrated architecture that helps customers achieve the promise of the world of many clouds. Only Cisco CloudVerse uniquely enables this world of many clouds, connecting people and organizations with an assured cloud experience.

For More Information

For more information, please go to http://www.cisco.com/go/cloud and http://www.cisco.com/go/unifieddatacenter.

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