How Do You Prepare for a Private Cloud?
A Blueprint for a New Architecture

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How Cloud Affects the Network

The rise of cloud architecture changes what is happening on the network:

• **New Infrastructure:** Everything is becoming virtualized, infrastructure is becoming programmwable, and servers and applications now have added mobility

• **New Applications:** Data-intensive analytics, parallel and clustered processing, telemedicine, remote experts, and community cloud services are being introduced

• **New Access:** Mobile device-based access and virtual desktops are expected

• **New Traffic:** Networks now have predominantly server-to-server traffic patterns and location-independent endpoints on both sides of a service or transaction

To support cloud models, networking needs to change:

• Network architecture needs to be flexible instead of being a static stumbling block

• Network services need to be location independent—delivered wherever data, applications, and users are–and whenever the services are needed

• Network resources need to be abstracted so that provisioning can be automated and actions orchestrated through common interfaces

For a growing number of companies, the journey to cloud computing starts with a private cloud implementation. But building and managing a cloud within your data center is not just another infrastructure project. It begins with data center consolidation, rationalization of OS, hardware and software platforms, virtualization, and more. The size of your organization and the degree of virtualization in your IT shop are among the key factors that can help you determine whether your company is ready to build a private cloud.

Understand Basic Definitions

Cloud computing delivers IT as a service through the use of the Internet and technology like virtual machines to share software and hardware.

Private cloud is arranged in a way that services, IT applications, and infrastructure are delivered to the user as a service.

Public cloud is similiar to private cloud, but it's off premises and usually delivered by a service provider. A hybrid cloud combines the two. In the long run, most companies that build a private cloud will also build a hybrid cloud so they can take advantage of the public cloud and its scalability.

Begin with Virtualization

The journey from virtualization to cloud computing happens one step at a time. The first step is server virtualization. But how do you know which servers and applications to virtualize? How many virtual servers should you place on each physical server? And how can you ensure that virtualization helps your business become more efficient and reduce costs? The key to getting all this right is to thoroughly assess your IT environment before you begin.

To ensure that a virtual server deployment will enable you to become more efficient and reduce costs, you need to build the business case for virtualization and map your business objectives to the goals of the project. This includes identifying the kinds of applications you run, their function, and importance to the company. Take the time to note which physical servers are installed, their resource utilization, and which applications and data reside on each server. An assessment involving a detailed review of current applications, analyzing the application landscape across multiple dimensions, and evaluating cloud readiness of each application in scope is essential in order to successfully virtualize your IT environment's physical resources.

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Cloud Models

- **Infrastructure as a Service (IaaS)** provides users with processing, storage, networks, and other computing infrastructure resources. The user does not manage or control the infrastructure, but has control over operating systems, applications, and programming frameworks.

- **Platform as a Service (PaaS)** enables users to deploy applications developed using specified programming languages or frameworks and tools on the cloud infrastructure. The user does not manage or control the underlying infrastructure, but has control over deployed applications.

- **Software as a Service (SaaS)** enables users to access applications running on a cloud infrastructure from various end-user devices (generally through a Web browser). The user does not manage or control the underlying cloud infrastructure or individual application capabilities other than through limited user-specific application settings.

Cloud Deployment Models

- **Private clouds** are operated solely for one organization. They may be managed by the organization itself or by a third party, and they may exist on or off premises.

- **Public clouds** are open to the general public or to a large industry group and are owned and managed by a cloud service provider.

- **Hybrid clouds** combine two or more clouds (private or public) that remain unique entities but are bound together by technology that enables data and application portability.

- **Community clouds** have infrastructure that is shared by several organizations and supports a specific community. They may be managed by the organizations or a third party and may exist on or off premises.

Source: NIST

Set Goals

Identify goals for the virtual server deployment project itself. Phase one of your project could be to virtualize all non-critical servers to determine server consolidation ratios and provide a proof of concept. You could then have longer-term goals, such as:

- Virtualization of all critical servers that place them in high-availability and load-balanced resource pools

- Virtualization of all end-user desktops

- Virtualization of all physical servers that have CPU utilization of less than 50%

You should tie goals to your virtualized resources and the resources' performance before and after virtualization. From the end-user perspective, the applications' performance should be no worse than when the applications ran on a physical server.

Reap the Rewards of Solid Planning

To build an on-premises cloud, you must have standardized and documented procedures for operating, deploying, and maintaining your cloud environment. Ensure that the levels of service quality and costs are clearly defined. With facts in hand, you'll be ready for a future in the cloud and all of the advantages it offers.

- A private cloud leverages existing infrastructure and can easily integrate with your current equipment by utilizing readily available add-ons.

- A private cloud offers the opportunity to achieve agility at a low price.

- Keeping the cloud private enables business units to harvest that knowledge to get better systems and increase end-user satisfaction.

- IT can react more quickly to changing business conditions than an external cloud provider.

- The SLAs are more easily managed.

- Private clouds bypass potential privacy and compliance issues

- You can initiate private clouds incrementally. This enables the IT organization to upgrade without overturning every existing process.

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Adhere to Standards

Finally, private cloud users must work with standards organizations to ensure that their clouds are tracking the important standards when they appear. The reason standards are so important is that users will eventually want to move applications from cloud to cloud, and this is very difficult without standard interfaces.

Where Private Cloud Is Best

Still unsure if a private cloud is best for your organization? These applications and data types should stay close to home and make a good argument for privatization:

• Direct procurement, or workflows that must be conducted across multiple lines of business or departments

• Highly regulated or confidential files such as financial data

• High-maintenance and immature applications

• Complex and cross-linked applications

• Operationally unstable or frequently altered applications

• Older, outdated applications still required to run core processes

Cisco Unified Data Center for the Private Cloud

Cisco Unified Data Center brings together networking, computing, storage, management, and security resources into a unified platform that provides the core infrastructure for cloud computing. 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 private cloud services into the overall data center strategy, which is a much simpler and more efficient model for data center operations.

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

Cisco's Unified Fabric-based approach to data center infrastructure allows consolidation of LAN, SAN, and NAS over one high-performance and fault-tolerant network. It's 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 Unified Computing System (UCS) eliminates 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 highly elastic and agile pools of virtualized resources.

Cisco Unified Management enables fast, flexible, and cost-effective deployment of infrastructure to support private cloud services. It encompasses:

• Cisco Intelligent Automation for Cloud, an automation, orchestration, service-catalog, and self-service user interface

• Cisco Network Services Manager for dynamic, policy-based provisioning of network services

• Cisco UCS Manager for centralized and embedded management of all computing hardware and software components

Whether you're just getting started with virtualization or you are planning a complete end-to-end cloud computing consolidation, the PC Connection family of companies can help. We are a Cisco Gold Partner and can offer you the highest possible level of support available. Call today to learn more about Cisco solutions that offer a practical route to virtualization and cloud computing.

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