

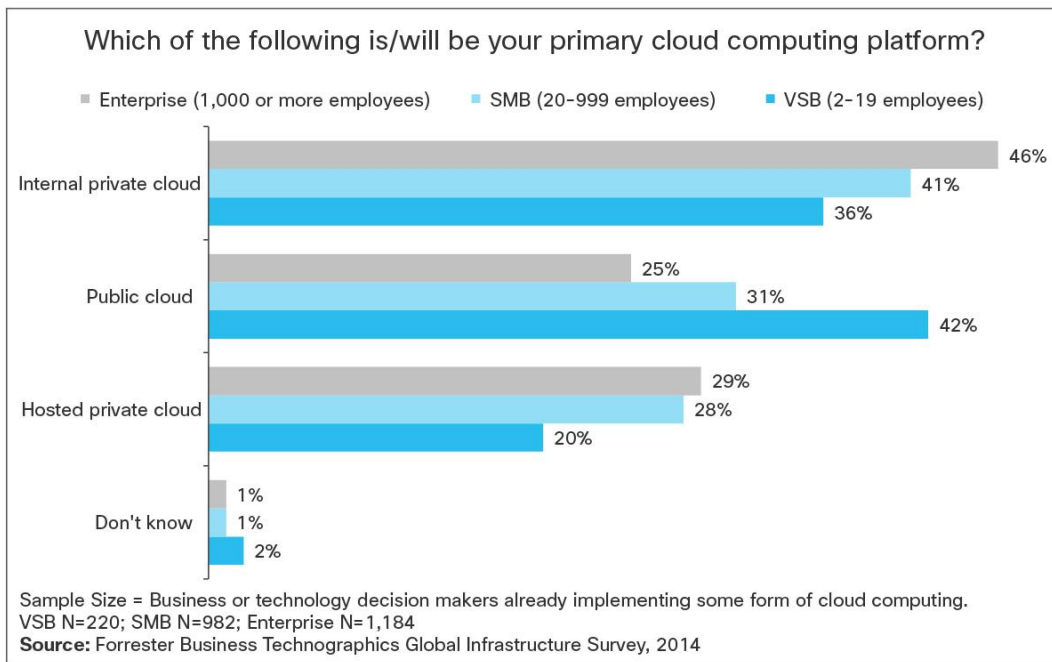
Bringing Together the Essential Elements of Private Cloud

Introduction: The Growing Need for Cloud-Based Services

It's no secret that many types and sizes of businesses are moving to cloud models to support their most critical business applications. Cloud is an attractive alternative for organizations that want to deliver IT services to employees, partners, and customers more quickly, flexibly, and cost effectively.

But every business has distinct and varied priorities, and many cloud options are available. According to a recent Forrester Inc. Survey¹, when considering their “primary cloud platform,” most enterprises and SMBs prefer an internal private cloud - one which they own and manage (Figure 1). Cisco’s primary market research studies and customer feedback continue to reflect similar preferences.

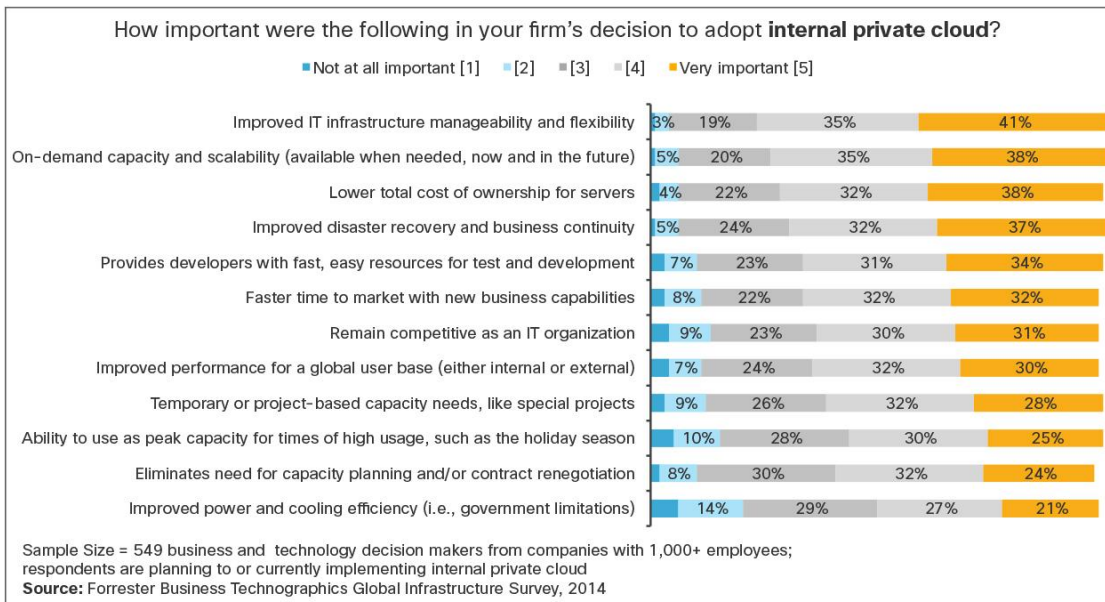
Figure 1. Most Enterprises and SMBs Prefer Internal Private Cloud Solutions



¹ Forrester, Inc. Business Technographics Global Infrastructure Survey, Q3, 2014; participants included 3190 business and technology decision makers located in Australia, Brazil, Canada, China, France, Germany, India, New Zealand, UK, and U.S. from companies of all sizes

Why are so many organizations embracing private cloud as their primary platform? According to Forrester, Inc., SMB and enterprise organizations are adopting private cloud to improve their infrastructure management flexibility and enhance on-demand capacity and scalability (Figure 2). The survey noted that 41 percent of participants considered improved IT infrastructure manageability and flexibility to be very important. Improved disaster recovery and reduced total cost of ownership (TCO) were both considered critical for more than 37 percent of businesses surveyed.

Figure 2. Infrastructure Flexibility and On-Demand Capacity Are Critical for Large Organizations



It's clear that the momentum toward private cloud is powerful. However, every IT organization has a different perception of the key elements that characterize private cloud deployments. For many businesses, deploying a private cloud environment for all their applications is not necessarily the best path. And IT transformation does not always equal ubiquitous adoption of private cloud in your environment. Furthermore, there are many varieties of private cloud deployment models, including internal private clouds, hosted or virtual private clouds, and managed or outsourced private clouds. Each of these deployment options has very different financial, organizational, and technological implications.

To make your cloud migration successful, you need to address some key questions:

- Which applications represent the best fit for an internal private cloud?
- What are the objectives associated with your private cloud deployment?
- Which private cloud consumption models are best suited to meet your needs?
- What are the financial, organizational, and cultural implications?
- What are the advantages of deploying a “hybrid cloud ready” private cloud?
- What is the business value that you can realistically expect to derive from private cloud deployments?
- What IT processes are already automated or prepared for automation in your existing environment?

The Essentials of Private Cloud

Let's take a closer look at what we mean by "private cloud". According to the National Institute of Standards and Technology (NIST)² definitions, the essential elements of any cloud deployment include:

- **On-demand, self-service access to IT services:** Your users should be able to provision IT services as needed and automatically, without interaction with your IT staff. To facilitate this access, your IT organization should provide a self-service catalog of cloud services that are ready to consume. Users can easily provision them based on a predefined set of processes.
- **Resource pooling:** The IT resources that support your organization's cloud services are usually shared by various applications, and support a multitenant model, such as multiple business units. As users and organizations request new applications and services, physical and virtual resources are dynamically assigned according to demand. IT can manage these pooled resources in aggregate for improved efficiency.
- **Rapid elasticity:** Your business stakeholders expect cloud technology to deliver an almost unlimited amount of IT resources. To meet these high expectations, you need to elastically provision and release the physical and virtual resources that your users require. For further agility, these capabilities should automatically scale based on current demand.
- **Measured service:** Measured service is critical for cloud systems. To track the efficiency and performance of your cloud solution, you need automatic control and optimization of how you are using specific services. Usage-based metering gives you deeper insight into the real cost and consumption levels of your IT services and allows chargeback and intracompany cross charges.
- **Broad network access:** The network is the foundation for private cloud solutions. It should deliver all the capabilities discussed above and provide smooth access to the services and applications that users need, on their platform of choice. As organizations become more mobile and dispersed, it's more important than ever to let users work their own way - on smart phones, tablets, PCs, laptops, and other devices.

It's important to remember that private cloud is in essence an IT automation and deployment model. The cloud IT infrastructure is provisioned for exclusive use by a single organization made up of multiple business units. When your employees and other users access services and applications, they aren't thinking about what kind of infrastructure architecture they are using. They're thinking about the applications and services they need to do their jobs better. If they have used public cloud services, they assume that a private cloud experience will be very similar or identical. Ultimately, user expectations define how you think about the role of your IT organization. And these expectations will only continue to escalate.

² <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>

Your Journey to the Private Cloud

As technology continues to advance, it's changing the relationship between IT and the business groups and individuals they support. For example, line-of-business (LoB) managers are becoming more involved in influencing or even driving IT budgetary decisions³. And the availability of easily accessible public cloud services is accelerating this trend.

Public cloud adoption was initially driven by the perception that it would be less expensive than traditional data centers. Many assumed that economies of scale would have continued to drive costs down as the model gained maturity. Cost savings have been, in fact, realized for capital expense avoidance and for commoditized IT services that don't have to be customized to fit a company's unique set of requirements.

The success of public cloud is not just about cost reduction. Organizations are choosing public cloud because they want quick access to IT services to meet their fast-changing business needs. They're focusing progressively more on business agility and capability to support innovation - not necessarily operational efficiency.

As businesses become more comfortable with the model, many are considering bringing cloud capabilities in house to benefit from the combination of public cloud agility and private cloud control. In fact, not all applications are a good fit for public cloud deployments. Organizations often need complete control of their infrastructure environment, including the ability to customize applications, meet SLAs, and help ensure the best possible performance. Additionally, public cloud may introduce security concerns and data privacy issues, and organizations may face compliance requirements such as industry regulations and data sovereignty laws. Therefore, does it make sense for you to transform your entire IT environment into a private cloud?

Deployment of private cloud services should be based on a well-defined strategy and a set of governance principles. To help you decide if private cloud is right for you, here are some considerations to help structure your decision-making process:

- **Your business objectives come first:** Consider what are you trying to accomplish with your private cloud deployment. Do you want to modernize your IT organization? Do you need to accelerate the delivery of IT services? Are you simply trying to increase operational efficiencies and lower TCO?
- **Define your use cases:** Not every IT service requires scalability, self-service access, and fast, elastic availability of the underlying resources. Applying private cloud capabilities across your entire environment may not be the best way to meet your business objectives.
- **Analyze the financial implications:** Accelerated service delivery is one of the top benefits of private cloud deployments. But someone - often your IT organization - needs to absorb the initial costs associated with the provisioning of IT infrastructure ahead of demand. If you build unused capacity too quickly, your overall ROI will suffer, calling into question the efficiency of your private cloud deployment. And IT will need to "market" its new capabilities, something it may not have done before.
- **Understand the cultural and organizational implications:** Due to the underlying fragmentation of data center technologies, many IT organizations have become siloed. This makes resource pooling and elasticity difficult to achieve. To offer private cloud services, you need to automate your environment to support dynamic provisioning of multiple network, storage, and compute elements. These capabilities have organizational, cultural, and technological implications that you must address.

³ http://www.cisco.com/web/about/ac79/docs/re/Impact-of-Cloud-IT_Consumption-Models_Study-Report.pdf

- **Automate judiciously:** Automating IT processes is at the core of any successful cloud deployment. But automation is sometimes complex and not always cost effective or applicable to every IT service. For example, automating the provisioning of highly customized IT services is particularly difficult. And automating the provisioning of tailored services that are not frequently consumed will inevitably yield poor ROI.

Ultimately, private cloud is not a “one size fits all” approach to deliver every IT service, but a journey. Cloud strategy is best developed on a case-by-case basis. For example, instead of focusing on the rollout of bulky, expensive, cloud management platforms, an incremental approach aimed at deploying private clouds can yield better business outcomes. A modular, paced approach to private cloud will also enable your IT organization and skill sets to adapt along the way.

Flexible Consumption Choices

A rich variety of private cloud consumption models are available. Private clouds may be owned, managed, and operated by the organization, a third party, or in combination (Table 1). And they may be deployed on or off premises.

Table 1. A Diverse Array of Private Cloud Models Is Available to Meet Your Specific Needs

Private Cloud Type	Ownership	Management	Location
Internal private cloud	Customer	Customer	On premises
Managed private cloud	Customer	Provider	On premises
Private Cloud as a Service	Provider	Provider	On premises
Hosted or virtual private cloud	Provider	Provider	Provider site or co-location

While these multiple options may seem to complicate your decision making process, they actually provide greater flexibility, allowing you to choose the solution that aligns best with your specific business objectives and use cases.

For example, some regulated industries like healthcare, government, and financial services are reluctant to consume public cloud services. They must comply with very specific industry and government regulations, and public cloud carries real or perceived concerns about privacy and security. Our experience at Cisco shows that adoption of public cloud services in these sectors is lagging the broader market.

These types of organizations may choose private cloud as a service, where a cloud provider manages the organization’s private cloud environment for a complete, turnkey solution. Under this model, sensitive data continues to reside in the organization’s data center. The organization gains all the agility and efficiency benefits of cloud, while maintaining its security and data sovereignty requirements.

Private cloud as a service can also provide additional financial flexibility. The provider owns the equipment, reducing CapEx, without limiting the ability to accelerate the delivery of IT services.

Hosted and virtual private cloud solutions are also becoming popular options. These models are well suited to support infrastructure-as-a-service (IaaS) testing and development use cases. With hosted and virtual private cloud solutions, standardized IT services can be efficiently deployed in the public cloud. For IaaS, this single-tenant approach is inherently more secure compared to the multitenant public cloud services that most public cloud providers offer.

With the right combination of public and private cloud solutions, you can take full advantage of the strengths of both models, and apply a complete solution that’s aligned with your business priorities.

Creating a Hybrid-Ready Private Cloud

Can you ignore public cloud when designing your private cloud deployment? The answer is no. But by applying what we've learned from numerous customer engagements, we know that successful private and public cloud solutions can integrate smoothly, and complement one another.

In fact, it's hard to imagine how any public cloud service would not require some level of integration with existing IT resources residing on premises. Conversely, an organization with a private cloud may need to temporarily "burst" into the public cloud for short-term capacity expansion. By doing so, the organization would be able to combine the control, security, and data locality of private cloud deployments with the speed, scalability, and economics that public cloud can offer.

At Cisco, we encourage customers to design their private cloud deployments with the option of being able to transparently extend their applications into the public cloud. Management and integration of traditional data center services with private and public clouds is key to designing your hybrid cloud environment. Even if you don't plan to deploy hybrid clouds initially, designing your private cloud with "hybrid readiness" in mind will not delay your deployments when they are needed. And it can help you avoid unexpected IT expenses and deployment risks.

Driving Positive Business Outcomes

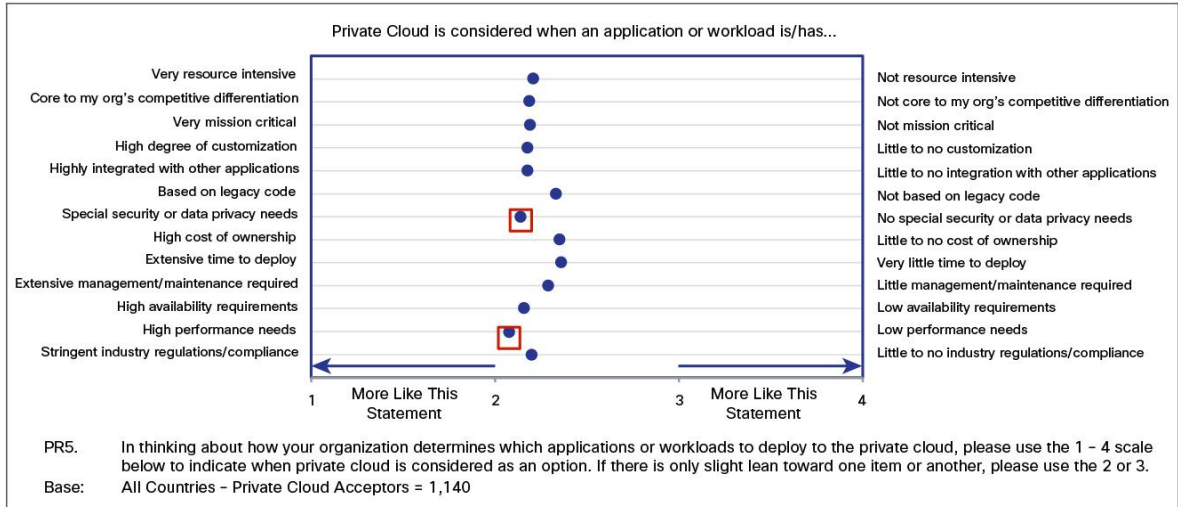
The business value of a private cloud deployment is clear. But to tap the full potential of private cloud, the first step is to explicitly define your cloud strategy. Research findings show that private cloud is an excellent solution for applications with high-performance requirements, as well as those applications that require extremely robust security and data privacy⁴ (Figure 3). Organizations with high-availability requirements should also strongly consider private cloud, as should those that face stringent industry regulations.

With the right cloud solution, you can quickly set the stage for substantial business benefits. Private cloud can enable you to:

- **Meet key business objectives:** A private cloud solution can enable you to increase business agility, lower your total cost of ownership, and gain IT efficiencies. You can also improve disaster recovery and enhance business continuity plans to help ensure that critical business operations remain available.
- **Optimize applications and meet data requirements:** Private cloud provides powerful support for mission-critical, existing, and commodity applications, as well as for testing and development. You can enjoy the agility and flexibility of cloud, while still meeting performance requirements and SLAs. And you won't compromise essential enterprise requirements like data protection, data sovereignty, and other security concerns.
- **Maintain financial control:** The right mix of cloud lets you allocate ownership of IT assets in a way that makes the most sense for your business. You can reduce CapEx with hosted or as-a-service private cloud models. You can also gain the flexibility to outsource management to a provider to reduce OpEx.

⁴ Cisco cloud study conducted with 1380 IT decision makers in midmarket and enterprise organizations in June 2014

Figure 3. Decision Tree for Applications Going to Private Cloud - Cisco Study



How Cisco Can Help

Cisco offers a comprehensive set of market-leading technologies and services for faster IT and cloud innovation. Using our experience working with many customers worldwide, we can help you build and manage your private cloud deployment. Our solutions combine our extensive experience, knowledge, and best practices with our constantly expanding portfolio of cloud offerings (Figure 4).

An Industry-Leading Infrastructure

Cisco has been rated by Synergy Research Group as the leader of the cloud infrastructure equipment market for the past several quarters⁵. This market includes private, hybrid, and public cloud segments. We are second in market share in the global x86 blade server market, and first in the Americas⁶.

Private cloud solutions deployed on Cisco UCS[®] Integrated Infrastructure can help you simplify your IT environment, increase operational efficiencies and consistency, and automate IT tasks to reduce risk. Our private cloud solutions are delivered in conjunction with a variety of infrastructure and application partners to provide the broadest levels of choice. They include VMware, Microsoft, and OpenStack implementations.

Together with solutions and services from our partners, Cisco's private cloud offerings enhance our market-leading Cisco UCS Integrated Infrastructure. They provide an integrated approach for delivering hardware, software, and services focused on cloud in both physical and virtual environments. And with Cisco[®] Application Centric Infrastructure (ACI) integration, we enable application behavior and requirements to drive the automatic deployment of network resources. The result is improved application performance and security.

⁵ [Synergy Research Group Q3 2014](#)

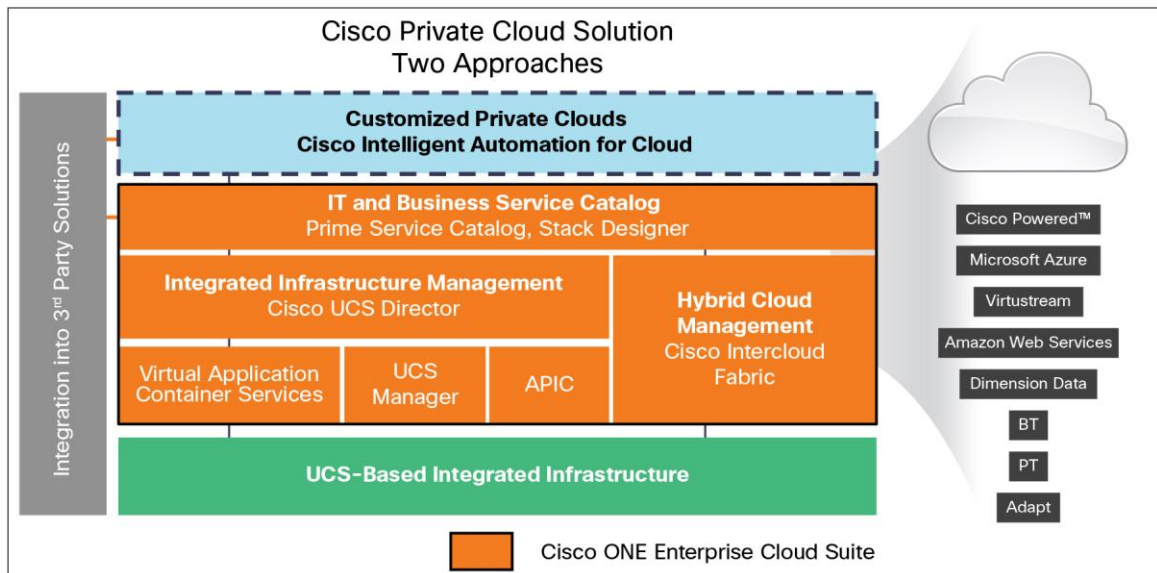
⁶ [IDC Worldwide Quarterly Server Tracker, Q3 2014](#)

Cisco's cloud solutions are designed to let you extend your private cloud security and networking policies into the public cloud, helping you reduce the burden and pitfalls associated with migrating workloads from your private cloud to the public cloud environment. If you're considering a hybrid cloud solution, Cisco Intercloud Fabric helps ensure that your private cloud solutions are hybrid-cloud ready. You can transparently extend your private cloud environment into the public cloud, while maintaining consistency with your network and security policies.

Advanced Cloud Management

As we've discussed, not every organization is ready to fully embrace private cloud. To help you in your cloud journey, we offer the Cisco ONE Enterprise Cloud Suite: an engineered solution that manages and automates the lifecycle of infrastructure, clouds, and applications. It accelerates the adoption of automation and cloud-based service delivery through a continuum of building blocks that span bare-metal to hybrid-cloud management. With the Cisco ONE Enterprise Cloud Suite, you can integrate automation into your organization at a pace that's comfortable to you. This modular approach offered by Cisco ONE Enterprise Cloud Suite can ease an organization's nontechnical barriers to automation and cloud-based service delivery, helping to accelerate adoption.

Figure 4. Cisco Private Cloud Solution Framework



Cisco UCS Director provides device-level management for unified pools of infrastructure. With unified infrastructure provisioning and administration, you can manage IaaS much more efficiently and effectively. IT services and automation defined within Cisco UCS Director can be directly used by enterprise IT to speed delivery, and are available to end users through a self-service portal.

Cisco Prime™ Service Catalog is another important component of our cloud management portfolio. This solution provides a flexible customer portal to give your users self-service access to IT services and IT-defined automation. It consumes IT services defined within Cisco UCS Director and provides its own unique graphical interface to define which IT services are available to users.

Cisco Intelligent Automation for Cloud (IAC) is a complete and customizable cloud management platform that delivers a wide range of services, from underlying infrastructure to “anything as a service” (XaaS). With Cisco IAC, you can transform the way you evaluate, procure, and deploy your IT and business services

If you need to extend the capabilities of your cloud management, Cisco cloud accelerators can snap directly into Cisco IAC to support more advanced use cases. You can add new features and functionality to your multicloud environment quickly, rather than waiting for long product release cycles.

Both Cisco ONE Enterprise Cloud Suite and Cisco IAC were designed to support heterogeneous data centers across physical, virtual, and bare-metal environments.

Private Cloud Consumption Choices and Cisco Cloud Consulting Services

To help ensure that you're getting the most value from your cloud deployment, Cisco offers a rich variety of service offerings. Cisco OpenStack® Private Cloud deploys and operates private clouds for global organizations with an OpenStack-as-a-service model. Built for hybrid architectures, it eases your migration to the cloud, providing choice, flexibility, and data governance. Cisco OpenStack Private Cloud supports the engineering and operation of your private cloud, letting you offer an open private cloud for users to focus on building and operating applications.

Cisco On-Demand Private Cloud provides an on-premises private cloud deployment that you can consume as a service. Its cloud services catalog gives you flexible self-service capability to consume IaaS and virtual desktop services. With Cisco On-Demand Private Cloud, you get all the benefits of a public cloud experience behind your own firewall, and pay only for the capacity and functionality that you consume. This preintegrated solution is an easy to deploy, manage, and consume private cloud. Both VMware vSphere and OpenStack versions are supported.

If you're seeking guidance in transitioning to the cloud, Cisco Domain Ten® is a helpful resource. This unique reference framework is based on Cisco's experience guiding clients through an extensive variety of IT initiatives to help drive tailored business outcomes.

Conclusion

If you're considering a private cloud deployment, you have more choices than ever before. And you can deploy your solution with confidence, without compromising business or IT priorities. But to make the most of cloud, a comprehensive and incremental strategy is key. It starts with a close look at your business processes and evaluation of whether a public, private, or hybrid environment will offer the best support. Also, you need to consider if you may need to extend your private cloud services and applications to the public cloud. And you must identify the enterprise and security policies you will need to maintain across a hybrid cloud environment.

With the right strategy, and with Cisco's expertise and proven solutions, you can deploy a cloud solution that brings together the advantages of private and public cloud platforms. Your cloud solution will set the stage for the business growth, fast innovation, and fast IT that you need to succeed in a competitive world.

For More Information

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Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
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Europe Headquarters
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