Create a More Virtualized, More Secure, More Open Private Cloud With Hitachi Data Systems

Making your data center more service-driven and ready for the private cloud is a process. Regardless of where you are on the path to data center modernization, Hitachi Data Systems can provide the platforms, software and assistance to get the job done right. The rich HDS portfolio of storage, converged solution and self-service offerings delivers a full range of the capabilities to create a services-driven private cloud for your stakeholders. With Hitachi Data Systems, your private cloud can be more virtualized, secure and open, and can help you save more money.

Overview

“The cloud” has gotten a great deal of attention in recent years. IT organizations have continued to wrestle with increasing demands to more effectively support the business while working within their budgets. If implemented correctly, cloud-based solutions can help meet these challenges.

As competitive pressures intensify, stakeholders are asking for IT to provide the resources and services to get their jobs done. In response, IT must create an environment in which applications and infrastructural components are available on demand, regardless of the loads imposed on the resources under IT’s control. To accomplish this on-demand environment, IT must transform the infrastructure of its data centers. IT must enable the predictable, automated delivery of services by decoupling these services from the underlying storage and compute platforms.

The abstraction of services from underlying infrastructure platforms is at the heart of the modernized, transformed data center. The path to get there is defined by a series of steps that involve the consolidation of resources into a smaller, more efficient data center footprint. Virtualization technologies are used to create pools of compute and storage resources that can be made available on demand. And the automation of IT management and provisioning processes makes IT administrative tasks easier.
Ideally, virtualization and automation are applied to a converged infrastructure, one that brings together storage, network and compute resources into a combined, integrated resource pool. This approach further enhances management efficiency and agility, and optimizes resources. Adding self-service capabilities completes what is required to build a true private cloud.

Many organizations use the platforms and technologies that make up HDS private cloud capabilities to build private cloud. Service providers can also use them to build public clouds that can then provide services to their end-user customers.

**Why the Private Cloud?**

There is no lack of interest in cloud-based solutions to address many of the challenges facing IT today. Forecasts for the cloud, whether for the purchase of public cloud services or for infrastructure to build a private cloud, vary. They differ, depending on a number of factors and whether hardware, software or services are involved. However, annual growth rates of 18% to 20% are typical, which is impressive for IT markets.

While interest in cloud is high, the decisions as to how and when to move to the cloud, and in what form, are still being made in many organizations. As with any decision involving IT architectures and approaches, the cloud requires an in-depth understanding of stakeholder needs, existing IT assets and how those assets are being used. The business must also have the ability and willingness to embrace and support the transformations involved.

Some of the most serious considerations organizations face in implementing a cloud involve security and control. Traditional data centers have their limitations, but since they reside within the company, IT can exercise strict control over them. Moving to the cloud can mean giving up some or all of this control. Such a move introduces security concerns, real and perceived, that can slow down cloud deployments or even stop them completely. These concerns are especially evident in cases where data is sensitive and workloads are critical.

Organizations have a choice of cloud options: hosted, private and hybrid. An outside vendor owns and hosts the hosted clouds, while private clouds reside within the company and are under its full control. Hybrid clouds combine hosted and private clouds: Well-chosen applications and data are deployed to 1 or more public clouds, while sensitive data and mission-critical applications are relegated to their private cloud. There is full integration between the 2 environments.

While public cloud providers claim to provide highly secure multi-tenant environments, security concerns have moved many organizations to begin with a private cloud. For some companies that have done so, their experience and success have given them the confidence and know-how to consider deploying some workloads to a public cloud.

Likewise, meeting the stakeholder demands noted earlier means modernizing the data center, which involves steps that are necessary to take full advantage of private cloud benefits. A full private cloud is a logical extension of the work already being done to make IT “service-driven.”

**Private Cloud Drivers and Challenges**

Competitive pressures have been pushing organizations to improve IT’s capability to support the activities of internal stakeholders that deliver the highest returns to the business.

For instance, line-of-business managers must access the business applications and data they need on demand. Developers require the ability to provision resources to create, qualify and test new business-strategic applications in a timely manner. To support the varied but stringent requirements of these and other end users, IT’s emphasis must move away from maintaining applications tied to siloed infrastructures to a more services-oriented model.

The goal of transformation is to create a services-driven infrastructure that enables stakeholders to get the resources they need on demand. This goal typically means that IT commits to specific levels of services, especially when chargeback mechanisms are enabled. Delivering services based on committed service levels means that stakeholders reduce the time to market for their work, which benefits an organization’s bottom line. Reducing time to market with traditional architectures can be difficult and inefficient, since they lack the ability to leverage available resources in an agile way.

**More Efficient Asset Utilization.**

Significant savings can be achieved by consolidating resources, which results in those resources being used more efficiently and, ultimately, reducing unnecessary purchases. Doing so requires skills, technologies and, in some cases, new organizational structure or alignment.

- **Minimizing Disruption.** If proper planning hasn’t taken place, transformation can cause significant disruption to operations as new technologies and platforms are brought online. New processes and skills must be developed and learned. The new, modernized infrastructure must therefore be created and deployed quickly, with existing assets leveraged as much as possible to minimize downtime and any possibility of lost business.

- **Managing Application Complexity.** Often, applications are numerous, built using differing technologies, and span a wide range of workload requirements. Some are virtualized, while others are not. Gaining a thorough understanding of what applications exist and what is being used today, and the storage, runtime and integration requirements for each is critical. Once those applications are migrated to a newly transformed data center architecture, the results can yield significant benefits: Organizations see greater agility, faster time to value, and more optimal resource usage.

- **Automating Operation.** Transforming to a flexibility-on-demand architecture can require new tools and capabilities as well as organizational and operational process refinement. Automating the processes of provisioning, deprovisioning and managing resources overall is critical to achieving the efficiency, speed, performance and cost benefits of a transformed data center. Doing so effectively can make IT more productive by freeing up resources for more strategic tasks that benefit the business.

- **Delivering to Service Level Agreements (SLAs).** The goal of transformation is to create a services-driven infrastructure that enables stakeholders to get the resources they need on demand. This goal typically means that IT commits to specific levels of services, especially when chargeback mechanisms are enabled. Delivering services based on committed service levels means that stakeholders reduce the time to market for their work, which benefits an organization’s bottom line. Reducing time to market with traditional architectures can be difficult and inefficient, since they lack the ability to leverage available resources in an agile way.
The reasons for taking the steps to modernize data centers are clearly strong. While addressing them can be challenging, if the right approach is taken, they can easily be addressed.

The Steps to the Private Cloud

Whether a full private cloud implementation is your goal, or you want to transform and modernize all or parts of your data center infrastructure, your success depends on the approach you take. Using an organized, multistep process that starts with building a cost-effective, efficient foundation can help you fully leverage the benefits of modernization and a services-driven environment.

Our methodology to transform traditional IT to a private cloud involves 4 major steps that build on each other (see Figure 1). The goal is to create a fully integrated and efficiently managed pool of IT services capable of providing stakeholders with the resources and service levels they require:

- **Consolidate.** The 1st step involves reducing your IT footprint to lower overall costs by reducing capital expenditure (capex), lowering space and utility costs, and lessening the administrative resources required. The goal is to architect 1 infrastructure platform for all data and workloads, which increases efficiency by minimizing costs and maximizing utility. For some, this consolidation involves only storage platforms, for others, compute resources, and in some cases, it takes the form of a “converged” infrastructure of all resources. In all cases, the resulting consolidated infrastructure is more efficient and cost-effective. If the consolidation activity is able to leverage your existing resources without any significant “rip and replace,” these benefits will be particularly evident.

- **Virtualize.** The 2nd step allows you to extract greater value and to become more efficient. You can create a single virtual pool of all resources, including file, block and object storage, servers and applications, with the ability to manage across all of these resources. Resources in this pool can then be dynamically provisioned on demand (see Figure 2). The resulting flexibility can mean more optimized usage because resources are no longer tied to legacy application or platform “silos” that remain unused when they can be leveraged somewhere else.
Ideally, this virtualization can be applied to single, converged infrastructure where both storage and compute resources work together to get tasks done. Then, processes must be revised to take advantage of the new virtualization capabilities. The IT staff must be trained and business stakeholders must be made aware of the new processes.

- **Automate.** The 3rd step is to automate your IT management and administrative processes to enhance your ability to meet committed service levels while making IT and stakeholders more productive. When applied to an infrastructure composed of integrated pools of compute and storage resources, and a complex mix of applications, automation can ease managing and provisioning tasks. Automation can deliver services with greater speed and reliability. As the new processes have been streamlined, automating them creates a highly efficient IT organization. With this type of approach, policies can be effectively enforced, and risks associated with tasks prone to human error can be reduced.

- **Self-Service.** Step 4, adding self-service capabilities, completes your path to the private cloud. These capabilities are provided via a portal or other user access framework. They enable end users to select the services they need and choose the service level required based on their roles. Provisioning and delivery of resources can then be automated to execute upon those service requests. A complete self-service implementation includes chargeback and/or showback functionality as part of an overall business and operational framework. This functionality allows IT to both measure where resources are being used, and, if the organization wants it, internally charge users based on their usage. The result is more accountability and better alignment of resources with business activities. The approach brings the greatest return on investment (ROI) and a faster “time to market” for the work stakeholders do (see Figure 3).

If this transformation is implemented using best practices, it not only maximizes private cloud benefits, but also paves the way toward leveraging public and hybrid cloud delivery models, where appropriate.

Some organizations have begun their path to the private cloud, while others have not. Regardless of where you are, it is important to recognize that you can enter the process at any point and take it as far as makes sense for you. If you have already built a private cloud, the process is iterative, focused on continuous improvement throughout 4 steps.

**Hitachi Platforms and Enabling Technologies for the Private Cloud**

Hitachi Data Systems provides organizations with the products and technologies they need for the private cloud (see Table 1). These storage, compute and management technologies compose the foundation for the modernized infrastructures required to support the service-based delivery that makes a private cloud attractive.

The newest version of the Hitachi unified management product, Hitachi Command Suite v8, supports Continuous Cloud Infrastructure, with centralized, integrated management of all storage and server resources. Configuration, performance, replication and other key functions can be managed more efficiently under a common management framework.

Hitachi Unified Storage and Hitachi NAS Platform represent the most powerful consolidation platforms on the market, enabling organizations to consolidate existing file servers and NAS devices onto fewer nodes. This capability allows them to perform the same or even more work with fewer devices and lower overhead. At the same time, it reduces floor space requirements and associated power and cooling costs.

Hitachi Unified Compute Platform (UCP) is a family of converged infrastructure solutions that brings together storage,
server, networking, hypervisor and software management in fully integrated packages. These pretested, cloud-ready infrastructure solutions can be deployed quickly and, because they bring various resources into a converged platform, management is greatly simplified. In fact, Hitachi Unified Compute Platform Director software allows administrators to pool, aggregate, manage, provision and monitor all physical and virtual infrastructure from within VMware vCenter. This capability makes it easier to implement optimized best-in-industry solutions as part of a cloud-ready converged stack.

While many organizations leverage their private clouds to deliver infrastructure services, others must deliver content-based services to users who are geographically dispersed, mobile, or both. Hitachi Content Platform (HCP) is at the core of our private cloud solutions. HCP is intended to address the accelerated proliferation of unstructured data, such as documents, records, audio, video, images, mobile, collaboration and machine-generated data. An object storage solution, HCP enables the storage, sharing, synchronizing and protection of unstructured data using a single system. HCP provides high density and high efficiency. Its ability to automate data protection and other IT operations makes it an ideal object storage platform for the cloud.

When combined with Hitachi Data Ingestor, HCP serves as both a private cloud-based object storage solution and an on-ramp to the private cloud for remote and branch offices.

Introducing Hitachi Content Platform Anywhere to the solution adds secure file sync and share capabilities. These abilities enable a mobile workforce to collaborate easier and faster, and support a “bring your own device” (BYOD) policy for employees, all from a safe, secure private cloud environment. HCP Anywhere allows organizations to provide the productivity tools their end users need, but still maintain control of data governance and protection practices. It also helps organizations to avoid data loss or leakage.

Hitachi cloud services management portal provides self-service capabilities for private cloud implementation. The portal enables self-service via a service catalog, automated provisioning, chargeback, subscription management, billing and other capabilities required to support private clouds. Today, the portal supports Hitachi UCP for VMware vSphere and UCP Select for VMware vSphere with Cisco UCS. vCenter and vSphere are required for any UCP implementation; vCloud Director is optional.

HDS and the Private Cloud: More Virtualized, More Secure and More Open

We know that organizations have many choices when implementing private clouds. With HDS, administrators can take advantage of our tested, cloud-ready platforms that enable more complete virtualization of the environment, better data security, and a more open environment.

Virtualization of all assets must begin with storage, which is also the most difficult to virtualize because data tends to be in motion. HDS provides the capabilities you require to virtualize block, file and object storage into a single resource pool that is abstracted from applications and is location-independent (see Figure 4). This consolidation facilitates true data mobility and dynamic scale, and is therefore the true foundation for the self-service cloud.
But virtualization goes beyond just data. Virtualizing the infrastructure means creating a single platform for all resources so that resources can be more efficiently leveraged on demand. In practice, virtualization means that infrastructure silos, where applications, virtual machines and other assets are hardwired to specific storage and server platforms, are combined and deployed across available resources. At the same time, they maintain their isolation from one another to retain performance and security.

The virtualized environment must also be managed. This task must cover not only the assets that make up the virtualized infrastructure and data layers, but also any frameworks that become part of the environment.

Comprehensive virtualization is made possible in great part through the abstraction of services from underlying assets. This “software-defined” approach is an important part of how HDS makes the private cloud more virtualized.

Despite a decision to implement a private cloud (as opposed to a public cloud) for control and security reasons, robust security must still be enforced. Even a private cloud introduces the opportunity for greater access to data and content by stakeholders, regardless of where they are located and on a wider range of access devices. HDS provides security capabilities that include:

- Universal encryption for both data at rest and “in flight.”
- Write protection to make data tamperproof.
- Unauthorized access protection through secure multitenancy and role-based access to data.
- Data loss and leaks focused on BYOD devices (including remote deregistration or wipe).

All of these measures must also be enforced with governance capabilities for access control, compliance, data retention and activity logging. The security capabilities within HDS solutions answer all of these challenges.

Private clouds give IT more control over security and governance. However, many organizations want to be able to leverage more assets and interoperate with various infrastructure components, applications and devices. Their goals are to create a best-in-industry private cloud while avoiding vendor lock-in.

A truly comprehensive approach to openness is at the core of HDS cloud enablement, and it includes:

- **Frameworks and Portals.** We provide the ability to integrate with a wide range of options. We offer choices, including our own portal, through APIs that we provide, integration with an organization’s own portals, or through portals that 3rd parties offer. Our Unified Compute Platform is a good example as well, with its integration with VMware and Microsoft® Hyper-V®, and our sponsorship and support of OpenStack. We give you flexibility for the long term: You can work with emerging technologies and frameworks as they become available and avoid locking yourself into a single vendor or framework.

- **Access Methods and Protocols.** In addition to supporting standard storage protocols and access methods, some of our platforms support the RESTful API and the Amazon S3 interface. You can take advantage of standards-based access to frameworks and portals. And, our private cloud can be a storage target for data that S3 applications generate or can write data to S3.

- **Infrastructure.** HDS offers support for 3rd-party compute, networking and storage and a wide variety of media. We support the ability to search, identify, access and use data regardless of its physical location.

- **Management Software.** Integrating all the frameworks, devices, other infrastructure components, and other assets creates a new level of excellence in terms of managing the overall environment.

HDS allows you to manage across the entire solution stack and across multiple frameworks. We provide a full set of APIs that enable organizations and 3rd parties to integrate other management frameworks into the environment as well.

The HDS approach allows organizations to transform their architectures from traditional, more closed and siloed ones found in many data centers to more open cloud architectures.

Openness is demonstrated through the variety of ways you can deploy and manage your private cloud with HDS. Several options are available to accommodate various ownership, financial and management models, allowing you to make the choice that is right for you (see Figure 5).

**We Help You Build Your Private Cloud**

When you are ready for transformation, Hitachi Data Systems can provide the services capabilities that help ensure your success. The Hitachi Services Framework is a methodology that applies proven best practices and tools to address both technological and organizational considerations in moving to the cloud (see Figure 6). The services include:

- **Consulting services** that help you drive your cloud transformation by assessing the cloud readiness of your organization, processes and technologies. These services also help you develop your transformation plan, your service catalog,
overall cloud architecture, and the business justification for moving to the cloud.

- **Transition services** that assist in securely deploying your cloud infrastructure, converged solutions and portal. HDS also provides migration services to move data across private, hosted and hybrid cloud environments.

- **Managed services** that accelerate your transformation to services-based consumption, based on SLAs.

Furthermore, we have mapped out a range of services to help at each step of our methodology and corresponding transformation process:

- **Consolidate.** HDS can help with driving the consolidation by identifying the cost and benefit of the new architecture, designing the architecture, and implementing the new consolidated architecture. We minimize disruption to your business while migrating and transitioning you to your newly consolidated architecture.

- **Virtualize.** We assess your existing infrastructure and architect the new virtualized environment to enable pooling of resources. We minimize any impact to business operations by conducting physical-to-virtual and virtual-to-virtual migrations.

- **Automate.** We work with you to define the service catalog and develop Information Technology Infrastructure Library (ITIL)-based processes for service level management. Then, we enable the process through deployment of the automation. Also, if more information is needed on what type of content you have across your organization and definition of policies for automation, we provide data classification services.

- **Self-Service.** Finally, with all of the previous tools and process in place, we can implement your self-service portal to align to your business requirements.

Leveraging HDS services not only gets you to the private cloud faster, but also lets you focus more resources on strategic activities that bring value to your business.

**We Help You Manage Your Private Cloud**

We offer options for organizations that would like their data and the cloud infrastructure it resides on to remain in-house. We support their interest in a cloud consumption model and/or freeing their staff from the day-to-day management tasks. These options include:

- **Customer-Owned Infrastructure**

In this case, the organization owns or leases the entire infrastructure. They build their private cloud either on their own or with services help from HDS or a trusted partner. Because this approach is likely to involve the transformational steps previously described, financial benefits will be realized over time as the steps are completed. Depending on whether the organization owns part of or the entire infrastructure, capex and/or operating expenditure (opex) benefits accrue to varying degrees.

**Managed Service Solution**

Here, HDS delivers an infrastructure-as-a-service offering where HDS owns and manages the private cloud that resides within your data center. There is no initial capex cost. Its pay-per-use pricing, a pure opex model, includes all hardware, software, transformation, managed service and support for the consumption of storage and converged infrastructure, based on service level agreements. As such, you realize cost benefits of the new private cloud model from day 1 of the contract. HDS owns the assets and you can flex up or down each month based on the needs of your business. HDS leverages best practices ITIL service management and our service operations centers around the world ensure 24/7 management. Three of our private cloud storage service offerings include:

- **File Tiering.** This service enables you to move inactive or low priority files out of your primary NAS environment and into your private cloud store or different on-premises tiers, if appropriate.

- **Primary File Serving.** Consumers of cloud services can be widely distributed geographically, even within a single organization. This service delivers bottomless, backup-free file serving “to the edge.” It provides both local cache, which allows frequently accessed content to easily be retrieved, and a central private cloud repository, which streamlines data management, governance and protection practices.

- **Microsoft SharePoint® Archiving.** This policy-based service enables efficient storage, protection and management of SharePoint data, resulting in a more efficient environment, reduced cost of ownership, and control over SharePoint data and metadata.

In either case, HDS can manage your private cloud for you. The physical infrastructure in your data center is remotely managed by HDS through a secure connection, reducing management overhead.
and providing the necessary skills to optimize the storage environment. Requests for new storage can be fulfilled based on the policies set up front between Hitachi Data Systems and the organization. The storage is then remotely provisioned and managed by Hitachi Data Systems.

**We Host Your Cloud for You**

Finally, when it makes sense for you to move certain workloads off-site, HDS offers hosted cloud services. The cloud environment is owned and managed by HDS or a partner, and delivered in a pay-per-use model. Built on the same cloud-ready platforms that we offer for the private cloud, Hitachi Cloud Services enable you to extend outside of the data center more seamlessly. The services also feature a RESTful interface to allow organizations to connect key enterprise applications to the cloud. Hitachi Cloud Services are available in the U.S. today, with other geographies being added over time.

**Add up the Savings**

Modernizing the data center for the private cloud can reap significant benefits in terms of total cost of ownership (TCO) (see Figure 7). A sample of some of our engagements shows that organizations delivering enterprise application functionality could reduce TCO by about 38% in moving from a traditional data center architecture to a capex-based private cloud. An extra 28% reduction in TCO could then be achieved when transitioning to a private cloud where the organizations do not own the assets.

These savings include both easily quantifiable costs directly related to operations, as well as costs associated with administrator productivity, performance issues, provisioning delays and other factors.

**Summary**

Preparing for the private cloud involves a series of steps that transform and modernize the data center so that the full benefits of the cloud can be realized. Hitachi Data Systems provides the platforms, technologies and services you require to build a more robust private cloud. We help you to take the most advantage of the benefits the cloud has to offer. Through our “more virtualized, more secure, more open” approach, we help you leverage and manage your resources for maximum return. At the same time, we enforce the security mechanisms you require to keep your data and content safe. Through our APIs and support for open interfaces and protocols, you can bring best-in-industry technologies and frameworks into your cloud environment. You gain access to the functionality you want and avoid vendor lock-in.

Regardless of where you are on our path to the private cloud, HDS is here to help.

**For More Information**

For more information regarding how HDS can help you move to the private cloud, contact your Hitachi Data Systems representative or visit www.HDS.com.