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Create the Data Center of the Future

Accelerate the Value of Cloud Computing With the Right Infrastructure

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April 2015

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Create the Data Center of the Future

Executive Summary

The data center of future will look very different from the data center of today. It will be built on a more flexible infrastructure to support both traditional IT and newer cloud environments. That infrastructure will be based on the virtualization, convergence and automation of all layers of the data center, including servers, networks and storage. It will make the future data center agile enough to deliver the services needed to run tomorrow's business.

In the data center of the future, companies will view data as a resource to be mined for insight, innovation and profit opportunities. This future data center will use infrastructure as a service (IaaS) and function more as a pay-per-use model. It will meet business requirements for cost control, scalability and service level objectives. Businesses will pay only for the cloud services they need, as they need them.

To prepare for the data center of the future, organizations must change the way they store, govern and manage data. To get there, IT must move the data center from a physical infrastructure with silos of independently managed devices to a virtualized one based on infrastructure services. This move will position the data center for its future as a strategic decision-making center capable of using data to gain competitive advantage.

Integral to this transition will be how organizations address the 4 dimensions of data growth, which are sometimes called the 4 Vs: volume, velocity, variety and value. These dimensions present colossal challenges to current data center infrastructures. If addressed correctly, they also present massive opportunities to realize significant cost savings and a more responsive, agile data center.

The Data Center in Transition

Traditionally, the data center has been a cost center to support business and store information. IT simply added server, storage and network resources to tackle information and business growth as needed. However, with data growing at 40% to 60% annually, files and their dependencies are getting bigger and more complex. Where terabytes used to be the norm and petabytes seemed beyond the horizon, we are now in a world where exabytes are around the next corner.

Organizations are utilizing cloud computing to turn the flood of data into actionable insight that will competitively position the business to drive innovation. The use of cloud computing has created enormous opportunities for con-solidation. It has improved business agility and provided applications and services to millions of users.

To achieve the promises of cloud computing, IT staff must lay the proper infrastructure foundation today. Otherwise, they face a confluence of performance, capacity and management issues that are sure to compound over the next few years. Transitioning to the data center of the future will require end-to-end virtualization of servers, storage and networks, using heterogeneous components. This virtualization will ensure the rapid deployment of services and applications with lower risk, as well as visibility of the entire infrastructure. Automation coupled with virtualization will cost-effectively simplify and streamline IT management tasks. At the same time, it will deliver significant increases in processing power and capacity for storing applications and data.

4 Challenges to the Data Centers of Today

Over the next few years, IT's challenges will be to store, govern and manage information to facilitate insight and inno-vation while keeping data center expenses in check. Those challenges arise from the 4 dimensions of data growth.

Challenge 1: Data Volume

While terabytes of information were the scare words for the past decade, petabytes of data are becoming the new normal. Anyone in IT knows that storage volume is increasing and requiring more storage resources, longer reten-tion times, and more management resources. But is IT ready for the higher operating expenses that come with this volume? These expenses can reduce data center return on value and present roadblocks to scalability.

When data volume is measured in petabytes, IT finds it increasingly difficult to use traditional tools for provisioning, backup, device migration, replication, extraction, translation and loading. The traditional incremental approach to building infrastructure to support exploding data volume will no longer work. Adding components as needed to sup-port growing data volume doesn't offer the scalability needed to meet the challenges that are incumbent in cloud computing. This strategy cannot efficiently scale virtual machines by orders of magnitude.

Most of the data volume is coming from unstructured data. Organizations need new tools and responsiveness to search and access the data as files or objects. The requirements of service level agreements (SLAs) and business agility depend on 24/7 data availability. To achieve the highest availability, data volumes must scale nondisruptively and migrate across technology generations.

Challenge 2: Data Velocity

The challenges of data velocity in today's data centers are the explosion in numbers of data sources and a demand for real-time access to data for analysis. Data velocity becomes particularly challenging to manage as more data is generated through a multitude of new sources.

Achieving high data velocity will depend on the data center's ability to deliver enough performance to quickly find data among billions of objects or files. To meet data velocity challenges and deliver the data velocity that businesses

require, the data must reside on a common underlying infrastructure. And that infrastructure can scale up and scale out on demand.

Challenge 3: Data Variety

The variety of data and data sources continues to increase, including unstructured forms of human and machine-generated data. New data types are emerging from diverse sources, such as click streams, smart meters, smart phones, radio-frequency identification (RFID) and near field communication (NFC).

Organizations need to capture these different data types in a way that makes it possible to easily correlate information contained in the data. This ability requires a convergence of solutions and tools that many data centers have yet to attain. Silos of disjointed applications and infrastructure often found in today's data center environments lack sufficient metadata for describing the object and the content within the object. The data remains dependent on the infrastructure and specific applications.

Challenge 4: Data Value

Data variety and volume have the potential and opportunity to produce great value to businesses. New data value will come from the intersections of rich data varieties. To achieve value, IT must consolidate and pool this data in a form that decision-makers can use for analysis to drive the business forward. Analytics will allow businesses to transform data into information for business innovation, marketing strategies, and other value.

Turning the 4 Vs of data growth into business opportunities that drive data value requires a foundation built upon convergence and end-to-end virtualization across server, storage and network resources.

The Cloud-Driven Data Center of Tomorrow: Converged, Virtualized and Automated

For years, IT has taken a bottom-up approach: Data centers are built from disparate and independently managed physical hardware, with business services residing on top. The data center of the future will invert this trend and experience a fundamental shift to a managed platform built on a converged, virtualized and automated infrastructure. In this future data center, IT will provide data from a cost and SLA standpoint, and deliver information and services to meet business requirements. Here is the underlying infrastructure that will support the cloud-driven data center of the future:

Deliver by Convergence, Enable by Virtualization

Effective management of data growth will take more than just raw hardware and software to crunch the data. The data center of the future will build upon a virtualized pool of resources and be managed as a whole. This end-to-end virtualization means all the resources are basically stateless, and it doesn't matter where or what they are. In this future data center, information will become disassociated from the application that created it, so that a wide range of applications can use it effectively.

Convergence and virtualization will deliver data that is accessible anywhere, at any time. Empowered with an automated, managed approach to sharing and accessing data, businesses will govern and analyze more data with more complex relationships. They will be able to deliver that data in real time, with complete scalability. With convergence and virtualization, businesses will realize higher return on investment through lower capital and operating expenses. They also will be better able to meet stringent SLA requirements for performance, capacity and data protection.

Automate to Free Up IT Resources and Rein in Costs

To efficiently meet the cloud user's needs for high performance, availability and productivity, the data center of the future will rely on deep automation and centralized management. This future data center will require dynamic, automated provisioning and tiering, as well as automated data classification that uses integrated analysis and discovery to accelerate data velocity.

The fusion of convergence, virtualization and automation with centralized management will free up businesses to separate physical resources and topology from architecture and from larger, higher-level systems. The result will be unified system and data management across heterogeneous environments. With this model, businesses will be able to reduce data center costs to gain the most value and margin from their cloud investment.

Transform Into an Infrastructure for All Data

Harnessing data as a strategic asset for deep insight and innovation transforms the 4 Vs of data growth into opportunities. Organizations gain the agility to act and react to internal and external demands in a more timely fashion and position themselves to take full advantage of their data and information. Convergence and virtualization are the cornerstones for a seamless stack of hardware, software and management components. These components use a cloud delivery model to provide dynamic infrastructure and one platform for all data.

The data center of the future will approach data as information services and view it through dashboards that enable efficient use of high-level, business-driven metrics. The foundational infrastructure will deliver data along with its representations, metadata and added information. With the data center engine in place, organizations can better capitalize on increasingly expansive and complex data for faster and more advanced insight and innovation.

Achieve the Payoff

To transition to the data center of the future, IT must address increasing storage volume. It must answer the need for velocity to drive the fast input and output of data. Further, it must store a variety of data types and use them to gain value through better problem resolution, innovation and decision-making.

Cloud computing brings a wealth of possibilities. However, the data center of today does not have the infrastructure to effectively support cloud computing. Fortunately, a converged and end-to-end virtualized architecture is available today from Hitachi Data Systems. This architecture solves data complexity and growth while simplifying and standardizing deployment and managing the infrastructure.

Cloud Capabilities and Options

LEARN MORE

Businesses that lay the proper data center foundation for the future stand to transform data growth into meaningful, actionable information. The vision for the data center of the future is about stepping ahead of the curve to support cloud services and accelerate business innovation, ensuring success for years to come.

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