NEXSAN™

by **imation**

TODAY'S CLOUD MEETS
TODAY'S STORAGE

Today's businesses are looking for ways to grow revenues while reducing costs. Cloud computing delivers new revenue generating services and reduces costs by improving scalability, enhancing flexibility and optimizing resource utilization. Nexsan's enterprise-class storage is purpose-built to deliver ultimate reliability and simplicity of operation while enhancing the ROI for private or public cloud infrastructures.

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FIVE KEY FACTS ABOUT CLOUD COMPUTING AND STORAGE VIRTUALIZATION

1. **CLOUD DELIVERS APPLICATIONS AND SERVICES** - Cloud computing delivers applications and data storage to customers on a pay-as-you-go basis over a network.

2. **CLOUD SERVICES ARE DELIVERED THROUGH A VIRTUALIZED INFRASTRUCTURE** - Cloud services are physically delivered using a virtual infrastructure and networks. Web Service APIs make it possible to offer Cloud services over any distance.

3. **STORAGE AND SERVERS USE STANDARD WAYS TO COMMUNICATE IN THE CLOUD** - Servers in data centers host Virtualization services, Web Service APIs, Operating Systems and Applications. The way a Server talks to storage doesn't change regardless of the architecture. Increasingly, storage is being virtualized and managed at the server level from hypervisors such as VMware's vSphere. In fact, the trend is to now to move management to the hypervisor, instead of using advanced management in the array as move toward centralized management and commodity storage.

4. **MANAGEMENT IS THE KEY TO EFFICIENCY** - While server virtualization improves infrastructure efficiency, often storage management is overlooked, resulting in undue expense.

5. **EFFICIENT STORAGE REDUCES COSTS** - When efficient storage is used with an efficient storage management scheme, savings are immense, and the business can rapidly meet shifting business requirements.

WHY ORGANIZATIONS ARE ADOPTING CLOUD COMPUTING

In the current global market, businesses are searching for opportunities to increase their top line revenues while cutting bottom line costs. Many are adopting Cloud computing as a way to accomplish both of these objectives.

Cloud computing refers to the provision of applications and/or data storage on demand to customers through a computer network or the Internet. Users can perform a task without possessing the necessary hardware or software; they simply use their personal computer as a display terminal connected to the network or Internet and pay for the services they use. Cloud computing comes in two flavors that depend on what the Cloud delivers: Cloud computing and Cloud storage. Cloud computing delivers applications and databases over the web. From a user's point of view, Cloud storage is a subset of Cloud computing that allows for web access to both structured data in the form of a Hadoop cluster or SQL database as an example or unstructured data (e.g. spreadsheet files, pictures, documents, videos, music and more) that represents the vast majority of all data stored online. In this paper we'll be talking about how to optimize Cloud computing and the role highly efficient storage can play in that infrastructure.

From a service provider's point of view, a Cloud computing architecture that is carefully planned for efficiency can also reduce the infrastructure costs of delivering services. Through its reliance on virtualization technology, Cloud computing allows organizations to consolidate their workloads onto far fewer servers by running multiple virtual machines (VMs) on a single physical machine. Cloud computing also offers significant scalability and flexibility; any number of users can access the Cloud over the Internet.
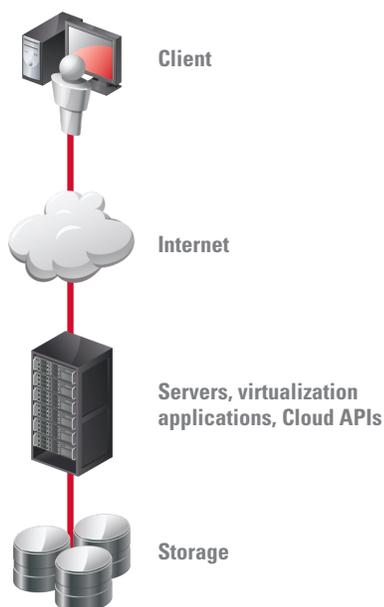
Another important attraction fueling the growth of public Cloud offerings is the economy derived from a business buying these services not needing to own or manage any information technology infrastructure, such as storage , servers, and people, thus reducing both capital and operating expense. Of course they can expect a charge from the service provider, but it may be a beneficial alternative approach over owning and running a data center.

Because Cloud computing uses the same model as utilities, such as water or gas, customers pay only for the data or services they actually use. As Matt Cain, a research vice president at Gartner says, "The defining characteristic is scale — the ability to service millions of users." According to Cain, Cloud computing also implies quick and easy provisioning and a simple cost structure, generally on a per-user, per-month basis, if it is billed at all as exemplified by applications like Microsoft's Hotmail.

CLOUD STORAGE BENEFITS

- Multi-tenant support allows more than one user to use storage via Storage Resource Manager
- Geo location and geo replication
- Seamless and real time provisioning of accounts
- Availability of unlimited amounts of storage "on-demand"
- Pay for use, of actual storage used over time

CLOUD INFRASTRUCTURE

Client

Internet

Servers, virtualization applications, Cloud APIs

Storage

ENABLING TECHNOLOGIES FOR THE CLOUD

Cloud computing has been made possible due to recent technology advances. Early architectures placed large data sets into the Cloud while applications ran on-premise. Bandwidth between the datacenter and the Cloud was quickly identified as the bottleneck. When applications are run in a private or public Cloud close to the data sets, superior performance is achieved, while simultaneously offloading the administration of the application servers to the IT professionals administering the Cloud. Industry-standard Web-based APIs including SOAP, REST, and WebDAV along with service-specific APIs allow computing tasks to easily be offloaded to distant Cloud-based services.

THE CLOUD INFRASTRUCTURE

All Cloud Computing and Cloud Storage services assume that a user or client has access to the Internet from a personal computer. Cloud services and host applications are delivered to these users using the Web Service Application APIs (like the Restful API) via servers in one or more data centers that share the workload. Servers are connected to data storage devices usually through a SAN and therefore eliminate the need for a storage array to need Web Service Application APIs to be part of a service offered to the Cloud. All of these technologies (except the Internet) take advantage of Server Virtualization technology.
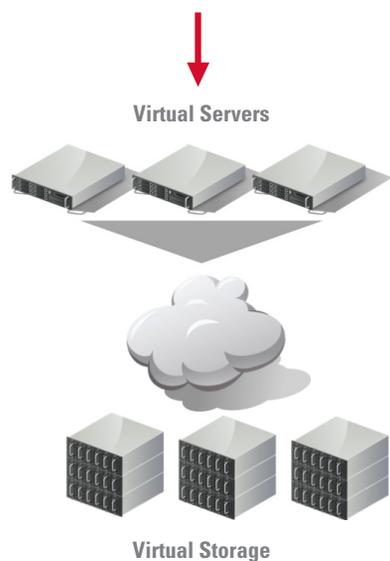
BEST PRACTICES

Today, many organizations are looking to adopt Cloud computing technologies and management techniques to improve the efficiency and flexibility of their own data centers and computing environments. But they need to implement this infrastructure in an optimal manner. After all, if the existing infrastructure wastes resources due to poor management, adding a new Cloud delivery mechanism will provide a better way to distribute information services and improve customer reach, but it won't improve cost efficiency.

One area that is typically ripe for additional efficiency improvements is data storage. By virtualizing storage also, organizations can potentially double their data center cost savings over what they would otherwise achieve if only server consolidation is implemented. But organizations can only achieve increased efficiency if they understand the type of storage to use and how to manage that storage effectively.

HYPERVISOR MANAGED VIRTUALIZATION

- Virtualization Management
  - › Thin Provisioning
  - › Snapshots and Replication
  - › vMotion and Storage vMotion
  - › Site recovery and data protection
- Storage Resource Manager
  - › Array Management
  - › Capacity Management
  - › Data Read and Write Performance Management
  - › Protection Architecture Management
  - › Maintenance and Planning

Virtual Servers

Virtual Storage

- Array Setup and Provisioning

[1] Source: vSphere 5, VAAI and the Death of the Storage Array by Archie Hendryx in ZDNet UK September 2, 2011

WHO'S IN CHARGE OF THE STORAGE?

A critical decision in the private or public Cloud infrastructure is centered on management. Today enterprise-class storage arrays have developed many features that, while useful in a SAN with physical application servers, work against the IT administrator of a virtualized computing environments that uses VMware, Hyper-V, DataCore, or Xen Server. Low-level administration of disks, RAID groups, RAID levels, spares or LUNs is not controversial, but the higher storage management tasks are. VMware claims to be leading the Hypervisor race particularly in Cloud infrastructure. With the introduction of vSphere 5 as Archie Hendryx of ZDNet UK says; "vSphere 5's launch is not only an unabashed attempt at cornering every single aspect of the server market but is also a result for the growing need for methodical scalability that merges the IT silos and consequently combines the information of applications, servers, SANs and storage into a single comprehensive stack". He went on to say that VMware's importance has influenced vendors to adopt a scale out as opposed to a scale up approach to storage. Archie is referencing VMware's move to do thin-provisioning, snapshot creation and management, replication, vMotion, Storage vMotion, and site recovery operations among others, as an integrated component of the Hypervisor. The advantages for not doing these operations in the storage array itself are compelling. In fact, Archie Hendryx has suggested that VMware's approach to storage management may spell the end of traditional storage arrays sooner than later[1].

Nexsan storage systems take maximum advantage of the virtualization hypervisor's built in storage management and scalability when adding enterprise-class storage arrays to the storage network. With the development of server virtualization that includes storage management capabilities, and storage resource managers that further enhance management, IT now has the option of managing storage from the Hypervisor. This means that rather than having to include redundant storage management capabilities within each storage array controller, a storage array can include a thin layer of software, leaving the bulk of storage management capabilities to the virtual server stack. These management capabilities are extensible to all storage. This scale out approach allows a single administrator to efficiently manage larger amounts of storage while significantly reduce the costs associated with purchasing and managing storage.

Virtualization hypervisor-managed storage aligns with the objectives of Cloud Computing and Cloud Storage. As a business grows, data storage requirements increase. Hypervisor managed storage makes it faster and less expensive to scale to meet growing storage requirements within the virtualized Cloud. IT can simply add new enterprise-class storage incrementally. Moreover, IT does not need to migrate to a new storage array system or even take the existing system down when adding storage hardware—it can simply dynamically shift some of the workload to the new devices as they become available.

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Nexsan offers the Nexsan E-Series storage system and Assureon archive storage which are ideal for being managed in the hypervisor and used in a scale-out virtual hypervisor managed storage environment."

REDUCING COSTS

Rather than marooning storage in separate, directly connected and individually managed storage arrays, hypervisor-managed storage virtualization makes storage available to all Virtual Machines from a common pool that can be dynamically allocated and managed as needed. This lowers costs in a number of ways. By managing storage from a central location (e.g. the hypervisor), it reduces the number of platforms necessary to manage storage, eliminating the need for replicated management every time a new array is added. It improves storage utilization by putting otherwise unseen and mismanaged idle capacity back to work. Having fewer storage devices reduces acquisition costs, lowers data center space/cost and cuts energy consumption. In addition, because stack-managed virtualization allows IT to manage all VMs and storage from a single management interface on the server; it greatly reduces the complexity of managing the data center.

NEXSAN STORAGE ARRAY SOLUTIONS

Nexsan offers the Nexsan E-Series storage system and Assureon archive storage which are ideal for being managed in the hypervisor and used in a scale-out stack managed storage environment. All Nexsan arrays are ultra-reliable and deliver high capacity, high performance and energy efficiency in a flexible software architecture that can be integrated into and managed transparently within a Virtualized Cloud environment.

To take advantage of the capabilities that exist within Virtualization solutions, Nexsan has built management software such as Microsoft's VDS/VSS or compliance with ESXi's round robin with subset into every storage array. Nexsan storage arrays can be managed through hypervisors for a scale out infrastructure from vendors that include VMware, Microsoft, Citrix, DataCore as well as Symantec's SRM.

CONCLUSIONS

Cloud computing is a natural choice for meeting the needs of IT providers who strive for scalability, flexibility and cost efficiency, and network-based users who expect exceptionally high availability, functionality and speed. New Cloud delivery and management technologies have enabled Cloud computing to become more widely used for increasingly diverse and mission-critical workloads. Nexsan has purpose-built arrays for virtualization that enhance the efficiency of an organization's Cloud infrastructure and the value of the services they manage and deliver. Nexsan storage arrays are managed in Cloud computing and Cloud storage environments through the existing virtualized hypervisor stack. These solutions can be managed seamlessly within Microsoft's Hyper-V, VMware, Citrix, DataCore and Symantec virtualization management solutions.

By using Nexsan storage in these environments, IT can better align storage resources with business requirements defined by the applications, services and storage delivered through the Cloud. Using Nexsan storage in a Cloud environment can facilitate top-line growth by scaling storage rapidly and inexpensively to meet the needs of growing businesses, reduce costs by requiring less storage, and lower the associated costs of system management, data center space and energy. Robust business continuity also minimizes the risk of downtime.

ABOUT IMATION

Imation is a global scalable storage and data security company. The company's portfolio includes tiered storage and security offerings for business, and products designed to manage audio and video information in the home. Imation reaches customers in more than 100 countries through a powerful global distribution network and well recognized brands. Additional information about Imation is available at www.imation.com/nexsan.