iSCSI plays well in the Cloud

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The stresses from the current financial crisis are pressing IT organisations to re-evaluate many policies and procedures. Policies around where data is stored, which vendors are used, and traditional backup routines, are some of the areas being re-evaluated in order to shift capital expense to more manageable operating expenses. Internal rules and standards once held tightly are now being rethought in order to reshape the IT operation to be more cost effective and responsive in preparation for a new business environment consisting of offsite IT services, or clouds.

For companies wanting to focus on their core business value without investing heavily in IT infrastructure, IT service providers offer subscription based services in place of onsite data centers. For these IT service providers, the data center infrastructure is the foundation of their product offering, and the more cost effective it is, the more able they are to pass that savings to their customers. One mature storage network technology that has proven successful at reducing infrastructure cost while also delivering the quality of service necessary to deploy IT services is Ethernet with iSCSI.

What is this "cloud" business?

We've been reading about clouds in the press for well over a year now. Only recently are we starting to see clear definitions of what a "cloud", in the context of information technology, really is and what attributes are associated with it. Most IT vendors are introducing "cloud products". But, many of the technologies that are enabling clouds have been available for some time, only now the business requirements are exposing the expanded use of these technologies in what is being defined as IT as a Service (ITaaS) or cloud services, or just clouds.

What are the types of clouds?

Generally, we speak of public and private clouds. Public clouds are considered to be IT services available to the general public and are hosted by a third party. Online email or travel registration services are examples of public cloud offerings. The application is hosted by a third party, such as Yahoo or Orbitz, and is accessible via a remote interface, such as a web browser. Private clouds are not available to the general public and are typically services available to organisations behind a secure firewall. For many organisations a hybrid model may used, which consists of an internal and external private cloud. One example may be an organisation that has both internal IT, such as email, engineering applications, which may also use an offsite payroll service or possibly an MRP or CRM system delivered by a third party. These services are available only to corporate employees via a secure mechanism, even though the applications, data, and infrastructure may be hosted by a third party service provider. It still appears local to the organisation even though it may be dispersed across many physical locations.

What are the requirements of clouds?

The requirements of internal clouds and external clouds (whether private or public) are largely the same (see Figure 1). However, for the purpose of this article, I'll discuss clouds from the perspective of the external cloud and the cloud service provider, since it is a little easier to define.

Cost – As a service provider, your infrastructure represents your cost of goods (COGS). As a result, the operating cost of your IT infrastructure represents one of your competitive advantages or worse, disadvantages. The lower you can drive down your COGS, the more competitive you can be in the market, and therefore the greater value you can offer your customers.

When it comes to networking technologies, Ethernet offers the most cost effective solution since the scale of the Ethernet market is so large. The sheer volume of Ethernet port shipments drives low per port costs. And the skills to manage an Ethernet infrastructure are common to practically every IT administrator in the market.

For block storage, iSCSI benefits from the low cost Ethernet environment with the use of software initiators running on standard Ethernet server adapters. Where a typical FC server adapter costs between $500 and $1000 per port depending on speed (4Gb to 8Gb), Ethernet server adapters

are typically in the sub $100 range per port for Gigabit speeds, and under $600 per port for 10Gigabit speeds. The ability to mix storage and data networking protocols on the same wire increases the value of Ethernet over single purpose networks.

Example: The leader in online directory services in Australia chose an IP SAN with iSCSI due to the initial projected savings in cost of almost 50% over 5 years. 10GbE delivered the bandwidth to satisfy current and future customer demand and reduced operational costs through rapid deployment of services.

Performance – As a service provider, you need to ensure that your infrastructure is faster than the long distance network between you and your customer. Generally, as long as your data center network is faster than the internet or WAN, then you can at least match the current end user experience in terms of performance. Deploying a super low latency, high performing network such as Fibre Channel will not relieve a bottleneck at the WAN and only adds incremental cost. Gigabit Ethernet can satisfy the requirements of the majority of applications. And as service providers grow customer base, 10GbE will provide the necessary throughput and efficiency to meet demand without modification to existing software tools or significant retraining.

Example: A supplier of SAP cloud services chose to use iSCSI for their storage infrastructure over competing storage networking technologies to achieve the right balance of cost and performance. Though cost was a primary driver, they found that Gigabit Ethernet was able to outpace any latencies across the WAN. As a result, only four Gigabit Ethernet links were required for the iSCSI storage network to service customer demand, allowing them to offer very cost effective solutions.

Security – As a service provider, you can't guarantee what goes on outside of your facility. But, you can definitely control what goes on inside of it. And you can greatly control how data leaves and enters your operation. Protecting and isolating data between customers is critical to your success.

Ethernet offers security through built in network services such as SSL, CHAP, iPSec among others. Since iSCSI is a layer 3 protocol, it benefits from all of the security features of the TCP/IP layer. VLANs can offer multi-tenancy support within the internal network, which can compliment virtual server and storage based multi-tenancy features. These multi-tenancy features enable you to isolate customer data and applications using a single, unified infrastructure, eliminating redundant hardware for each customer. Not only does it reduce capital cost, but it also improves operational efficiency.

Scalability – This is definitely a requirement for the end user. But, it's likely a major concern for you, the service provider. As your business grows and your customer base grows, scaling to accommodate ever expanding access requirements allows you to increase revenue while maintaining service levels. You must be able to expand your server, network, and storage resources easily as you add more customers and expand your services.

Ethernet offers a cost effective and simple way to scale ports as the network bandwidth requirements increase. Adding Ethernet ports for more bandwidth is easy. And for higher

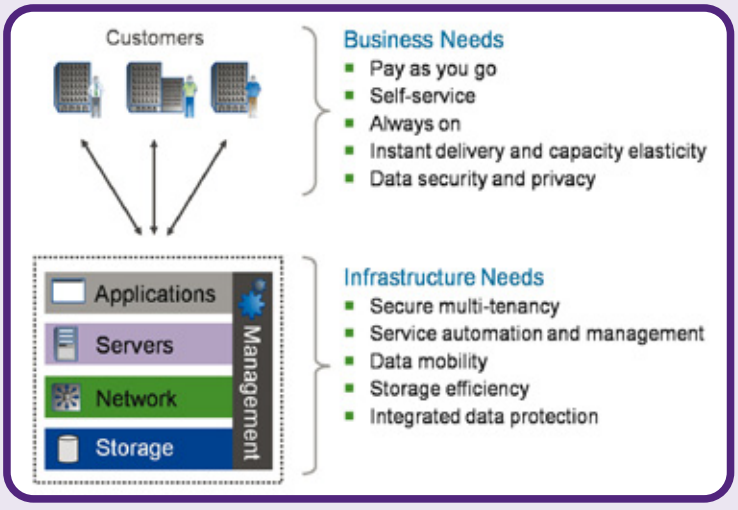

Figure 1 Cloud infrastructure requirements

workload environments, 10GbE offers the bandwidth to handle incremental workloads without having to constantly add additional ports and cables for each new application. Additionally, due to the inherent routing of IP, Ethernet networks, including iSCSI, can span very large distances. Whether you decide to deploy a storage network that spans multiple sites is a separate decision. But, the technology is available to maximize network scalability according to business requirements without purchasing special gateways.

Data Mobility – For the end user, one of the values of the cloud is that data is accessible from anywhere. As end users move about, the data can move as well. Data mobility, therefore, is a key priority for you, the service provider. Your network needs to be able to support remote and mobile access. Mobility can be addressed in a couple of ways. Clouds assume a high level of virtualisation at the server, network, and storage. The ability to move applications from one physical device to another offers a number of advantages in the cloud for secure failover, load balancing, and serviceability. Network port mobility is required to support server and storage mobility. Ethernet with TCP/IP offers native virtual IP addressing which facilitates the consistency of VMs to the network when moved from one server to another. iSCSI leverages this feature to offer a simple means to maintain storage access with VM mobility. Because iSCSI runs over TCP/IP, WAN acceleration technologies can improve long distance data movement, facilitating data movement across large distances.

Summary

The "cloud" in its various forms is quickly becoming a necessary part of any organisations IT strategy. Fortunately, many of the building blocks to deploy cloud services are available today or are now hitting the market just in time to address critical business requirements. In the case of storage protocols for clouds, Ethernet is emerging as the network technology of choice, and iSCSI is positioned to play a major role. iSCSI is proving to effectively address the cost, performance, security, scalability and mobility requirements for cloud services.

For more information about SNIA and iSCSI, visit the Ethernet Storage Forum websites at http://www.snia-europe.org/ethernet_storage/ or www.snia.org/forums/esf

	Cloud Requirements	iSCSI (Ethernet) Value
Cost	Infrastructure costs must enable affordable IT services	Ethernet offers the lowest capital and operational costs
Performance	Performance must satisfy multi-user requirements on shared infrastructure	Ethernet is simple to scale ports and offers GbE and 10GbE speeds.
Security	In a shared storage environment, customer data must be isolated from other customer data	Ethernet offers SSL, CHAP, IPSec and VLANs to logically isolate and protect data traffic
Scalability	Infrastructure must be able to scale as customers are added	Ethernet port scalability is simple; 10GbE offers cost effective bandwidth
Data Mobility	Cloud services assume data accessibility across the globe	IP routing of Ethernet and iSCSI and virtual port addressing enable wide area networks and simplified data transfers

Table 1 Network requirements for cloud service providers