

End to End Systems Resource Analysis for Virtual, Cloud and Abstracted Environments

Importance of Situational Awareness for Virtual and Abstracted Environments

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Introduction

Many organizations are in the planning phase or already executing initiatives moving their IT applications and data to abstracted, cloud (public or private) virtualized or other forms of efficient, effective dynamic operating environments. Others are in the process of exploring where, when, why and how to use various forms of abstraction techniques and technologies to address various issues. Issues include opportunities to leverage virtualization and abstraction techniques that enable IT agility, flexibility, resiliency and scalability in a cost effective yet productive manner.

An important need when moving to a cloud or virtualized dynamic environment is to have situational awareness of IT resources. This means having insight into how IT resources are being deployed to support business applications and to meet service objectives in a cost effective manner. Awareness of IT resource usage provides insight necessary for both tactical and strategic planning as well as decision making. Put another way, effective management requires insight into not only what resources are at hand but also how they are being used to decide where different applications and data should be placed to effectively meet business requirements.

Background

IT Organizations are faced with the constant demand to process, move and store more information, including multiple copies of the same or similar data for longer periods of time while reducing per unit costs. In addition, IT organizations also need to maintain or enhance quality of service (QoS) levels as seen in Figure 1.

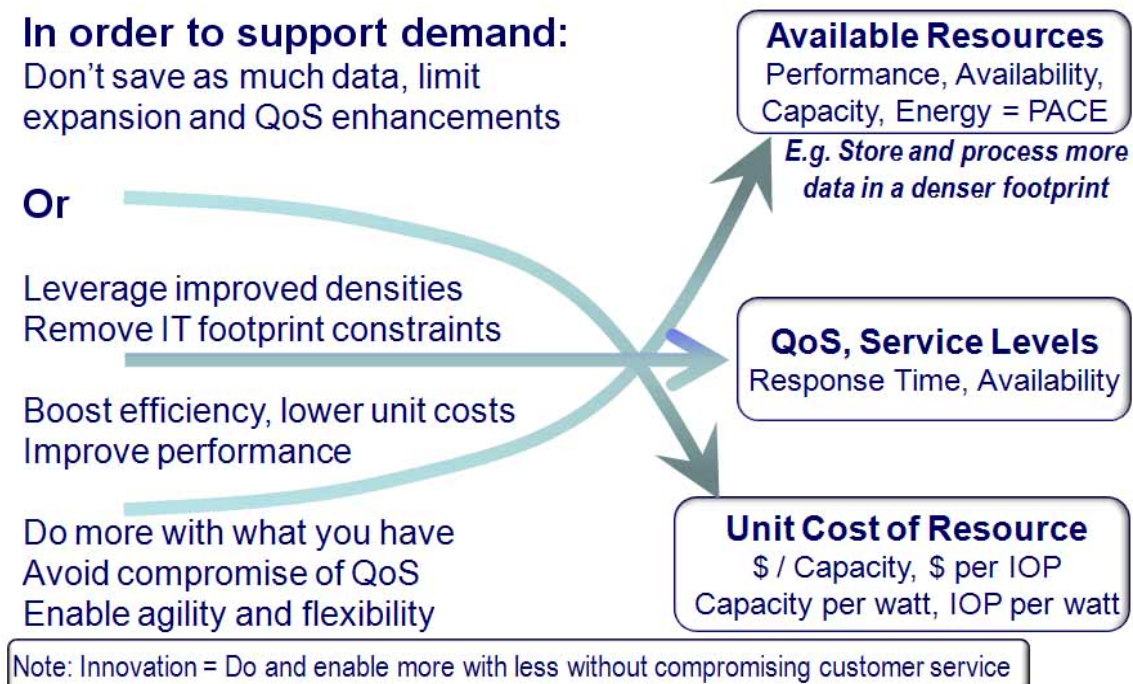


Figure 1: IT Resource Demand, QoS and Cost Balancing Challenge (Source: StorageIO)

The result (Figure 1) is a squeeze play that requires innovation to allow more to be done with already available resources without compromise of customer services. Many approaches are being used including server virtualization or storage virtualization, consolidation, re-tiering among other optimization techniques.

Issues and Challenges

In the real world there is no magic big red Easy Button™¹ that businesses can push to magically transform their IT infrastructure. Nor is there an easy, readily available means to transform or move an applications portfolio from its current state to a highly virtualized, abstracted public or private cloud environment. However, there are tools available to help expedite as well as automate the time consuming tasks needed to transform an existing IT environment into an abstracted or virtualized infrastructure.

Behind the layers of abstraction and virtualization exist physical resources (servers, storage, networks and software) all of which need to be managed in a coordinated manner. Figure 2 shows some of the complexities that are abstracted via cloud, virtualization (or other means of enabling agility and flexibility) that need to be managed from an E2E (end to end) perspective. Key to managing resources effectively is being able to identify, track and coordinate when as well as where those items are being use for service delivery. It is also important to coordinate changes that occur across the different technology domains (servers, network, storage, appliances and security) in a timely manner. For example during physical to virtual (P2V), Virtual to Virtual (V2V) and Virtual to Physical (V2P) conversion, general IT resource consolidation, data center or storage movement, as well as for technology reconfiguration, refresh and upgrades.

Many faces of virtualization – Various Locations

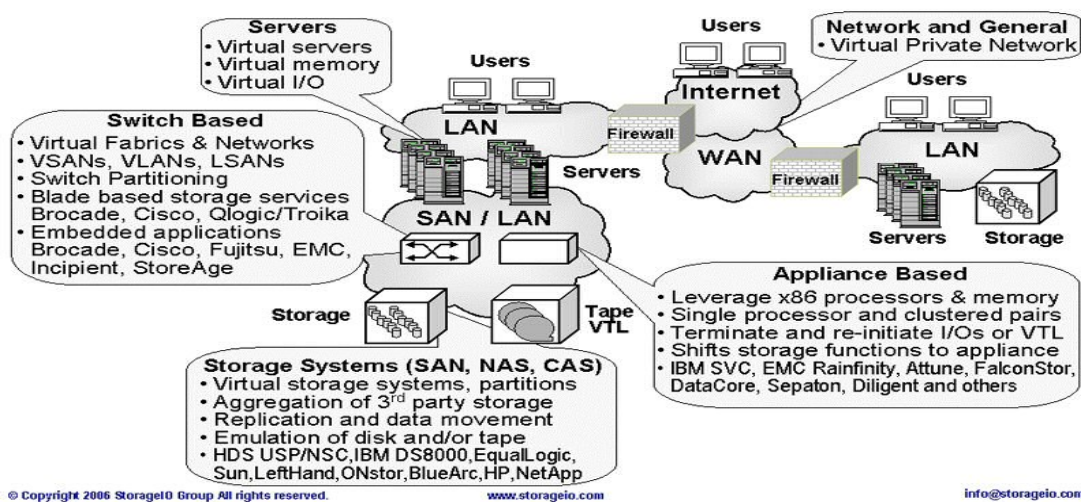


Figure 2: Various areas of focus and complexities involving virtualization (Source: StorageIO)

Common issues and barriers for managing physical and abstracted environments include:

- Finding, identifying and subsequent tracking of logical to physical mappings
- Timely awareness of what resources are being used to deliver a given level of service
- Identifying where remediation or upgrades of hardware and software are needed
- Generating planning blueprints or documents to determine what to move where and when
- Facilitating task execution and workflow across various technology management groups
- Determining levels of Infrastructure Resource Management (IRM) task compliance
- Manual and error prone intervention or interaction with various technology tools
- Resolving multiple vendor, multi technology interoperability differences or dependencies

¹ Easy Button™ Staples Corporation All Rights Reserved

Another complexity introduced is that with virtualization or other forms of abstractions traditional affinities of how a particularly server was allocated to a storage device or vice versa may no longer apply. Consequently the relatively simple act of migrating from an existing storage system to a new or upgraded system can take longer as the various interdependencies are discovered and coordinated. That is assuming that all is well with the servers, their networking adapters, hypervisors and virtual machines along with networking settings and that no remediation or upgrades are required to preceding dependencies to support the upgrade.

The business benefit of virtualization or other forms of abstracting is to provide transparency and agility. However, an additional layer of complexity is introduced that requires end to end (E2E) cross technology management. Storage and networks are needed for IT organizations to effectively manage their resources and deliver applications services to business users, systems resource analysis (SRA) tools that support collection and correlation of data from servers.

What this all means is that a new category of tools that provide E2E SRA and DPM (data protection management) are needed for planning and migrating while enabling ongoing management of a virtualized environment as well as with a traditional IT environment. While virtualization, IT clouds and other forms of abstraction provide a layer of transparency and agility between where and how services are delivered and their user customers, there is also an increased layer of complexity.

What can be done?

There are tools and techniques that can help identify what is in place, what is needed, and where, when, why and how to deploy those resources as well as to facilitate in the effective delivery of IT services to the business. Two important capabilities that are needed for enabling IT and data storage transformation to a more dynamic, cloud, virtualized or other form of abstracted environment are migration automation, workflow and configuration management. Another important capability is visibility (or situational awareness) into common Infrastructure Resource Management (IRM) tasks including business continuance (BC), disaster recovery (DR), data protection management (DPM) as well as resource tracking, change management and performance capacity planning.

What to watch for and avoid.

The removal of cost and complexity are key enablers for effective service delivery that facilitates agility and flexibility for IT environments. An important capability for virtualized, dynamic and cloud (public or private) environments is the ability to effectively manage available resources to a given business services level demand in a cost effective manner. The benefit of SRA in a virtualized environment becomes that of enabling E2E management thereby providing visibility and tracking of the logical mapping behind abstraction layers.

In general, avoid solutions that:

- Add to or increase the amount of complexity of the environment
- Require extensive customization or programming to fit into the environment
- Cannot coordinate across different technology management domains
- Lack change configuration validation management and remediation
- Only work with a single vendor's hardware or software technology
- Are singularly or narrowly focused

Consider solutions that:

- Work with various third party data sources and data movers
- Provide insight and tracking of abstracted resources along with their interdependencies
- Can automate (where practical) and generate workflow lists when needed
- Enable realistic and timely payback or return on investment
- Work in traditional environments and virtualized, cloud or abstracted dynamic environments
- Facilitate BC, DR and other common Infrastructure Resource Management (IRM) tasks

Putting it all together

SANpulse Technologies is an example of a company who provides E2E situational awareness, workflow and automation management for traditional physical as well as dynamic, abstracted, virtualized and private cloud IT environments as a software or as a service. Consequently SANpulse tools and professional services based on the SANlogics technology engine can be leveraged for various tasks in homogeneous and/or heterogeneous environments including:

- Gain situational awareness including identifying resource usage and allocation
- Provide insight into physical resource mappings in dynamic changing environments
- Coordinate workflow management including workflow generation
- Identify areas in need of configuration change remediation
- Streamline data and storage migration movement activities

For more information about SANpulse Technologies visit www.sanpulse.com.

Summary

While virtualization, cloud and other techniques or tools for enabling dynamic IT environments help to abstract physical resources from applications, the need for E2E management tools providing situational awareness becomes more important. The need for management tools becomes magnified to help identify and track configuration and interdependencies between various server, storage and networking resources.

With abstraction comes some simplicity however there is also additional complexity that needs to be managed by having a clear and timely view of how resources are being used and allocated. In addition to needing situational awareness via systems resource analysis (SRA) tools, virtualized or abstracted environments also need to have streamlined common workflow management.

Speed, agility and accuracy are important for supporting dynamic IT environments. Consequently tools that can identify, track, support automation along with enabling workflow files for various vendors' technology becomes essential for IT organizations moving to abstracted environments.

About the author

Greg Schulz is founder of Server and StorageIO, an IT industry advisory consultancy firm, and author of the books *The Green and Virtual Data Center* (CRC) and *Resilient Storage Network* (Elsevier). Learn more at www.storageio.com, www.storageioblog.com or on twitter @storageio.

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