THE KEY TO SUCCESSFULLY SIZING A VDI PROJECT

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Introduction

Challenges around data management have been causing difficulties for IT managers to reduce costs and improve efficiencies “in” and “around” the data center. In fact, leading transformation within a company is not an easy task. Virtualization brings a new philosophy to allow storage, servers, applications, and desktops to face business challenges. However, is the desktop industry ready for cloud and disaster recovery? What are some metrics that need to be taken into account while designing a desktop virtualization project? What makes the customer’s environment ready for Virtual Desktop Infrastructure (VDI)? How can we reach the best level of availability for the user environment? How can we achieve virtualization goals while facing infrastructure constraints?

For IT architects and pre-sales consultants, neither reference architectures and solution design documents provide a deep view into the impact that virtualization can have on the desktop environment while considering all technical constraints surrounding the data center. Therefore, centralizing desktops in the data center requires a new management plan, user cooperation, new skills for desktop support, as well as a new organization of IT staff; essentially, providing IT as a Service for internal and external users of a company.

This Knowledge Sharing article highlights the complete VDI solution design: not only hardware and software, but all the processes of change for organization, security, applications, network, systems management, server infrastructure, desktop deployment, storage, backup, and much more.

Let's start off by understanding what the customer uses.

Phase 1: Assessment

Customer Requirement

It is very important to understand the reason why a customer has decided to invest in a VDI design. Answering this question will help model the best solution that fit the customer's expectations.

Traditional Desktop Environment Issues

What are the main problems with the actual desktop infrastructure in the customer's environment? Is ITIL (Information Technology Infrastructure Library) implemented?

Environment Considerations

Initial questions about the customer's environment:

- How many sites/branches are there? Are they involved in the VDI plan?
- What is the actual network, by site?
- How many desktops are critical for the company? Can we measure the cost assigned to downtime?
- Could the company survive a disaster in the main site? In its branches?
- How is the data center? Is there sufficient space and cooling for new equipment?

Hardware

What hardware is the customer using? Which desktop configurations are used? How many desktops/laptops are there?

Devices

Are there attached devices to the desktops? If so, what are those attachments?
Any specific drivers involved? Are there any authentication keys? Are USB ports used?

OS *(Operating Systems)*

What are the OS used within the company? Are Linux desktops used? Template desktops? How many images? Is a migration to Windows 7/8 planned?

Applications

Which applications are installed? How many types of users are there? Is Active Directory (AD) and LDAP implemented? Any Group Policy Object (GPO)? Does any application use a specific card? Are there critical applications that are installed in the desktop?
Is there video use (flash, standard WMV, HD WMV)?

Data

Is Network Attached Storage (NAS) installed? If we ask clients about their data, how many gigas (or gigabytes of space?) will they ask for? What is the growth percentage? For example, if we informed clients that this data would be available in storage but would incur costs when used, how many gigabytes will actually be fully utilized?

Network

The network is the basis of the VDI because all data flows through the LAN. Therefore, it is important to know how developed it is.

- Is there a VPN for distant users?
- Is there a WAN with other branches? What is the bandwidth? Is there replication?
- What is the network diagram?
- What is the network speed in the data center? Which technology is used?
- Is there a DHCP?

Security

What are the security policies for the data center? For the network? For desktops? For Windows?

Storage

Is storage consolidated? Does a Storage Area Network (SAN) or NAS exist in the customer environment?

Servers

Have the customers' servers been virtualized already? Are all servers centralized?

Backup plan

Is there backup for servers and/or desktops? Is there a recovery plan for desktops? What is the Recovery Point Objective (RPO)/ Recovery Time Objective (RTO) for desktops?

Users

- How many users connect at the same time (i.e. in the morning?)
- How many mobile users?
- Is there a need for offline access to laptops? How many?
- Is there a shift for users?

IT Staff

How is the IT diagram organized? How many people manage the desktop infrastructure? Is there any software utilized for desktop management (i.e. monitoring, inventory, patch)? Are

network and security staffs involved in the project? Are they aware of the advantages of virtualization?

Summary

Understanding existing customer requirements and objectives may help drive a clear strategy to design the best solution during the Proof of Concept (POC) phase through the use of best practices by the constructor. Our study will focus on EMC,VMware/Citrix, and Cisco.

Phase 2: Drive the Change

Introduction

While connecting with the customer, it is important to encourage them about the need to switch to a new desktop mindset. As seen from recent behavior, clients are not only seeking hardware but are searching for flexibility, mobility, and “freedom”. IT administrators suffer from security issues, management, and the need to fulfill business demands while minimizing IT expense. We are talking about a new era of desktop: Desktop/End User computing. This article is a summary checklist about aspects we should not forget when designing with specialized storage, network, and security architects.

Desktop Challenges

- Energy
- Backup/Recovery -> Business Continuity
- Patch and Configuration Management
- Diagnostic and Problems Resolution
- Efficiency
- Dynamic Allocation of Space
- Business Agility
- Security
- Compliance
- Intellectual Property
- Mobility
- New Devices

How can we face these challenges?

Hardware Aspect

In a complex customer environment, it is very important to start the assessment for design and POC.

Desktop Hardware

- Customers have been known to buy new desktops/laptops every year to replace their old equipment (after 3 or 5 years of use) or for new recruitment obligations.
- The typical user has internal storage, performing CPU/RAM, and full access to their machine. The user is free to use his/her storage for professional and personal use.

As long as customers run all applications on servers, we can suggest “thin clients” or “Zero Clients” to resolve security, energy, and incident issues on the desktop. For the customer, we can designate the desktops that need to be changed and those that need to be kept intact to protect investments while providing progressive change.

Servers

Designing servers is a critical point for new infrastructure because all desktops will be running in storage but will be accessed by hypervisor layers in servers and management servers.

Key points to remember:

- No single point of failure
- Investment in memory and CPU for high availability and new desktops during the three to five year timeframe to enable business agility
- CPU for virtualization
- Dedicated servers for managing the infrastructure
- Proposing Blade servers is ideal for five servers or more

Many documents are available for designing VMware and Citrix server infrastructure according to their best practices:

- http://www.vmware.com/products/view/resources.html
- http://blogs.citrix.com/2012/03/21/best-practices-document-for-xendesktop-and-xenapp-now-available/

EMC documents reference architecture is available also for approved solutions.

Storage

The most critical part of our design is storage. In fact, all desktop data will be migrated and centralized in a consolidated storage unit.

Today, the best storage for VDI is unified storage, offering NAS and SAN, and multiple protocols iSCSI, FC, and FCoE with performing disks (SSD, SAS) and costless disks (NL-SAS). All software around the storage gives the VDI environment the best performance with cost-effective solutions such as: tiering, fast cache, compression, deduplication, thin provisioning, and so on.

The main point to achieve the best solution is to design an infrastructure that can avoid storage overhaul, which also ensures overall competitiveness.

Seven points to focus on during the assessment:

- Boot Storm
- Login Storm
- Network Considerations
- OS Used
- Number of Desktop Configurations/Images
- Size of Data
- Disaster Recovery

An easier and safer way to design involves following: “EMC Documents Reference Architecture”, “EMC Proven Solutions Guide”, or “EMC VSPEX Solution”.

Network

The leader of network-based virtualization (next generation virtual workspace) is Cisco which combines Nexus/MDS in a unified fabric for the best level of availability and scalability. Many documents are available that show how Cisco virtualized networks are on the same wavelength as VMware virtual switches management. Cisco Nexus 1000v (free version available) could also be used to facilitate management of virtual networks allowing teams to manage all of the new networks for virtual machines from a single management interface. A network architect should be involved in order to draw a complete view of the network from the creation of the virtual machine to the LAN access.

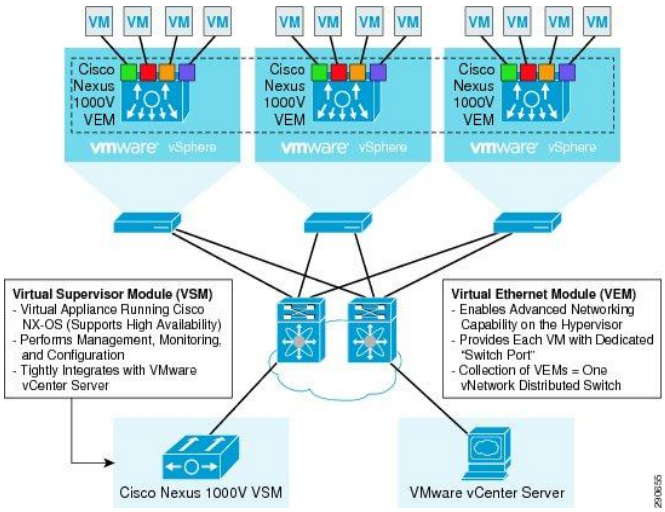

Figure 1: Cisco Nexus 1000v integration with vCenter

If distant branches are part of a virtualization project, WAN optimization is a must! The network bandwidth should be considered for the disaster recovery plan for VDI. PCoIP is a new network technology for virtual desktops that can also be implemented in customer environments. Best practices are also available to offer to the user the best connection experience.

Using Cisco Ace technologies and Nexus, we are ready today to expand architecture inside two different data centers allowing virtual machines to move outside while creating a cloud and managing charges and scalability in all data centers of the company (or with a cloud provider).

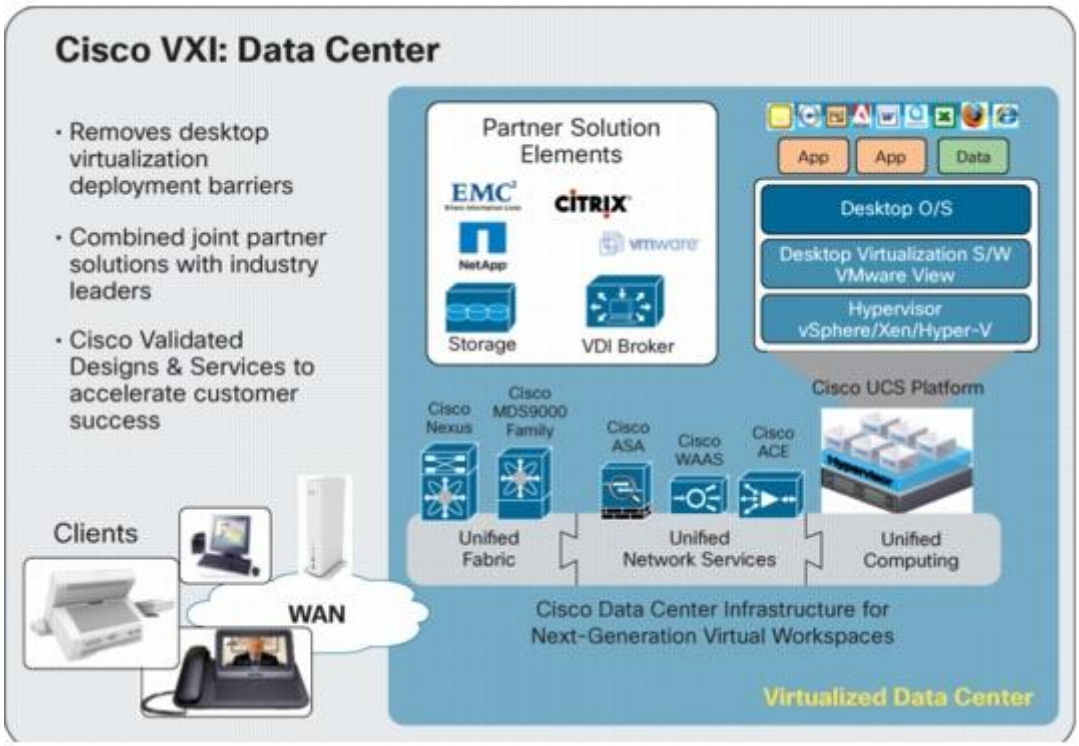

Figure 2: Cisco virtualized data center vision

It is very important to engage the customer's network team from the design phase through to project delivery.

Cisco documents for design available in the link below:
http://www.cisco.com/en/US/netsol/ns978/index.html
http://www.vmware.com/files/pdf/view/VMware-View-5-PCoIP-Network-Optimization-Guide.pdf

Security

Virtualization will bring a new network design. Consequently, it will require a strong security strategy with an end-to-end solution. Start with the network, hypervisor, and the virtual machine:

- Internal/External Environment
- Communications
- Applications
- Physical Device

New administration and management of virtual desktops introduce new functionalities such as:

- Dynamic resource allocations over the data center
- vMotion “hot migration” of virtual desktop between servers in the cluster VDI
- High availability which offers the virtual machine a mobility that should be considered while designing the security schema

Moreover, the use of new devices such as tablets and smart phones outside the company creates a real need to protect data and to secure access to the data center. EMC offers many functionalities such as ‘security and compliance pack’ in storage to protect data from changes or deletion. VMware has wide security functionalities already included in VMware suites where it has also extended its security catalog with vShield.

http://www.vmware.com/files/pdf/view/VMware-Security-Solution-Architecture-for-VDI.pdf
http://pubs.vmware.com/view-51/topic/com.vmware.ICbase/PDF/view-51-security.pdf
http://support.citrix.com/proddocs/topic/xendesktop-rho/cds-plan-security-rho.html

Associated with third party products (Cisco, F5, Cyberoam…),

All levels of security should be installed:

- Firewalls
- Antivirus/Antispam/Malware/UTM
- Email security
- Network Access Control
- Intrusion Detection Systems
- VPN

As for network, a security architect should be involved to draw a complete solution within the customer environment.

It is very important to engage the customer's security team from the initial design through to the delivery of the project.

Backup Plan

Losing all desktop environments after virtualizing and consolidating could be a disaster. As for the servers' environment, backup became imperative for centralized desktops. After answering questions about the criticality of desktops, we can provide a clear view on how we can achieve RTO/RPO.

If the customer has an existing backup server, we can integrate it or add backup for desktops using EMC Avamar® or—if there is sufficient budget—Avamar and Data Domain® Boost. Backup to disk is a necessity especially for critical data and tuned desktops.

As Avamar is integrated into VMware—replacing Data Recovery—the customer will take full advantage of a centralized Avamar backup.

Combining source-based deduplication and target-based deduplication maximizes backup space for a complete backup strategy, reducing costs, avoiding redundant information, and increasing efficiency.

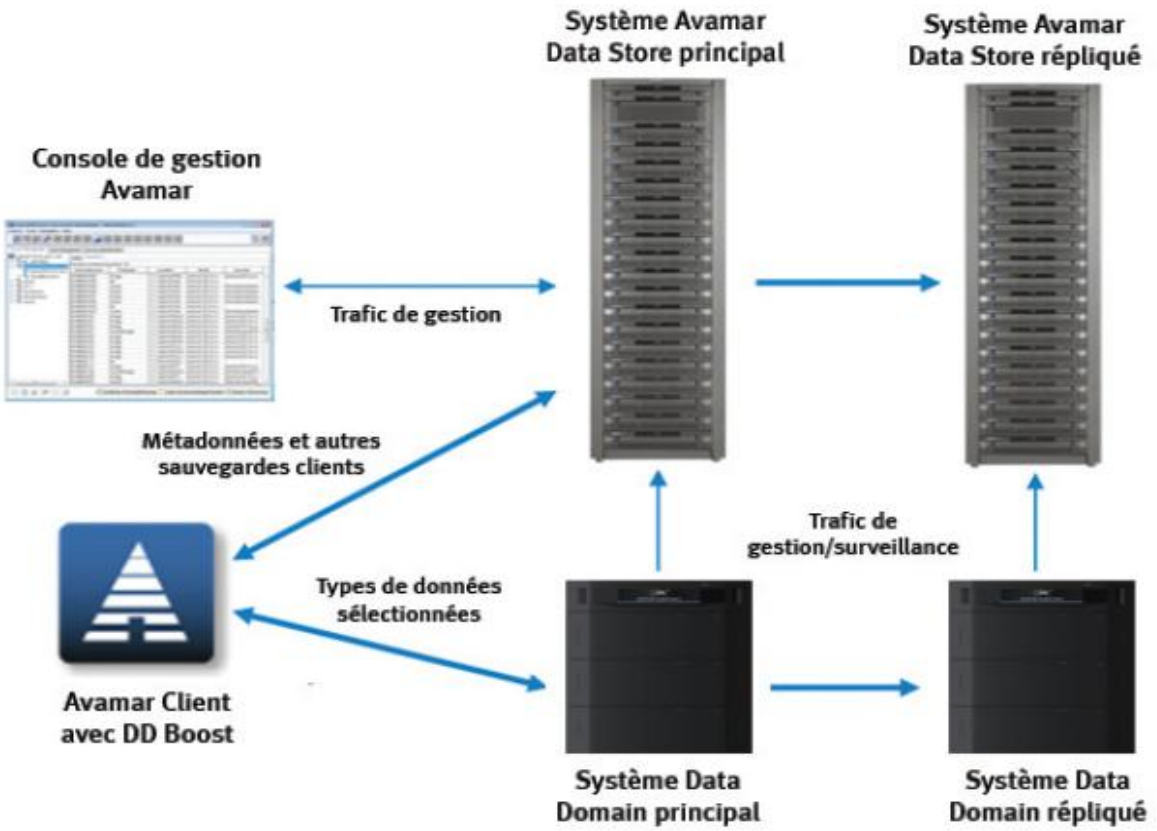

Figure 3: Avamar and Data Domain DDBoost for primary and recovery site

Available documentation can be found via the link below.
http://www.emc.com/collateral/software/white-papers/h6397-avamar-vmware-view-wp.pdf

Recovery Plan

The Recovery Plan for VDI should include all the necessary components to restart in a remote office in case of a disaster.

Scenarios of recovery depend on RTO/RPO that our customer wants to achieve and the budget available for it. Two of the most common scenarios are:

- Active/Active ; both sites deliver desktops for users and the replication is in two ways
- Active/Passive : only one site delivers desktops and the replication is one way

Key Components:

- Two storage units with synchronous/asynchronous replication
- RecoverPoint appliances
- VDI component replication
- Avamar (and Data Domain) and their replication
- Depending on budget (EMC VPLEX®, Cisco OTV)

Unfortunately, VMware Site Recovery Manager is still not supported for VMware View.

Some useful links:
http://www.vmware.com/files/pdf/techpaper/VMware-View-Backup-Best-Practices.pdf
http://support.citrix.com/article/CTX127563
http://france.emc.com/collateral/hardware/technical-documentation/h7113-vplex-architecture-deployment.pdf

Choice of virtualization software

With all questions answered in phase 1, we are ready to choose the best virtualization software. Today, even though VMware fails to virtualize Linux desktop, it is a leader of virtualization and many customers that have already implemented it for servers would choose it for VDI. VMware View client for Linux can be used to access the desktop.

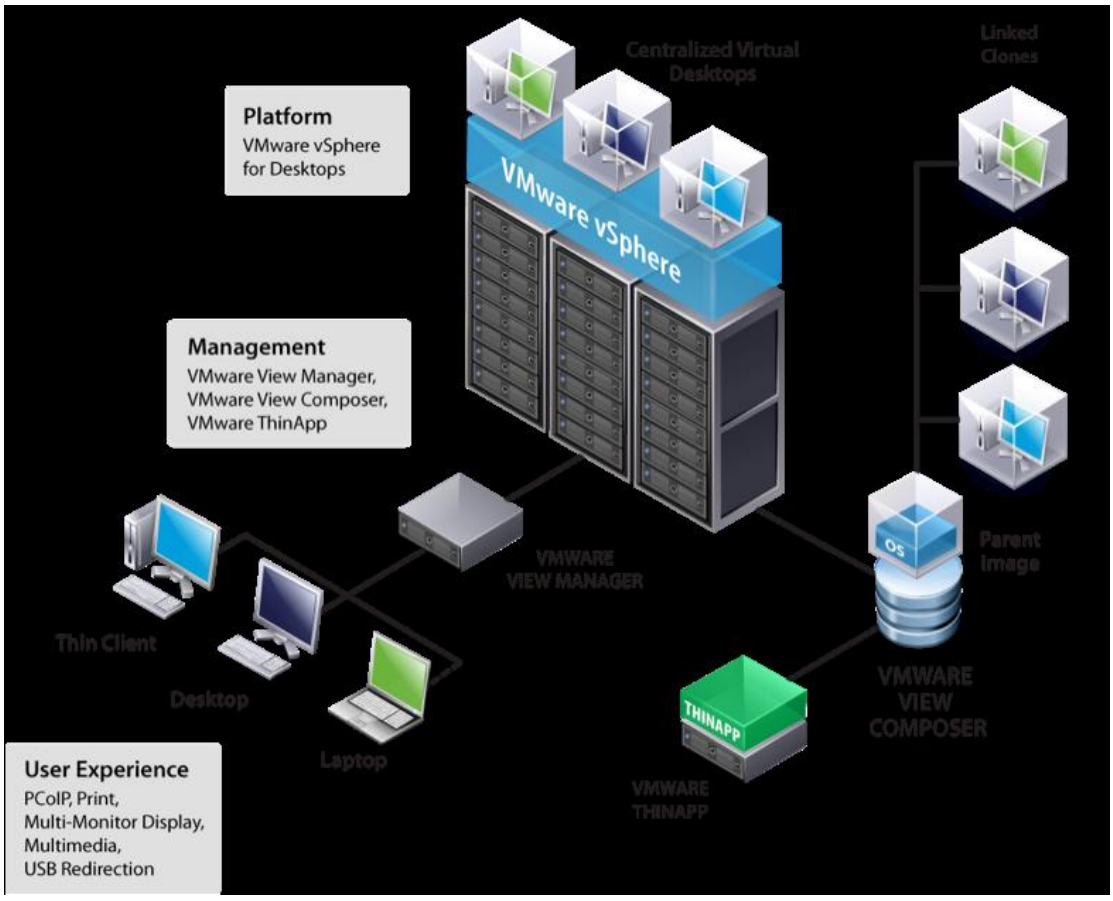

Figure 4: VMware View architecture

Organizational Aspect

IT Staff

Changing the desktop infrastructure requires a new organization within IT staff, Director of IT should drive this change progressively with technical staff. A team spirit is very important to project success; infrastructure and system managers will need the network and security team, and technicians will need all of them to accomplish their missions.

Incidents will differ from those of traditional desktops as the desktops will be in the data center; technicians need to acquire new knowledge and skills (servers, virtualization) to manage the virtual workstation environment. It is recommended that a complete training program be included as a part of the project.

Users

Commitment of users is a very important metric to judge a VDI project. The best way to engage them is to clearly explain to them what you are looking for before starting the project, the aim of the virtualization, and how they can gain more flexibility over time. IT administrators should define groups of users, know how to grant access and for whom, which template (CPU, RAM, disk), and which use of workstation?

Journey to cloud

Virtualization is a first step in the journey to the cloud. As seen in this article, many other aspects can play an important role to success. IT as a service is a new way of developing and offering services around data in the company. Today, offers are coming to create a new desktop sphere but there are still several management tools to reach the cloud objective for VDI. However, the dream of VDI cloud can only be realized if a budget is invested in by the customer.