



Storage on Demand & Infrastructure as a Service

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Northwest Regional Data Center

- Northwest Regional Data Center (NWRDC) operates as a 100% self-funding, auxiliary of Florida State University
- NWRDC is a nonprofit that charges only what our services cost to provide those services
- Provide services to universities, community colleges, K12, as well as city, county, and state government entities

NWRDC Background

- Mainframe services
 - Primary application hosting
 - Application sunsetting
 - DR services
- Server Hosting
 - Collocation and Disaster Recovery site (hot, warm, or cold)
 - Managed services
- Software as a Service (SaaS)
- **Storage on Demand - NEW**
- **Infrastructure as a Service (IaaS) - NEW**
- Connectivity to the Florida Lambda Rail
- 100% cost recovery – pass savings to customers



Storage on Demand

Storage Needs & Concerns

- Need to replace older storage:
 - DASD for Mainframe 5+ years
 - 3 SANs for Open Systems 6+ years
 - 5 other SANs that we manage 7-8 years
- Management of different SANs
- Didn't have an alternative for Customers
(Provide their own SAN for minimal storage)
- 30 – 35 SANs on the Data Center floor
- Power and Cooling constraints

Review of Current Storage Needs

Replacement of 8 legacy SANs to increase:

- Reliability of hardware
- Ease of management of the storage
- Expandability
- Cost-effectiveness of storage
- Ability to provide production storage in Atlanta to transition from off-site backup target to a fully functional DR facility.

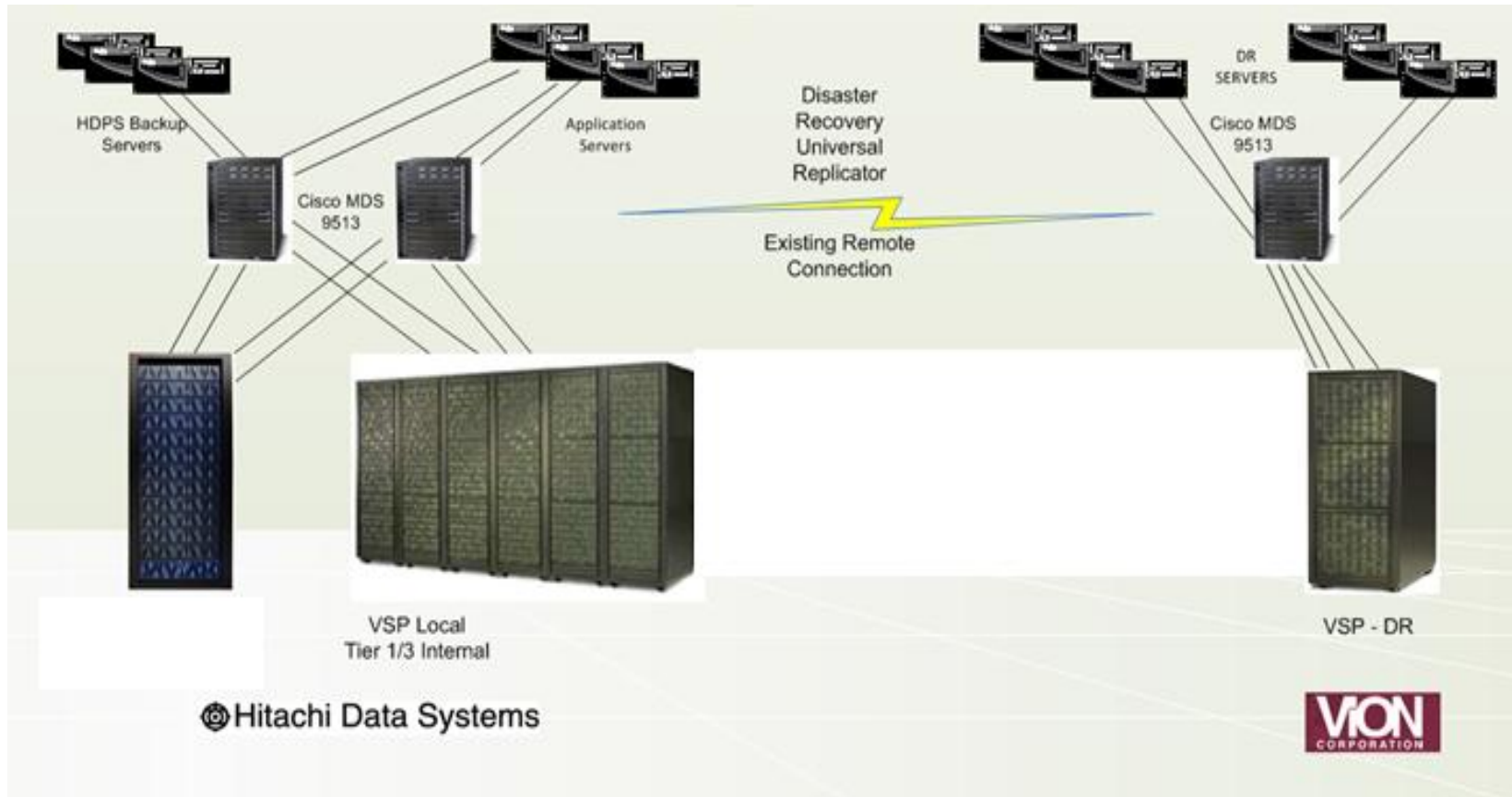
New Storage Offering

How is this offering different?

A Different Storage Offering

- Main difference is that we don't own the hardware, ViON does.
- We agreed to a baseline that we wouldn't go below.
- Storage can increase and decrease, we just cannot go below our baseline
- As a nonprofit & auxiliary of FSU, so we don't charge any more than what it costs to run the service.

Storage Offering



ViON/Hitachi Solution for NWRDC Enterprise Storage

- VSP – Virtual Storage Platform for both Production and DR sites
 - Allows integration of multiple vendors' backend storage systems through Universal Volume Manager aiding migration efforts
 - Accessible to both Mainframe and Open Systems
- AMS2500 – Adaptable Modular Storage at Production site for backup
 - Replaces function-specific backup storage devices
 - Full storage ability allowing use of storage space for purposes other than backup
- Support for all present storage protocols (Fibre, iSCSI, FCoE, FICON)
- Cisco 9513 Director Class switches
 - Flexible enterprise level switches
 - Multiple blade configuration options

Capacity on Demand Needs

- Storage by tier (T1, T3, BackupT3-AMS)
- Internal clones and snaps
- FC ports
- Remote Replication to VSP in Atlanta
- Remote Production Storage on VSP in Atlanta

Infrastructure is in place for (available upon request):

- Dynamic Tiering
- Tier 0 - SSD

Capacity on Demand

- Customers can subscribe to storage on a monthly basis
- Subscribe to the amount of storage they actually plan to use.
- Quickly add more storage during peak times
- Unlike other traditional offerings, “give back” the storage you don’t need
- You only pay for the storage that is allocated to you.

Overview of Capacity on Demand

Positive points

- Vendor owns the hardware (no maintenance)
- No upfront costs...pay as we go
- Charges increase as our utilization increases BUT they also decrease as our utilization drops
- Allows for greater flexibility in delivering service
- Vendor responsible for keeping “buffer” storage available

Tale of Two Service Offerings

Capacity on Demand

IOPs on Demand

IOPs on Demand - Performance

- Performance-based model accommodates the IOPs that the Customer needs and when they need them
- Customer establishes a baseline (ex. 20,000 IOPs)
- Increase increments of 5,000 IOPs
- Month to month storage IOPs can be increased or decreased, just not below the baseline.
- Also, ViON will provide set amount of additional IOPs at go live or critical times.

Local and Offsite Replication

- Local Clones and Snapshots Onsite backup of VSP to AMS system
Mainframe and Open System clones are using AMS storage
- Offsite replication of VSP to VSP at DR site
 - “Real-time” LUN level replication
 - After initial sync, it only sends changes
 - Creates infrastructure backbone for hot site DR
 - Directly supports connectivity to mainframe and open systems without need of system restorations
 - Increases client options for DR
 - Improves NWRDC offerings to fulfill requirements of clients/prospective clients
- Onsite backup of VSP to AMS system
Production Mainframe VTL reconfigured to use AMS storage

Migration from Legacy to Hitachi

- Externalize the existing storage behind the VSP
- Put VSP into same storage group so it can see the LUNs
- Physically move the FC cables from legacy switches to the new FC directors.
- Zone them into the new fabric
- Map and mask them through the VSP back to the externalized legacy storage

Now for the Fun!

- Migration is like moving a LUN from Tier 3 to Tier 1
(It is all behind the scenes)
- Done.

Mainframe Storage - Now

- Mainframe Production DASD storage is on VSP
- Production volumes replicated “real-time” to VSP at DR site in Atlanta.
- Snaps running to the AMS.
- Mainframe backup writing to a VTL on the AMS
- Backups being replicated “real-time” to Atlanta
- Near future migrating HSM and Customer data on ATL to the VTL and have it also replicated to Atlanta.

Open Systems - NOW

- All of our back office Open Systems are on the VSP storage
- Our Open Systems backups are being written to the AMS, which is being replicated to the VSP in Atlanta
- Replaced most of our legacy SANs and are in the process of migrated off the rest.



Questions or Comments?



Infrastructure as a Service

Virtualization Savings

- Space
 - Physical rack space
 - Power and cooling
- Time
 - Efficient Management
 - Quick turn-around time for new projects
- Money
 - Cost of hardware
 - Cost of maintenance
 - Cost of administration

Current Offering - Virtual Hosting

- Full managed or Collocation
- Priced out in Resource Pools bundles
(1vCPU & 2GB RAM)
- Enterprise Storage
 - Performance
 - Expansion & Flexibility
- Secure Remote Connection – VPN
- Florida Lambda Rail and TLH Fiber Loop
- DR & offsite virtual machines

Building Infrastructure as a Service

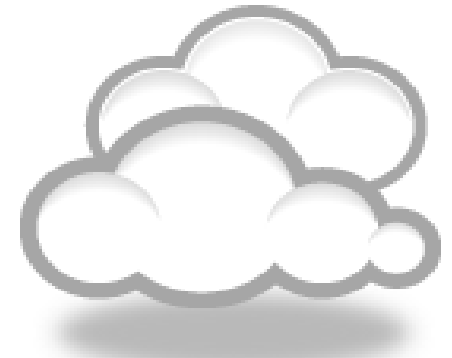
IaaS - evaluating vCloud Suite Enterprise

- Working on becoming a VMware vCloud Service Provider
- Since we are 100% cost recovery and a nonprofit, we can pass it on to our customers
- We can't charge any more than what it costs to run the service



Building IaaS - continued

- As we get more customers on this offering, we will reevaluate the pricing.
- This lowers our pricing, which lowers our customers' bill



vSphere 5.1 ESXi

What's new?

- Size of virtual machine
 - 64 virtual CPUs (vCPUs) and 1 TB of vRAM
- vShield EndPoint
 - Protecting VMs from the host level
- Storage DRS and Profile-Driven Storage
 - Similar to DRS with virtual machines and hosts, but now with datastores

vCloud Director & vCloud Connector

- Allows portal into customer's datacenter
- Private Clouds can connect to Public Clouds through a "single pane of glass"
- This hybrid cloud allows you to move VMs & vApps between private and public clouds
- Free up resources in your datacenter

vCloud Director & vCloud Connector

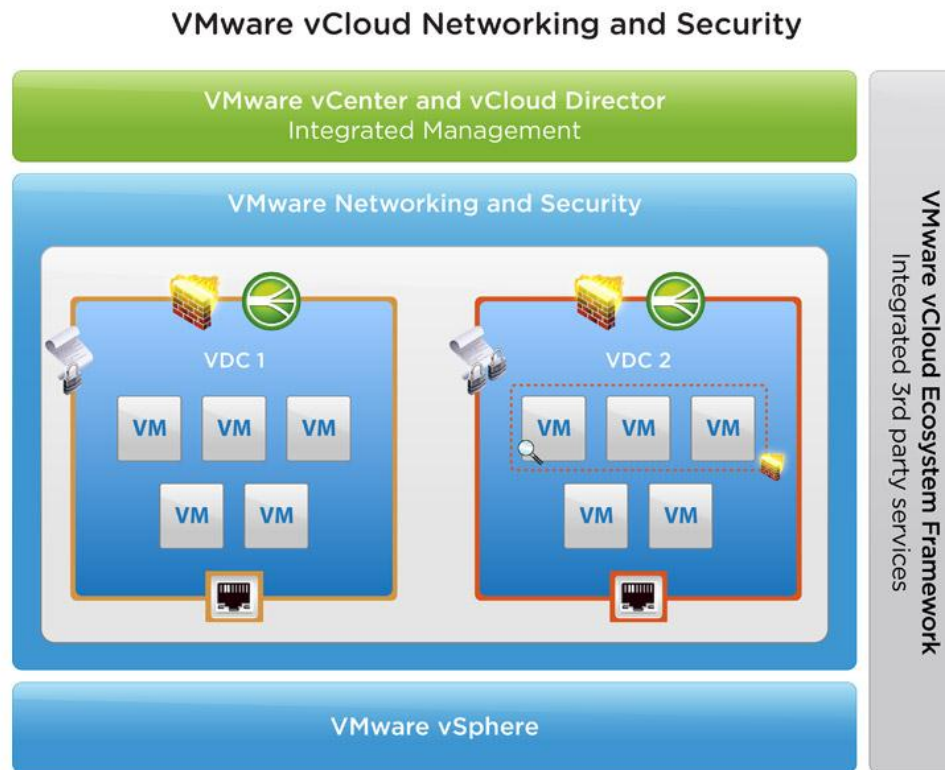


Customer site

NWRDC

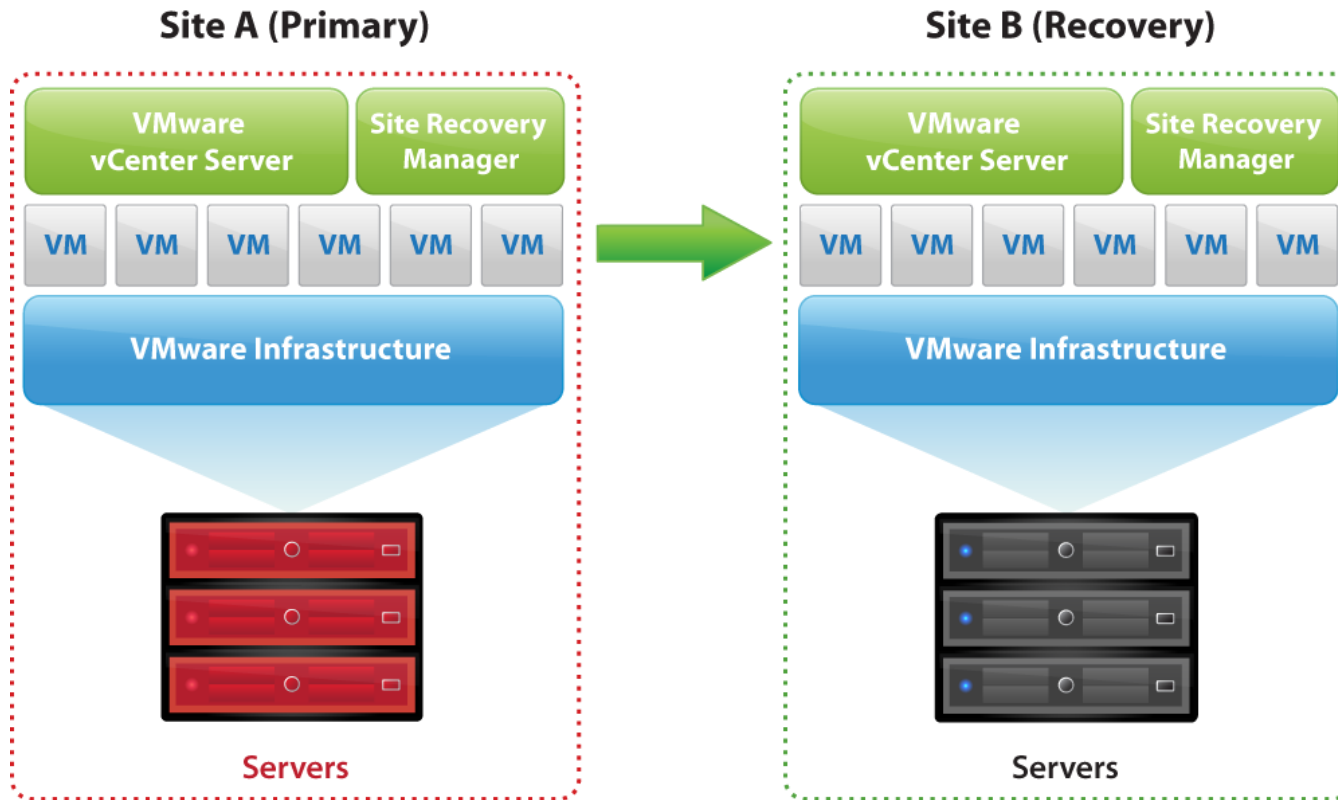
vCloud Networking & Security

Provides flexible tools that include firewall and load-balancing services



Source: <http://www.vmware.com>

vCenter Site Recovery Manager



Site Recovery Manager can accelerate recovery of the virtual environment through automation

vCenter Site Recovery Manager

- SRM automates the creation of DR run books
- Provides the means to test these plans without impacting production environment
- Can bring up your environment in a “bubble” as well as bring up a group of servers that are connected (ex. SharePoint in a farm configuration)

vCenter Operations Management

- Dashboard that provides views into health, risk, and efficiency of your infrastructure
- Correlation of Performance and Change Events
 - What changes happened and when they happened from within guest OS
- Capacity planning, reporting, and optimization
- Cost metering and smart alerts

vCenter Configuration Manager

- Management and performance monitoring of both host and VMs
- Even shows Change Management for before root cause analysis
- Allows NWRDC to improve and expand our service offering

vCenter Configuration Manager

VMware vCenter Configuration Manager | Collector: VCMDEMO | User: VCMDEMO\vcMAAdmin, *Admin

Machine Group: All Machines | Filter: Define

View report | Export | Print

Start Date: 2/27/2011 4:47:42 PM
End Date: 8/5/2011 4:47:42 PM

Machine Change Management Dashboard

| Execution Time | Login Name | Role | Machine Group Name |
|---------------------|-------------------|-------|--------------------|
| 3/5/2012 4:48:11 PM | VCMDEMO\vcMAAdmin | Admin | All Machines |

Total Changes Between 2/27/2011 4:47:42 PM and 8/5/2011 4:47:42 PM

Please use the Machine Change Log Detail Report to view the details for categories that have more than 10,000 records.

| Change Type | Count |
|-------------|--------|
| Added | 16,397 |
| Deleted | 5,889 |
| Modified | 12,881 |

| Data class | Added | Deleted | Modified |
|----------------|-------|---------|----------|
| Accounts | 29 | | 11 |
| Device Drivers | 22 | | 17 |
| Disk Space | | | 1 |
| File System | 925 | 79 | 12,555 |
| Groups | 2 | | |
| IIS | 96 | 150 | |
| IP Information | 2 | 8 | 8 |
| Machines | 1 | | 24 |

0 jobs running

Source: <http://www.vmware.com>

Other vCloud Suite Components

Other tools that NWRDC would use to analyze and help deliver a better service to its customers:

- vCenter Chargeback Manager
- vCenter Infrastructure Navigator
- vFabric Application Director

Success Story

- Removed/moved from an Agency in a short period of time
- Didn't have core infrastructure
- Needed all data center functionality
- Transferred existing applications in a different virtual environment
- 19 servers all together
- Able to leverage existing environment

Success Story – (continue)

Deployment included:

- Active Directory
- Exchange
- Oracle
- SQL
- File and Print
- Existing App servers

Success Story – (continue)

Using a Resource Pool gives the agency the flexibility to make strategic decisions on increasing or decreasing their pool based on performance needs

Disaster Recovery and Virtualization

Hot, warm, and cold site for Disaster Recovery

- Hosted virtual disaster recovery servers
- Data Replication to offsite DR servers running VMware
- Reduction of cost by using virtual servers instead of acquiring physical servers for collocation
- Virtualization provides a platform for bare metal restorations from physical servers to virtual machines

Moving Forward...

Restores as a Service

“You are only as good as the backup that you can RESTORE.”



Questions or Comments?



Thank You

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