Designing, Building, and Deploying Dell Active Systems for Virtualization & Private Clouds

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Dell Enterprise Forum Australia
Optimize your enterprise
Melbourne | 19 November 2013
Agenda

• Active System Overview
• Active System Design Points
• Active System Manager Overview
• Deploying and Expanding Active System 800 with Active System Manager
• Using Active System Manager to Deploy and Integrate Workloads
Active System Family Overview
Active Infrastructure Portfolio

**Workload Optimization**

- **Private Cloud**
  - Microsoft Private Cloud
  - VMware Private Cloud

- **VDI**
  - Citrix VDI, VMware VDI, Microsoft VDI

- **Enterprise Applications**
  - SAP, SQL, UC&C, SharePoint, Lync, HPC

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**Unified Management**

**Active System Manager 7.1**

Automated workload delivery & end-to-end converged infrastructure management

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**Integrated, optimized systems**

- **Active System 50**
  - Self-contained IT environments with simple application needs

- **Active System 200**
  - Intermediate IT environments with general application needs

- **Active System 800**
  - Scalable for large enterprise IT environments with sophisticated IT needs

- **Active System 1000**
  - Highly scalable for large enterprise IT environments with sophisticated IT needs

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**Customer Experience**

Range of service and support choices including Pro-Support, Support Assist & Co-pilot

Available worldwide

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Active System Design Points
Active System Design Principles

What are the key items designed into each Active System?

<table>
<thead>
<tr>
<th>Optimal Hardware and Software Configuration</th>
<th>Redundancy</th>
<th>Flexibility</th>
<th>Easy Deployment</th>
</tr>
</thead>
</table>
| • Based on Dell and industry best practices | • Minimize single points of failure  
• Provide resiliency | • Multiple prepackaged options  
• Selectable CPU, Memory and Storage options | • Available to be racked and cabled at a Dell Merge Center  
• Bundled with Technical Services to configure and bring up at the customer site |
## Active System Design Points and Features

### Workloads

<table>
<thead>
<tr>
<th>Hypervisor</th>
<th>Server</th>
</tr>
</thead>
</table>
| • Local Storage (SD/HDD)  
• HA, vMotion / Live Migration, DRS enablement  
• Isolated Management Fabric | • Processor Model starting point  
• Memory Sizing starting point  
• NIC Sizing and Redundancy (teaming)  
• Isolated vMotion / Live Migration Fabric |

### Network

<table>
<thead>
<tr>
<th>Storage</th>
</tr>
</thead>
</table>
| • Converged Fabric  
• Segregated iSCSI Fabric  
• Segregated LAN Fabric  
• ISL sizing for inter-array traffic | • Switch Redundancy  
• Future Expansion Ports  
• Network Segmentation  
• Uplink to core  
• Storage multi-pathing  
• Storage load balancing  
• Active connections sizing | • Switch Redundancy  
• Future Expansion Ports  
• Network Segmentation  
• Uplink to core |

### Storage

<table>
<thead>
<tr>
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</table>
| • Storage multi-pathing  
• Storage load balancing  
• Active connections sizing | • Storage Tiering and load balancing ready  
• Healthy Subscription ratio |

### Management

<table>
<thead>
<tr>
<th>VM Provision/Manage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x Many VM Mgmt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitor/Manage</th>
</tr>
</thead>
<tbody>
<tr>
<td>OOB Management</td>
</tr>
<tr>
<td>Hardware monitoring</td>
</tr>
<tr>
<td>Hardware inventory</td>
</tr>
<tr>
<td>Hardware management</td>
</tr>
<tr>
<td>Storage monitoring</td>
</tr>
<tr>
<td>Cloud Integration</td>
</tr>
<tr>
<td>Upgrade/Maintain Firmware updates</td>
</tr>
<tr>
<td>RepoUtil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance Monitor/Manage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server performance</td>
</tr>
<tr>
<td>Storage performance</td>
</tr>
</tbody>
</table>

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**Optimal Hardware and Software Configuration**

**Redundancy**

**Flexibility**

**Easy Deployment**
Active System 50
1 GbE non-converged LAN and iSCSI SAN

**Hardware Components**
- Servers - R620 & R420
- Networking – PowerConnect 7024
- Storage – PS6100
- Dell UPS 3750

**Common Features**
- Broadcom Quad Port 1GbE rNDC and PCIe Add-in Card
- Separate LAN and SAN fabrics
- Traffic distribution across ports and NICs

**VMware ESXi Active System Features**
- EqualLogic MEM for SAN multi-pathing redundancy and improved SAN utilization

**Hyper-V Active System designs**
- EqualLogic Host Integration Tools (HIT) + MPIO DSM for distributed SAN MPIO load.

**Optimal Hardware and Software Configuration**
- **Redundancy**
- **Flexibility**
- **Easy Deployment**
Active System 200 & 800
10 GbE based Converged LAN and iSCSI SAN

Hardware Components
- Servers – M620, R720, R620
- Networking – I/O Aggregator, S4810, S55
- Storage – PS6110, PS6510

Converged LAN & SAN
- Guaranteeing SAN traffic can flow
- How to allocate bandwidth
- Hardware and Software must support

Data Center Bridging
- Isolates LAN from SAN Traffic
  - Bandwidth allocation & flow control
- Supported End-to-End
- Managed centrally
  - Configured centrally & distributed via LLDP DCBx
  - Utilizes iSCSI TLV over DCBx

Optimal Hardware and Software Configuration
Redundancy
Flexibility
Easy Deployment
Active System 1000
10 GbE based LAN and 8 Gbps Fibre Channel SAN

Hardware Components
• Servers - M620, R620
• Network – I/O Aggregator/MXL, S4810/S5000
• Storage – SC8000, Dell 8|4 FC & Brocade 6510 FC Switch

Fibre Channel SAN
• NPIV support from Dell 8|4 module
• Native Host Multi-pathing & Single Initiator Zones

Compellent Storage Center
• Virtual Port mode for load balancing and WWN failover
• Fluid storage tiering between different storage enclosures
• Fibre Channel and iSCSI front-end ports

Other Highlights
• Hyper-V solution adds the iSCSI front end to Compellent to support in-guest clustering (< Storage Center 6.3)
Active System Virtual Switches

Hyper-V Virtual Switches
- Native Windows Server 2012 Load balance and Failover teaming
- Single function network adapters for simplified networking
- Bandwidth weighting applied to tune the virtual network adapters

VMware Virtual Switches
- Active/Active and Active/Passive port groups
- Bandwidth allocation and tuning provided via hardware partitioning
- vSwitches and port groups separated based on traffic

Optimal Hardware and Software Configuration
Redundancy
Flexibility
Easy Deployment
Active System Customer Network Integration

**Active System 200/800/1000 options**
- (4) x 40G LACP w/VLT (160G Total Active)
- (8) x 10G LACP w/VLT (80G Total Active)
- (4) x 40G LACP w/RSTP (80G Total Active)
- (8) x 10G LACP w/RSTP (40G Total Active)

**Active System 50 options**
- (4) x 10G LACP w/RSTP (20G Total Active)
- (8) x 1G LACP w/RSTP (4G Total Active)

**Notes**
- Layer 3 routing based in customer core, optionally in Active System switches
- Uplinks are 801.q trunks with Management, OOB and Workload VLANs

**Optimal Hardware and Software Configuration**

**Redundancy**

**Flexibility**

**Easy Deployment**

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Active System Manager Overview
Active System Manager Overview

**Automation**
- Rapid infrastructure on-boarding
- Automated infrastructure configuration & lifecycle management

**Centralization**
- Robust, centralized management platform
- Self-service web portal

**Operational Savings**
- Manual step & touch point reduction
- Increased speed of delivery

**Capital Savings**
- Resource pooling
- Dynamic resource allocation

**Accuracy**
- Template-based provisioning & workflow orchestration
- Real-time & historical operations auditing

**Adaptability**
- Workload resource scaling
- Physical & virtual workload migration

**Agility**
- Accelerate IT service deployment

**Efficiency**
- Maximize efficiency across the IT services lifecycle

**Quality**
- Offer consistent IT service delivery

Active System Manager
Automated workload delivery and end-to-end converged infrastructure management

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Deploying & Expanding Infrastructure with ASM
Deploying the Compute Cluster Nodes

Manual Configuration
• Configure each component independently
• Multiple touch points
• Repetitious & error prone

Automated Configuration with ASM
• Install ASM
• Discover hardware & prepare servers
• Customize template
• Go!

Servers

vCenter

Networking

Hypervisors

Storage
Preparing for Deployment

Identify Hardware
- Enter device IPs and credentials

Start discovery process

Enter Customer Settings
- Set key customer settings
- IP Addresses
- Passwords
- DNS Servers
Scheduling Deployment

Select the best practices based deployment template

Set additional customer settings
- Cluster size
- LUN settings
- Network VLANs

Schedule Deployment
Active System Manager Deployment Process

Available Hardware

- Select Blades
- Configure NPAR settings

Customer Settings

- Configure VLANs on IOAs
- Configure VLANs on Top of Rack Switches

Best Practices Based Template

Server
- LUN Creation
- CHAP Credential Creation

Network
- Deploy Hypervisors
- Configure Password
- Configure IPs (Mgmt, vMotion, iSCSI)
- Configure Port Groups (VLANs)
- Configure iSCSI Initiators
- Deploy Hypervisor
- Install/Configure EQL
- MEM module
- Syslog Settings

Storage
- Cluster Creation
- Datastore Creation

Hypervisor
- Best Practices Based Template
- Available Hardware
- Customer Settings
Successful Deployment

Each compute node is built out according to best practices.
Expanding the Active System 800

**Challenge**
- As business grows, more compute nodes are necessary.
- Must deploy additional nodes quickly, but consistency is critical.
- Expansion nodes must be configured similar to existing nodes.

**Solution**
- Add additional chassis and/or blades
  - Up to 2 chassis and 32 blades
- Cable according to Active System 800 Solution Guide
- Discovery and deploy!
Doing More with Active System
Rapid Expansion and Integration of Production Server

**Challenge**
- Need to deploy a new webserver.
- Must be integrated into the production web farm.
- Deployment must be able to be initiated by end-users.

**Solution**
- Utilize Active System Manager to orchestrate the deployment and integration of the new webserver.

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Workload Provisioning Process

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE drl SYSTEM "http://activeSystemManager:40500/">

Workload Lifecycle
1. End-user request of workload
2. VMware cloning of workload
3. Workload integration with customer environment
4. Provision Complete - Workload in operation
5. Workload disintegration from customer environment & VM deleted

- Cloning
  - VMware-based provisioning
  - Leverages standard vCenter customizations

- Setup
  - Execute a local script to integrate workload with environment

- Production
  - Unregister webserver from load balancer
  - Workload is powered off and deleted

- Teardown

- Request
  - Web Portal
  - XML API

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Summary

- Overview of the Active System Family
- Walk-thru of Engineering Design Points
- Technical walk-thru of key Active System components
- Connecting an Active System to the customer’s network
- Active System Manager Overview
- Using Active System Manager to deploy the compute cluster
- Using Active System Manager to expand your cluster
- Using Active System Manager to deploy workloads and orchestrate integrating into a customer environment
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