Taking Software Defined Storage to the Next Level with FlexPod

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What If You Could...

- Accelerate business response instead of being the critical path?
- Focus on IT innovation instead of just keeping things running?
- Quickly support all new opportunities even opportunities not yet identified?
- Do all of this with one architecture in any environment
Changing Role of IT

Everyone has to think like a service provider
But Hybrid Data Centers Are Difficult

Integrate public resources while retaining control
...And Data Doesn’t Move Easily

- Data needs to be close to compute for performance
- Moving data between clouds is difficult
  - Time consuming
  - Expensive bandwidth
  - Cloud formats are often incompatible
  - Data services are not consistent

Compute is agile; data is not
NetApp Can Help

Seamless connectivity among clouds
Path to the Data Center Transformation

Software-Defined Data Center: Simplify IT operations through services, which pool, abstract, and automate data center infrastructure

Software-Defined Storage: an intelligent, scalable, always-on enterprise wide data infrastructure – supports apps along the transformation
Path to the Data Center Transformation

Microsoft® Private Cloud: Simplify IT operations through services that pool, abstract, and automate the data center infrastructure

Agile Data Infrastructure: An intelligent, scalable, always-on enterprise-wide data infrastructure that supports apps during the transformation
Unified Storage Platform for XenDesktop

NetApp Clustered ONTAP

CIFS/Blocks  NFS/Blocks  NFS/Blocks  CIFS  CIFS

Dedupe aware NetApp Snapshot copies

Win 7/ 2008 OS
User Installed Apps
Corporate Apps
Profile / Folders / User Data

XenDesktop

Base image/ vDisk  PVS Write Cache  Personal vDisk (s)  XenApp  ShareFile / CIFS Home Directory

Hypervisor

NetApp unified architecture supports all data types

NetApp SnapMirror

DR Site
Clustered Data Ontap

These stay online!

Eliminate planned downtime for storage

- Move data off old nodes
- Upgrade Data ONTAP software
- Scale and load balance
Agility for Multi-vendor Storage Implementations

Non-virtualized Servers

Virtualized Servers

Big Data Content Servers

Workloads and Users

Policy-based Data Management

Unified Data Network

FCP, FCoE, iSCSI, CIFS/SMB, NFS/pNFS
Agility for Multi-vendor Storage Implementations

Non-virtualized Servers

Virtualized Servers

Big Data Content Servers

Workloads and Users

A
B
C
D
E

Support for NetApp disk And 3rd Party Arrays

Non disruptve upgrade of controllers and capacity expansion

Support for Unified SAN And NAS Protocols

Mix of FAS and V-Series In clustered ONTAP

Policy-based Data Management

Unified Data Network
FCP, FCoE, iSCSI, CIFS/SMB, NFS/pNFS
Benefits of Nondisruptive Operations

Zero downtime for upgrades, refreshes and replacements

- Utilize existing storage
  - Match data to disk price and performance, e.g. CX, DMX
- Make transparent upgrades and technology refreshes
- Seamlessly expand capacity and performance
- Maintain data access across product lifecycles
- Rebalance performance or capacity for critical workloads
Best-in-Class Functionality
New in Clustered Data ONTAP 8.2

Nondisruptive Operations
- Continuous data access during upgrades
- Fast, storage-efficient backups
- Higher data availability in Microsoft® environments

Proven Efficiency
- QoS for full range of SAN and NAS workloads
- Multi-tenant consolidation

Seamless Scalability
- Start small, grow big—start with a single-node cluster
FlexPod Integrated Infrastructure
Validated Platform to Speed Application Deployment

Core architecture
- Cisco® UCS B or C Servers, UCS Manager
- Cisco Nexus® switch
- Cisco fabric interconnect and fabric extender
- Optional virtual switch
- NetApp® FAS storage and Data ONTAP®
- NetApp E-Series storage

Workload (application and/or hypervisor)
- VMware®, Microsoft®, Oracle®, Citrix®, Big Data…

Validated Design document
- CVD, NVA, Solution Guide

Delivery via solution integrators
- FlexPod Premium Partners, Certified Partners

Cooperative support
- NetApp, Cisco, VMware, Microsoft, Citrix
FlexPod Sizing Tools Enable Flexibility
Flexing for Different Uses, Performance Profiles

Production
Balanced Infrastructure

VDI
Higher Performance Blades and More IOPS

Develop and Test
More Computing and Less Storage

Starting Out
Deploy Entry System; Then Scale Up

Data Protection and Backup
Less Computing and More Storage

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Next-Generation Integrated Infrastructure
Flexible Architecture for Shared Virtualized Environments

Pool resources
- Single server pool/storage pool
- Service profiles for consistent policy-based Cisco® UCS™ deployments

Abstract resources
- Virtualized servers and storage
- Stateless computing
- Dynamic scalability; app and data mobility

Consume resources
- Service catalogs
- Rapid resource provisioning in accordance with SLAs
- Open APIs for self-service/user-driven resource consumption
FlexPod Management and Orchestration
Open Ecosystem of Management Partners

Service Catalog

Cloud Orchestration Tools

APIs

Service Profiles

Service Catalogue

APIs

Server and Network Admin

Storage Admin

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Accelerating FlexPod with Flash

NetApp Is the Flash Leader with Over 60PB Deployed

FlexPod® Express and FlexPod Datacenter:

- **Server Level**
  - NetApp® Flash Accel™

- **Controller Level**
  - NetApp Flash Cache™

- **Storage Pool Level**
  - NetApp Flash Pool™
  - All-SSD aggregates

FlexPod Select:

- **Hybrid Arrays**
  - Persistent or Cache
  - E-Series

Flash especially helpful for these FlexPod workloads:

- Databases
- Microsoft
- VDI
FlexPod Prevalidated Application Stacks
Expanding Business-Critical Workload Support

- Cisco Nexus® Data Center Switches, Virtual Multiservice Data Center
- Citrix® XenDesktop, CloudPlatform
- Cloudera Distribution
- Hortonworks Data Platform
- Microsoft® Private Cloud, Exchange, SQL Server®, SharePoint®, Hyper-V™

- NetApp® MetroCluster, SnapProtect®
- Oracle® RAC, JD Edwards, Oracle Linux®, Oracle VM Server
- Red Hat Enterprise Linux®
- SAP® Applications
- VMware® vSphere®, View®

Validated Workloads

Security Options

Secure Separation

Secure Multi-Tenancy

Hypervisors

Hyper-V

Oracle VM

Red Hat

VMware vSphere

Bare Metal OS

Performance Balanced Server, Network, and Storage Components

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FlexPod Wins 2013 Best of TechEd Award

FlexPod® with Microsoft® Private Cloud Awarded Best of TechEd 2013 in the Systems Management Category

Award Criteria:

- Strategic Importance
- Competitive Advantage
- Value to Customers

“A collaborative effort between Cisco, NetApp, and Microsoft, FlexPod combines hardware and software to provide a complete, turnkey solution for Hyper-V® provisioning. The FlexPod® software toolkit utilizes PowerShell™ and Orchestrator to minimize customer headaches by fully automating the provisioning process. The toolkit is free as part of the overall hardware solution. This collaborative effort between Cisco, NetApp, and Microsoft provides a strong level of support and future potential.”

- TechEd 2013 Judges

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The NetApp and VMware Global Alliance

- Mutual top level partners
- Over 40,000 joint customers
- Cooperative support lab & processes
- All NetApp products are VMware certified
- Deep engineering-level collaboration
- Co-developed converged infrastructure
- Industry leading technology integration
Customer-Focused Partnership

- 11+ year history, with 10,000+ mutual customers
- Executive, engineering and sales alignment
- Preferred storage vendor for customer deployments
- Premier storage development platform for Citrix IT
- Integrated, jointly validated solution designs
- Joint support agreement with Citrix

Deploy faster, with greater confidence
Oracle Reference Architectures
Expanding Support for Oracle Workloads

- Brings FlexPod® converged infrastructure benefits to Oracle® business-critical workloads
- 4 new architectures in all
  - Oracle on FlexPod with VMware®
  - FlexPod with Oracle JD Edwards EnterpriseOne
  - FlexPod with Oracle Linux®
  - FlexPod with Oracle VM
- Oracle value: Increased performance, availability
- Includes: Oracle Database 11g R2 RAC on Oracle Linux (RHEL), bare-metal or VM as indicated, up to 4 RAC nodes tested
FlexPod Datacenter with SAP Applications

- FlexPod® validated architecture simplifies and accelerates SAP® deployments
  - Integrated storage-based backup
  - Support of bare metal and VMware® based virtual machines
  - Virtualization on all layers of the solution stack
  - Secure multi-tenancy for fenced SAP systems or landscapes

- Update to last FlexPod for SAP applications CVD
- Promoted at recent SAP Sapphire conference
- Cisco® Validated Design document
Red Hat Enterprise Linux OpenStack Platform on FlexPod

Published as a NetApp® technical report

- Description of how to use OpenStack features in conjunction with FlexPod®

Unified architecture

- Keep VM images, objects, and application data on the same shared, fault-tolerant, and efficient data center infrastructure

Secure multi-tenancy

- Keep tenants secure and isolated

Service automation

- Automate management and expose control through OpenStack tools

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The Software-Defined Datacenter with NetApp and VMware

- **Networking and Security**
  - VMware® vCloud Networking and Security (vCNS) NSX
  - SVM with Secure Multi-tenancy

- **Compute**
  - VMware® vSphere™
  - NetApp® VSC for VMware VAAI

- **Storage and Availability**
  - VMware SRM™ VMware Snapshots
  - NetApp® Snap Creator® NetApp Snapshots NetApp SnapMirror

- **SDC Management**
  - vCenter Operations Management Suite VMware Log Insight

- **SDC Automation**
  - VMware® vCloud Automation Center VMware® vCenter Orchestrator
  - NetApp® PowerShell NetApp® Workflow Automation

NetApp Software-Defined Storage with clustered Data ONTAP

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**VMware Integrations Today**

**Horizon Suite**
- View VCAI Provisioning
- B/R for Workspace

**vCOPs**
- NetApp Plug-in

**vCenter Plug-ins**
- VSC
  - VSC 4.2 (May 2013 GA) features
  - RBAC and Integrated Flash Accel manageability
  - Monitoring and host configuration
  - Provisioning and cloning
  - Backup and recovery
  - Optimization
- DR failover/failback with SRM 5
- Insight Balance

**VASA Provider**
- Storage topology & capabilities
- Events and alarms
- SDRS guidance on capacity

**vCloud Director**
- vCloud Backup & Recovery
- DataStore provisionning
- vApp provisionning - VAAI

**VAAI for SAN**
- Full Copy
- Block Zero
- HW Assist Locking
- Space Reclamation
- Thin Provisioning Suspend

**VAAI for NFS**
- Full Copy / Clone
- Space Reservation

**vSphere**
- Storage I/O Control (SIOC)
- Multi-pathing (ALUA)
- Symantec vDMP
**FlexPod with Microsoft Private Cloud**

**Microsoft Applications**
- Exchange
- SharePoint
- SQL Server

**Microsoft Infrastructure**
- System Center Virtual Machine Manager
- System Center Operations Manager
- System Center Orchestrator

**Cisco and NetApp® Management**
- Cisco: UCS Manager, Power Tool
- NetApp: OCPM, Data ONTAP®, PowerShell Toolkit

**Provisioning**
- Configuration and Provisioning
- Physical and Virtual Machine Monitoring
- Network Management
- Back Up and Recovery
- Disaster Recovery

**Monitoring**

**Automation**
- Cisco and NetApp PowerShell Integration Libraries

**Cisco and NetApp® Hardware:**
- Compute
- Network
- Storage

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Self-Service Management and Automation

Deep Integration with System Center and Hyper-V

**Administration**
- Microsoft System Center Service Manager
  - Sample Scripts
  - CMDB: Fabric state UI: Initiate workflows

**Orchestration**
- Microsoft System Center Orchestrator
  - Orchestrator Integration Packs
  - OnCommand® Plug-In for Microsoft
  - End-to-end workflows

**Management**
- Microsoft System Center Operations Manager
- Microsoft System Center Virtual Machine Manager
  - Management Packs
  - SCVMM PRO Tips
  - OnCommand Plug-In for Microsoft
  - Manage processes and operations

**Automation**
- Windows PowerShell 2.0
  - PowerShell Toolkit
  - Centralized automation and configuration

**Virtualization**
- Windows Server
  - SnapDrive® for Windows
  - SnapManager® for Hyper-V
  - Virtualization and resource pools

**Hardware**
- WS-Man, PowerShell, SMI-S Interfaces
  - Data ONTAP SDKs
  - Management and provisioning

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What Is SnapProtect?

Generally speaking…

1. Data is quiesced and protected via Snapshot® copies
2. Snapshot copies and clones used to access data for indexing
3. DataFabric® Manager handles provisioning of secondary storage, using resource pools and provisioning policies for replication
4. D2D replication with SnapVault® and/or SnapMirror®
5. D2D2T with SnapProtect™ movement to tape
Shrink Backup Windows

- **BT**: 96 hours to 15-31 minutes
- **Agilent Technologies**: 16 hours to 10-15 minutes
- **Infosys**: 12 hours to 10 minutes
- **ARUP**: 36 hours to 20 minutes
- **ASU**: 8-10 hours to near-zero
Hybrid Cloud Enablement

- Several Cloud options
- Innovative Data Protection & DR
- Rapid environment cloning
- Several connectivity and service level options

DR & Backup as a Service

Hyperscale Provider

Data center
Direct-Connect

Private Cloud
Deduplication

- Integrated in Data ONTAP (free feature)
- Thousands of systems today
- Primary, Secondary, & Archive
- All protocols: FCP, iSCSI and NAS
- Transparent to servers and/or clients
Thank you