LET THE TRANSFORMATION BEGIN
Continuous Availability and Non-disruptive Data Mobility

Modern Data Center

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Agenda

- Unplanned downtime and data mobility challenges
- Solution
  - VPLEX VS6 / AFA
  - Recover Point
- Continuous Availability
  - Zero RPO/RTO in the event of a disaster
- Non-disruptive Data Mobility
  - Tech Refresh
  - Workload balancing
- Q&A
Dell EMC Data Protection Continuum

AVAILABILITY, REPLICATION, BACKUP & ARCHIVE

Complete portfolio to meet any data protection requirement

- VPLEX: Availability
- RecoverPoint: Replication
- ProtectPoint: Snapshot

- Backup
- Archive

Zero Seconds Minutes Hours
Data mobility: an operational challenge

STORAGE SILOS CANNOT KEEP UP WITH CHANGING BUSINESS NEEDS

Resulting in…
- Application **downtime**
- Poor IT resource **utilization**
- Migration **service costs**
- **Months** for Tech Refresh
- **Risk** of things going wrong
Unplanned downtime

CATASTROPHIC EVENTS CAUSE SEVERE BUSINESS DISRUPTION

Resulting in…

Application **downtime**

Lost **productivity**

**Reputation**

**Revenue** impact

**Stress** for IT staff
Where do you stand?

Disaster resilience

What are the disasters you want to protect against?

What is your RPO/RTO tolerance?

How does the story of a data center disaster end?

Operational data mobility

How long did the last tech refresh take? What was the opex?

How do you balance performance across multiple storage tiers?
Data Protection for Continuous Operation

“I want to protect against regional disasters such as a hurricane that could affect two of my data centers in a metro region…

…and I need to have Operational Recovery capabilities for my data”
VPLEX For The Modern Datacenter

SUPPORTING EVERY STEP OF YOUR DATACENTER MODERNIZATION

**Always-On**

- Active-Active datacenters or Local mirroring
- Delivers highest availability for business-critical all-flash workloads

**Agile**

- Seamless data mobility for optimal resource utilization
- Creates an flexible storage infrastructure across the hybrid cloud, so that you can rapidly respond to business needs

**Accelerate**

- Time to value cut down from months to days
- Enables faster Tech Refresh and workload consolidation to All-Flash
Availability: keep all-flash always-on

**VPLEX Local**

Local mirroring ensures uptime

**VPLEX Metro**

Metro protects from complete site failure

Mix and match Tier-1 and Tier-2 arrays without performance degradation

All reads serviced from the Tier-1 local array
Simultaneous R/W access
TO THE SAME LUN ON TWO ARRAYS, LOCALLY OR OVER DISTANCE

Stretched clusters over distance

Other clusters supported: MC ServiceGuard, HACMP, PowerHA, Veritas Cluster Server, etc.
Design Elements

PHYSICAL CONFIGURATION REVIEW

Back-end:
- All directors must see all storage
  - Maximum **four IT paths** per storage-volume per director rule
  - VPLEX uses simple round-robin / outstanding commands per path (5.5 SP1+)

Front-end:
- Balance host workloads across directors and ports
- Multipath software **is required**
  - Powerpath w/ Adaptive
  - VMware NMP w/ Round Robin
  - Windows MPIO w/ Weighted Path
What does VPLEX Local do?

**READS**

VPLEX cache read hit
local director or peer director

VPLEX cache read miss
What does VPLEX Local do?

**WRITES**

1:1 Encapsulation
Write THROUGH cache
Data is retained in cache after written

Local RAID1 Mirror Device
Writes protected to both mirror legs
Reads are round-robin
What does VPLEX Metro do?

WRITES & READS

**Distributed-device writes**
Writes synchronously protected across clusters

**Distributed-device read miss**
Reads are local
VPLEX data Migration

DATA IS COPIED FROM THE SOURCE TO THE TARGET

1. Host
   - VPLEX
   - Storage LUN A

2. In-progress
   - Host
   - VPLEX
   - Storage LUN A
   - Storage LUN B
   - Full Rebuild or Thin Rebuild

3. Committed
   - Host
   - VPLEX
   - Storage LUN B
Storage-view configurations
SINGLE ENGINE AND DUAL ENGINE

Single Engine

Dual Engine
Quad engine Storage-view Options

EIGHT DIRECTOR STORAGE-VIEWS

Host 1 and 4 sees 4 paths
Host 2 and 3 sees 8 paths
VPLEX VS6 and VPLEX for all-flash

2X IOPS and 1/3rd latency

12000 Volumes

Future Ready Architecture

Next generation Hardware and Software

VPLEX For All-Flash All inclusive appliance

Add as many EMC AF arrays as needed
No limitation on capacity
All HW and SW included
VPLEX: Trusted and Proven Technology

VS6 BUILDS UPON VPLEX MOMENTUM

>8,000+ Clusters deployed

>150 Million+ run hours

>50% of Global Fortune 500 Companies

Recent milestone

1 Exabyte of data behind VPLEX

Seven 9s Availability on target code
Built for flash: software

• GeoSynchrony 6.0
  - Re-architected for new multi-core h/w
  - Built on a solid foundation with over 150M run hours

• Flash optimized
  - UNMAP support for thin provisioning
  - Full iCDM support

• Future Ready
  - Further 2X performance gain in next s/w release

• Designed for maximum availability
  - Over seven 9s on 5.5 target code
Customer choice comes standard

VPLEX

- Per frame for UNITY/VNX
- Per X-Brick for XtremIO
- Per capacity for any system

VPLEX For All-Flash

- Unlimited use with:
  - UNITY AF
  - XtremIO
  - VMAX AF

Hybrid arrays use standard VPLEX licensing options

Single, Dual and Quad configurations of VS6 and VS2 supported on both models
More business behind VPLEX
WIDER ECOSYSTEM SUPPORT

EMC UNITY Family

DELL Compellent (SC Series)
VMware SRM: new use case!

VPLEX enabled Active-Active technology to VMware non-stretched clusters!

- Planned failover: non disruptive instant vMotion (Zero RTO/RPO)
- Unplanned failover: Zero RPO
  - Add RecoverPoint (MetroPoint topology) to protect against corruption
- SRM API allows for additional capabilities like automated failover
- **White paper** to learn more about the difference between VMware stretched clusters and SRM

Note that VMware clusters are not stretched. Instead SRM is used to orchestrate failovers and failbacks.
VPLEX non-disruptive (NDU) H/W upgrade

- Establish physical connectivity
- FC to connect Local COM between clusters
- 50M between clusters
- No Rezoning needed
  - Same WWN
- Fail VS2 Director A
- Continue 1 Director at a time
RecoverPoint: Any point in time recovery

Provides DVR-like, ANY point-in-time access to data

Minimize RPO and RTO

DATA CORRUPTION OCCURS AT 3:28pm
RecoverPoint Family
2 GREAT PRODUCTS FOR DIFFERENT USE CASES

RecoverPoint
Data Protection for Storage Arrays
XtremIO, VPLEX, VNX, VNXe, VNX-F, VMAX, ScaleIO
and Non EMC Storage Using VPLEX

RecoverPoint for VMS
Data Protection for Virtual Machines
VMware Environment
New: RecoverPoint Gen6 Appliance

Complete new design for RecoverPoint appliance

Up to 60% more power!
  320MB/s Throughput
  39,000 IOPS

Modular, field replaceable network cards:
  1U
  16GB FC,
  1GbE or 10GbE
Recoverpoint and XtremIO
SNAP-BASED REPLICATION

Full synchronization:
The first Snapshot

Transfer all data from
Snapshot, store as a
Snapshot at target
side.

Get diff answer and build a bitmap
of changes

Start a new cycle:
Create Snapshot

Send diff between new Snapshot
and latest transferred Snapshot
changes as Snapshot at target
side.

First Initialization
Snapshot

New Snapshot

New Snapshot

First Snapshot

New Snapshot

DIFF Ans
Bitmap

IN-MEMORY
METADATA

DIFF
RPAs

DIFF
RPAs

First Snapshot

New Snapshot

DIFF
SCSI

New Snapshot

New Snapshot

First Snapshot
RecoverPoint & ProtectPoint
CONSOLIDATED BACKUP AND REPLICATION

- Shared infrastructure
- Same Consistency Group
- Central management
- Offloaded processing

What about backup?
Full operational restore - XtremIO
AT THE COST OF A DIFFERENTIAL

App Owner
PROTECT
RecoverPoint for VMs Architecture Zoom In

- No Single Point of Failure
  - vRPA cluster provides high-availability
  - Each VM can be replicated to any vRPA (on any ESXi)

- Replicated VMs can be fully separated from replication infrastructure
  - vRPAs can be deployed on a different ESXi cluster

- Fast recovery time
  - No need for data copying when accessing image, except for rolling the journal – disks are attached to replica VM
  - Switching VMs is a fast and efficient operation
VPLEX Use Cases
Continuous availability
SEVEN 9S OF APPLICATION AVAILABILITY
Site failure without VPLEX

DOWNTIME/DATA LOSS

- Decision making
- Fail over
- Application restart

HOURS LOST IN

DOWN

PASSIVE
Active-Active Datacenters With VPLEX

ACTIVE

Simultaneous R/W at both the sites

ACTIVE

Stretched host clusters
Site failure With VPLEX
AUTOMATIC AND TRANSPARENT FAILOVER
When the site is back up...

Active

Simultaneous R/W at both the sites

Stretched host clusters
VPLEX Metro - Always on data access

“Uninterruptible Power Supply” for your data that extends across datacenters
Intelligent Data mobility
A traditional tech refresh can cause months of planning, downtime and will be expensive.
Tech Refresh: weekend killer

- **Expensive professional services engagement**
- **Disruptive to applications**
- **Remediation required**
- **Non-reversibility**
  - Wastes employee time
  - Long *time to value*
New Migration Strategy with VPLEX
NON-DISRUPTIVE TECH REFRESH DURING WORKING HOURS

- Save money
- Non-disruptive migrations FOREVER
- No remediation
- Eliminate risk
- Save employee time
- Faster *Time to Value*
With VPLEX: Online Tech Refresh

NO HOST DISRUPTION

1. New array is brought in
2. VPLEX discovers new array and devices
3. VPLEX mirrors storage
4. I/O is automatically and non-disruptively directed to the new array
5. Once the new array is fully replicated the old array can be removed without disruption
6. The old device can be removed from VPLEX and rolled out of the data center
Non-disruptive load balancing

- Migrate Application/Data
  - Across storage arrays
  - Across data centers
  - All non-disruptively

- Improve performance & scale
- Accomplish during business hours
- Perform scheduled maintenance without downtime
- Improve asset utilization
Cloud mobility with VPLEX

Use Case
- Save on primary storage usage by moving cold data to cost effective cloud storage
- No host disruption and continuous access to data

Applications
- Oracle and IBM DB2 have in built features to partition old data that can be moved to cloud
- Save less frequently used archive mailboxes to the cloud
- Big data generators like Splunk can push older data to the cloud
VPLEX and RECOVERPOINT

Continuous Availability

0 Downtime

Continuous Data Protection

∞ Recovery
VPLEX & RecoverPoint

DISASTER PROOF BUSINESS CONTINUITY

VPLEX Metro
Across Data Centers
*Synchronous (10ms RTT)*
Distances

VPLEX Local
Within A Data Center

RecoverPoint
Operational Recovery And 3rd
Site Protection For *Extended*
Distances
Two-site continuous availability with local protection

- Local Protection on both sides of VPLEX Metro
- Redundant operational recovery for applications
- Remote and local Protection
- Recovery to any point in time
MetroPoint topology

CONTINUOUS AVAILABILITY WITH BUILT-IN DISASTER RECOVERY

- Single DR Copy
- Automatic Switchover
- CDP On Both Sides Of Metro
- Remote And Local Protection
Integration with EMC Ecosystem

- **ViPR**: Automation of data services
  - Simplified provisioning (VPLEX Integrated Array Services-VIAS)

- **VPLEX**: Continuous availability with continuous protection and DR

- **RecoverPoint**: VMware and Oracle RAC integration
  - Deep integration for stretched clusters and DR

- **UNITY**, **VMAX**, **XtremIO**, **CloudArray**: Dell EMC and 3rd party platforms
QUESTIONS?