NO LIMITS

Site Recovery Manager and Stretched Storage: Tech Preview of a New Approach to Active-Active Data Centers

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Disclaimer

- This presentation may contain product features that are currently under development

- This overview of new technology represents no commitment from VMware to deliver these features in any generally available product

- Features are subject to change, and must not be included in contracts, purchase orders, or sales agreements of any kind

- Technical feasibility and market demand will affect final delivery

- Pricing and packaging for any new technologies or features discussed or presented have not been determined

The information on the roadmap is intended to outline our general product direction and it should not be relied on in making a purchasing decision. It is for informational purposes only and may not be incorporated into any contract.

Agenda

- **What is an Active-Active data center solution ?**
  - Benefits, Use-Cases and Deployment Requirements
- **VMware Stretched Clusters**
  - Benefits and Challenges

- **A new approach to Active-Active data centers with SRM**
  - Technical Overview
  - Demo

- **Partner presentations**
  - IBM: Carlos Fuentes, IBM SVC Architecture
  - EMC: Cody Garvin, EMC VPLEX Product Management

- **Q&A**

First, a request…

Please fill out a short, product-related survey

http://tinyurl.com/BCO1916

Your feedback is very important !! Especially for a Tech Preview

You can pre-register for Beta through the survey link as well
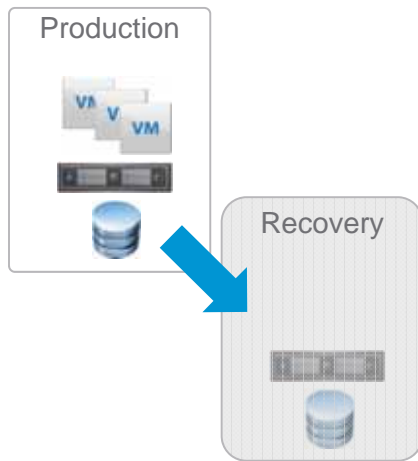
Note: Beta and GA dates can only be shared under NDA

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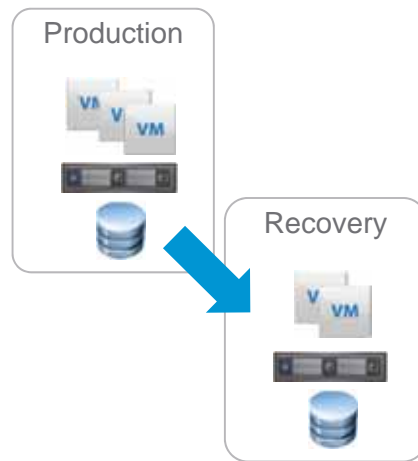
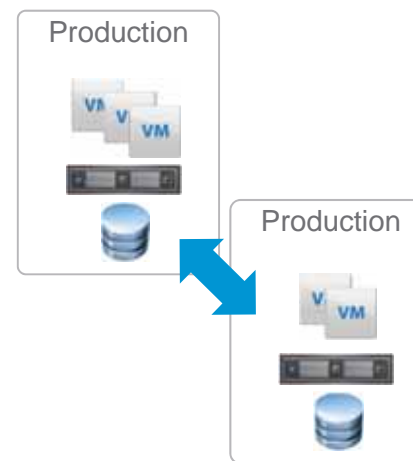# Topologies for Business Continuity

Supported by SRM today

SRM Tech Preview

"Bunker Site"

Dedicated Sites for Prod & DR

Bi-directional Failover

Active-Active data centers

- Legacy DR scenario
- Expensive dedicated resources

- Leverage recovery infrastructure for test, development, training
- Utilize sunk cost of recovery site

- Production applications at both sites
- Each site acts as the recovery site for the other
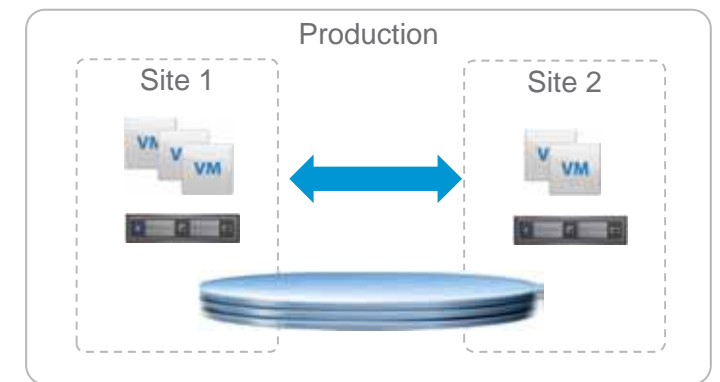
- Production apps at both sites with seamless mobility across sites
- Zero downtime for planned events
- Typically limited to a Metro distance

Multi-site topologies with three or more sites are not shown here

Typical Use Cases For Active-Active data centers

Planned Maintenance

- Planned maintenance of one site without any service downtime
- Transparent to app owners and end users
- Avoid lengthy approval processes
- Ability to migrate applications back after maintenance is complete

Disaster Avoidance

- Prevent service outages before an impending disaster (e.g. hurricane, rising flood levels)
- Avoid downtime, not recover from it
- Zero data loss possible if you have the time

Automated Recovery

- Automated initiation of VM restart or recovery
- Very low RTO for majority of unplanned failures
- Allows users to focus on app health after recovery, not how to recover VMs

What you need for an Active-Active Datacenter model

1. ## Stretched Storage solution

   – Storage clustering solution that supports distributed data mirroring

   – Read/write access to the same volumes from both sites

   – Some tie-break mechanism to avoid split-brain

   – Examples: EMC VPLEX, IBM SVC, NetApp MetroCluster, etc.

Stretched Volumes

Storage Controllers   Storage Controllers

Backend Arrays   Backend Arrays
Site 1   Site 2
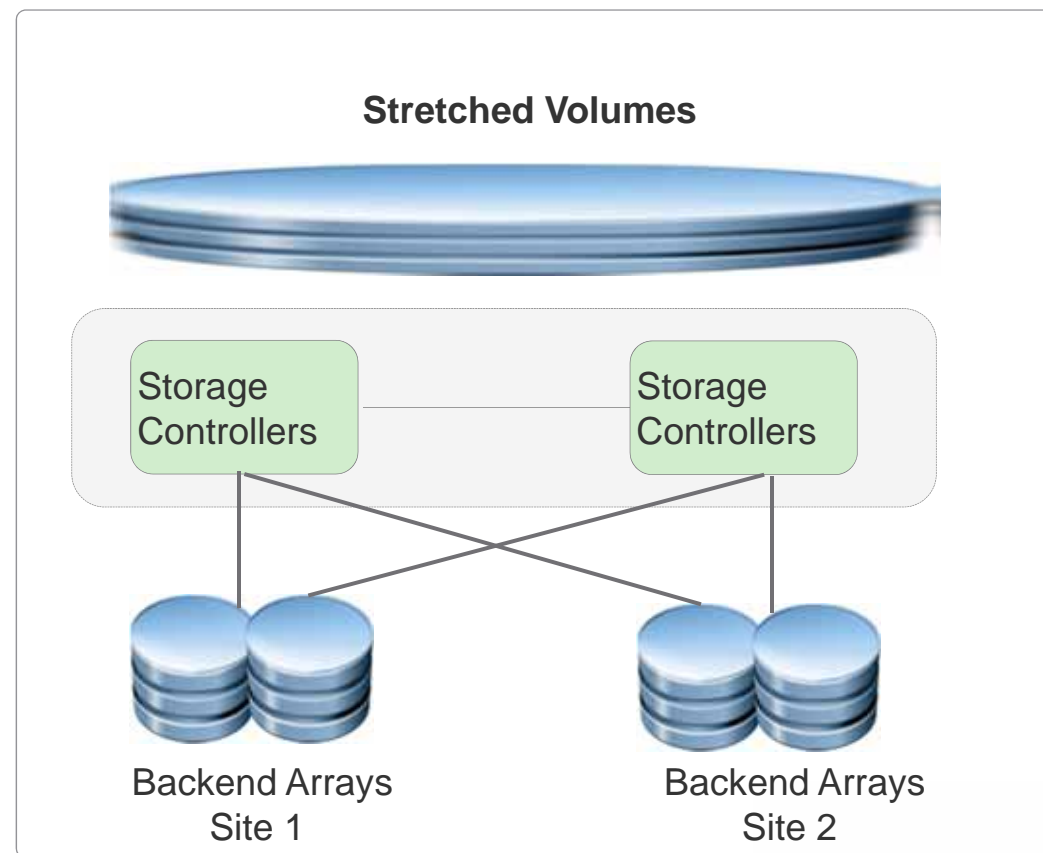
What you need for an Active-Active Datacenter model

2. **Stretched Network solution**

   – VMware NSX or 3rd party solutions

     • See #NET1974 for details on Multi-site NSX solution

   – Enables live migration of apps without changing IP addresses

   – vMotion supports a max of 10 millisec RTT latency

   – vMotion requires 250Mbps bandwidth for each VM
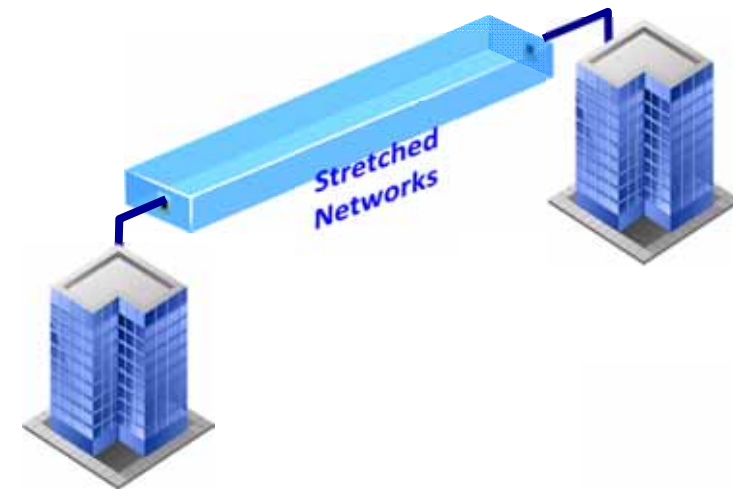
vSphere choices for Active-Active datacenters

- **VMware vSphere deployed in one of two ways**

  - **Option 1**: Stretched vSphere Cluster with a single vCenter
    - Solution certified through VMware Metro Stretched Cluster (vMSC)
    - Available since vSphere 5.0 – HCL has over 10+ vendors

  - **Option 2**: Separate vSphere Clusters and a vCenter at each site
    - Focus of this Tech Preview session
    - **Live Migration will soon be possible across vCenters!**
    - Enables two autonomous datacenters to be managed as Active-Active sites
    - Enables live migration of applications as well as proper handling of unplanned failure events
    - Leverage SRM for orchestrating both planned and unplanned single site events

Tech Preview

VMware Stretched Clusters

VMware Metro Stretch Clusters
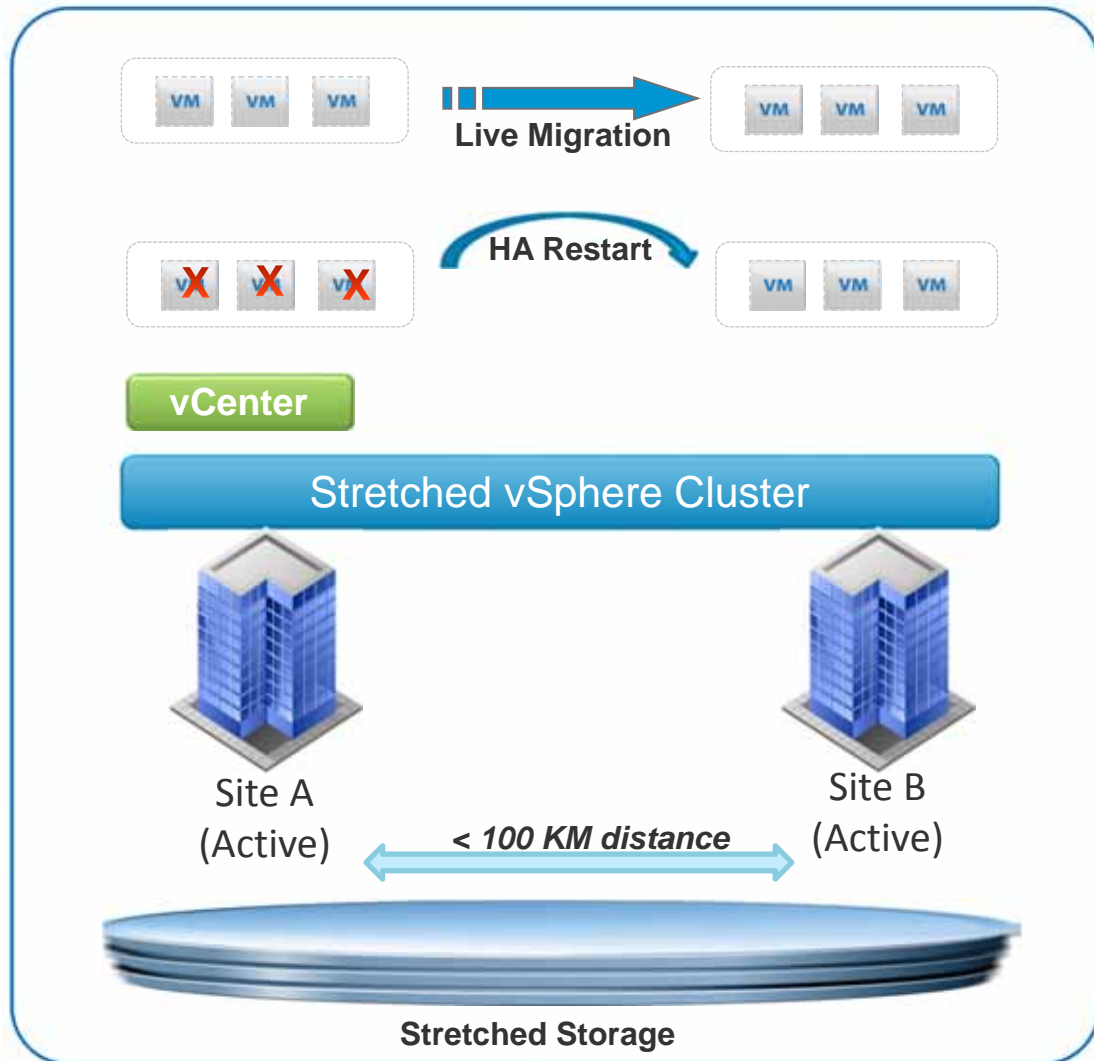
- Applications are protected against localized site failures

- Proactive live migrations of applications for continuous availability

- Automated recovery of workloads after host failures

- Single Management console for all workloads

Challenges with Stretched Clusters

- Think about availability of a single vCenter managing both sites
  - Failure of the site where vCenter is running disrupts management of both sites

- DRS and HA are not site aware
  - VMs are recovered and migrated to any site – may not be what you want !
  - Could result in additional East-West traffic when your network is not designed to handle it
  - DRS affinity rules are an option, but requires ongoing management of Host Groups etc.

- No Orchestration or Testability
  - Planned Migration or Disaster Avoidance need to be done manually
  - Stretched Clusters lack a repeatable, testable procedure to handle unplanned failures
  - HA will restart VMs based on VM restart order – but doesn't give you granular control of VM dependencies or customization

Active-Active Datacenters: Preview of a new approach with SRM

Active-Active Datacenters with SRM
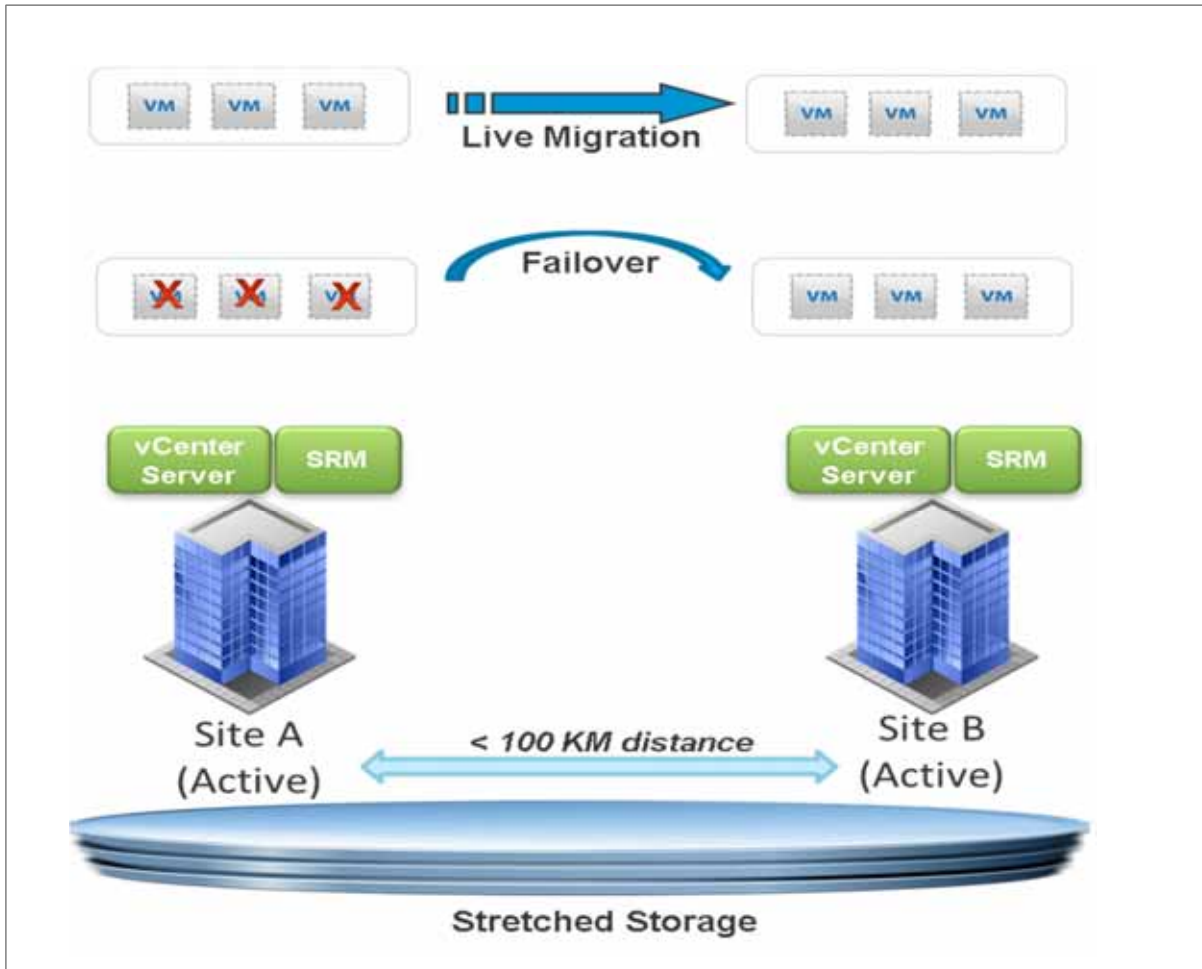
Description

- Live Migration (vMotion) of workloads across sites and vCenter instances for planned failover
- Full orchestration of VM movement (vCenter and solution configuration, storage, and live state).
- Combined with DR orchestration to enable recovery of failed VMs in the event of site failure

Benefits

- Reuse same orchestrated Recovery Plan for unplanned failures and Continuous Availability
- Integration with Stretched Storage enables very low RTO for unplanned failures and easier load balancing across sites
- Non-disruptive test for unplanned failures

vMotion across vCenter Servers

vMotion

Management Network

vCenter Server

VM VM VM VM

ESXi

VM Network

NFC Network

vMotion Network

vCenter Server

VM VM VM VM

ESXi
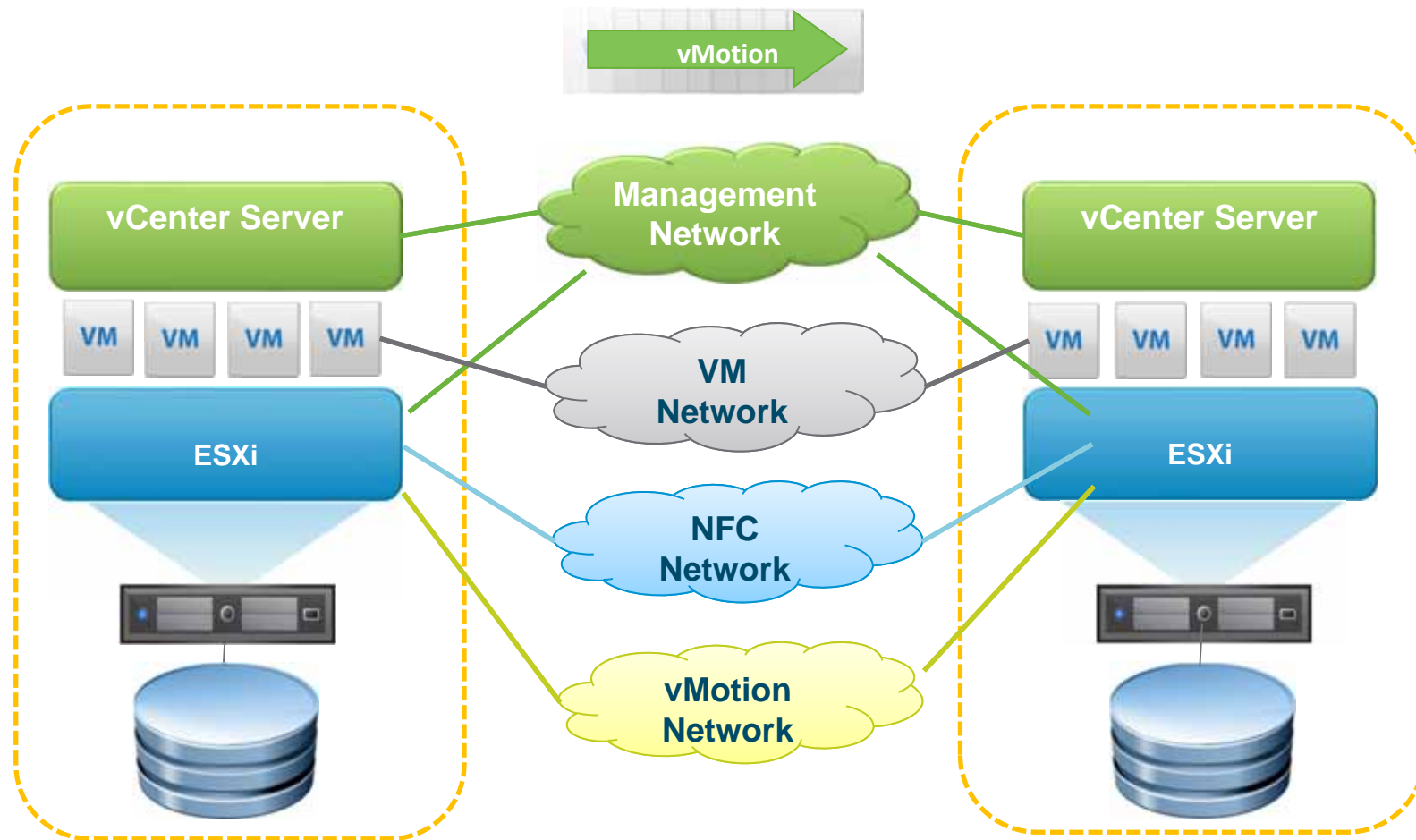
Requirements:

- **VCs must be connected via L3**
- **VM network:**
  - L2 connection
  - Same VM IP address available at destination
- **vMotion network:**
  - L3 connection
  - Secure (dedicated or encrypted)
  - 250 Mbps per vMotion operation
- **NFC network:**
  - routed L3 through Management Network or L2 connection
- **L4-L7 services pre-configured at destination**

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Active-Active Datacenters with SRM

vCenter · SRM · vCenter · SRM

VM VM VM VM · Stretched Networks · VM VM VM VM

Site 1 vSphere cluster · Site 2 vSphere cluster

ESXi ESXi ESXi · ESXi ESXi ESXi

Volume A at Site 1 (Full R/W access) · Stretched Storage · Volume A at Site 2 (Full R/W access)

Scenario 1: Local Host failures in one site

vCenter SRM   vCenter SRM

Stretched Networks

VM VM VM VM VM   VM VM VM VM

Site 1 vSphere cluster   Site 2 vSphere cluster

ESXi ESXi ESXi   ESXi ESXi ESXi

HA handles local host failures

Volume A at Site 1
(Full R/W access)

Stretched Storage

Volume A at Site 2
(Full R/W access)
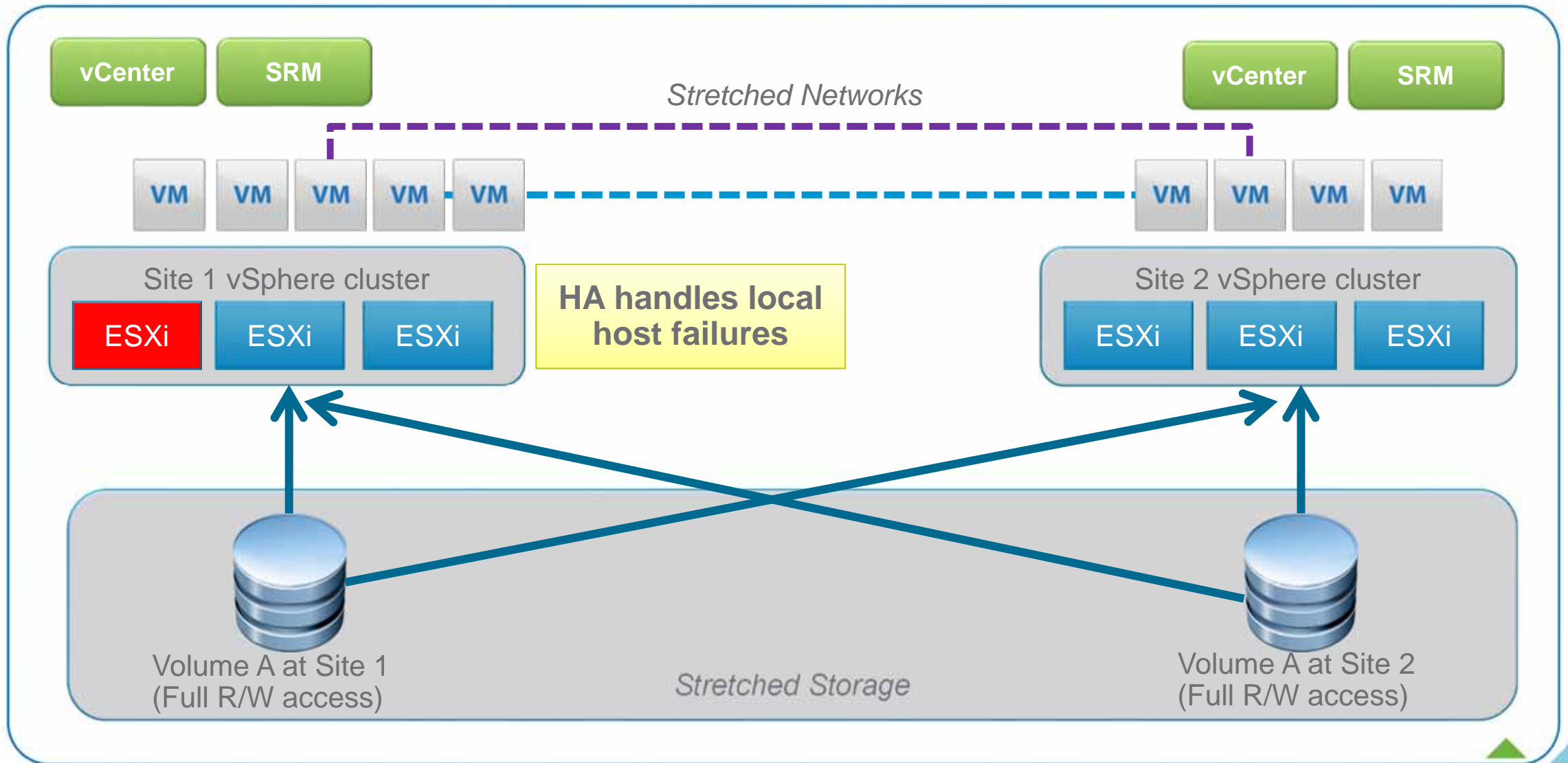
Scenario 2: Disaster Avoidance at one site

SEVERE WEATHER EXPECTED

vCenter	SRM

SRM invokes vMotion as per VM priority and dependencies in Recovery Plan

vCenter	SRM

VM VM VM VM   VM VM

Stretched Networks

Site 1 vSphere cluster

ESXi	ESXi	ESXi

Site 2 vSphere cluster

ESXi	ESXi	ESXi

Volume A at Site 1
(Full R/W access)

Stretched Storage

Volume A at Site 2
(Full R/W access)

SRM gives you the "easy button" for handling planned downtime in Active-Active datacenters

Scenario 3: Faster Recovery from Unplanned Failures

vCenter

SRM

VM VM VM VM

VM VM VM VM VM

Site 1 vSphere cluster

ESXi ESXi ESXi

Site 2 vSphere cluster

ESXi ESXi ESXi

In a site failure scenario, execute SRM Recovery Plan at other Active site.

Can be automatically triggered by an external system

M's test capability are for site-wide failures

Volume A at Site 1
(Full R/W access)

Stretched Storage

Volume A at Site 2
(Full R/W access)

SRM enables a reliable, testable and low RTO solution for handling unplanned failures in Active-Active datacenters

Technical Deep-dive and Demo

SRM with Stretched Storage: Initial setup

- Follow the existing SRM installation procedure
  - Install SRM at each site
  - Install SRA (Storage Replication Adapter) from your array vendor at each site
  - Configure Array Managers at each site

- New SRA interface
  - Contact your array vendor for the SRA availability and supported array models
  - Most vendors will provide a single SRA to manage both stretched and non-stretched volumes
  - Existing SRAs (with no stretched storage support) will continue to work as is with new SRM

- Configure stretched storage volumes using the array UI/tools

- SRM will discover stretched arrays/volumes through the SRA
  - Use the SRM UI to verify stretched volumes and how they map to datastores
 - Use the SRM UI to verify the site preference for stretched volumes

SRM with Stretched Storage: Initial setup – Demo
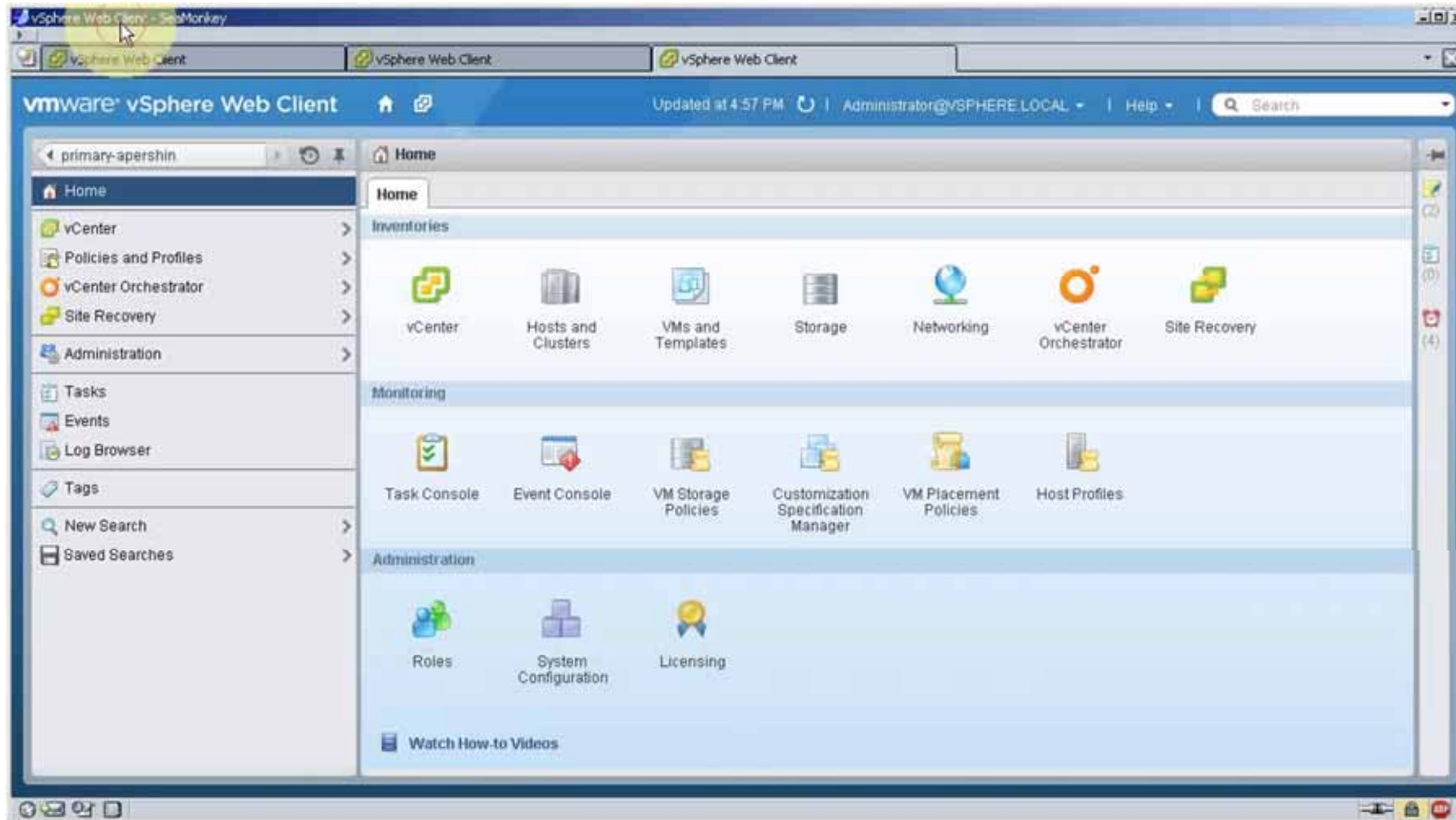
SRM with Stretched Storage: Configuring protection

- Stretched storage supported only with Storage-Profile based Protection Groups (SPPG)
  - SPPGs are a new capability in a future SRM release
  - SPPGs allow the Admin to link DR Protection to the Storage Policy of the VMs

- Configure storage profiles for stretched volumes at each site
  - Use either manually assigned tags or volume capabilities exposed by the array
  - Must provision VMs through the storage profiles (i.e. Profile Driven Storage)
  - Use SRM UI to map storage profiles across sites

- Configure protection groups for the storage profiles
  - SRM will automatically protect all VMs assigned to the storage profiles in the group
  - Can mix stretched and non-stretched storage in the same protection group

- SRM will verify and monitor the site preference to be assigned to the protected site
  - If the array supports statically assigned site preference for each stretched volume/consistency group

SRM with Stretched Storage: Configuring protection – Demo

vmworld 2014
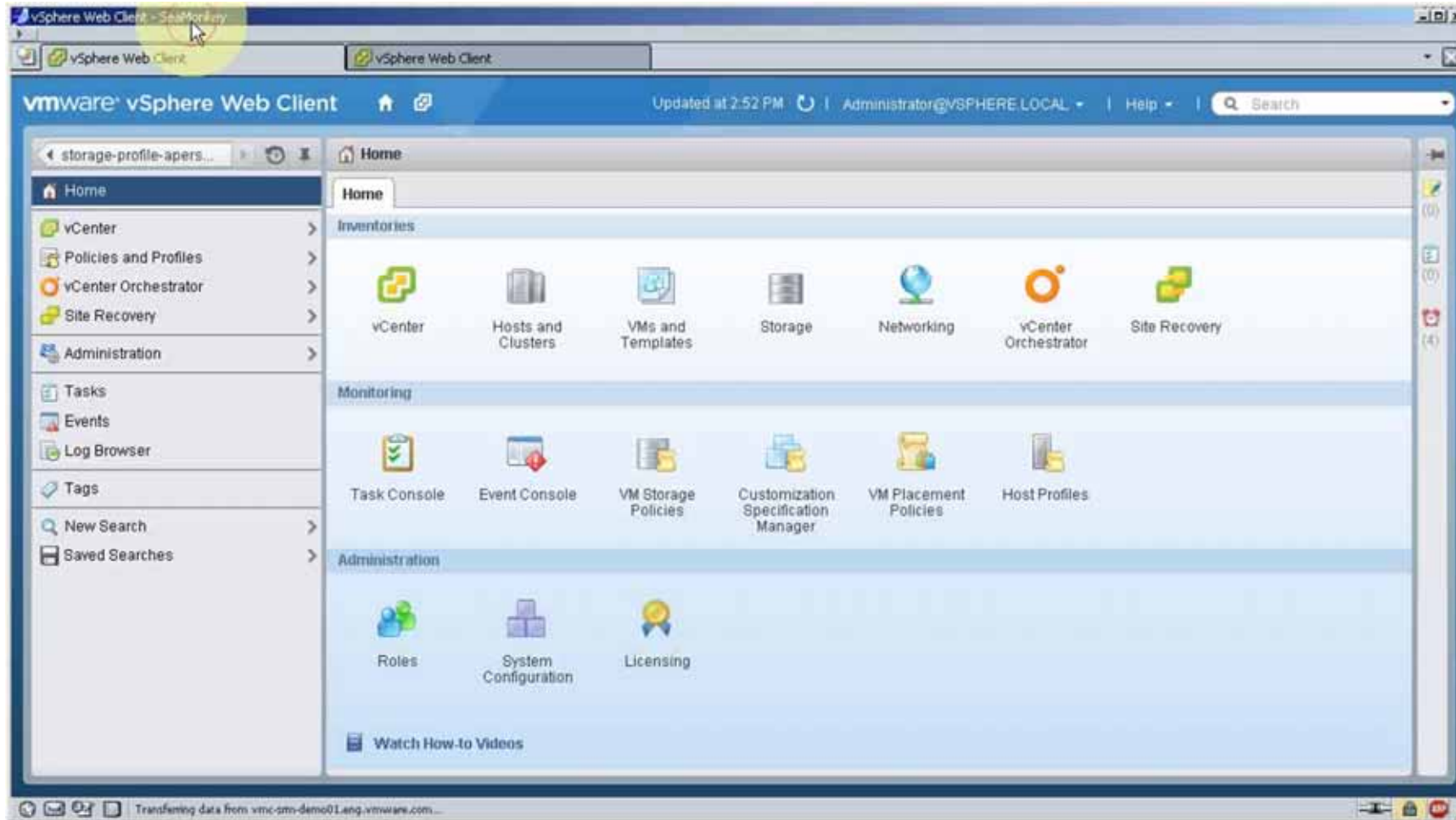
SRM with Stretched Storage: Configuring recovery

- Create one or more recovery plans for all or some protection groups
  - The same protection group can belong to multiple recovery plans
  - Can mix stretched storage, non-stretched storage and vSphere Replication in the same recovery plan

- Configure recovery settings for each VM
  - Multiple priority groups with explicit dependencies between VMs if necessary
  - Stretched VMs[§] can depend on non-stretched VMs and vice versa
  - Can configure IP customization for stretched VMs that do not have stretched networks (for DR/Test)
  - Can assign scripts to stretched VMs
    - Scripts can run on the SRM server or in the VM
    - Scripts can run before or after power on (or live migration)
  - Can opt out of vMotion for some VMs even if they reside on stretched storage

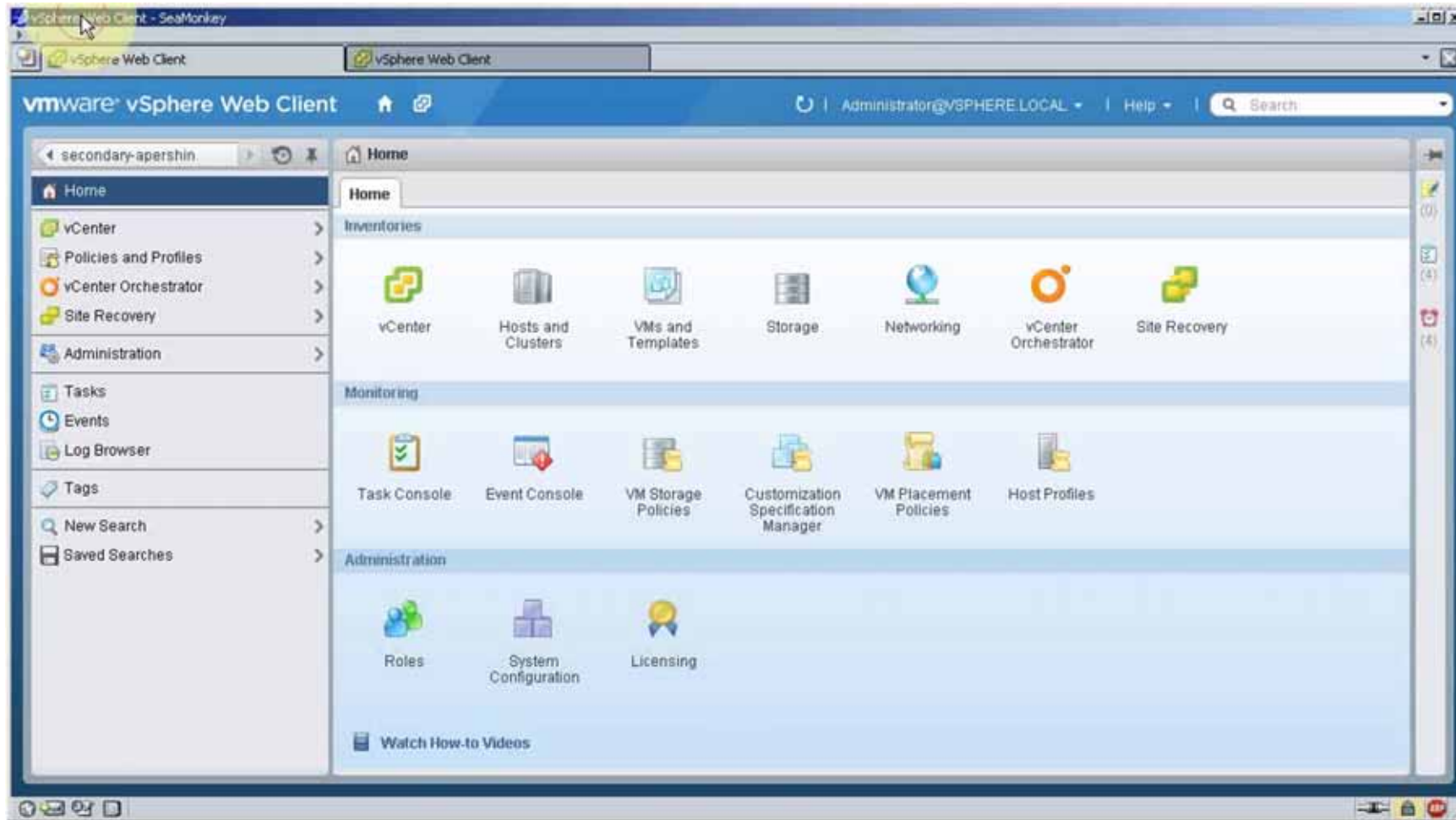*§ - Stretched VMs refers to VMs on Stretched Storage datastores*

SRM with Stretched Storage: Planned Migration

- Use planned failover to avoid an expected outage
  - Initiated when both sites are fully operational

- Choose whether to use vMotion when initiating a planned migration
  - If enabled, SRM will use vMotion to migrate all stretched VMs to the recovery site
  - If disabled, SRM will shut down stretched VMs at the protected site and power on at the recovery site

- Using vMotion guarantees no service downtime for stretched VMs
  - SRM will reassign site preference to recovery site for all stretched volumes (if array supports it)
  - SRM will orchestrate vMotion for eligible VMs according to priority tiers and VM dependencies
  - SRM will perform a storage sync to make sure no blocks are left at the protected site

- Planned failover with stretched and non-stretched VMs
  - A single recovery plan can fail over the entire site including non-stretched VMs
  - The migration will be completed before any non-stretched VMs are shut down at the protected site

SRM with Stretched Storage: Rerunning planned migration

- Planned failover stops if any error is encountered
  - vMotion may fail due to configuration issues
  - Resolve the issues and rerun the planned migration

- Rerunning planned migration
  - SRM will skip completed steps
  - SRM will repeat failed steps (including vMotion)

- Turning off vMotion on a rerun
  - If it is too difficult/impossible to resolve vMotion issues, rerun planned migration with vMotion off
  - Stretched VMs will be shut down at the protected site and powered on at the recovery site

- vMotion may take a long time to complete for busy VMs or long distances
  - Use test failover to estimate the time needed to complete an unplanned failover
 - When too close to the expected outage, cancel planned migration and rerun with vMotion turned off

SRM with Stretched Storage: Planned Migration – Demo

SRM with Stretched Storage: Unplanned failover

- Use unplanned failover to recover from a disaster
  - Initiated when the protected site is no longer functional

- Stretched VMs are powered on at the recovery site
  - Stretched and non-stretched VMs are recovered together
  - Priority tiers and VM dependencies are honored across all VMs
  - SRM will coordinate with the array to guard against any VMs still running at the protected site

- Stretched volumes are recovered faster – shorter RTO
  - Stretched volumes are already visible at the recovery site
  - No need to wait for costly surfacing, mounting and host rescan operations

SRM with Stretched Storage: Unplanned failover – Demo
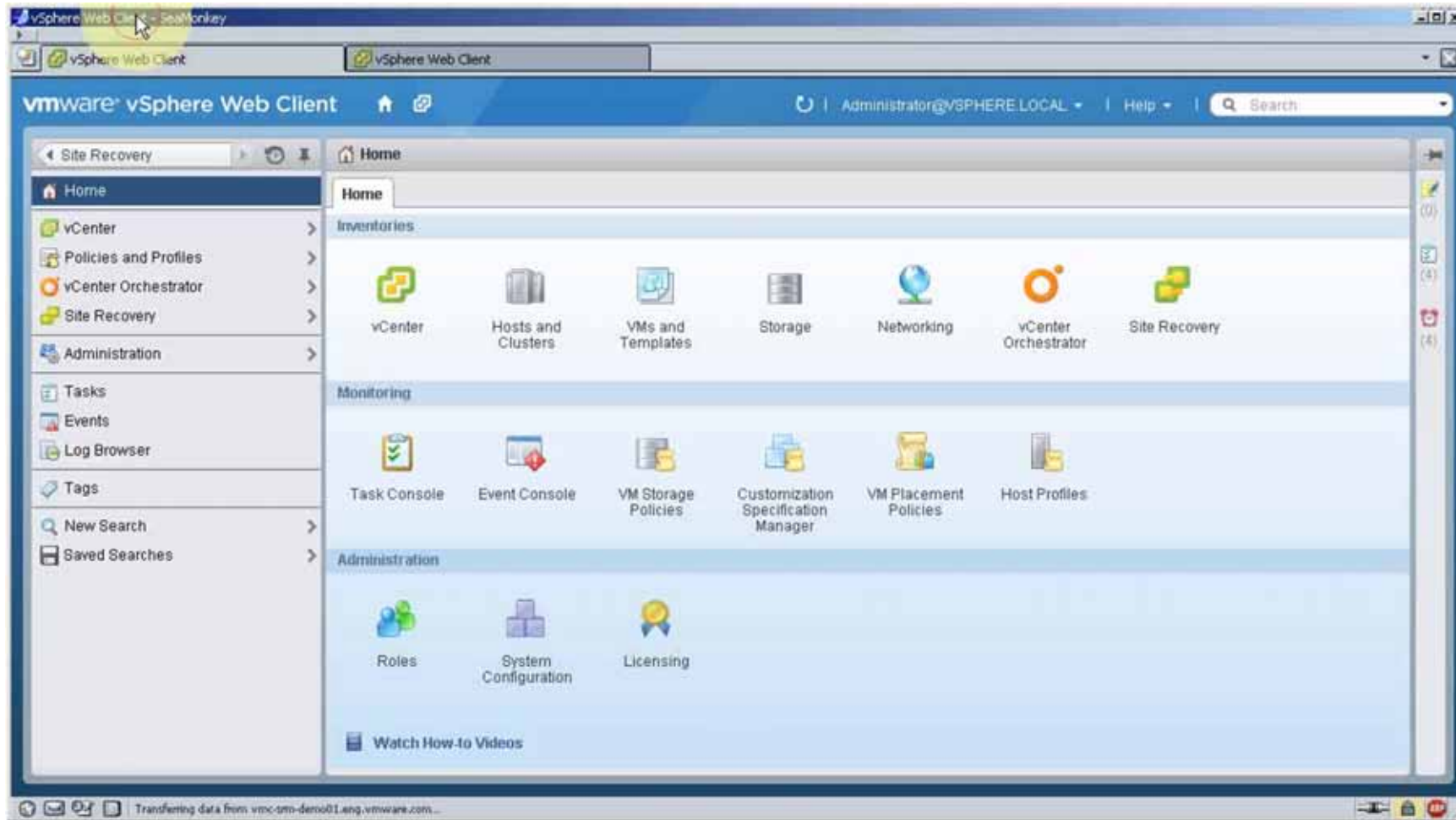
SRM with Stretched Storage: Test failover

- Use test failover to make sure an unplanned failover would succeed
  - Should be performed regularly to ensure DR-readiness
  - Periodic DR-tests with an audit trail are required by most compliance rules

- Stretched VMs are included in the test failover
  - Stretched VMs are powered on in an isolated network
  - SRM will perform vMotion host compatibility tests as part of the test failover
  - SRM will not perform vMotion as part of the test failover
    - Complicated environmental issues (i.e. network latency) may remain undetected

- Test failover for stretched storage requires array support
  - Not all arrays support snapshotting of stretched devices
  - Contact your array vendor for specific compatibility requirements

SRM with Stretched Storage: Reprotect and failback

- Use reprotect to reverse the roles of sites after a successful planned failover
  - Repairs replication for stretched devices (if damaged during the unplanned failover)
  - Ensures the new protected site (former recovery site) has the site preference for stretched devices

- Reprotect after an unplanned failover
  - Rerun planned failover once the protected site becomes available
  - Migrated and recovered VMs will continue running at the recovery site untouched

- Failback
  - Initiate a planned failover after the reprotect to migrate all VMs back to the former protected site
  - It is recommended to perform a test failover first to make sure everything is ready
  - Once the planned failover is complete, initiate reprotect to bring everything back to the original state

Vendor Presentation

Carlos Fuente,

SAN Volume Controller and Storwize Senior Architect,

IBM Hursley, UK

IBM & VMware Provide Virtualization of the Complete Infrastructure

You have virtualized your server infrastructure

IBM DB2. ORACLE SAP Exchange ERP

VM VM VM VM   VM VM VM VM   VM VM VM VM

Layer   Layer   Layer

VMware Virtualization

IBM.

IBM SVC (SAN Volume Controller

STORAGE HYPERVISOR

SAN Volume Controller   OR   V5000 V7000

IBM VSC (SmartCloud Virtual Storage Center)

A Comprehensive approach to SDS (Software Defined Storage)

IBM HITACHI EMC NetApp Sun HP NEC XIV FlashSystem 820
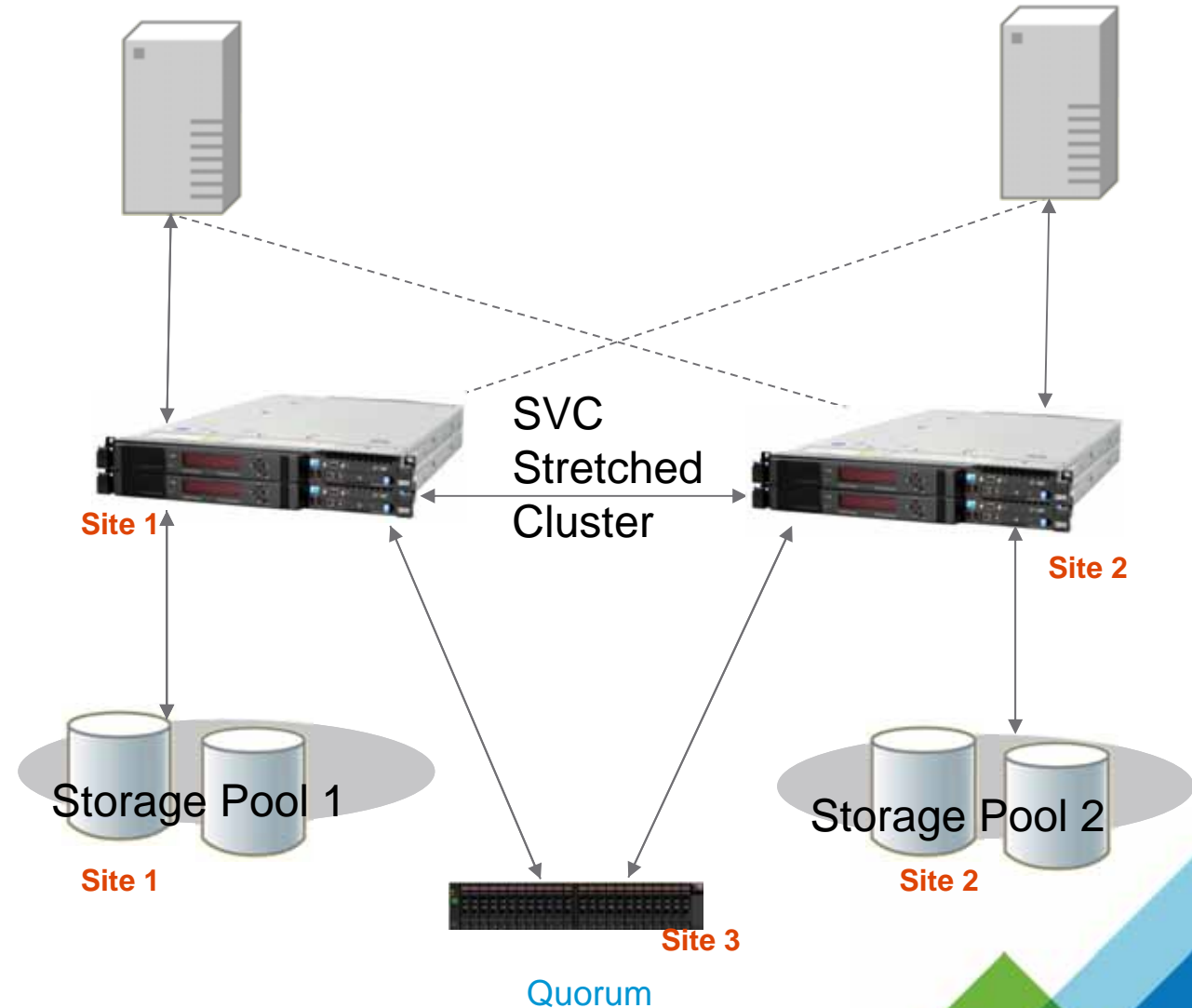
Storage Virtualization

Stretched Storage with IBM SAN Volume Controller

- Single system image across two sites provides single pane of glass management for day-to-day storage management activity
  - Simplify management of your environment at same time as deploying active-active storage

- Based upon a rich and mature platform
  - Provide Real-time Compression, Easy Tier, Non-disruptive migrations, Long distance replication
  - 40,000 engines installed worldwide, 11 years field experience

- 250+ storage devices supported to provide back-end capacity
  - Retain your existing investment in storage devices
  - Keep flexibility for the future

- Active quorum device enables automatic failover
  - No external management software
  - Prevents split-brain

- Supports recovery in case of full unplanned site failure scenarios

SVC
Stretched
Cluster

Site 1

Site 2

Storage Pool 1

Storage Pool 2

Site 1

Site 2

Site 3

Quorum

Planning for Unplanned Site failures with Stretched Storage

- Active-active storage does **NOT** eliminate need for proper Unplanned Site failure planning
  - **Plan** which applications to be recovered together
  - **Test** the recovery process to validate it
    - Use SRM!!
  - **Review** the business and non-IT processes which must operate in case of major disaster
- Active-active storage provides much greater business value from the same infrastructure investment
  - Continuous availability with orchestration
- Active-active storage achieves more robust recovery
  - Exercises the recovery infrastructure as part of the BAU operations of the enterprise
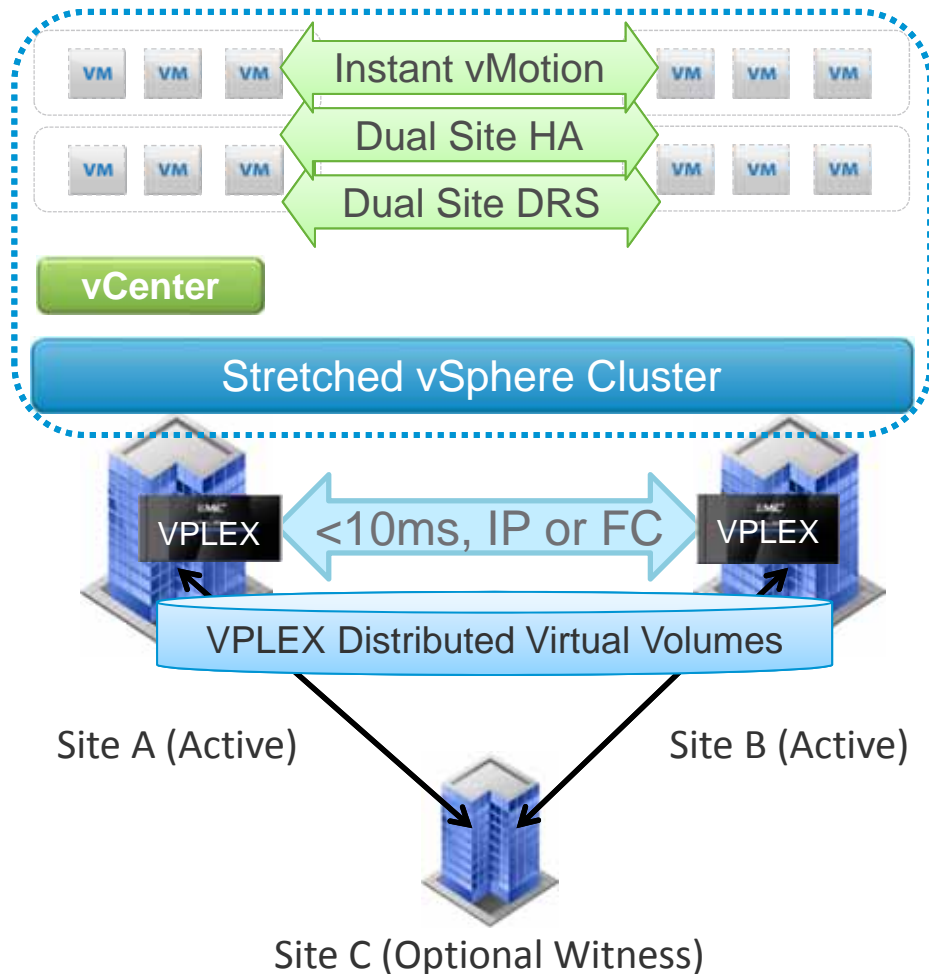 - Better testing, greater confidence
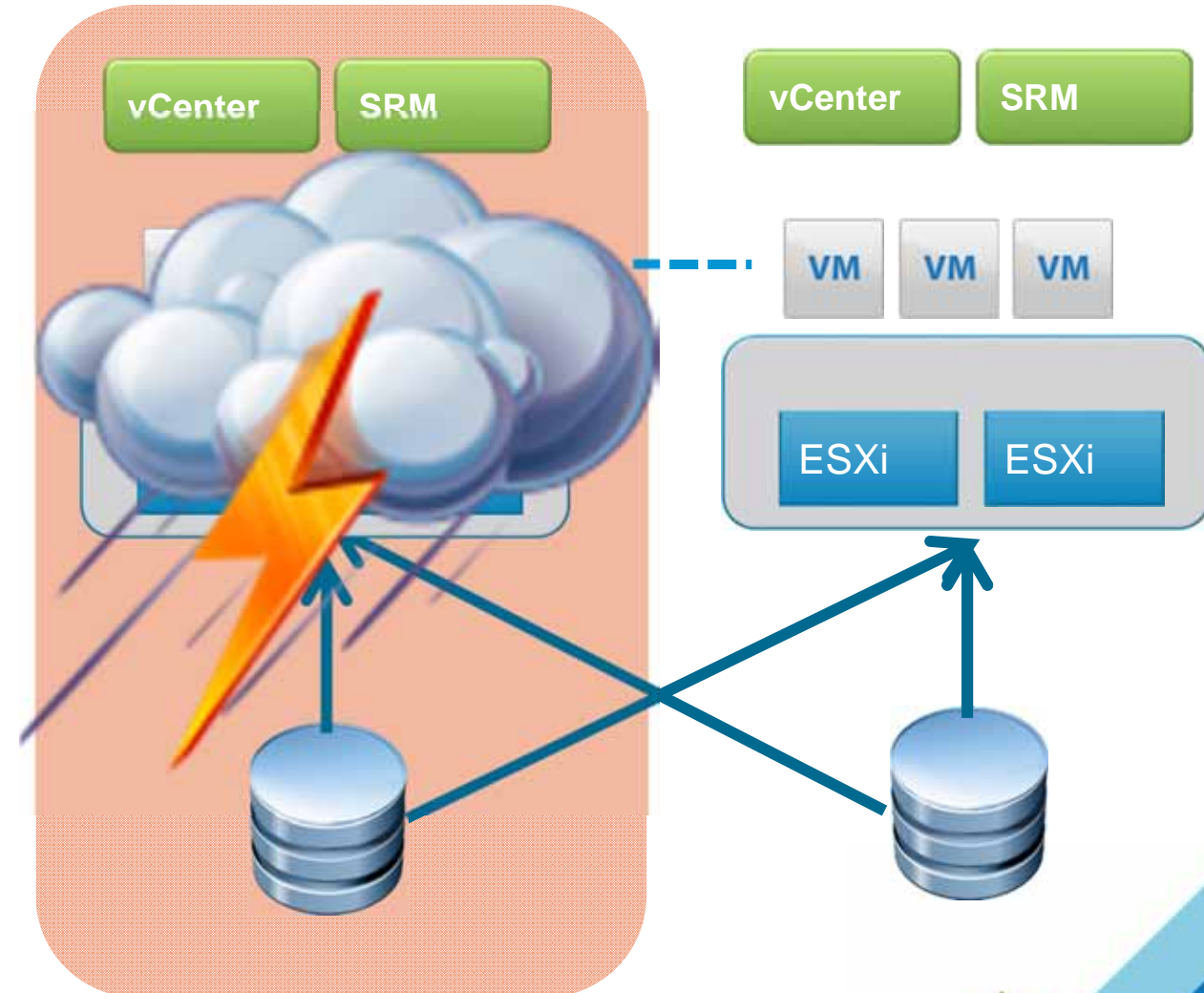
Vendor Presentation

Cody Garvin,

Senior Product Manager, VPLEX

EMC

VPLEX Continuous Availability for Stretched Metro Clusters

VM VM VM | Instant vMotion | VM VM VM

Dual Site HA

VM VM VM | Dual Site DRS | VM VM VM

vCenter

Stretched vSphere Cluster

VPLEX **<10ms, IP or FC** VPLEX

VPLEX Distributed Virtual Volumes

Site A (Active)   Site B (Active)
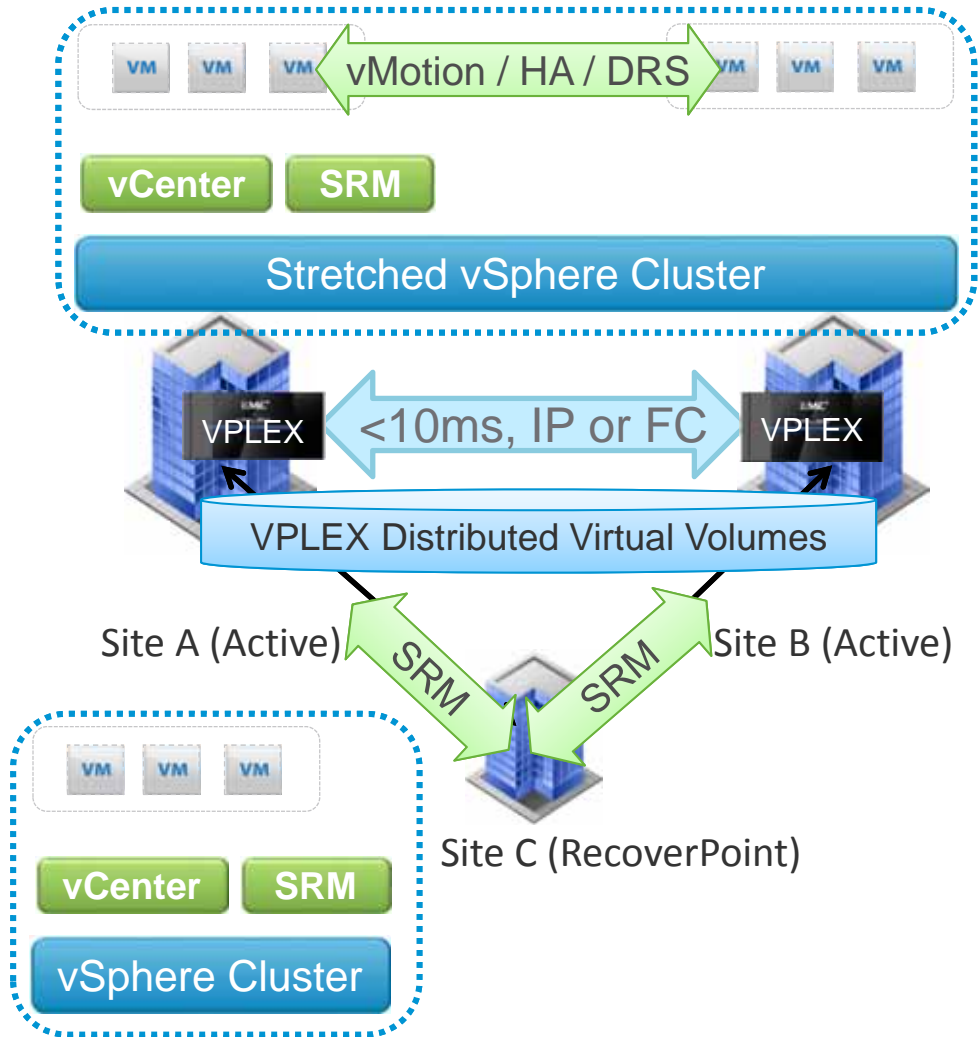
Site C (Optional Witness)

- Established VPLEX Active-Active Solution
  - Instant vMotion across distance
  - VMware HA automatically restarts VMs at either site for system or site failure
  - Balance workloads across both sites with VMware DRS
  - Supports VMware FT out of the box

- Additional flexibility of VPLEX Metro
  - Doesn't Require FC Cross-Connect
  - Choose IP or FC Connectivity between sites
  - Third Site – IP connectivity to Witness VM
  - No SPOF – If you lose a Director, no loss of access at any site

EMC²

VPLEX Active-Active for VMware SRM & Dual Datacenters
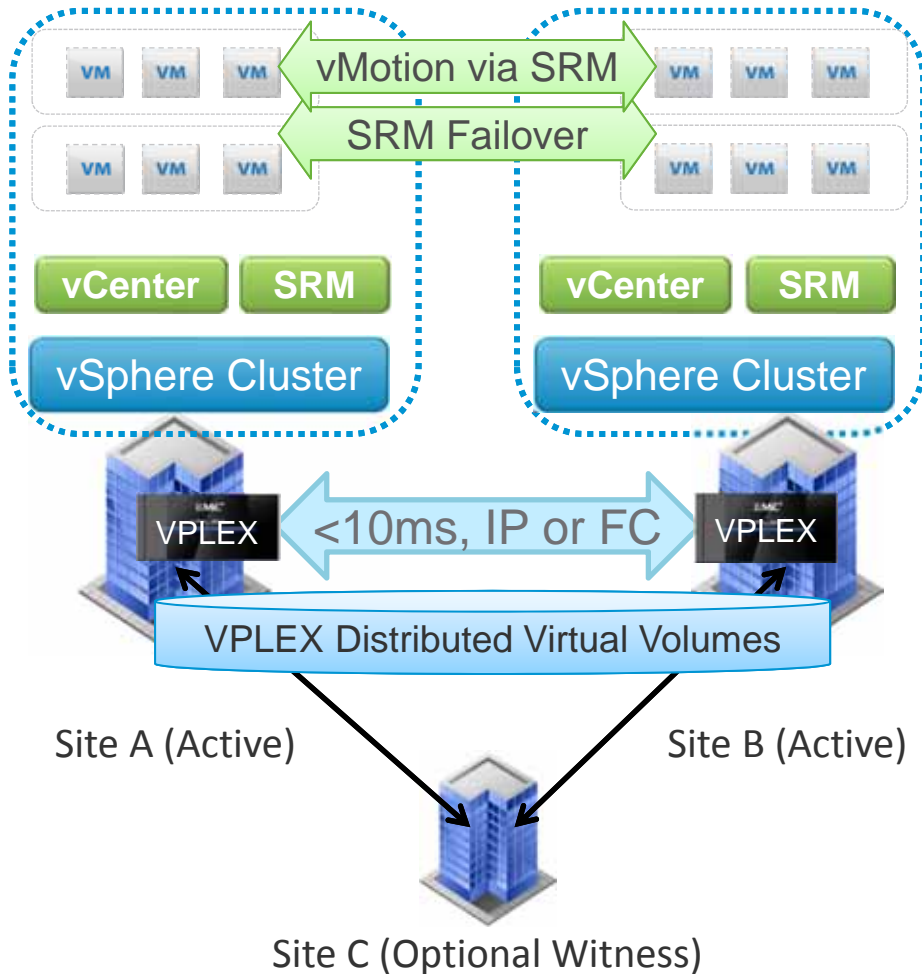
- VPLEX Active-Active with VMware SRM
  - Retain instant vMotion across distance
  - VMware SRM SRA for VPLEX is coming
  - VMware SRM coordination for planned and unplanned failover between sites
  - Failovers CAN be automated via SRM API
  - Zero RPO compared with replication

- Additional flexibility of VPLEX Metro
  - Doesn't Require FC Cross-Connect
  - Choose IP or FC Connectivity between sites
  - Third Site – IP connectivity to Witness VM
  - No SPOF – If you lose a Director, no loss of access at any site

EMC²

The Best of Both Worlds Today! VPLEX MetroPoint

vMotion / HA / DRS

vCenter SRM

Stretched vSphere Cluster

VPLEX ◄—► <10ms, IP or FC ◄—► VPLEX

VPLEX Distributed Virtual Volumes

Site A (Active) SRM SRM Site B (Active)

Site C (RecoverPoint)

vCenter SRM

vSphere Cluster

- Combine a Stretched Metro Cluster with 3rd site SRM recovery
  - Same benefits of the Stretched Metro Cluster VPLEX solution combined with SRM managed 3rd site recovery
  - Uses VPLEX Metro for shared storage and RecoverPoint for 3rd site Disaster Recovery
  - Single DR copy at the 3rd site
  - Leverage RecoverPoint Any Point-in-time integration with SRM
  - Maintain DR capability even with a complete site loss

Visit the EMC booth and ask about VPLEX deep dive information!

EMC²

Summary

Key Takeaways

- SRM is a great solution for Active Active datacenters
  - SRM enhances Continuous Availability with rich orchestration
  - Stretched Storage enables a lower RTO for unplanned failover
  - SRM with vMotion enables ZERO service downtime for disaster avoidance

- You don't have to trade-off Testability and Repeatability when you choose Active-Active model

- SRM + Live Migration is a game changer in IT operations

Q & A

Please fill out a short, product-related survey

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Your feedback is very important !! Especially for a Tech Preview

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Thank You

Fill out a survey

Every completed survey is entered into a drawing for a $25 VMware company store gift certificate