כנס הטכנולוגיות השנתי של EMC

Information Passion - the Power of EMC²

5.12.06

EMC RecoverPoint

Network-based Intelligent Data Protection

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The CIO's Information-Storage and -Management Requirements

Lower TCO

Utilization, consolidation, automated management

Protection/recovery

Matching availability to a range of service-level requirements

Access and availability

Information growth > 50% annually

Simplicity

Hundreds of information-management tools

Compliance

> 16,000 regulations worldwide

The right local- or remote-replication solution will help you overcome these challenges

Replication Benefits

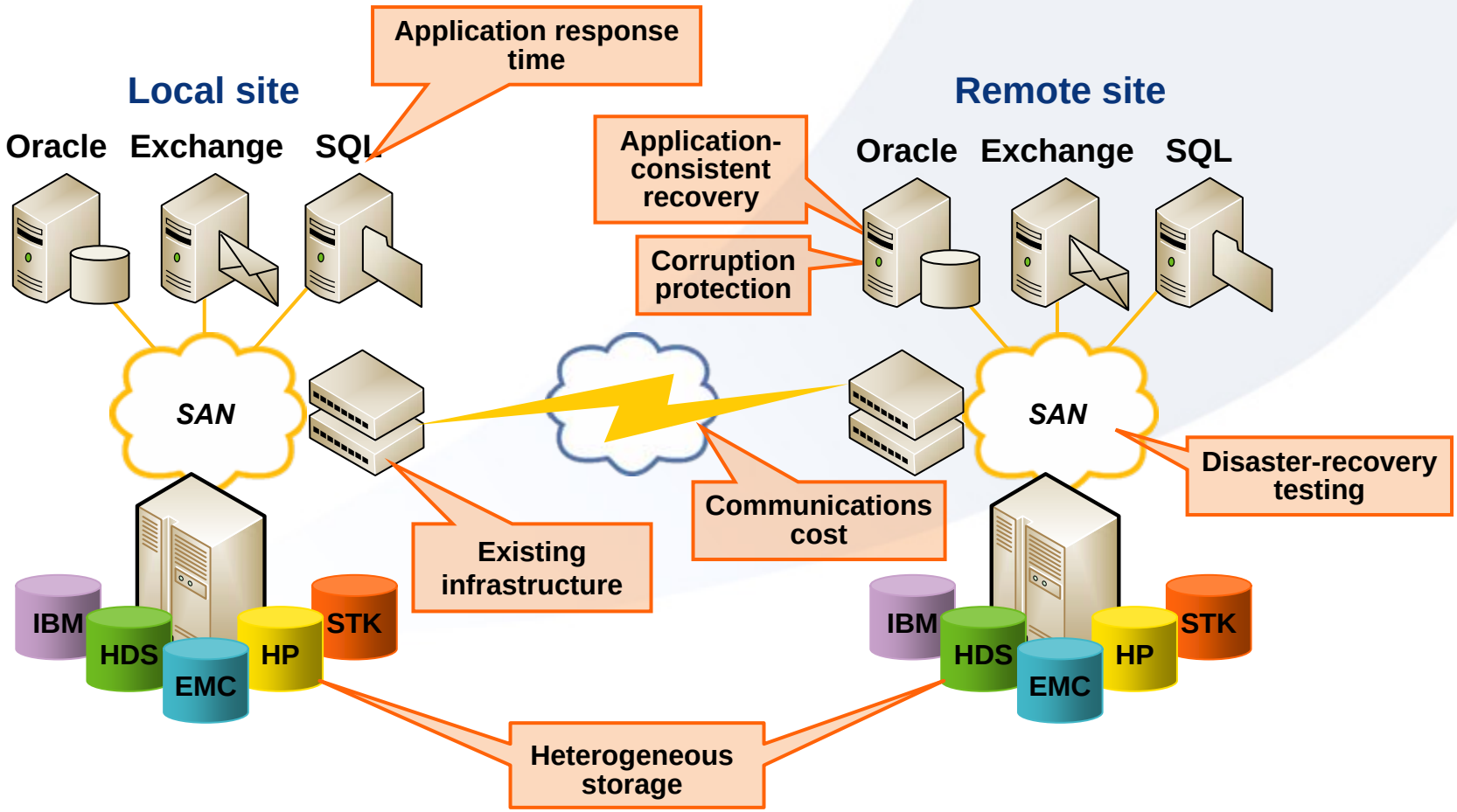
- Protect against local and regional site disruptions
  - Continuous data availability
  - Remote-recovery sites
  - Meet regulatory requirements
  - Support multiple service levels with tiered storage
- Provide near-instant recovery
- Migrate, consolidate or distribute data across heterogeneous storage platforms
  - Data center consolidations
  - Technology refreshes
- Enable non-stop operations
  - Application restart across volumes or arrays

Decision Drivers to Consider

Business Considerations	***Technical Considerations***
Cost	**Recovery and consistency**
Functionality, availability	**Capacity**
Recovery-time objectives	**Bandwidth**
Recovery-point objectives	**Performance**

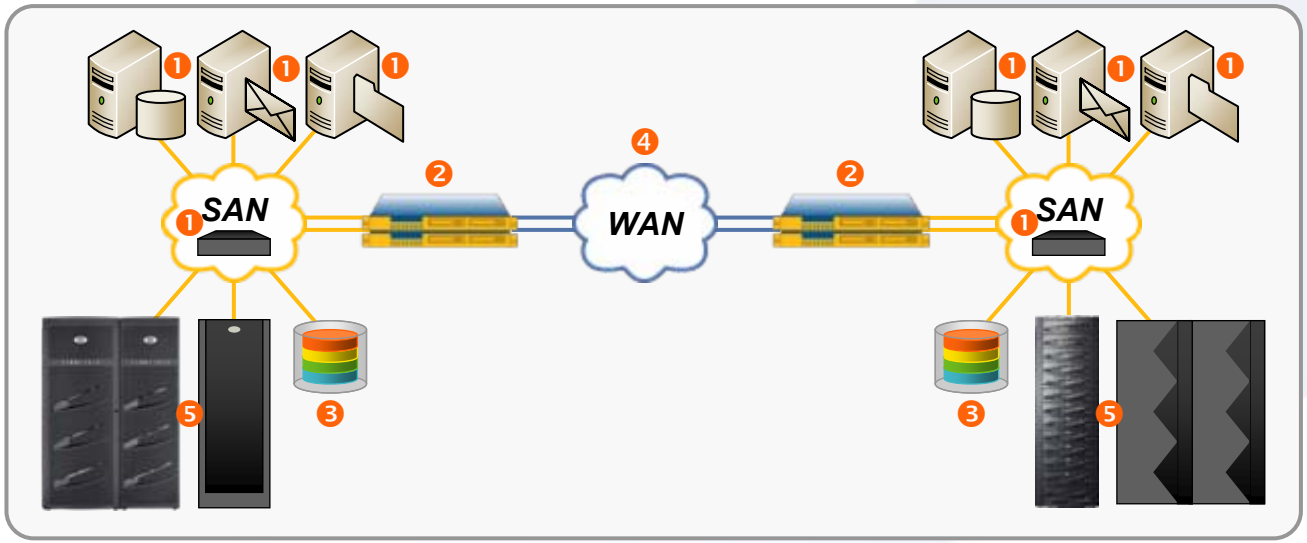
PRIMARY DECISION DRIVERS

Data-Replication Pain Points



Introducing EMC RecoverPoint

Network-based Continuous Remote Replication (CRR)



❶ RecoverPoint splitter drivers
- Intercepts server writes (block-level)
- Resides on host or in fabric

❷ RecoverPoint appliance
- Performs all bi-directional replication
- Handles monitoring, management, and control

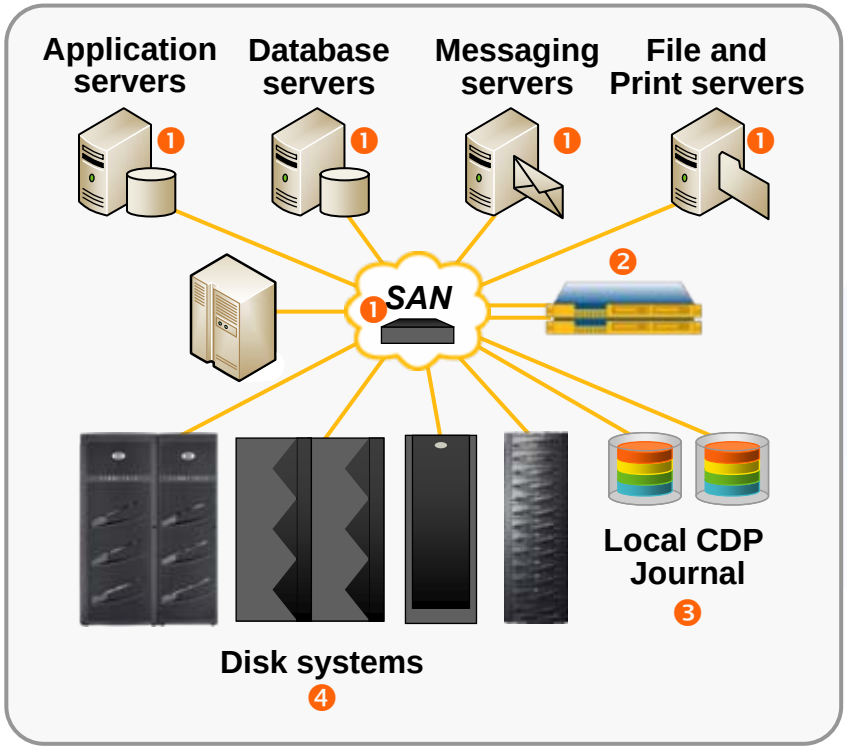
❸ History Journal
- Tracks all data changes to every protected LUN
- Utilizes bookmarks for application-aware recovery

❹ Provides advanced functionality
- 3–15x data compression
- No need for expensive FC/IP converters

❺ Supports heterogeneous environments
- Works with EMC and third-party storage
- True any-to-any volume replication

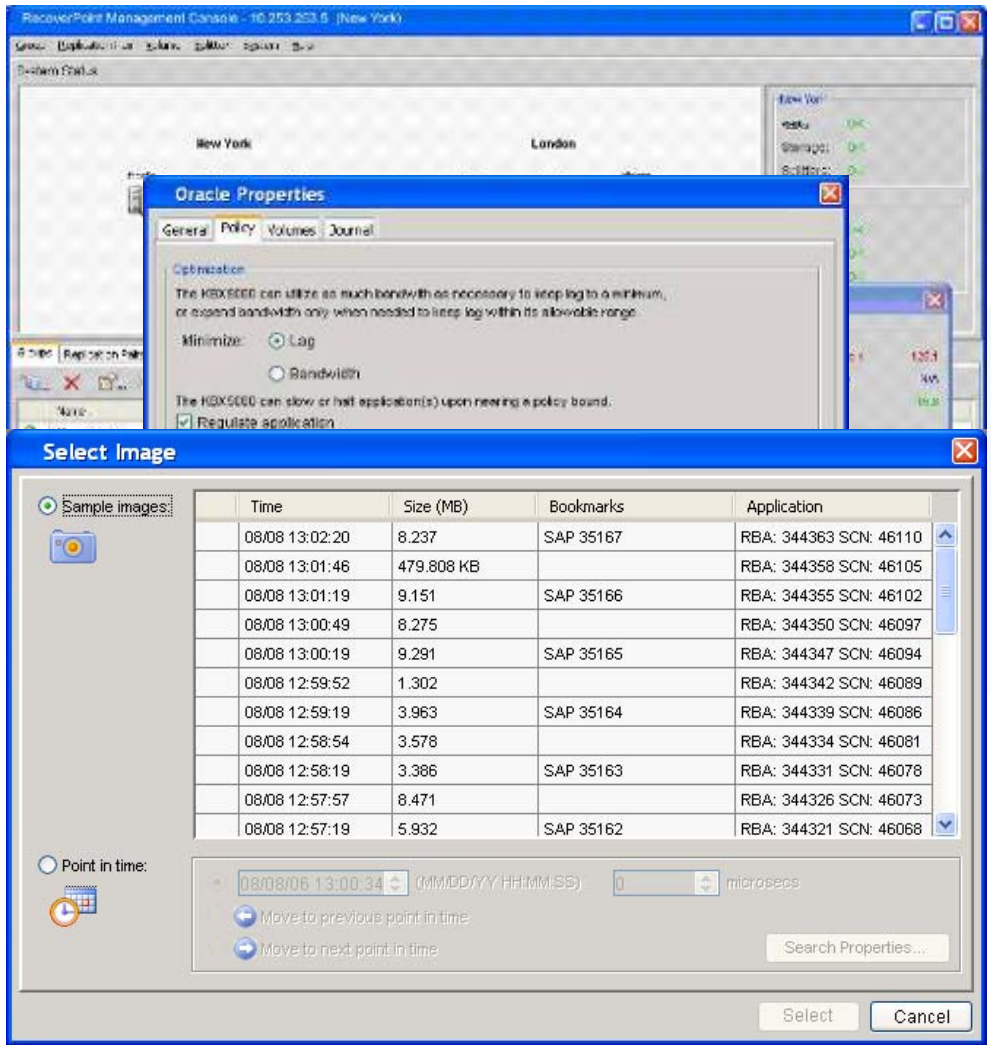
Introducing EMC RecoverPoint

Network-based Continuous Data Protection (CDP)



1. **RecoverPoint splitter drivers**
   - Mirrors server writes to RecoverPoint appliance
   - Resides on host or in fabric
2. **RecoverPoint appliance**
   - Writes changes to CDP Journal
   - Distributes changes to target
3. **History Journal**
   - Tracks all data changes to every protected LUN
   - Stores bookmarks for application-aware recovery
4. **Supports heterogeneous environments**
   - Works with EMC and third-party storage
   - Fabric splitters support Cisco SANTap

RecoverPoint's Advanced Software Functionality



Integrated CRR and CDP

- Bi-directional replication and continuous data protection
- Out-of-band architecture does not impact application performance

Policy-based Management

- Establish polices to manage resources
- Optimize based on differing recovery-point and recovery-time objectives

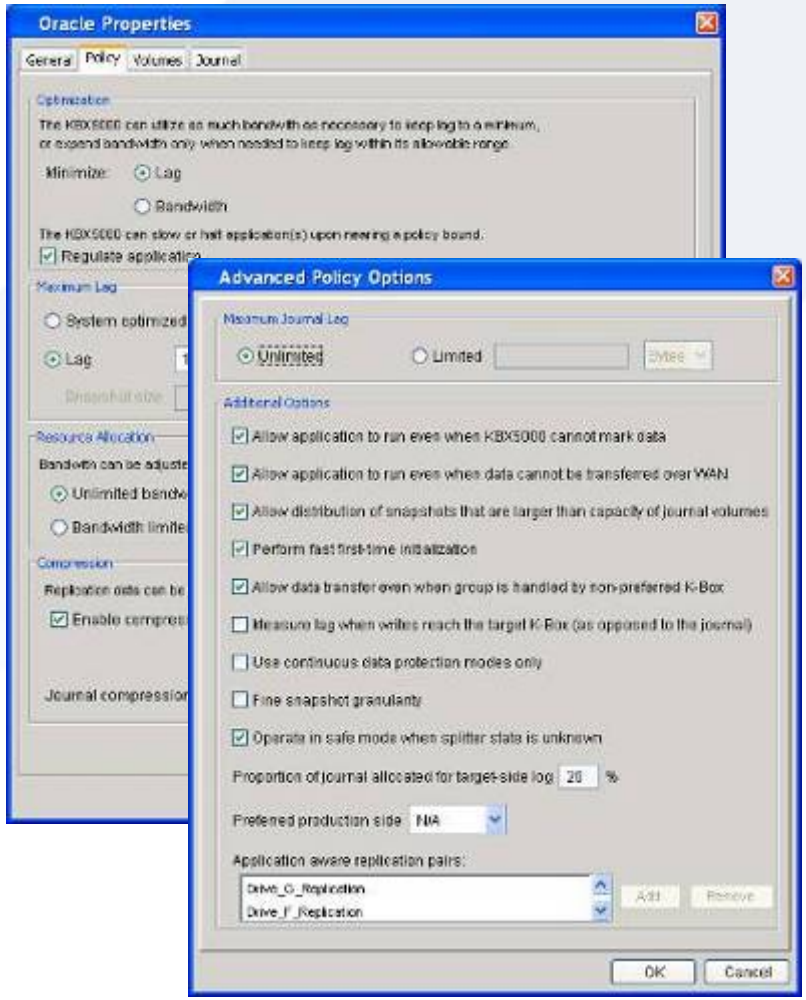
Heterogeneous Recovery

- Recover to any point in time
- Application integration for recovery

Policy-based Management

RecoverPoint Software

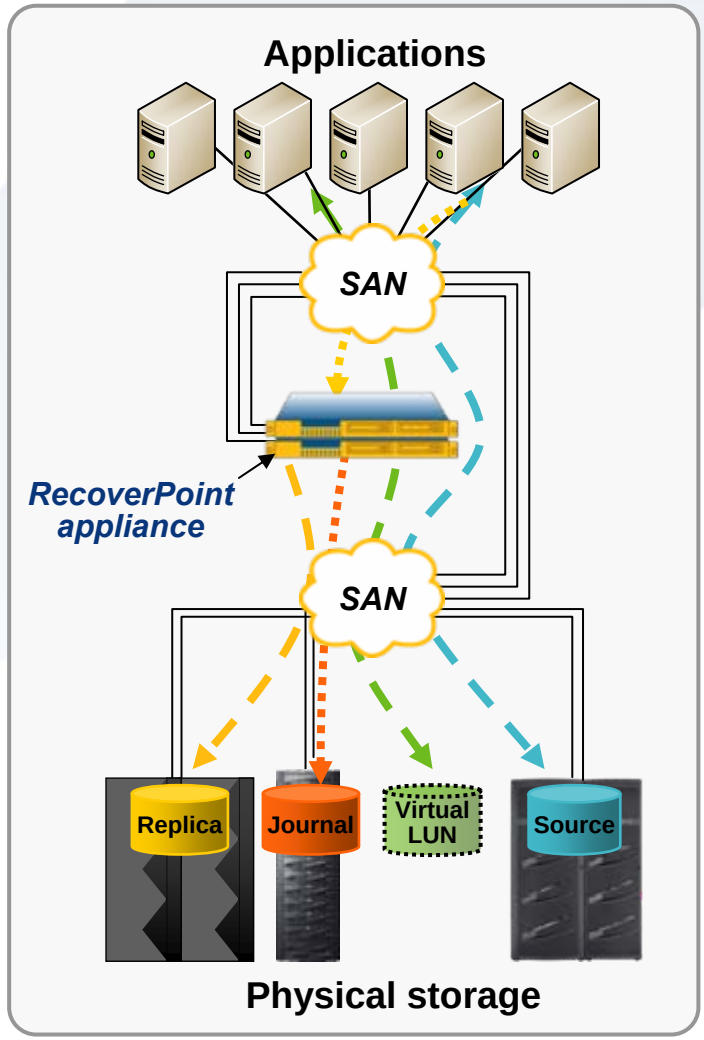
- Group policies are used to minimize lag between sites or bandwidth utilized, allowing capping of lag or bandwidth per group
- RecoverPoint optimizes resources as necessary to meet policies
- Alerts are raised when polices are exceeded



Heterogeneous Recovery to Any Point in Time

RecoverPoint Software

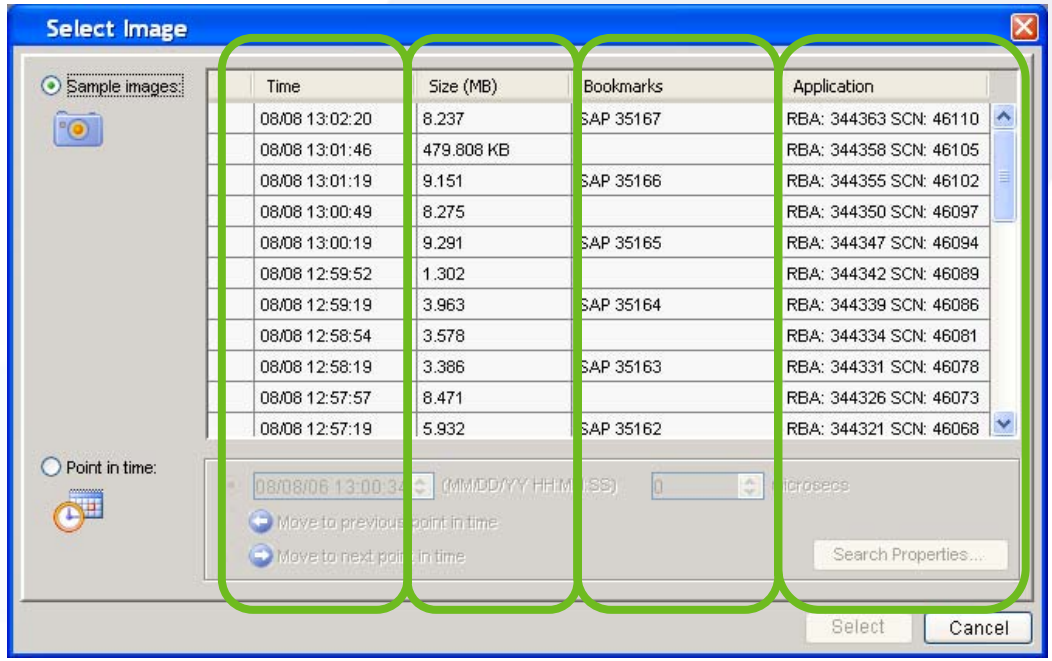
- Instant recovery of any image
  - Recover any point-in-time image
  - Mount image to any host in SAN
  - Full read/write access to image without protection loss
- Maximize recovery benefits to support service levels
  - Backup and recovery
  - Testing, development, and training
  - Parallel processing, reporting, and queries



Journaling for Application-aware Recovery

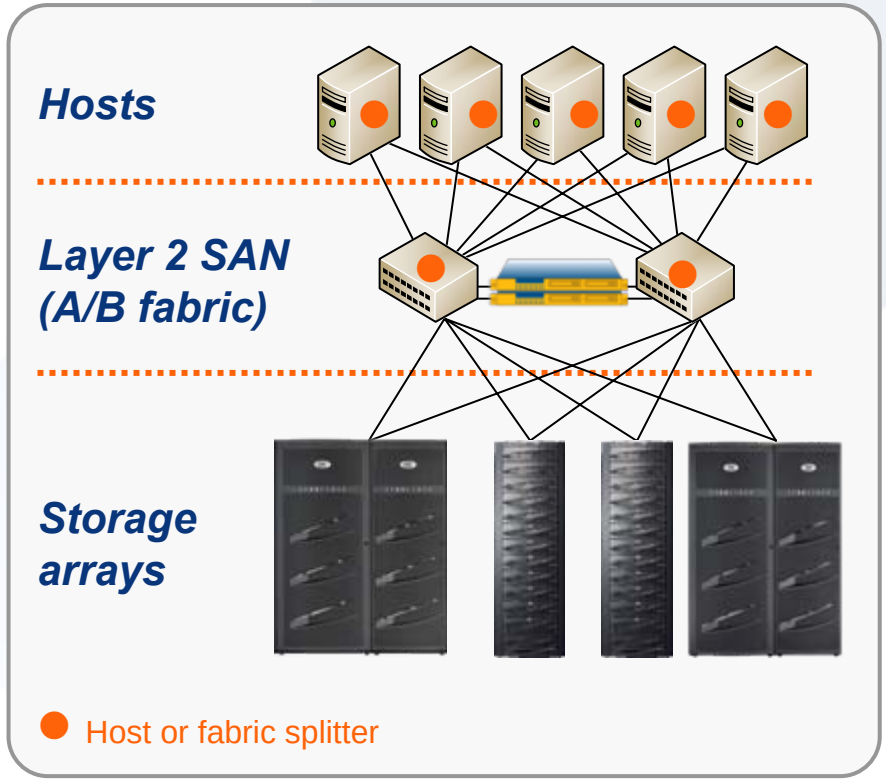
Journal Includes Data plus Metadata

- Time/date
  - Identifies time image was saved
- Size
  - Identifies size of image for recovery
- Bookmarks:
  - System-generated group bookmarks
  - User-generated bookmarks
  - System-event-generated bookmarks
- Application Integration
  - Microsoft Virtual Device Interface (VDI) operations
  - Oracle hot backup mode
- Application-specific annotations
  - Oracle: Tracks database-specific events
    - Relative Block Address (RBA)
    - System Change Number (SCN)

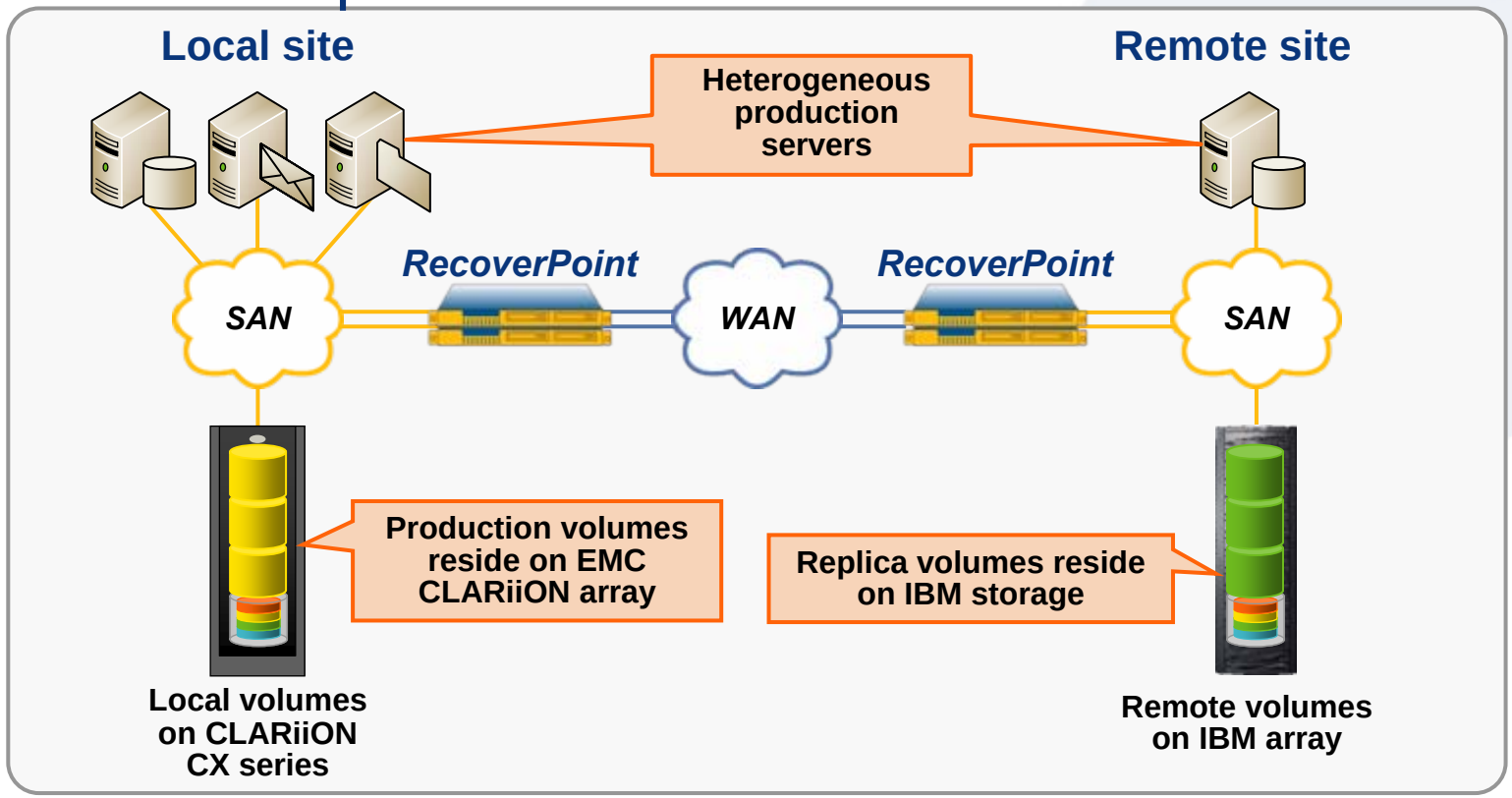


RecoverPoint Configuration

- RecoverPoint is a multi-node cluster
  - Active-active configuration
  - Load distribution across nodes
  - Nodes can be added to live system
- Multiple appliances
  - Protects LUN across appliance failures
  - Support for switch upgrades (hardware and firmware)
- Host- or fabric-based write splitter
  - Lightweight driver on host
  - Cisco SANTap splitter in fabric
  - Intercepts writes to protected LUNs only
  - Sends writes to local appliance
- Supports mirrored SAN
  - Two separate SANs for reliability
  - Supports nondisruptive firmware upgrades
  - Provides high availability for switch configurations through fault isolation

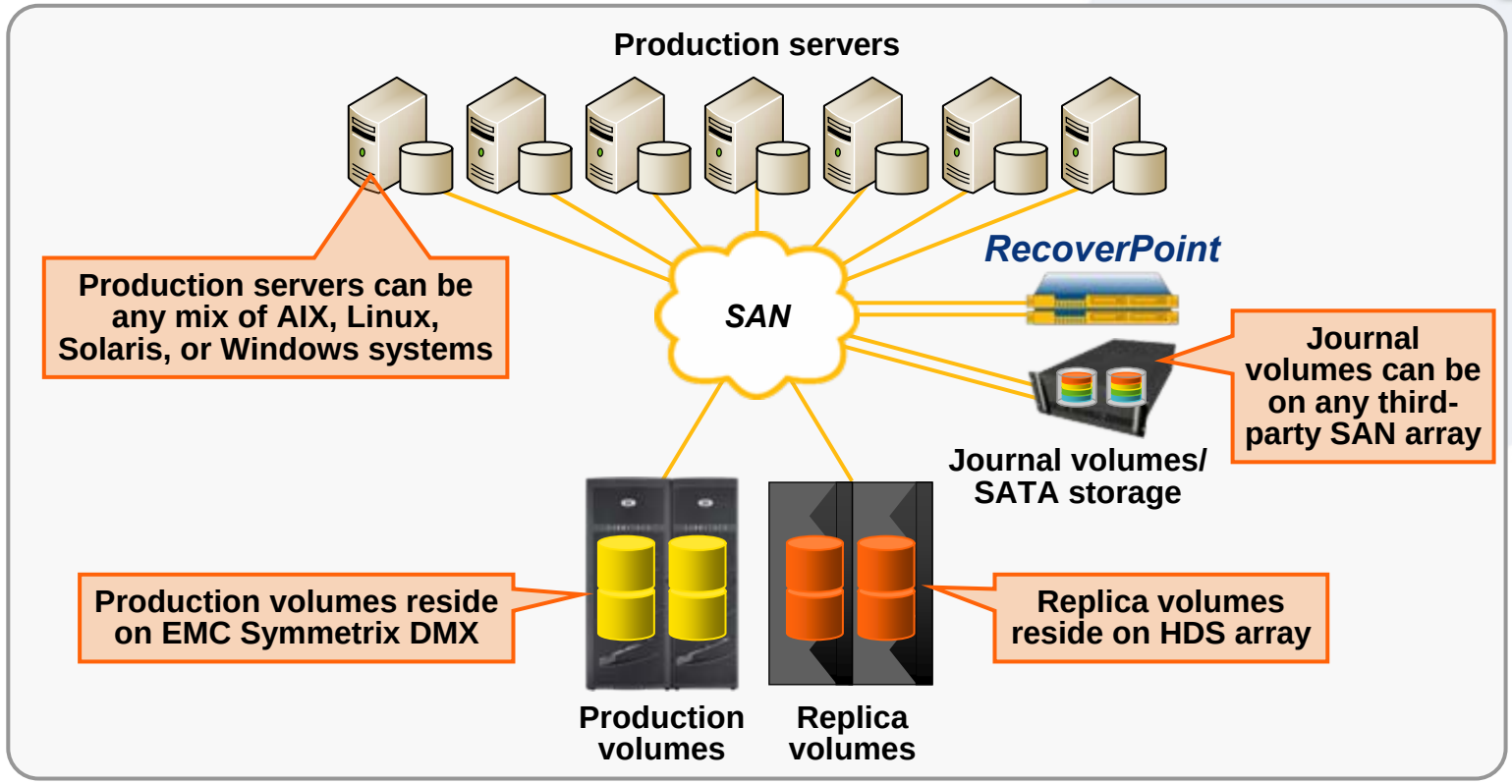


Site-to-Site Replication



- **Solution Benefits:**
  - Bi-directional replication between non-EMC storage and EMC storage
  - Protects storage and server investments
  - Quick recovery and resynchronization between sites in the event of a data loss

Continuous Data Protection



- **Solution Benefits:**
  - Heterogeneous data protection
  - Immediate recovery to ***any*** point in time
  - Can be combined with other EMC solutions to optimize the storage infrastructure through information lifecycle management

EMC is Building a Heterogeneous, Multi-Vendor, Standards-based Solution

Industry Leaders as Partners

BROCADE*

CISCO SYSTEMS

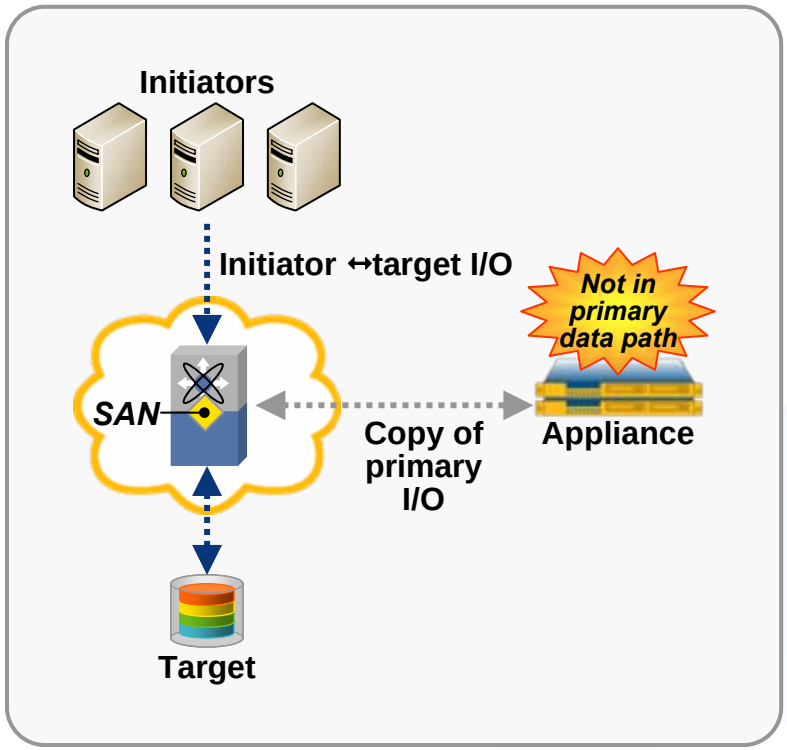
Robust Heterogeneous System Qualification*

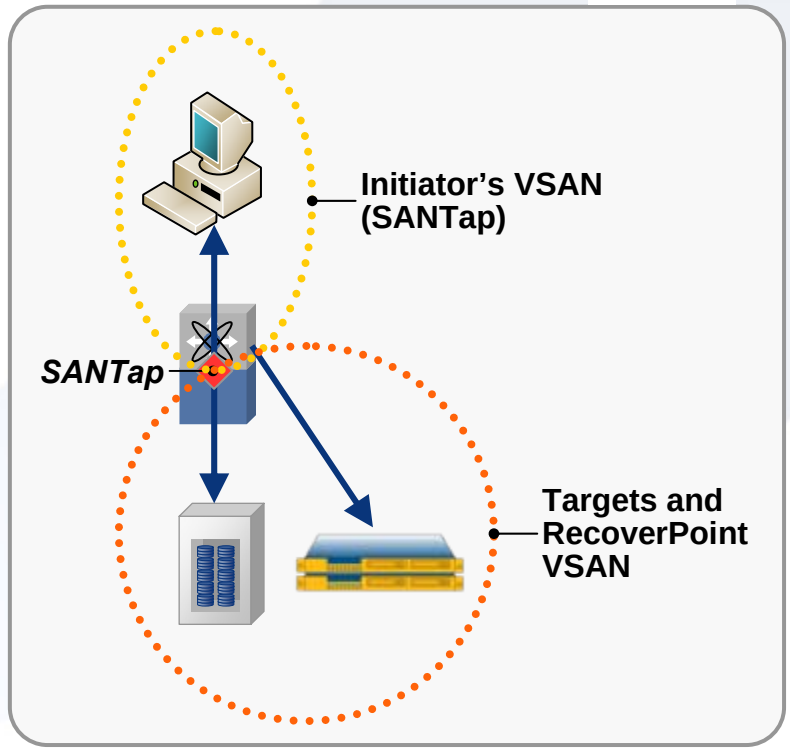
EMC	HP	HDS	IBM
Sun Solaris	Microsoft Windows		Red Hat Linux
IBM AIX	HP-UX		VMware

Consult the "EMC Support Matrix" as of December 2006 for qualification and support details

**To be supported in the next release*

SANTap Intelligent Write Splitting





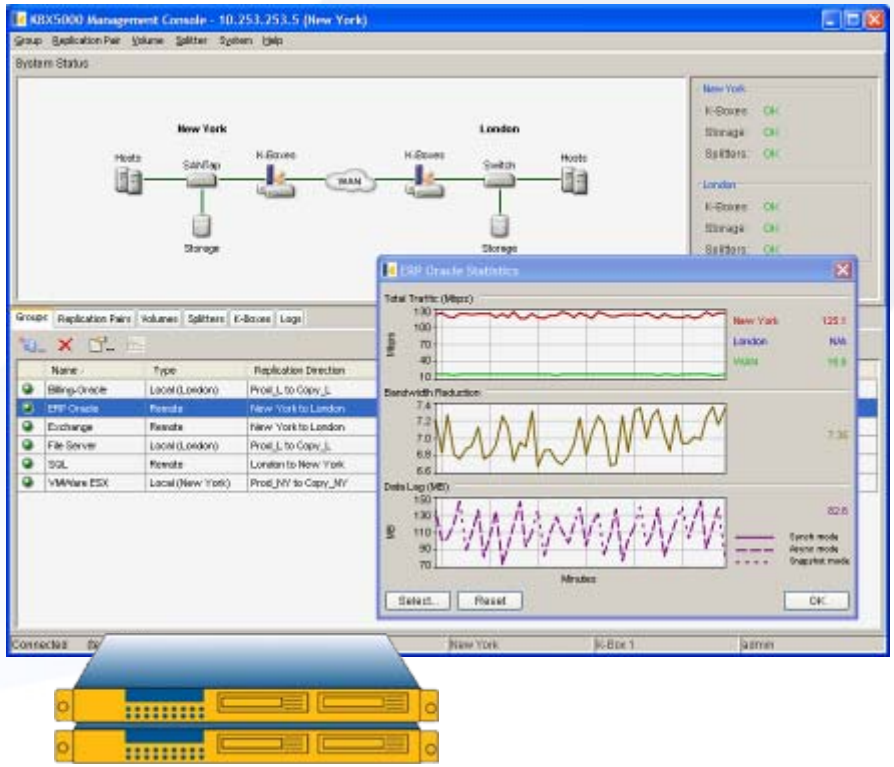
- RecoverPoint leverages SANTap services
  - Part of the Cisco Storage Services Module
- Out-of-band architecture
  - SANTap redirects I/O
  - Eliminates need for host splitter
- Virtual SAN configurations

Competitive Comparison Matrix

Feature	RecoverPoint	Array-based	Host-based
Support for heterogeneous servers	Yes	Yes	Limited
Protection across heterogeneous storage	Yes	No	Yes
Impact to production applications	None	Potential	Severe
Scalability	High	High	Low
Data reduction and compression	5–15x	None natively	Potential
Guaranteed consistency, even across multiple servers or storage devices	Yes	No	Limited by scope
Recovery to any point in time to minimize data loss	Yes	No	Limited by scope
Application-level recovery (I/O bookmarks)	Yes	No	Limited
Replication/recovery across any distance	Yes	Limited	Limited
Guaranteed service levels and data-protection policies	Yes	No	No
Synchronous, asynchronous, snapshot, continuous	Yes	Multiple software	Multiple software
Dynamic data replication	Yes	No	No
Bi-directional replication	Yes	Yes	No

RecoverPoint Summary

- RecoverPoint represents a revolutionary new way to protect data locally and remotely
- Based on scalable out-of-band appliances that leverage intelligent write-splitting and data-management algorithms that make RecoverPoint technically superior to competing products
- RecoverPoint joins a complete list of EMC choices to optimize the storage infrastructure through information lifecycle management

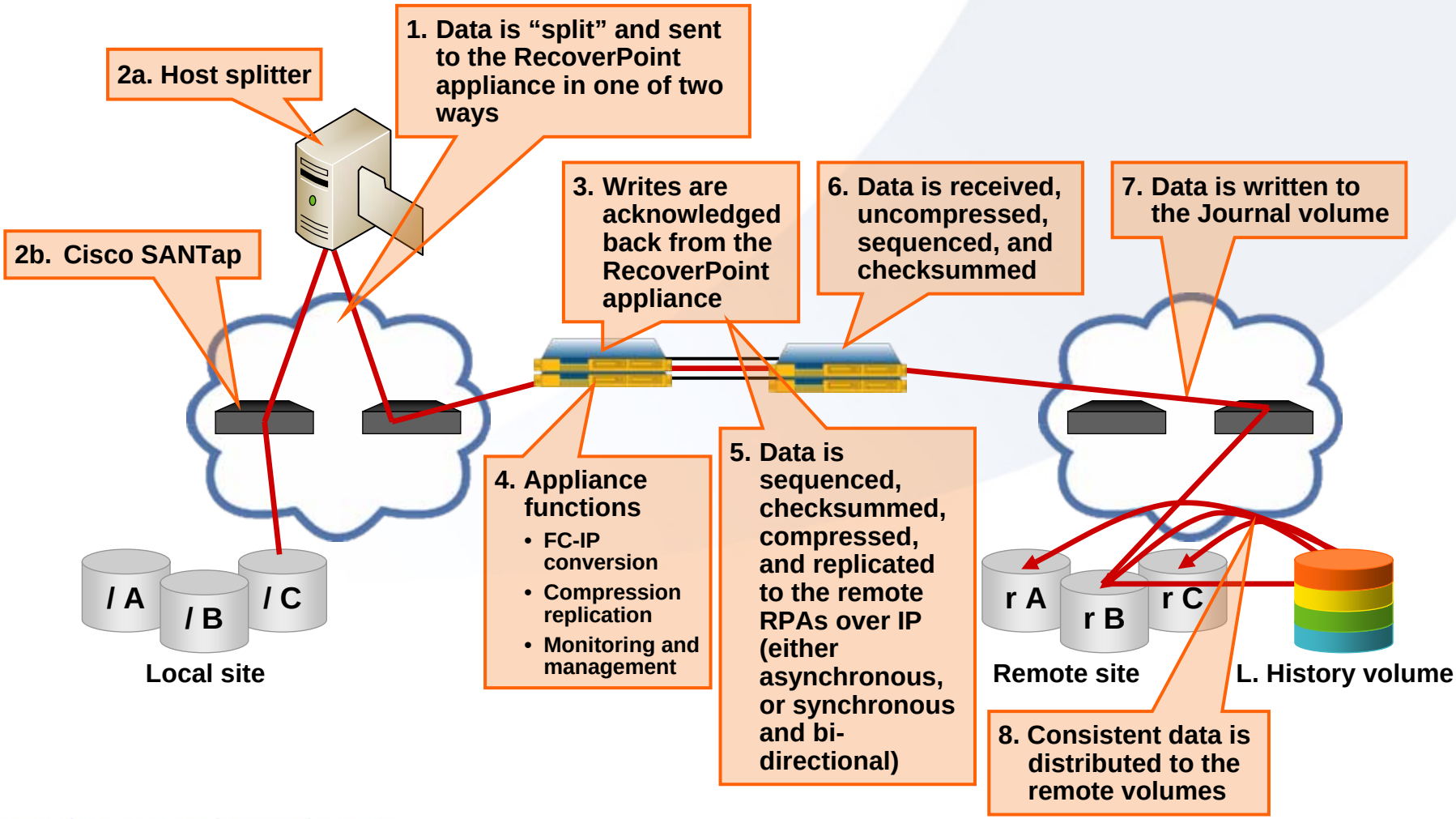


תודה רבה !


EMC²
where information lives®

Backup Slides

RecoverPoint Remote-Protection Process



RecoverPoint Local-Protection Process