

Sigurna virtualna infrastruktura za pohranu podataka

Virtualizacija³

Blitz Cinestar, Branimir Centar, 06.10.2009

Žaneta Findrik Nöthig, *Presales Manager Adriatic*
Blaženko Blažević, *Enterprise Technology Consultant*



EMC Enabling Technology



intelligent storage

widest set of storage choices

full VMware integration

“single giant array”

fully automated storage tiering

information management

deduplication for VMware

SRM-integrated business cont.

archiving of virtualized data

optimized vClient solutions

resource management

vCenter plug-ins

VM-aware discovery

VM-aware ITIL workflows

VM-aware IT compliance

information security

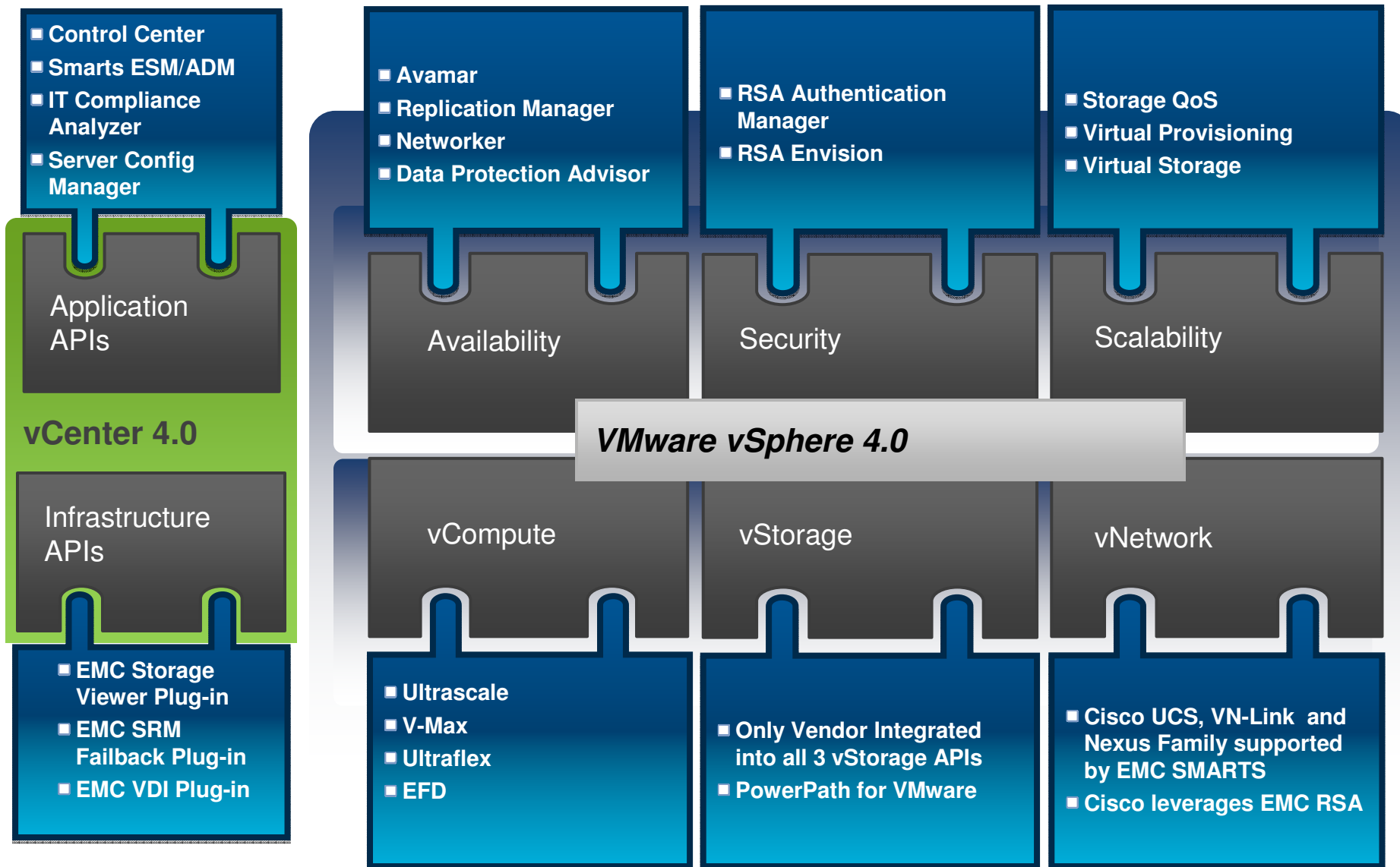
encryption and key mgmt

advanced authentication

data loss prevention

auditing and compliance

EMC and vSphere Integration



vSphere Integrations Benefit Customers



See virtual-to-Physical
maps, root cause, reports

Better Recovery-
storing 500% less and doing it 200% faster

Better SRM
failback, every scale and RPO

VMSafe integrated SEIM

50% Better
storage utilization

Availability

Security

Scalability

vCenter 4.0

VMware vSphere 4.0

Infrastructure APIs

vCompute

vStorage

vNetwork

scale to whatever with a 24x forever model

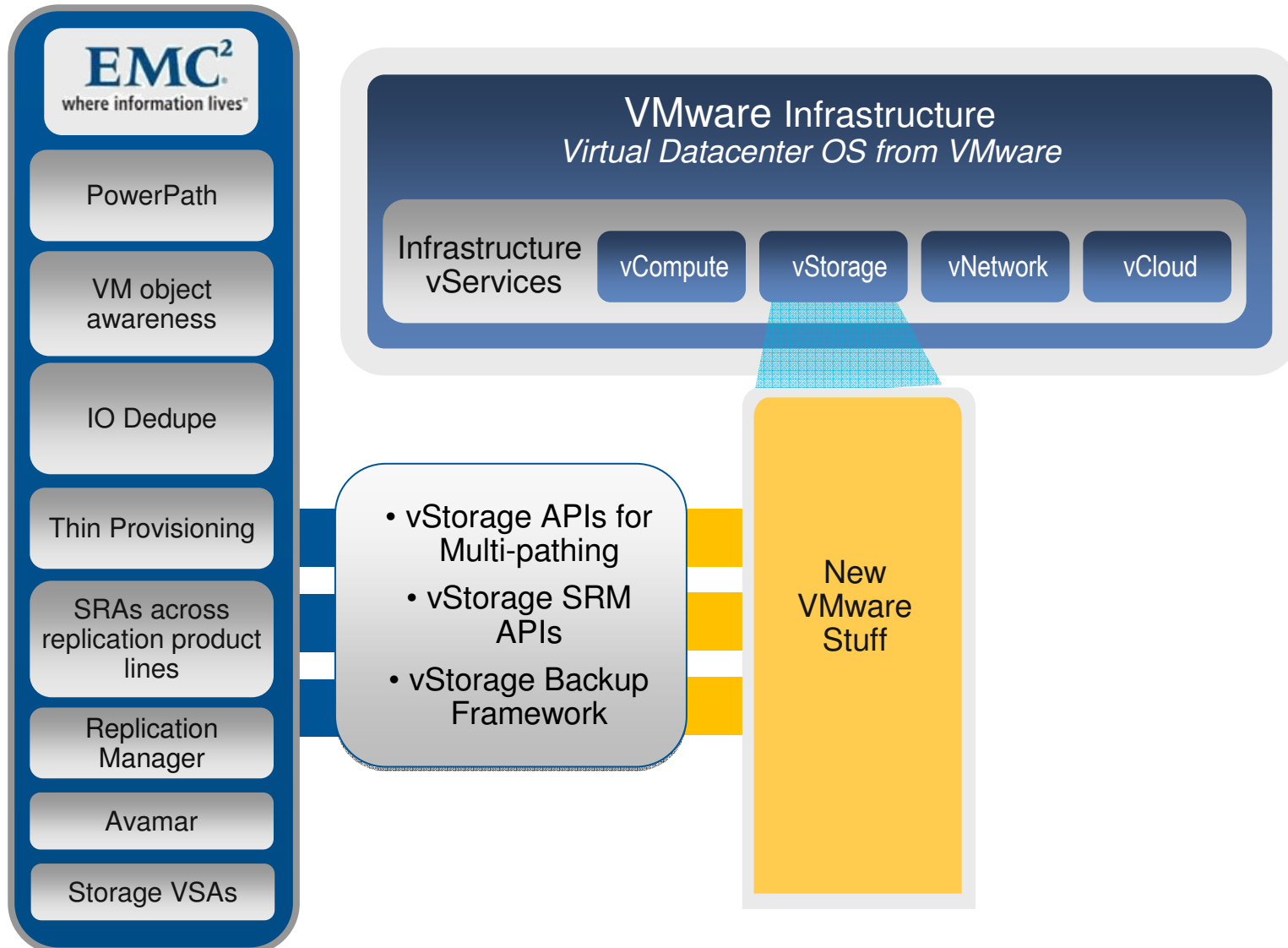
View/Manage Array in vCenter

Better performance
- 1/3 \$/IOps acquisition cost

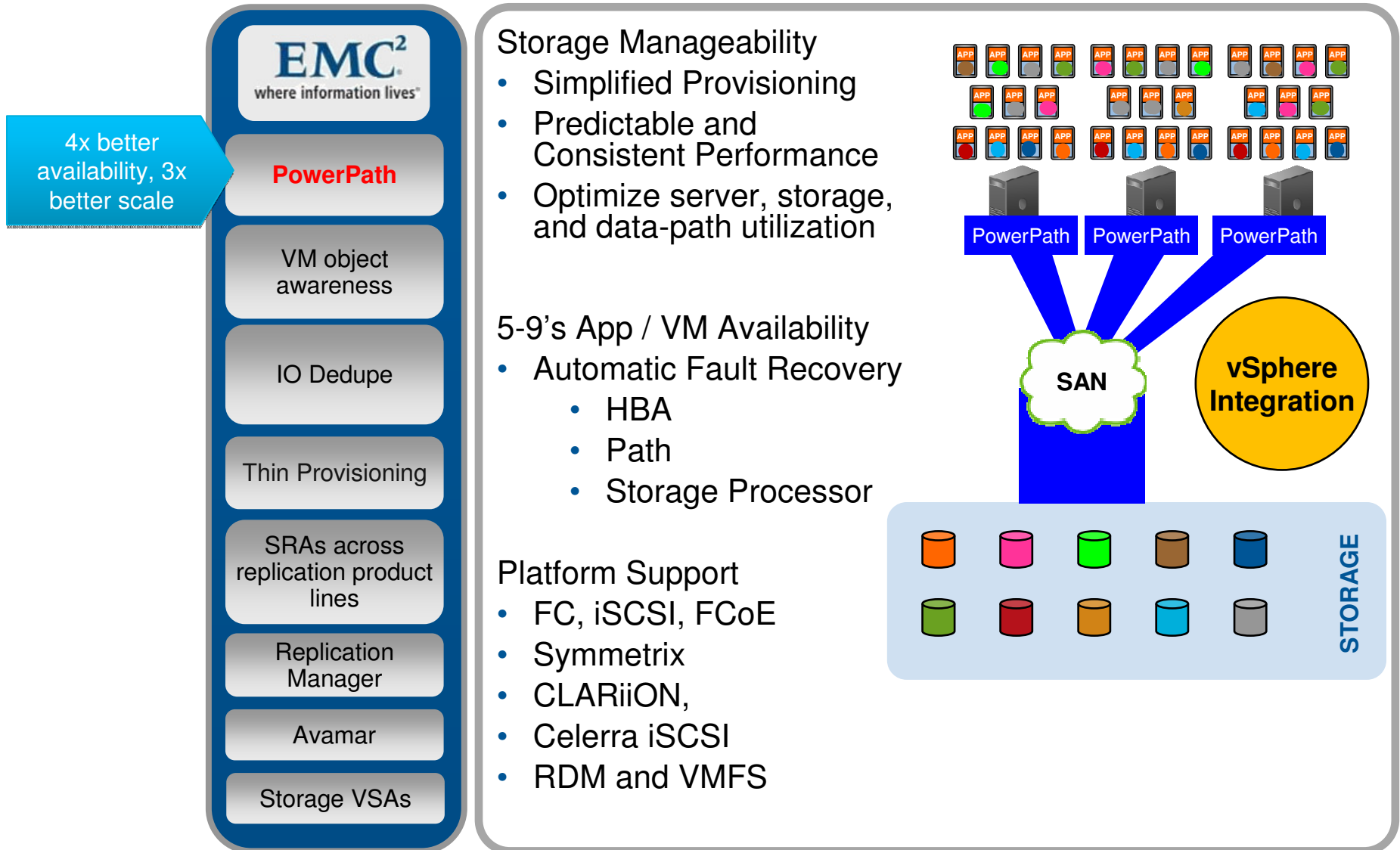
Better Multipathing
3x more performance
4x higher Availability

Fluid Storage
change anything, anytime

What's Coming from EMC vStorage



What's Coming from EMC vStorage



What's Coming from EMC vStorage



4x better
availability, 3x
better scale

PowerPath

"Hardware Offload"
(future)

**VM object
awareness**

2x less IO, 10x
faster provisioning
(future)

IO Dedupe

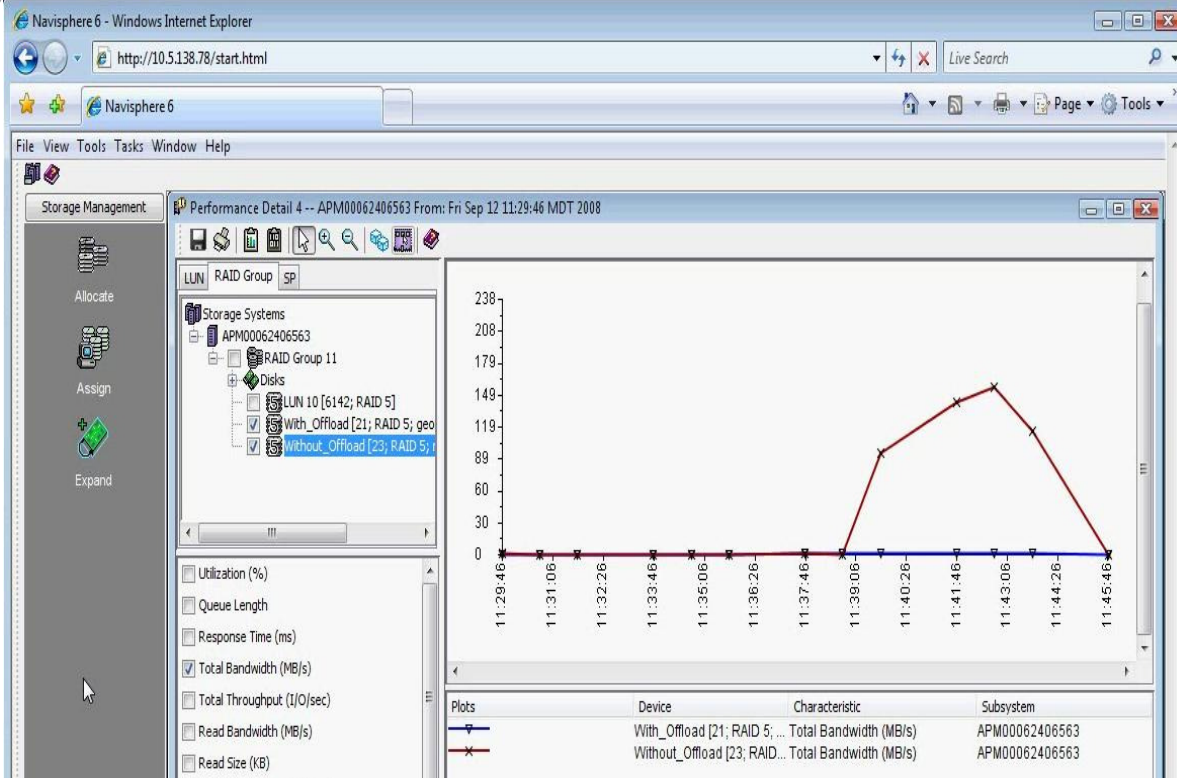
Thin Provisioning

SRAs across
replication product
lines

Replication
Manager

Avamar

Storage VSAs



Array Offload of I/O Intensive Operations

- Reduce network traffic
- Reduce ESX workload
- Drastically increase completion time of operations

Array will be able to perform block-level operations on VMs

Not Everyone Needs Uber-managers...



10.13.156.200 - Remote Desktop

vc-server-20 - VMware Infrastructure Client

File Edit View Inventory Administration Plugins Help

Inventory Scheduled Tasks Events Administration Maps Consolidation

Hosts & Clusters

- DC20
 - Cluster20
 - r5c4s10vdi.vdi.emc.local
 - r5c4s11vdi.vdi.emc.local
 - r5c4s12vdi.vdi.emc.local
 - r5c4s13vdi.vdi.emc.local
 - r5c4s14vdi.vdi.emc.local
 - r5c4s15vdi.vdi.emc.local
 - r5c4s16vdi.vdi.emc.local
 - r5c4s3vdi.vdi.emc.local
 - r5c4s4vdi.vdi.emc.local
 - r5c4s5vdi.vdi.emc.local
 - r5c4s6vdi.vdi.emc.local
 - r5c4s7vdi.vdi.emc.local
 - r5c4s8vdi.vdi.emc.local
 - r5c4s9vdi.vdi.emc.local
 - Cluster20-Pool01
 - Cluster20-Pool02

r5c4s10vdi.vdi.emc.local VMware ESX Server, 3.5.0, 110268

Getting Started Summary Virtual Machines Performance Configuration Tasks & Events Alarms Permissions Maps EMC Storage

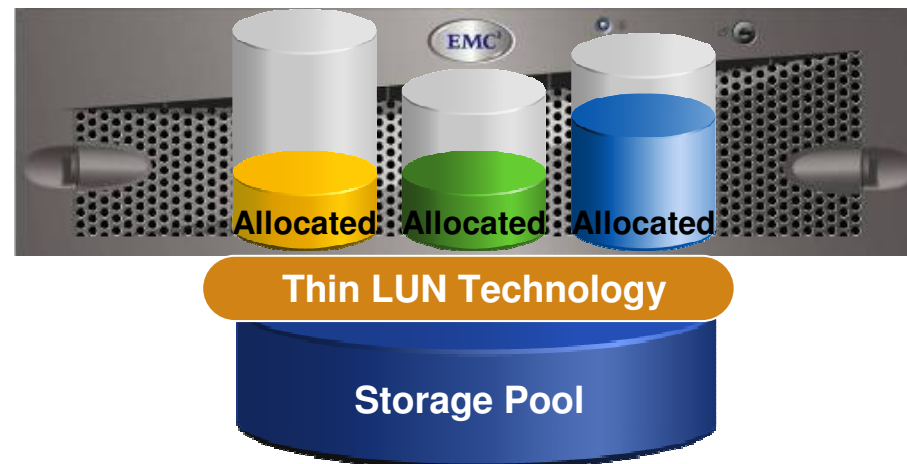
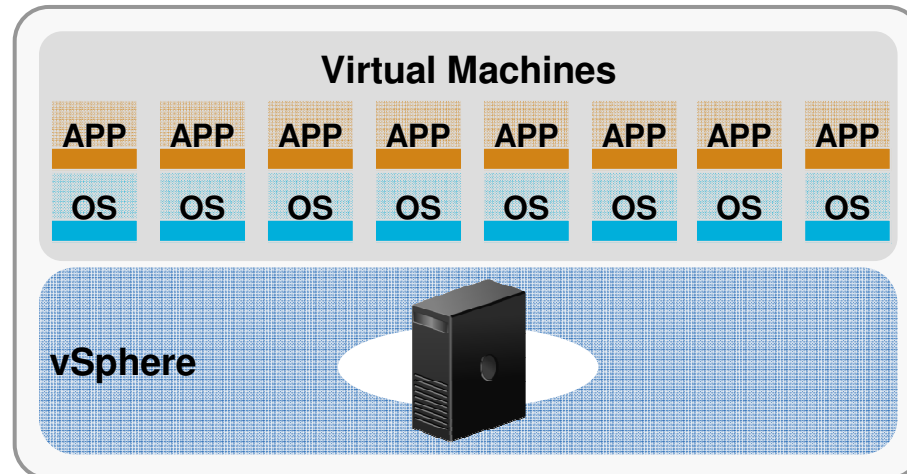
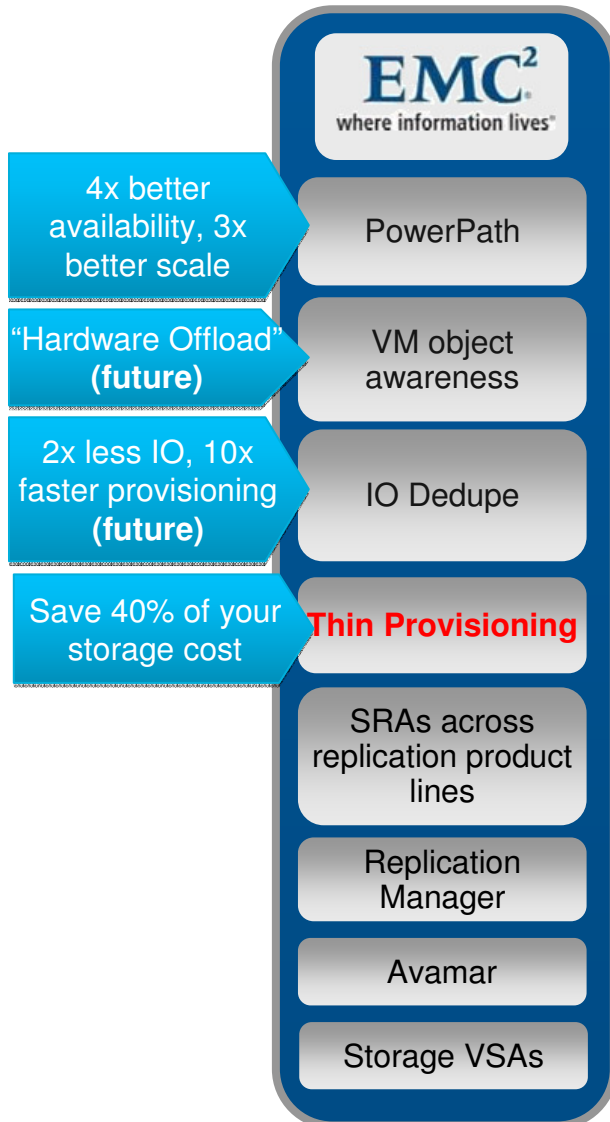
Storage

- Datastores
- LUNs
- Targets

EMC Storage LUNs: Show all LUNs

Canonical	Model	Revision	Array	Device	Type	RAID	Capacity	META	VP	Datastore
vmhba1:9:27	SYMMETRIX	5773	000190103899	03D23	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:29	SYMMETRIX	5773	000190103899	03D2B	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:26	SYMMETRIX	5773	000190103899	03D1F	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:11	SYMMETRIX	5773	000190103899	03CE3	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:59	SYMMETRIX	5773	000190103899	03DA3	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:13	SYMMETRIX	5773	000190103899	03CEB	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:10	SYMMETRIX	5773	000190103899	03CDF	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:61	SYMMETRIX	5773	000190103899	03DAB	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:43	SYMMETRIX	5773	000190103899	03D63	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:31	SYMMETRIX	5773	000190103899	03D33	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:28	SYMMETRIX	5773	000190103899	03D27	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:45	SYMMETRIX	5773	000190103899	03D68	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:42	SYMMETRIX	5773	000190103899	03D5F	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:30	SYMMETRIX	5773	000190103899	03D2F	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:15	SYMMETRIX	5773	000190103899	03CF3	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:12	SYMMETRIX	5773	000190103899	03CE7	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:63	SYMMETRIX	5773	000190103899	03D83	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:60	SYMMETRIX	5773	000190103899	03DA7	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:14	SYMMETRIX	5773	000190103899	03CEF	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:62	SYMMETRIX	5773	000190103899	03DAF	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:47	SYMMETRIX	5773	000190103899	03D73	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:44	SYMMETRIX	5773	000190103899	03D67	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:46	SYMMETRIX	5773	000190103899	03D6F	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:58	SYMMETRIX	5773	000190103899	03D9F	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:1	SYMMETRIX	5773	000190103899	03CB8	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:19	SYMMETRIX	5773	000190103899	03D03	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:33	SYMMETRIX	5773	000190103899	03D3B	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:21	SYMMETRIX	5773	000190103899	03D0B	TDEV	RAID_6	128.00 GB	Concate...	Yes	
vmhba1:9:3	SYMMETRIX	5773	000190103899	03CC3	TDEV	RAID_6	128.00 GB	Concate...	Yes	

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availability, 3x
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PowerPath

"Hardware Offload"
(future)

VM object
awareness

2x less IO, 10x
faster provisioning
(future)

IO Dedupe

Save 40% of your
storage cost

Thin Provisioning

Easier DR testing,
10x easier DR

**SRAs across
replication product
lines**

Replication
Manager

Avamar

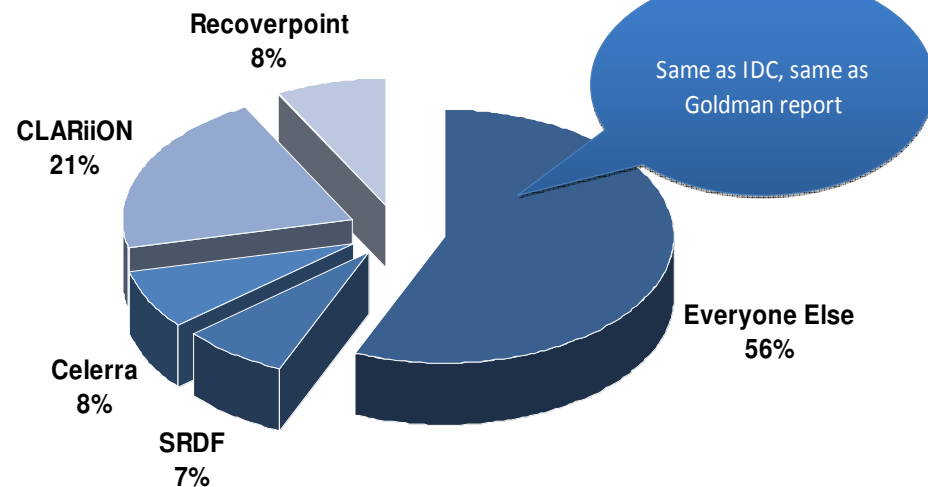
Storage VSAs

"I ran 13 sessions of the hands on LAB for SRM at VMworld 2008 and 80% were looking to integrate this with EMC storage ..As well as from a pure documented solution, EMC is the winner by far at this time ... Just my 2 cents ..."

Rodney Rock – VMware Sr.
Systems Engineer

"I'd say at least 75% of the traffic visiting the SRM booth at VMworld asked questions about SRM on top of EMC storage and replication." – Jonathan McCormick, VMware Sr Systems Engineer

SRM Downloads Since Launch



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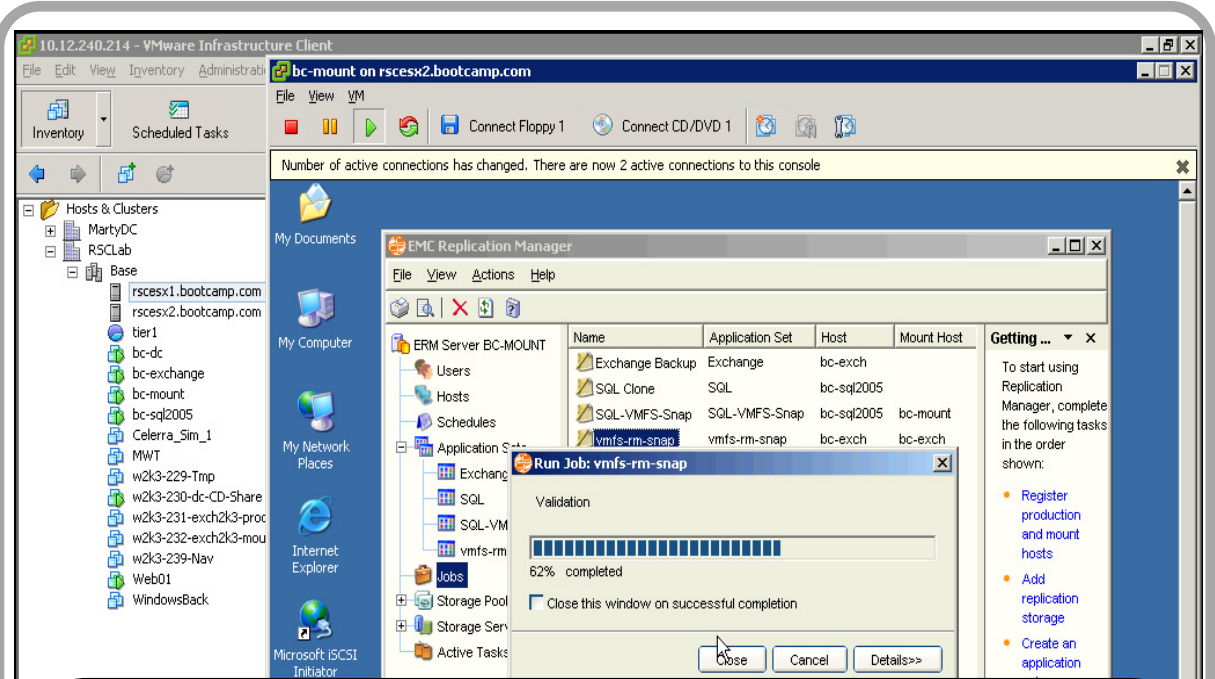
SRAs across
replication product
lines

Instant VM
Recovery

**Replication
Manager**

Avamar

Storage VSAs



EMC Replication Manager

- Integrates array snapshots with VMware
- Instant recovery at single VM & Datastore levels
- Automated Replication and Backup Scheduling
- Exchange, SQL, Oracle, and VMware Consistent Snapshots
- Application Integrated Backup (VSS, Oracle hot backup)

What's Coming from EMC vStorage



PowerPath

VM object awareness

IO Dedupe

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SRAs across replication product lines

Replication Manager

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Storage VSAs

4x better availability, 3x better scale

"Hardware Offload" (future)

2x less IO, 10x faster provisioning (future)

Save 40% of your storage cost

Easier DR testing, 10x easier DR

Instant VM Recovery

Save 500%, get 2x consolidation

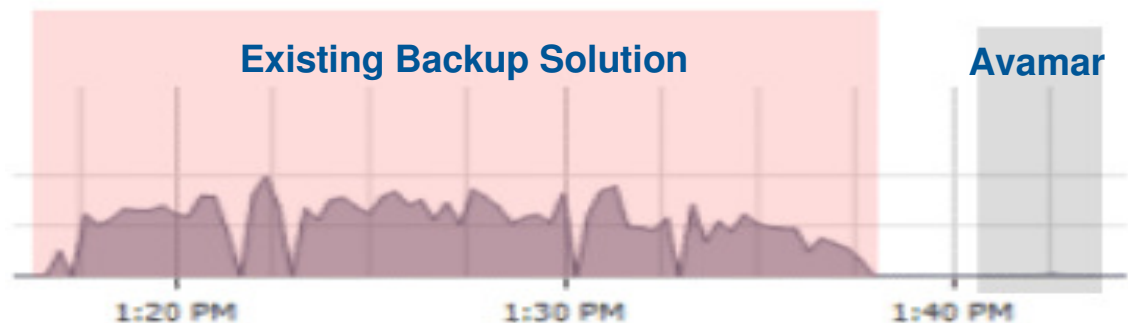
VMware and Source-based Dedupe Backup

Real-world results:

Customer analysis: Jan 4 – Feb 5, 2009

Host Name	New Data	Total Data-set	% Saved	Avg Daily BU Time
ora-edwprod-d1	17.43 GB	126.27 GB	86.20%	1.06 hrs
ora-dmqa-d1	10.16 GB	132.45 GB	92.33%	0.77 hrs
ftpsite	21.25 GB	415.89 GB	94.88%	0.67 hrs
ora-test-siebel-d1	5.63 GB	203.15 GB	95.86%	1.73 hrs

Network Usage



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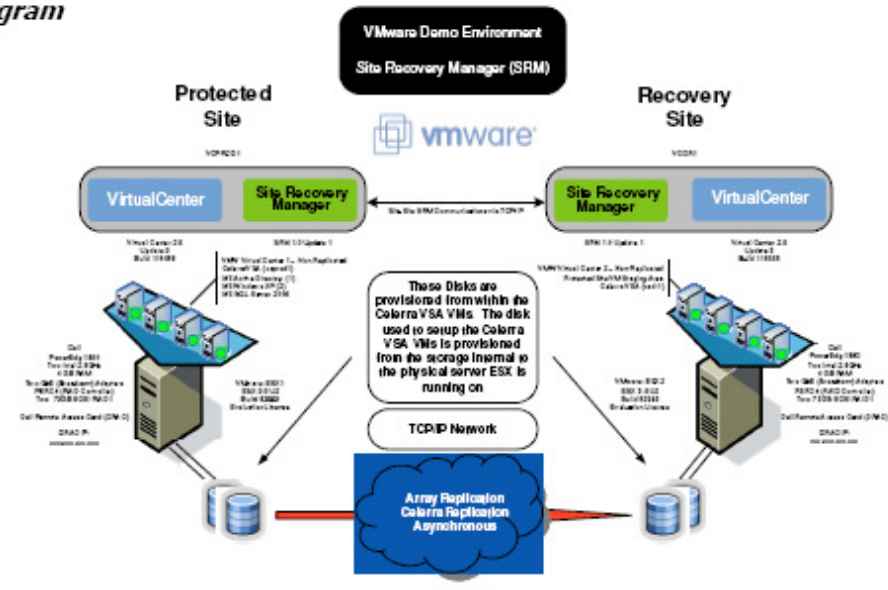
Avamar

Partner Tools

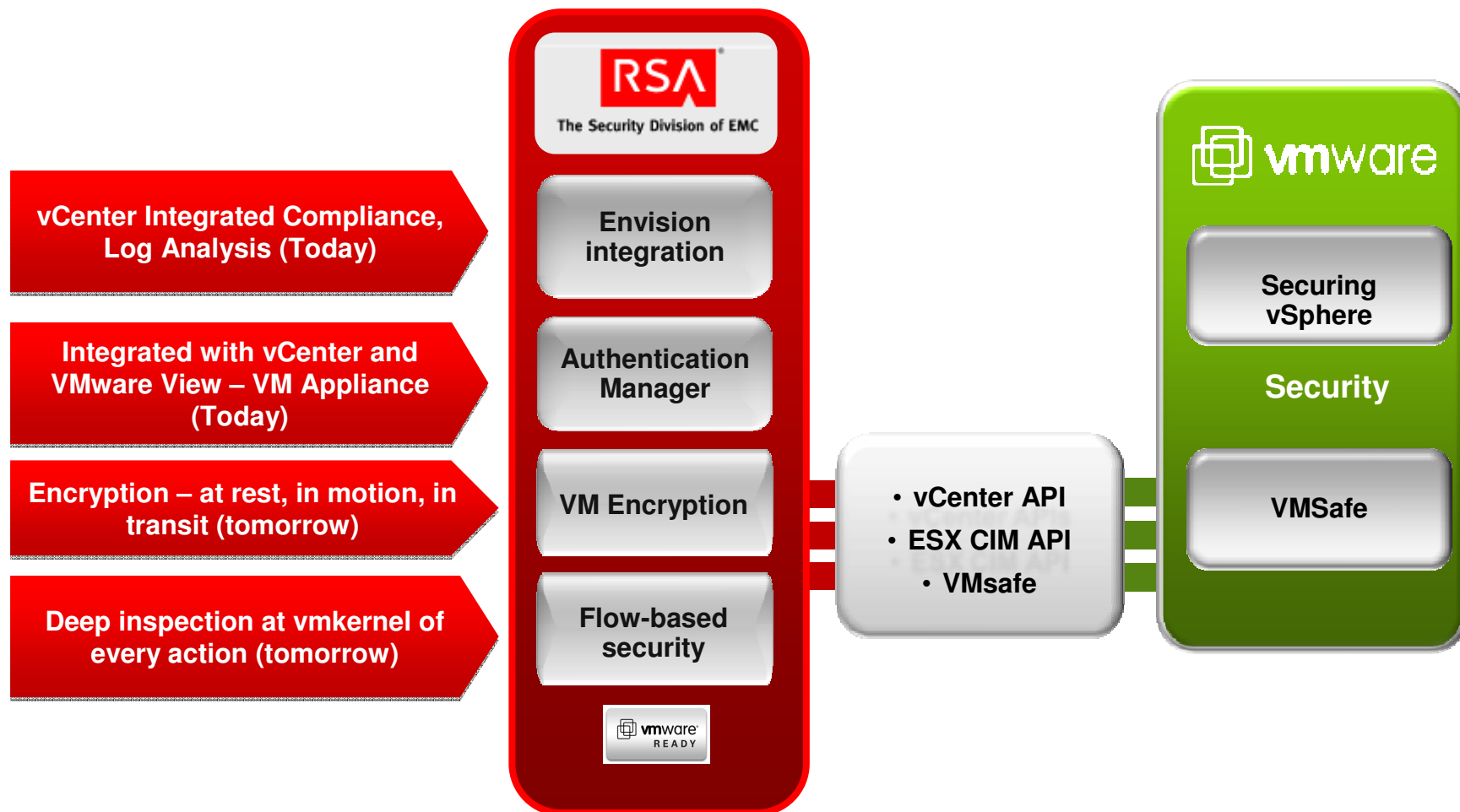
Storage VSAs

EMC Celerra Virtual Storage Appliance (VSA) & VMware Site Recovery Manager

Diagram



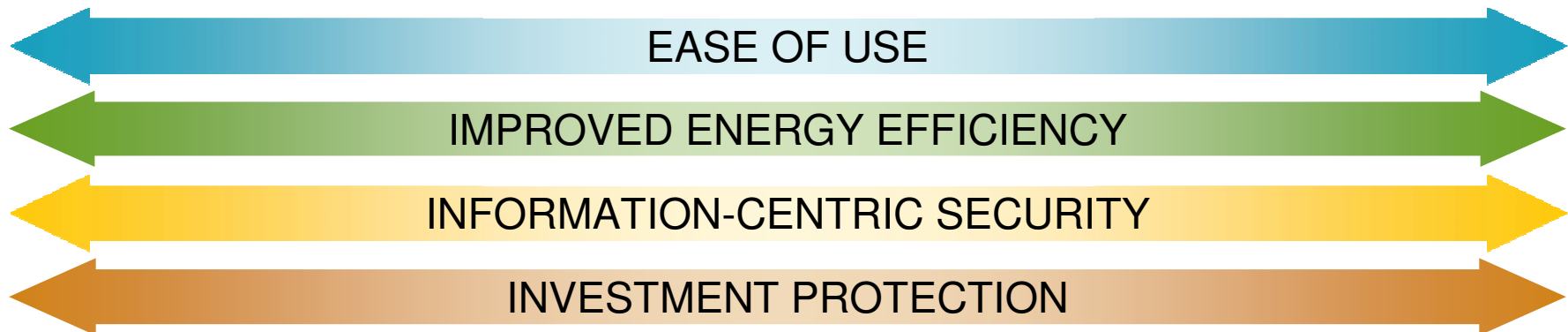
Example: How we are Building our Security Suite for the 100% Virtualized Datacenter



By the Way, We Sell Storage Too... EMC's Storage Innovation



Broadest Range of Function, Performance, and Connectivity





SYMMETRIX

Announcing EMC Symmetrix V-Max.
Built on the industry's first Virtual Matrix Architecture

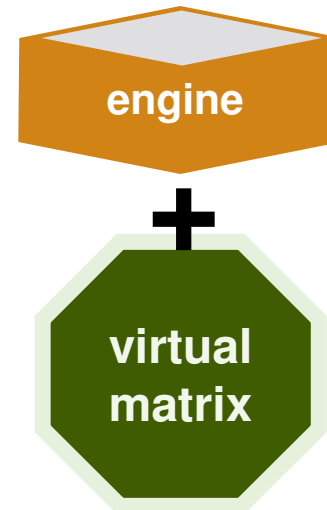
The Impact of Storage Architecture



start small

- 8-16 ports
- 16 processor cores
- 32-128 GB of memory
- 48-256 drives

**can be uniquely
assembled into
extremely large arrays**



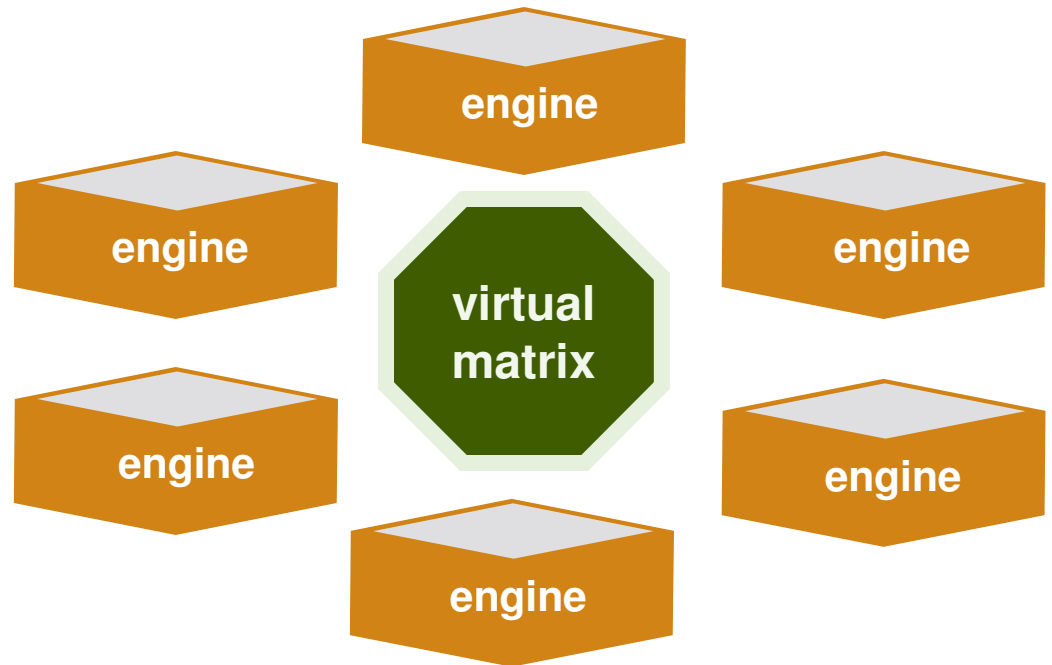
The Impact of Storage Architecture



get big

- hundreds of ports
- hundreds of cores
- TB's of memory
- thousands of disks

**build a large array
from smaller ones**



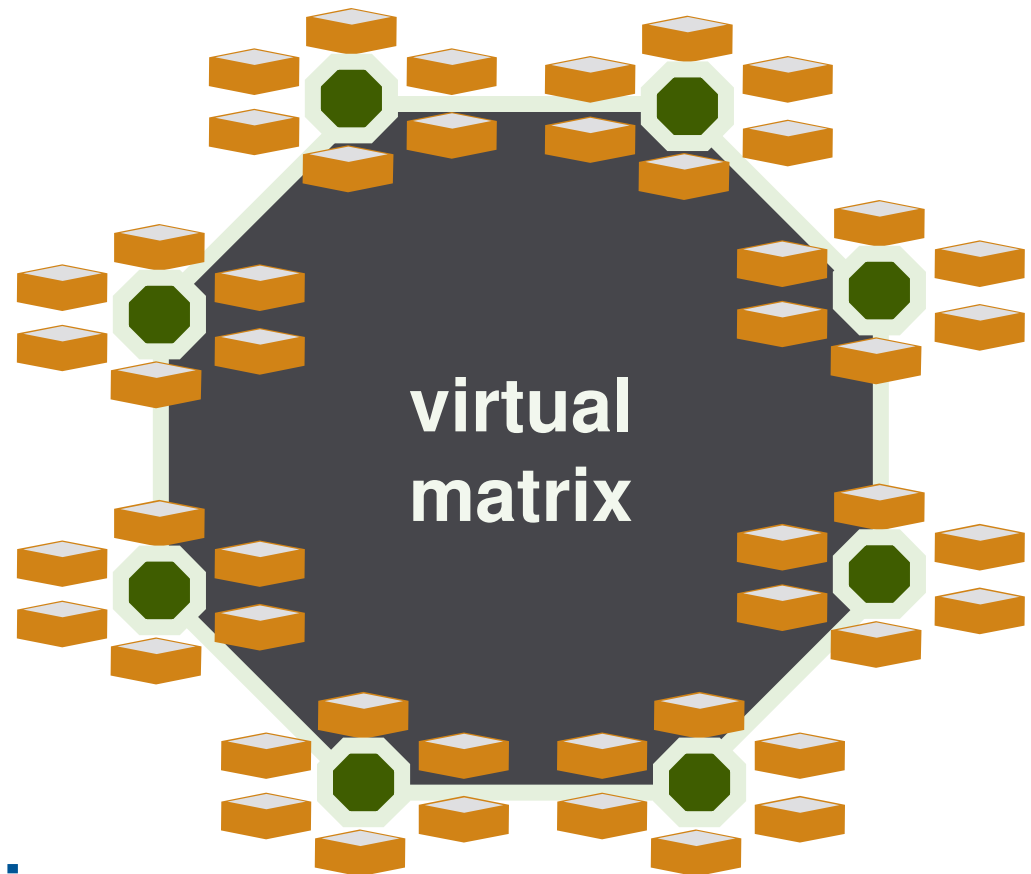
The Impact of Storage Architecture



get *really* big

future

- thousands of ports
- thousands of cores
- hundreds of TB of memory
- tens of thousands of disks
- multiple frames, multiple locations

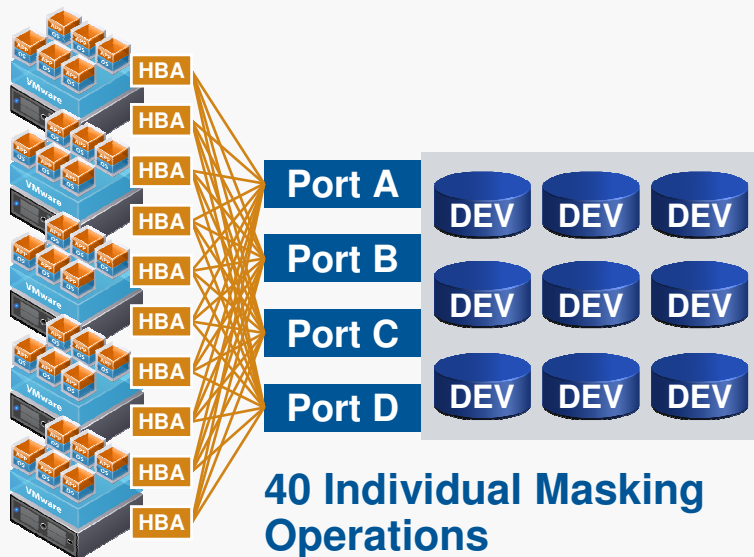


a single, giant enterprise array

Easy, Quick, and Automated Storage Provisioning for Virtual Servers with a Single Action



Traditional Mapping and Masking



40 Individual Masking Operations

5 ESX servers x 2 HBAs x
4 storage ports

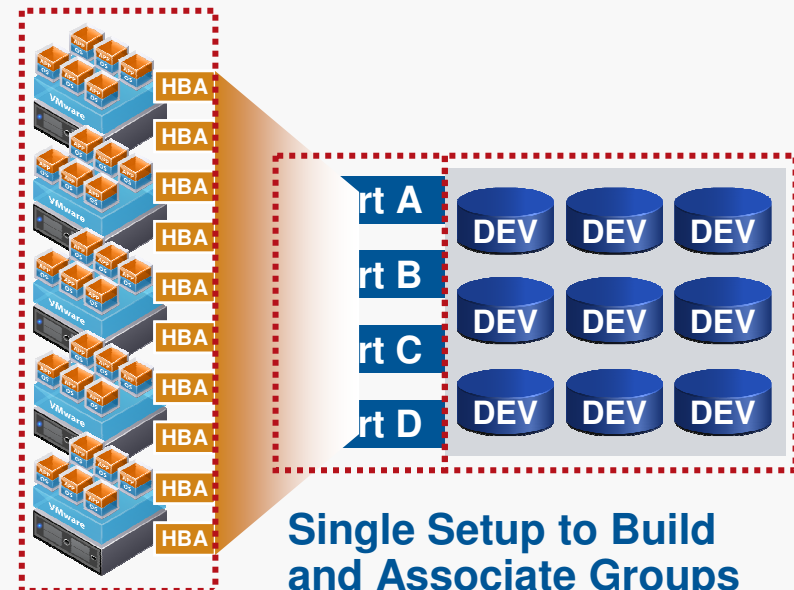


~160 clicks to complete

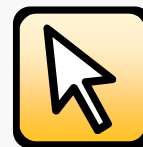
Includes initial configuration and repeated for every change or add

Auto-provisioning Groups

New



Single Setup to Build and Associate Groups



15 clicks to complete

Simplifies initial configurations and all future changes and additions

Easy, Quick, and Automated Storage Provisioning



Auto-provisioning Groups simplifies initial configurations and all future changes and additions

The image displays three overlapping windows from the EMC storage management interface, illustrating the steps to create storage groups.

- Initiator Group Management - Modify (000192601201/bg_esx_tag_hba)**: Shows the 'Initiator Group Name' field (1) and a list of 'Available Initiators' (2).
- Port Group Management - Modify (000192601197/bg_esx_infr_port)**: Shows the 'Port Group Name' field (3) and a list of 'Available Ports' (4).
- Storage Group Management - Modify (000192601197/bg_esx_infr_stor)**: Shows the 'Storage Group Name' field (5) and a list of 'Available Devices' (6). It also includes 'Add', 'Add All', 'Remove', and 'Remove All' buttons.

1 Create Initiator Group

2 Add/Remove Initiator

3 Create Port Group

4 Add/Remove Port

5 Create Storage Group

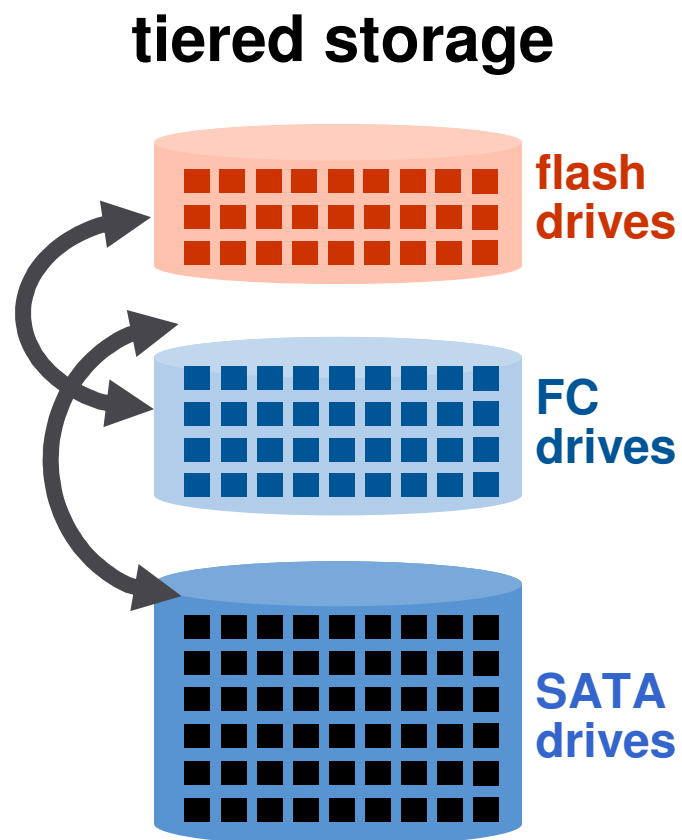
6 Add/Remove Device

Coming Soon:
Fully Automated Storage Tiering



FAST

**automates
movement and
placement of data
based on
changing needs**



Flash Drives Shatter Performance Barriers



Unprecedented Application Performance Characteristics

30x IOPS
improvement

OLTP Workload

Same thing stated
differently...
3x cheaper \$/IOPS

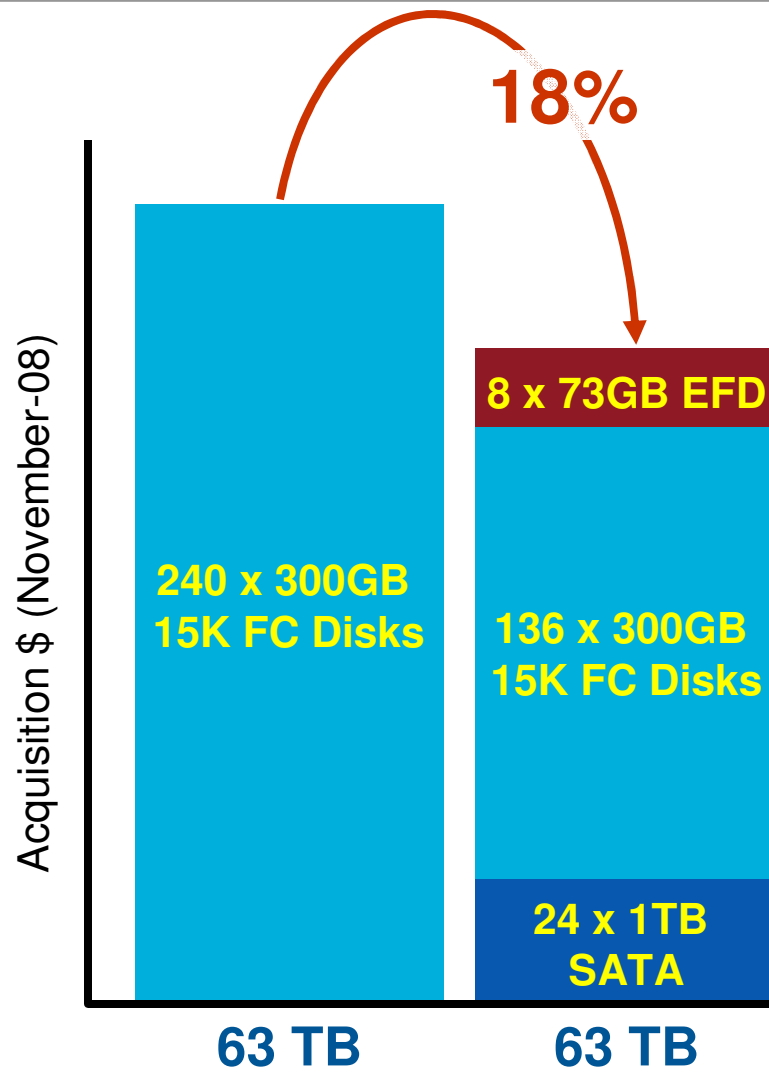
5x cost savings
per TB

Reliability - no
moving parts

Flash Drive

Workload - IOPs

Efficiency is not just for Servers Anymore



18% Lower Storage Costs
+ Reduce Maintenance & SW costs

60% More Disk IOPS
64,000 vs 40,000 Aggregate IOPS*

17% Less Power & Cooling
6.48 kVA vs 7.82 kVA

30% Fewer Disk Drives
168 EFD+FC+SATA vs 240 FC

* EFD = 5,000 IOP/disk
FC 15K = 167 IOP/disk
SATA = 80 IOP/disk

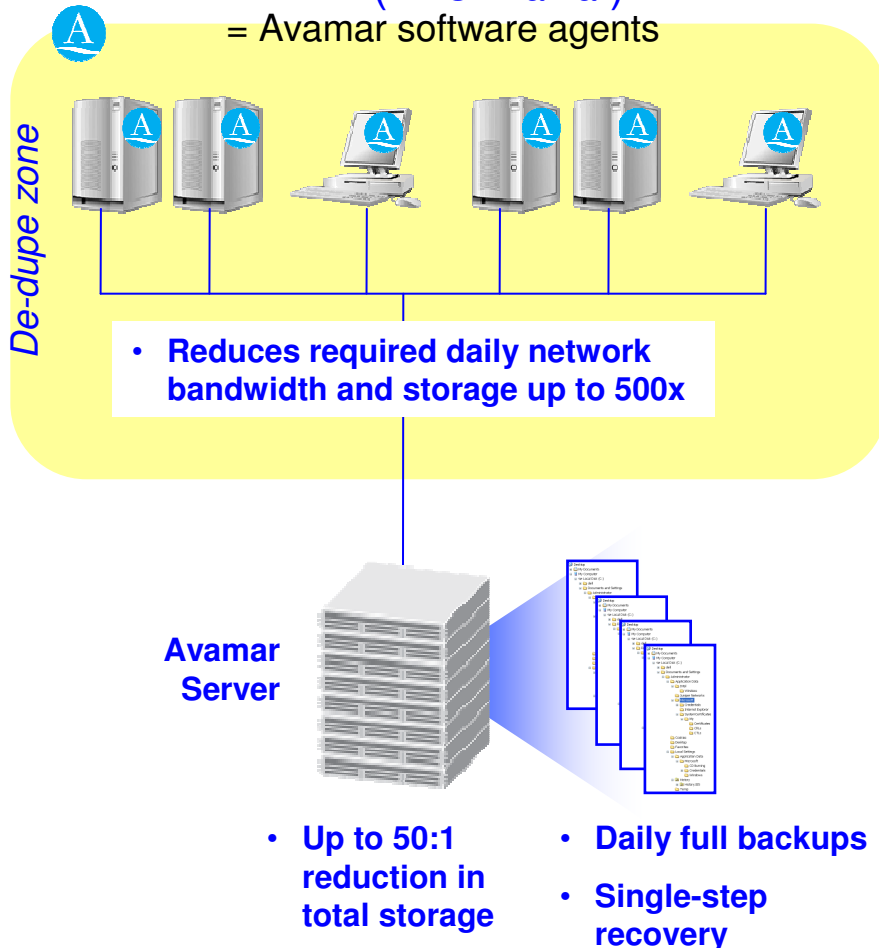
Source vs. Target De-duplication



Source de-duplication

(EMC Avamar)

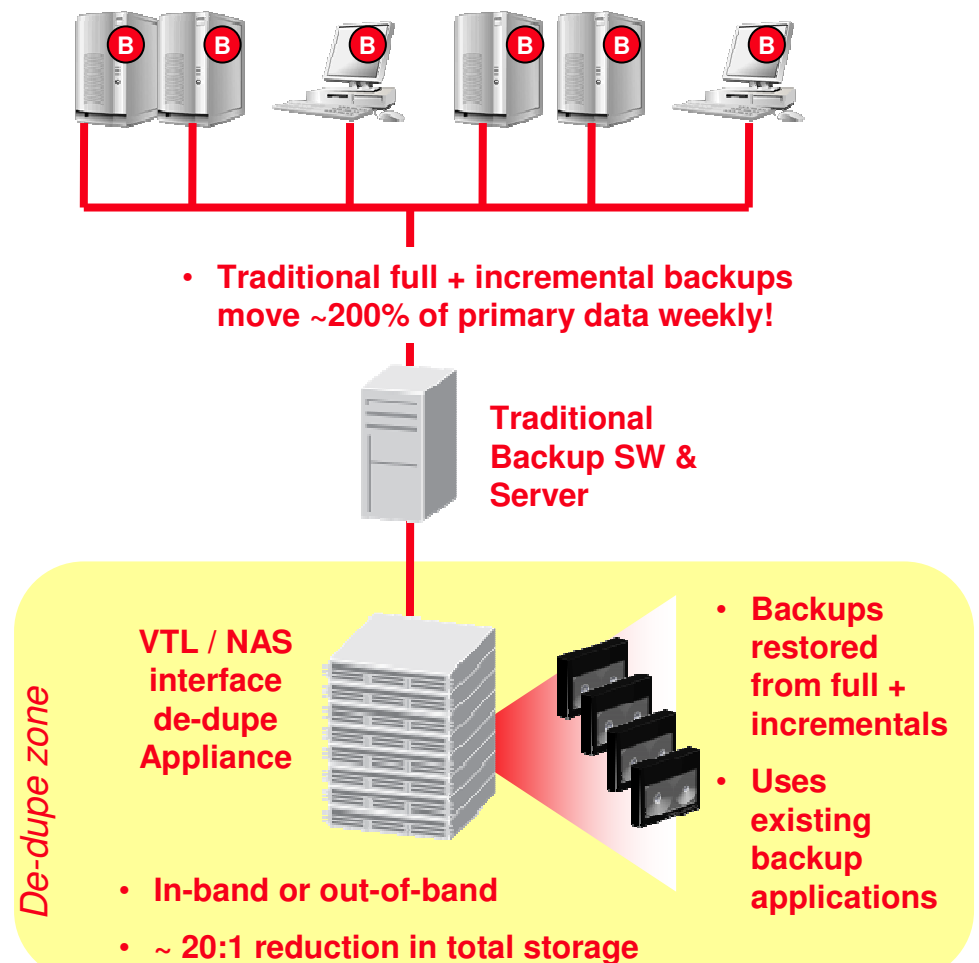
= Avamar software agents



Target de-duplication

(e.g. EMC Disk Library, Data Domain, etc.)

B = traditional backup software agent (no de-dupe)



EMC: The Best Information Infrastructure for VMware



Storage Consolidation

- Every Protocol, Every Scale, Every Feature
- Every Scale (from SOHO to largest Enterprise)
- 2x utilization, 2x power efficiency, 2x TCO



Backup Disaster Recovery

- Simple Backup Restore Every Level (File, VM, Datastore)
- Broadest SRM Support and most deployments
- 2x more server consolidation, using 10x less storage, while being 10x more efficient, and 7x better WAN use



Management

- Integrated views of physical and virtual domains
 - For the VMware Administrator
 - For the Storage/Network Administrator
 - For the Application SLA owner



Proven Solutions

- Most Multi-Vendor Reference Architectures
 - Exchange, SQL Server, Oracle, SAP, VMware View
 - Every Scale



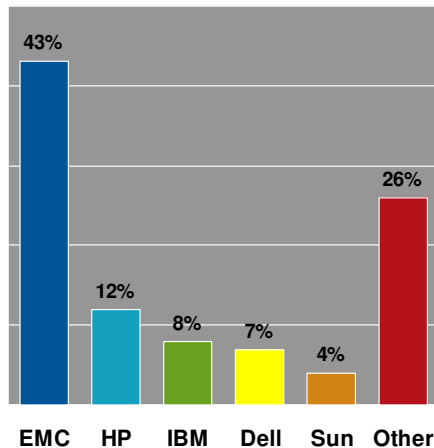
Services

- End-to-end capabilities for Virtualized Infrastructure
- Plan, Build, Manage
- More than 1400 VMware-Trained staff – across every function

Result = Consistent Market Leadership



2007 Server Virtualization Survey Results - IDC



One report is interesting

2008 Goldman Sachs IT Spending Survey – “Storage of Choice for Virtualized Environments”

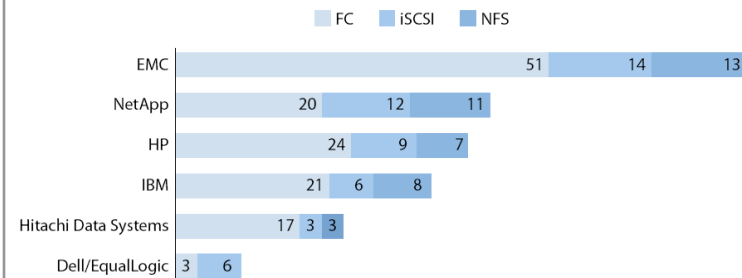
	Aug-08	Jun-08
EMC	42%	40%
IBM	22%	25%
Hewlett-Packard	13%	7%
Hitachi	9%	8%
Dell	7%	9%
NetApp	6%	8%
EqualLogic/Dell	2%	4%
Sun Microsystems	1%	3%
Compellent	--	1%

Source: Goldman Sachs IT Spending Survey.

Two reports are a trend

2009 Forrester Storage Choices for Virtual Server Environments

6-2 “Which vendor(s) supplied the networked (SAN or NAS) storage used for your virtual server environment?”



(multiple responses accepted)

Base: 124 global IT makers currently using x86 server virtualization technology

Source: September 2008 Global Virtual Server Environments Online Survey

Multiple reports over multiple years and multiple analysts is a legacy

Our Own Experiences With Data Center Virtualization



EMC Statistics

4068 VMs on 272 ESX servers

First Rollout - 5:1 (adhoc)

New Norm - 40:1 using vPods

Virtual Desktops – 800 now, 100% EOY

100% Virtualized EOY, including 60K Exchange 2007 mailboxes

Savings

\$42M saved from Storage Consolidation

\$13M saved from Server Virtualization
(\$80M cost avoidance)

\$30M datacenter build avoided

64% Reduction in on-going Power Consumption

Deployment time reduced from 8 weeks to 3 days

Cisco Statistics

14,250 servers, 3,780 apps

2,720 VM's on 162 ESX Servers

50% of existing, 75% of all new servers virtualized

Savings

\$19+ Million in Server Virtualization

\$50+ Million from Storage Consolidation

Deployment time reduced from 8-12 weeks to 3 days

Integrated Solution for Client Virtualization



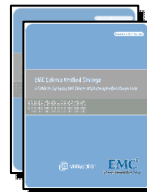
Save 70% of your WAN, 5x better response time

VMware/ Cisco Joint Reference Architecture (transport)



Save 70% of your boot image storage, 99.999% availability, scaling to 40K+

VMware/ EMC Joint Reference Architecture (server/storage)



Backup 80% faster + 80% less with active archive, simple DR

User Folder Solution White Paper



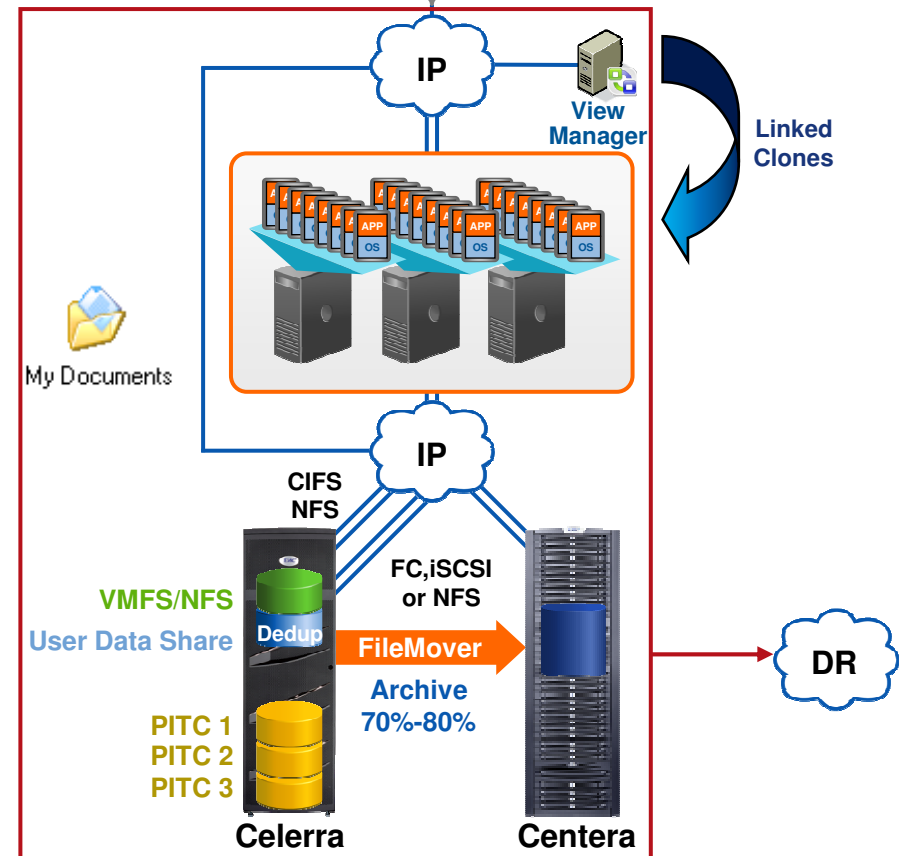
50% less storage, at 80% lower cost –

De-duplication White Paper



100x faster and easier file restore

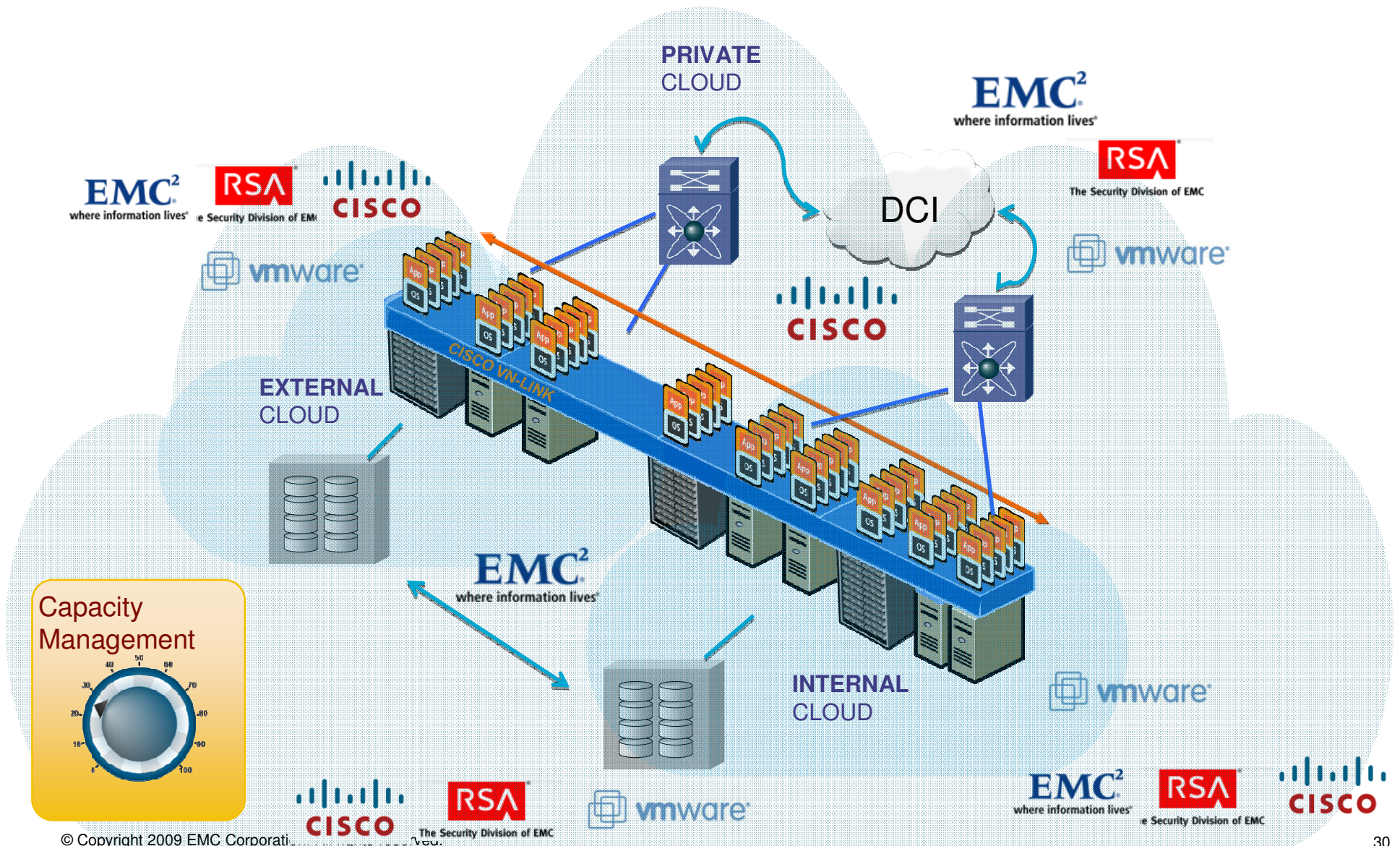
User Self-serve Recovery



Q: Who can do this?

A: no single vendor – requires cooperation

EMC²
where information lives[®]





EMC²
where information lives[®]