EMEA CompeteCenter

Fordele ved lagring af data i et virtuelt miljø

Bent Lerager

Competitive Storage Specialist

ON DEMAND BUSINESS™

IBM Technical SAP Forum

Agenda

- What's Storage Virtualisation
- Why, what's the business benefits
- Competitor claims…
- Competitors virtualisation
- FlashCopy benefits for SAP

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What is Storage Virtualization ?

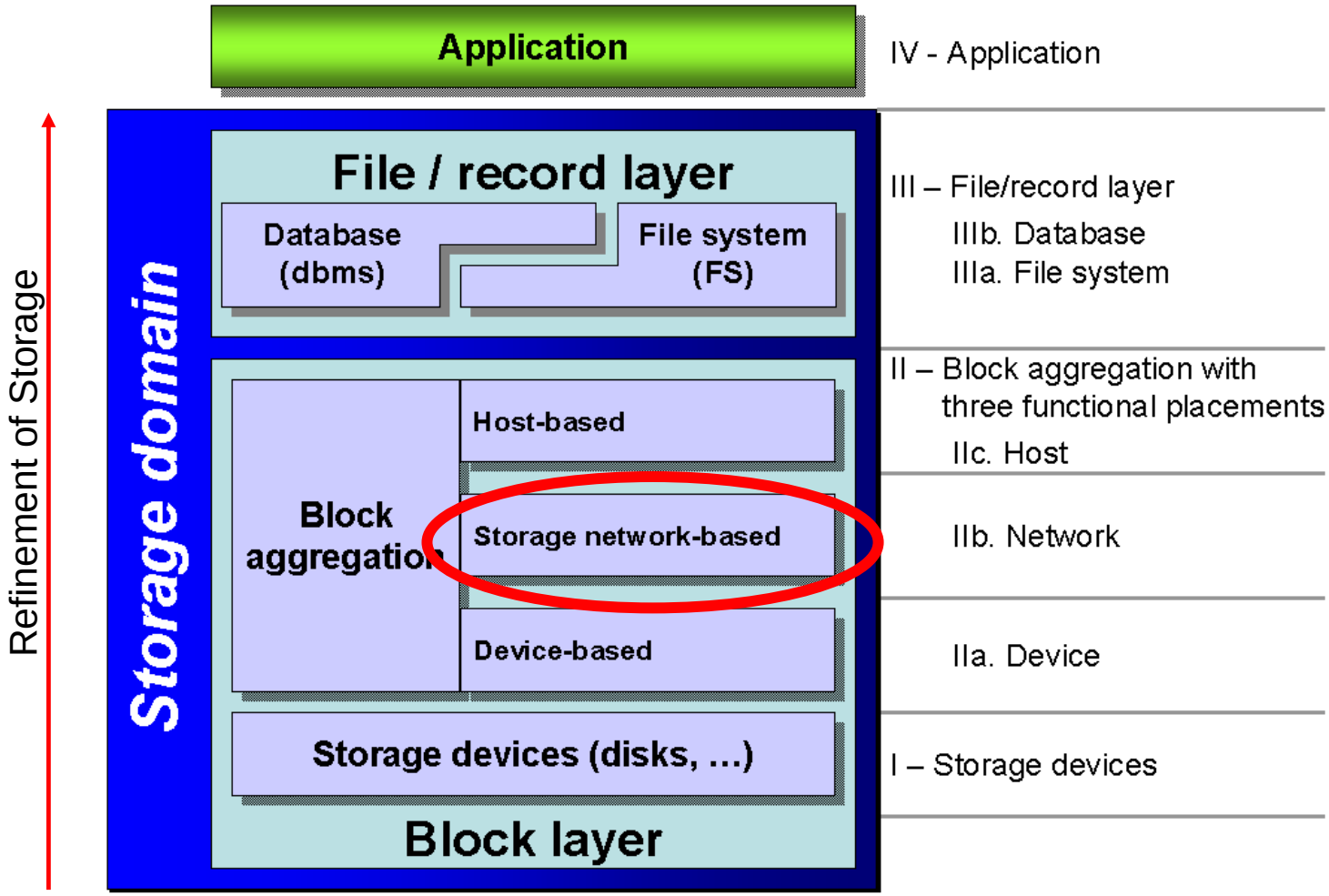
Definition:

- **It separates the users (the servers or server applications) of a resource from the physical issues of the resource. For instance, a program needn't be aware of the physical characteristics, location or constraints of the device.**
  - **Insulates users from changes to the physical devices**
  - **Offers the possibility of better storage utilization via sharing resources**

RAID, SAN ... !!!

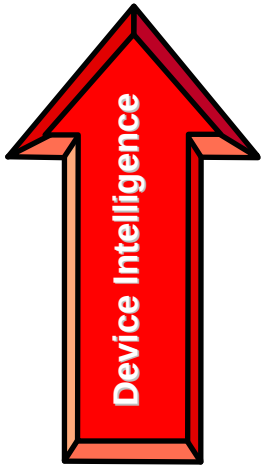
FILM

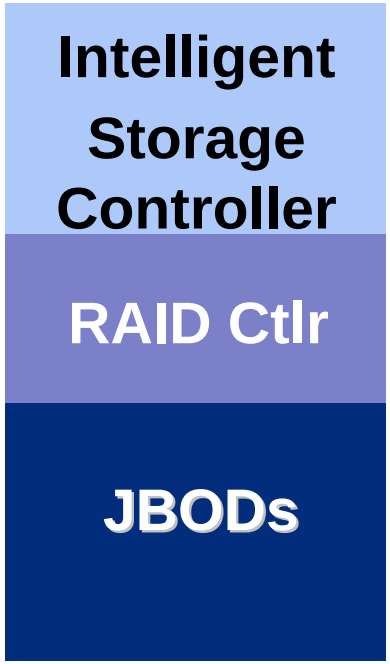
Block Aggregation – SAN Volume Controller



SNIA – www.snia.org - Storage Network Industry Association

Intelligent Disk Array "In Box" Approach





"In box" Virtualization

- RAID is a type of Virtualization
- Storage Partitioning/LUN Masking
- Dynamic Volume Extension
- Single Point of Management for JBODs

Box-to-box Replication Services

- FlashCopy
  - Source and Target inside the box
- Remote Mirroring
  - Target is same box-type as source

- All operations done at the box level
- The IBM SVC strategy moves the Intelligent Storage Control out of the Disk Array and into the Storage Network
- Results: Virtualization and Replication Services for all storage in the SAN network

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- Competitor claims…
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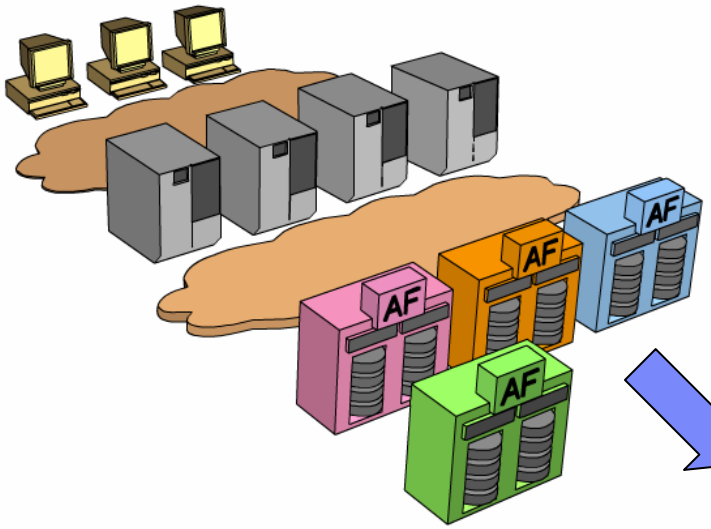
SAP related Business Values

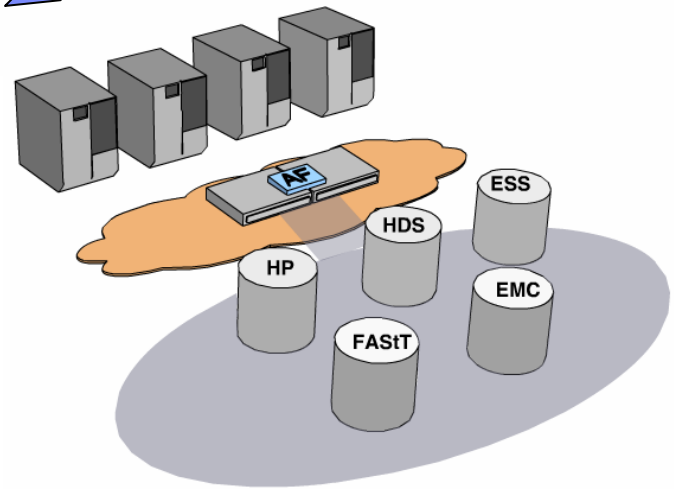
- What is important for a SAP environment from a storage point of view ??

- Business Continuity
- Operational Flexibility
- Easy to manage
- Optimized TCO

SVC Business Values ?



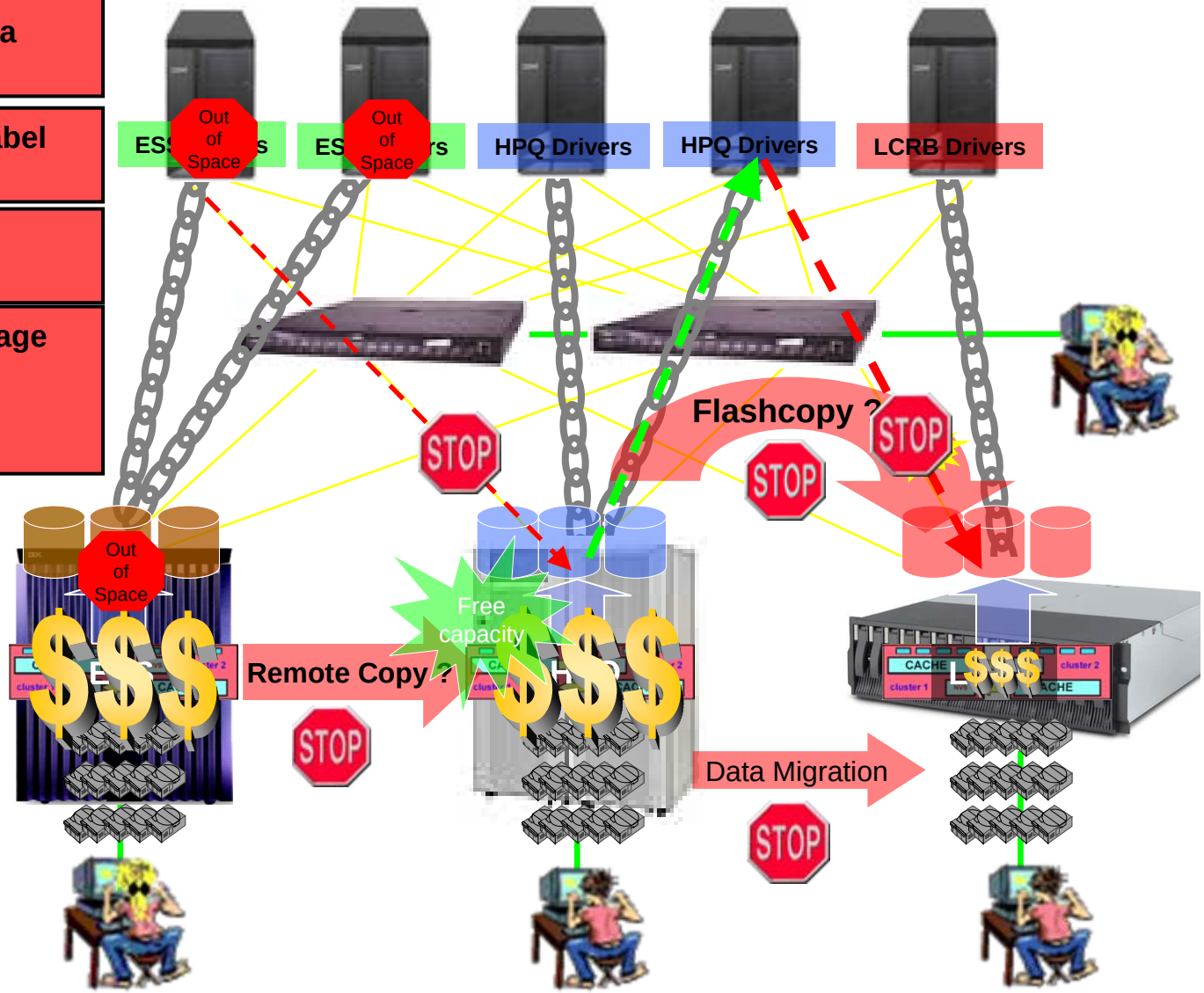
- Improve TCO, save operation costs
- Maximize storage investment
- Increase staff satisfaction
- Protected investment
- Improve application availability
- Enhance storage personnel productivity
- Improve storage utilisation
- Improve performance and connectivity

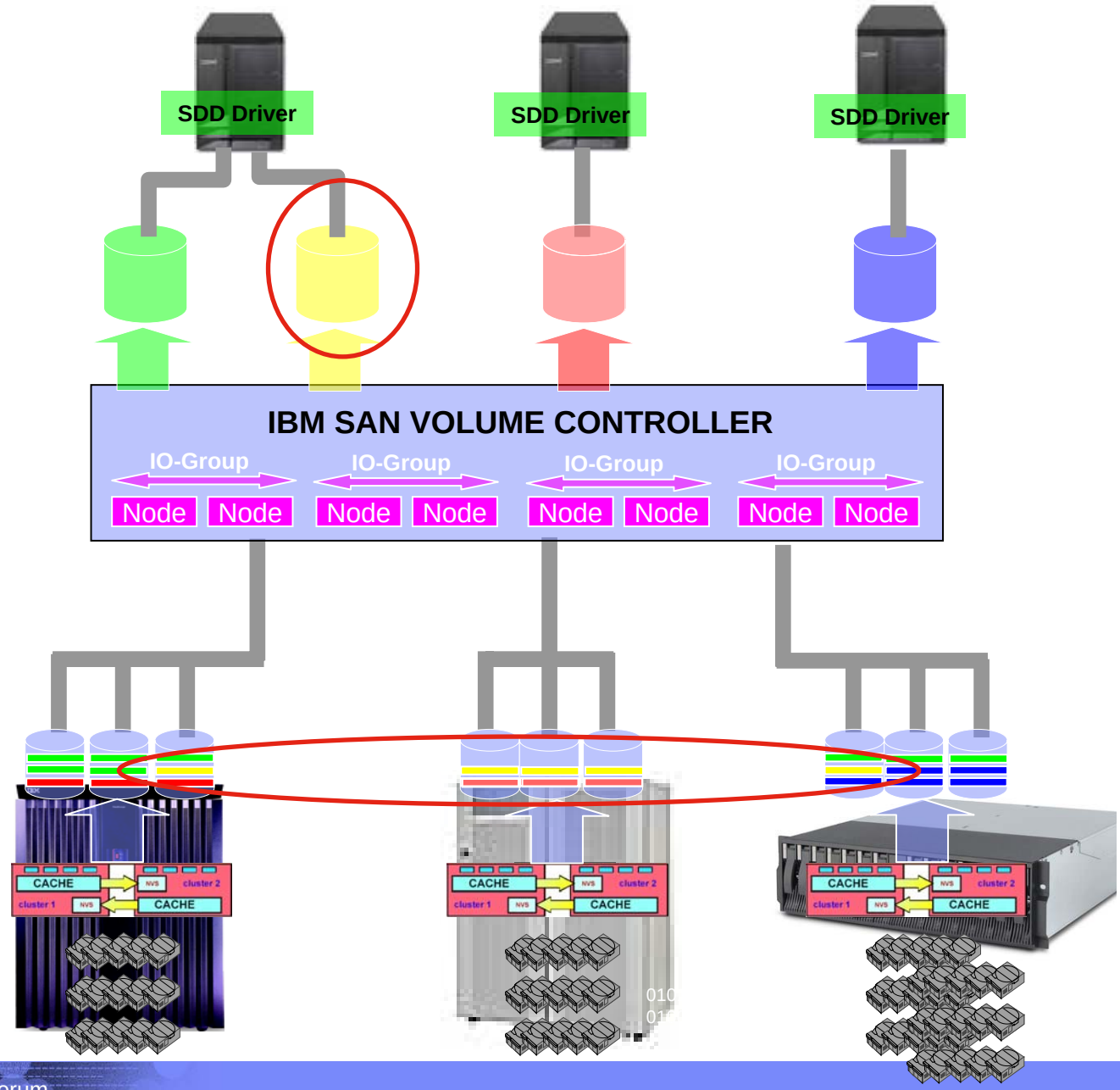


Just sales talk ??

SAN today – Problems and Limitations

- Static Relationship between Servers and Storage Systems
- Inefficient use of Storage resources, Migration of data usually disruptive
- Proprietary, non-interoperabel Copy Services
- No homogenous Storage Management
- Monolithic, expensive Storage Subsystem.
  Pay for Functionality when needing Capacity




SDD Driver
SDD Driver
SDD Driver
IBM SAN VOLUME CONTROLLER
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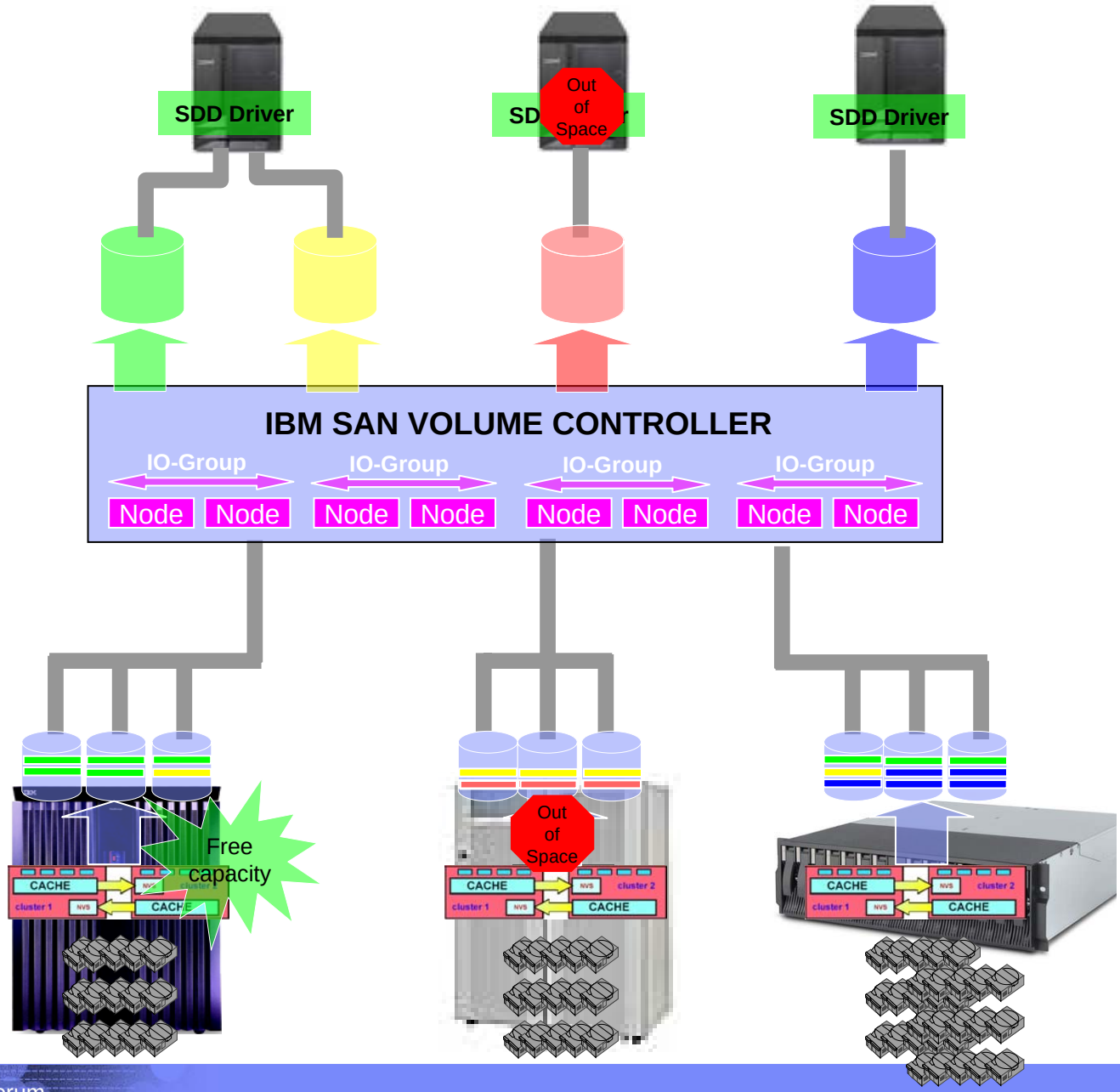
SDD Driver
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SDD Driver
IBM SAN VOLUME CONTROLLER
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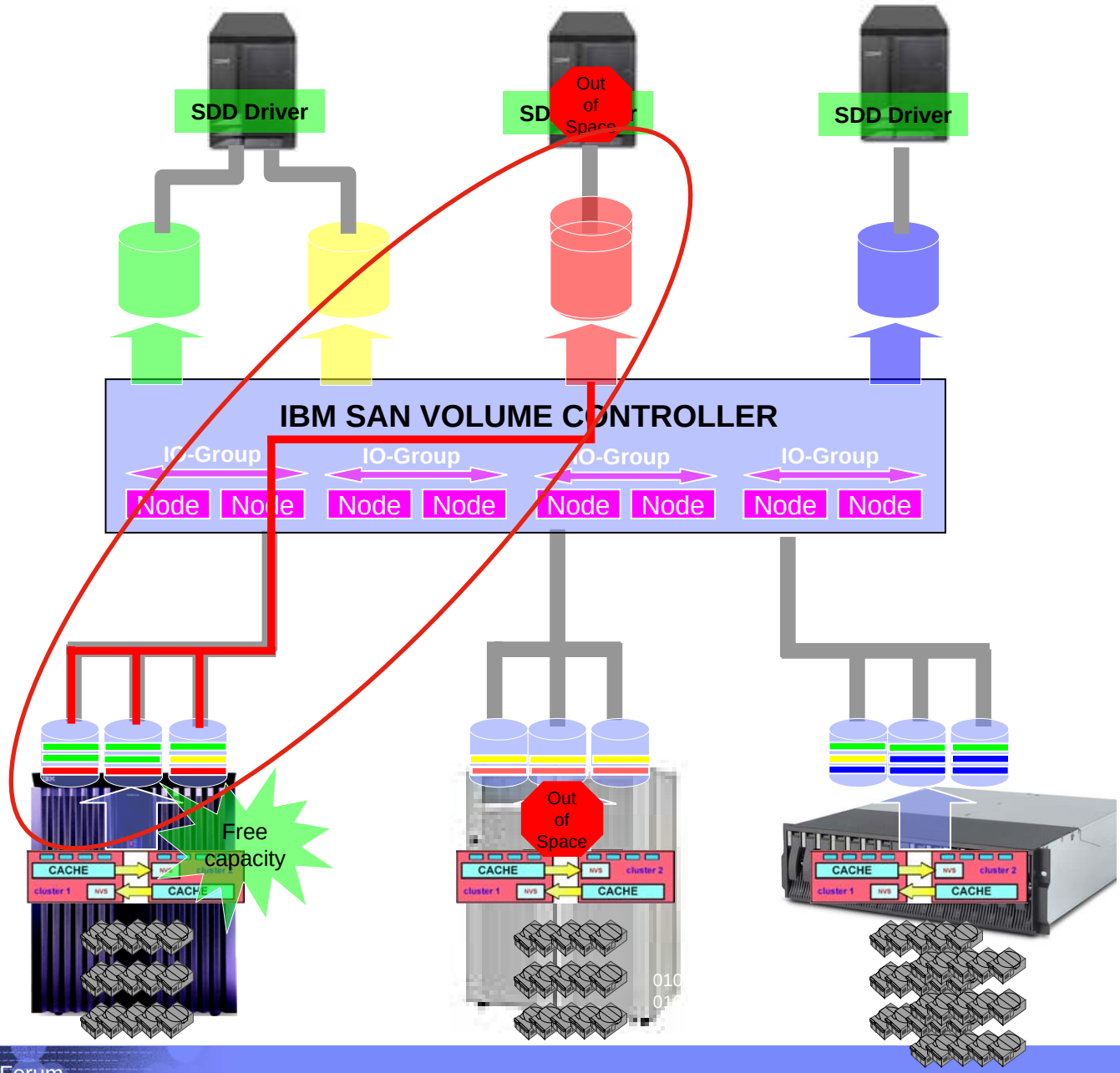
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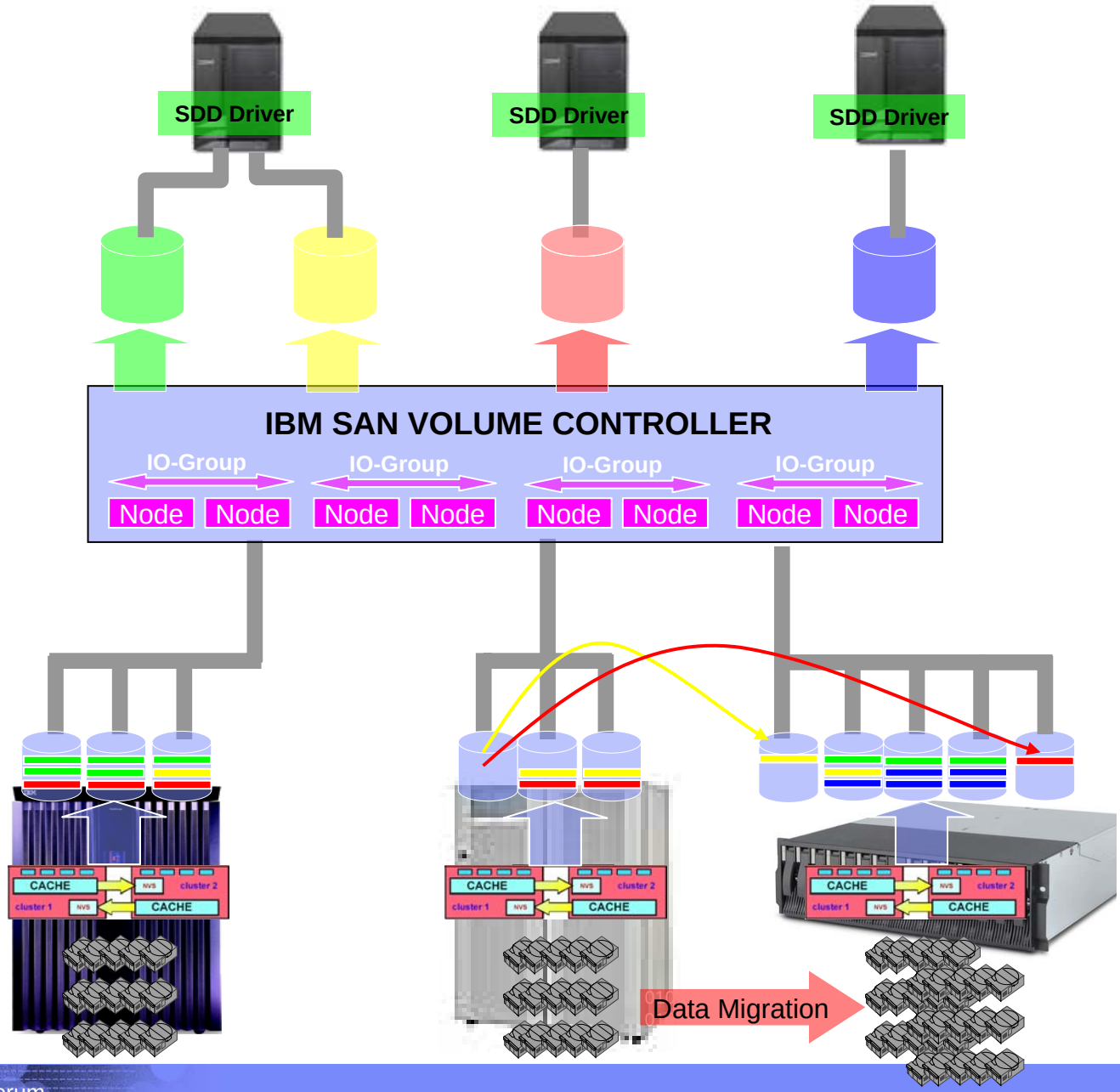
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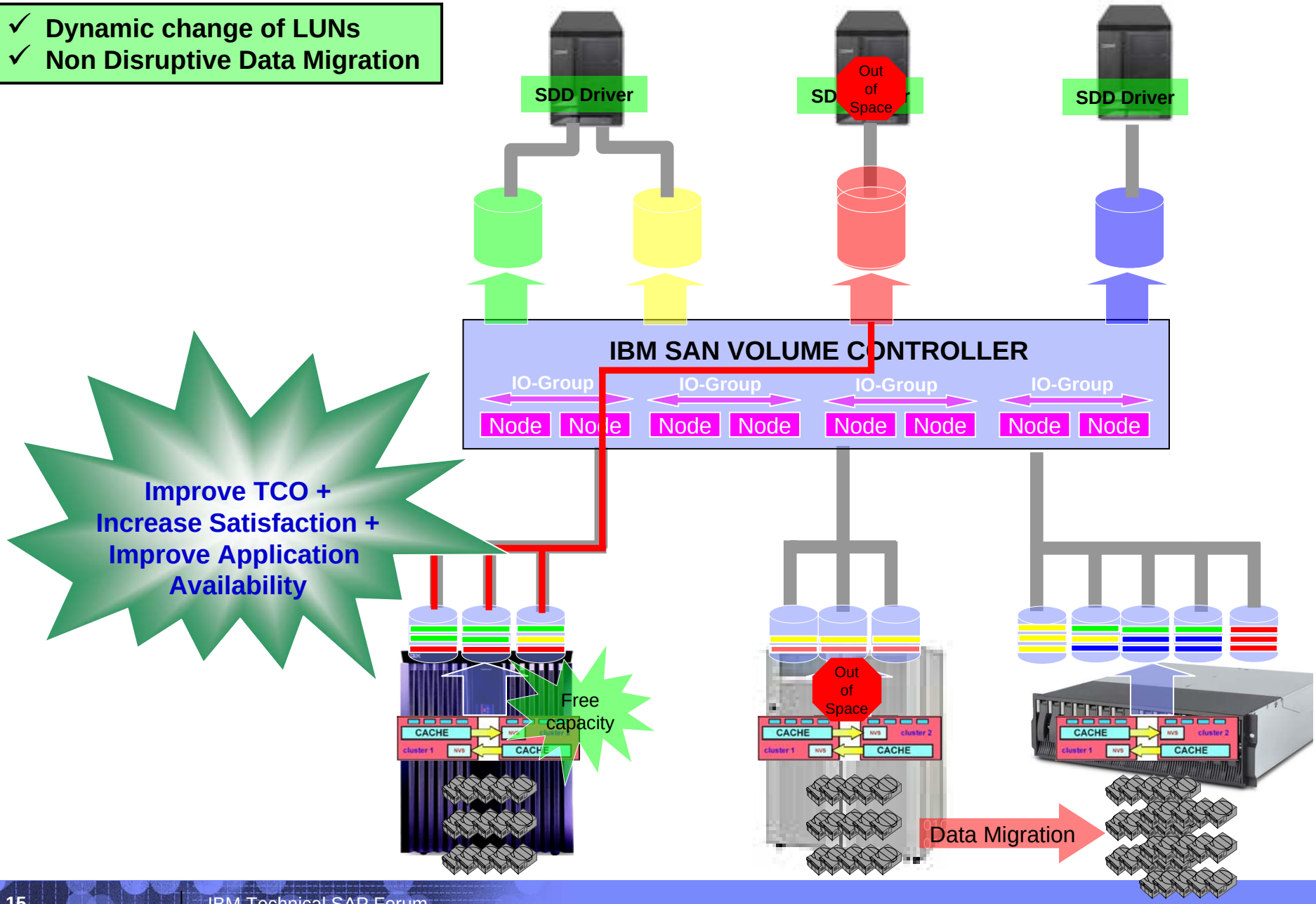
Data Migration

- ✓ Dynamic change of LUNs
- ✓ Non Disruptive Data Migration



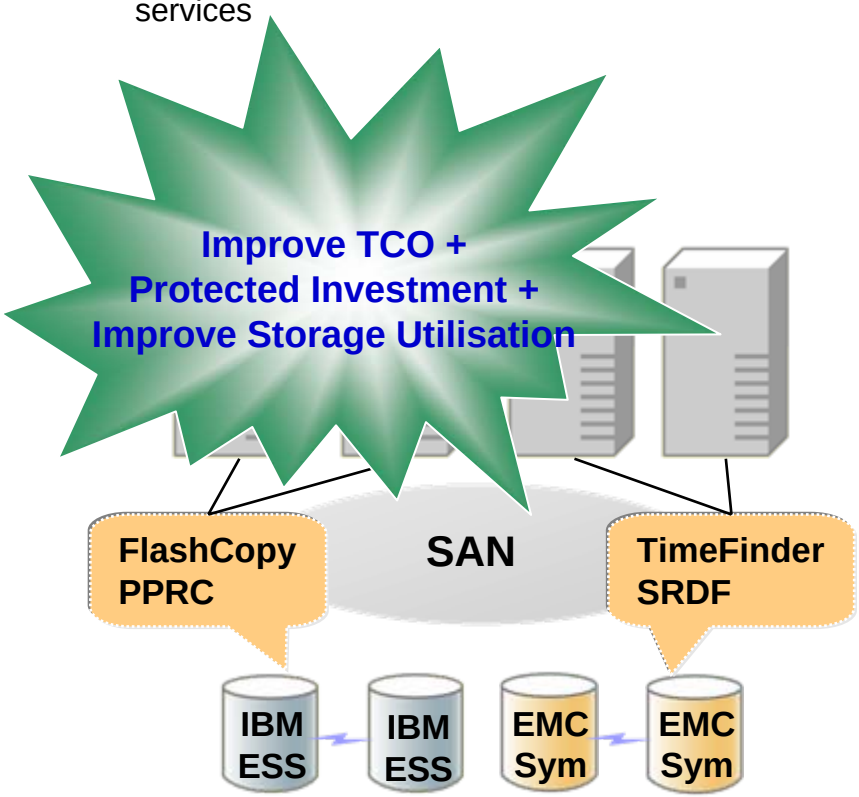
- ✓ **Disk Array independant mirroring**
- ✓ **Lower Secondary Array Cost**

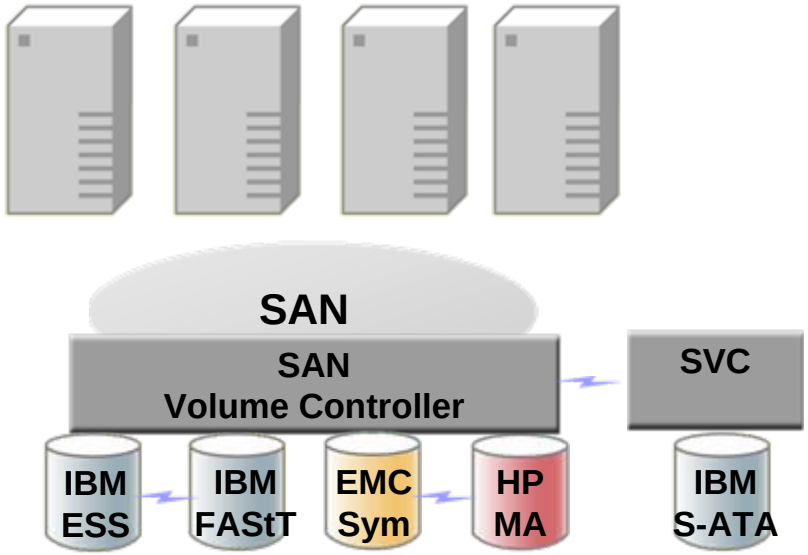
Traditional SAN

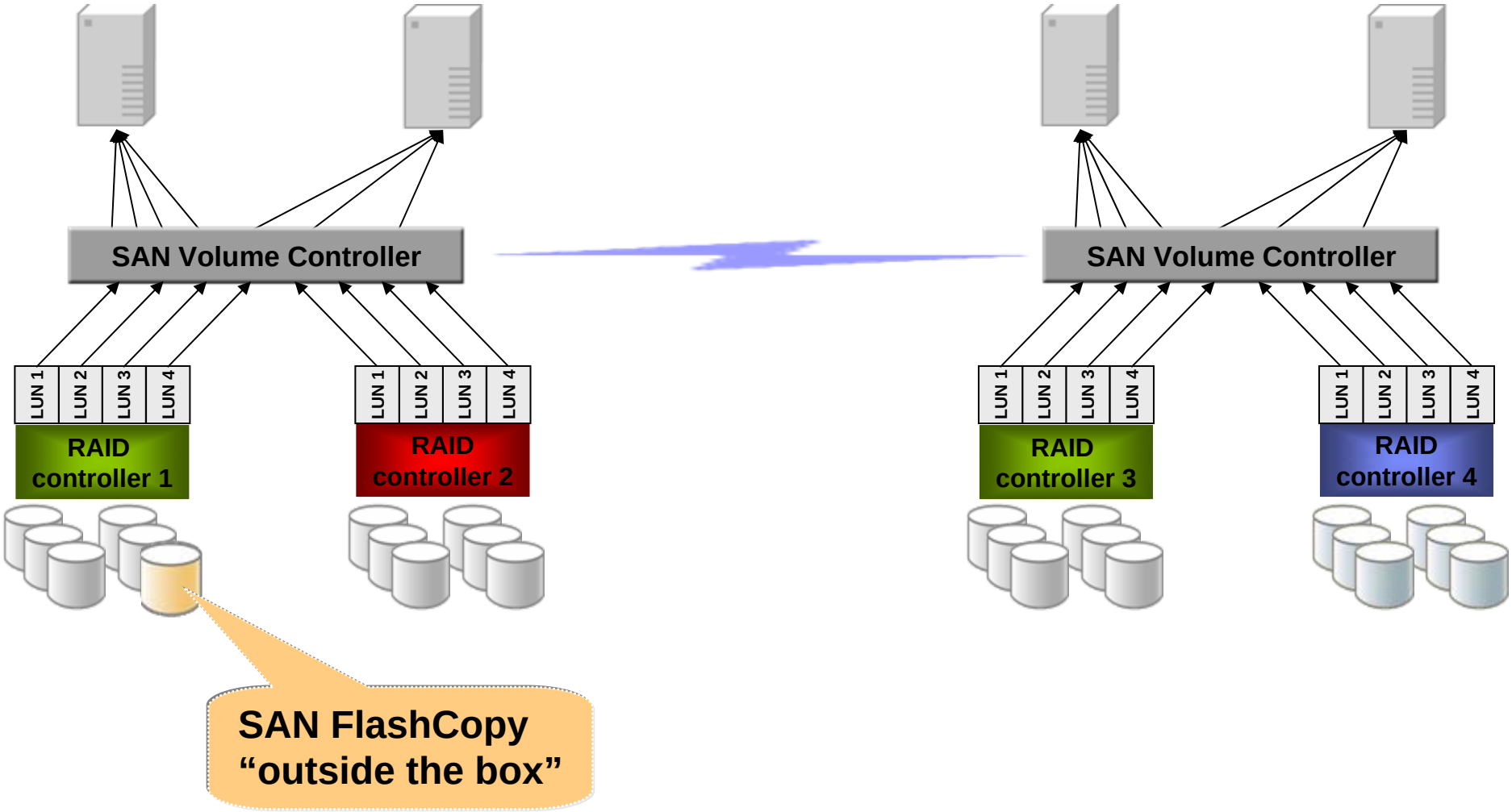
- Replication service API's differ by vendor, making it difficult to integrate applications
- Replication targets must be the same expensive disk as the source
- Lower-cost disks offer primitive, or no replication services

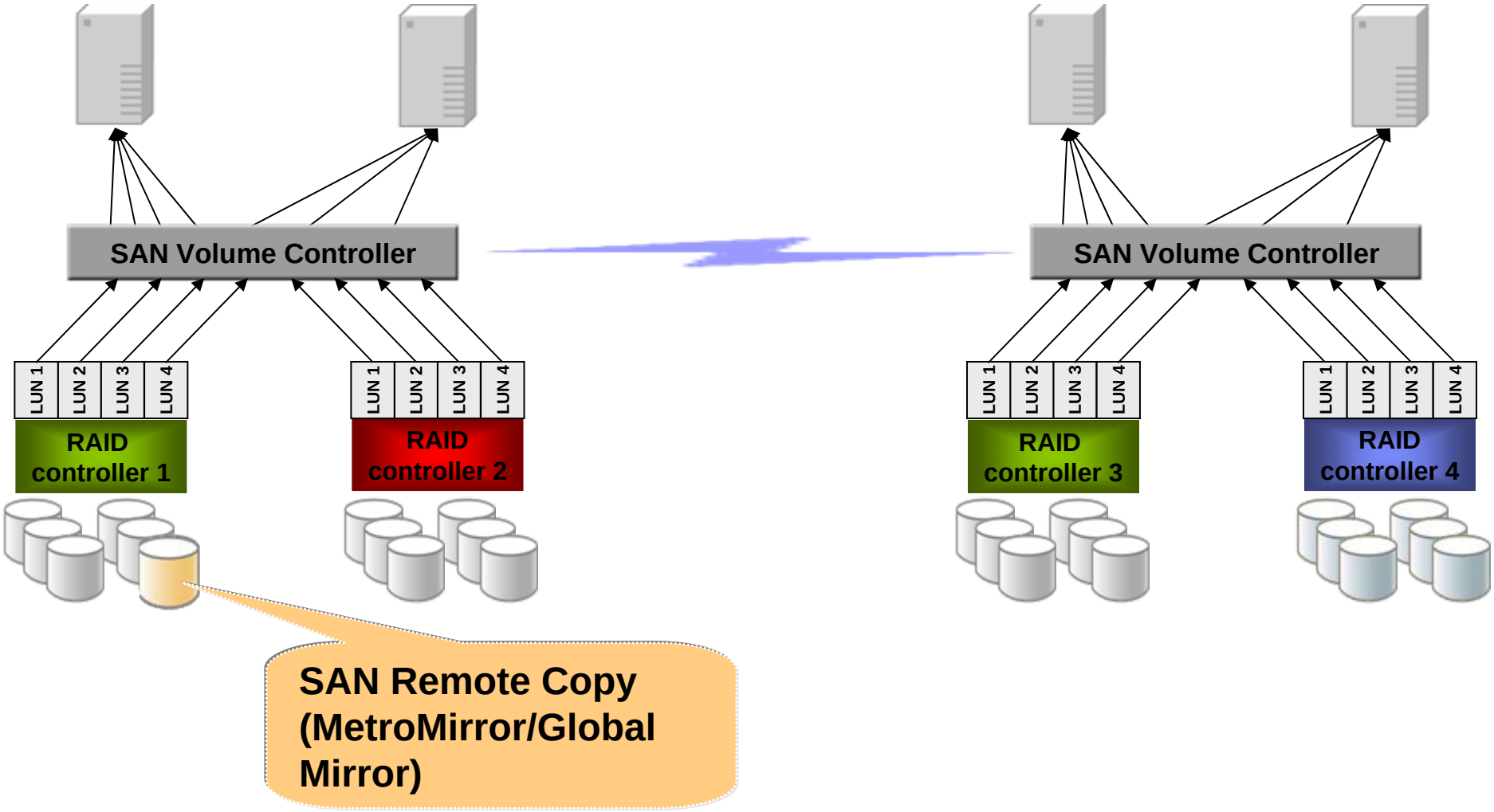
SAN Volume Controller

- Common replication API, SAN-wide, that does not change as storage hardware changes
- Replication targets can be on lower-cost disks, reducing the overall cost of exploiting replication services






SAN Volume Controller
SAN Volume Controller
LUN 1
LUN 2
LUN 3
LUN 4
LUN 1
LUN 2
LUN 3
LUN 4
LUN 1
LUN 2
LUN 3
LUN 4
LUN 1
LUN 2
LUN 3
LUN 4
RAID controller 1
RAID controller 2
RAID controller 3
RAID controller 4
SAN FlashCopy "outside the box"


SAN Volume Controller
SAN Volume Controller
LUN 1
LUN 2
LUN 3
LUN 4
LUN 1
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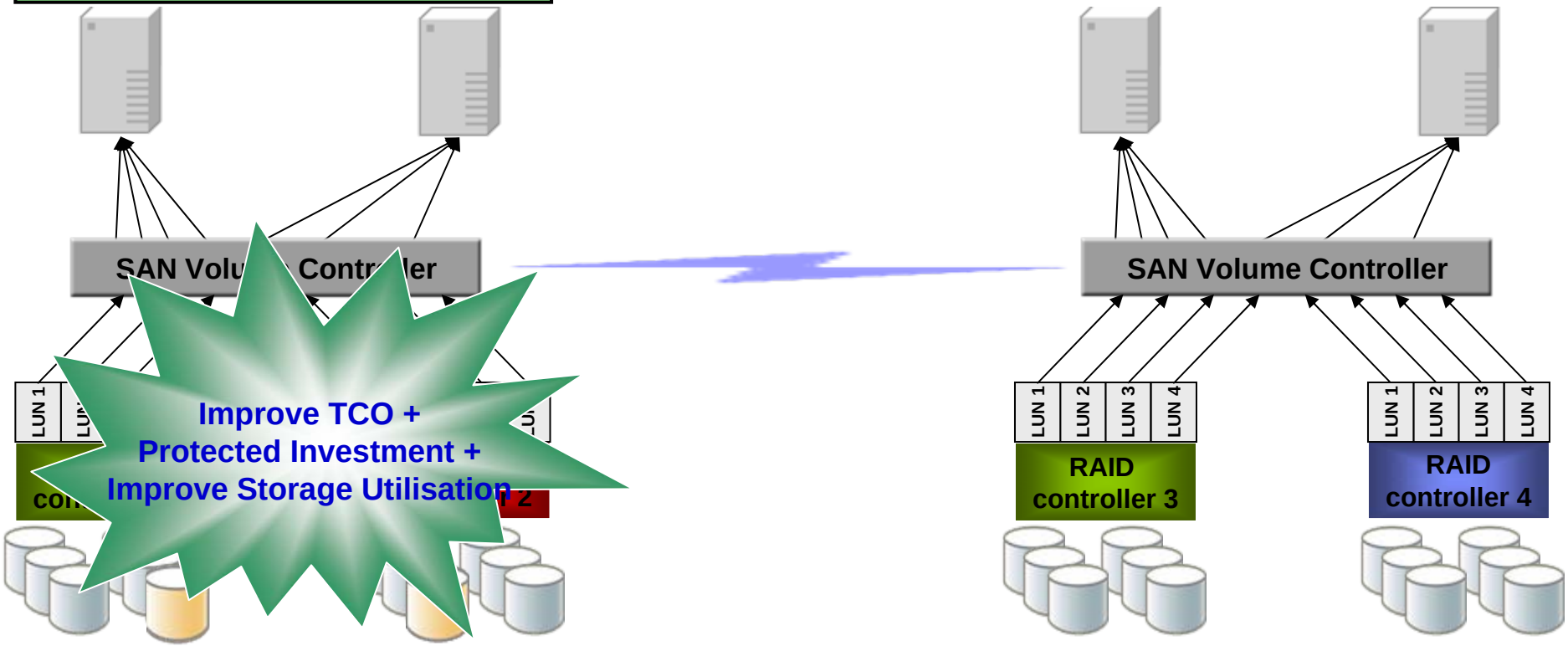
LUN 2
LUN 3
LUN 4
LUN 1
LUN 2
LUN 3
LUN 4
RAID controller 1
RAID controller 2
RAID controller 3
RAID controller 4
SAN Remote Copy (MetroMirror/Global Mirror)

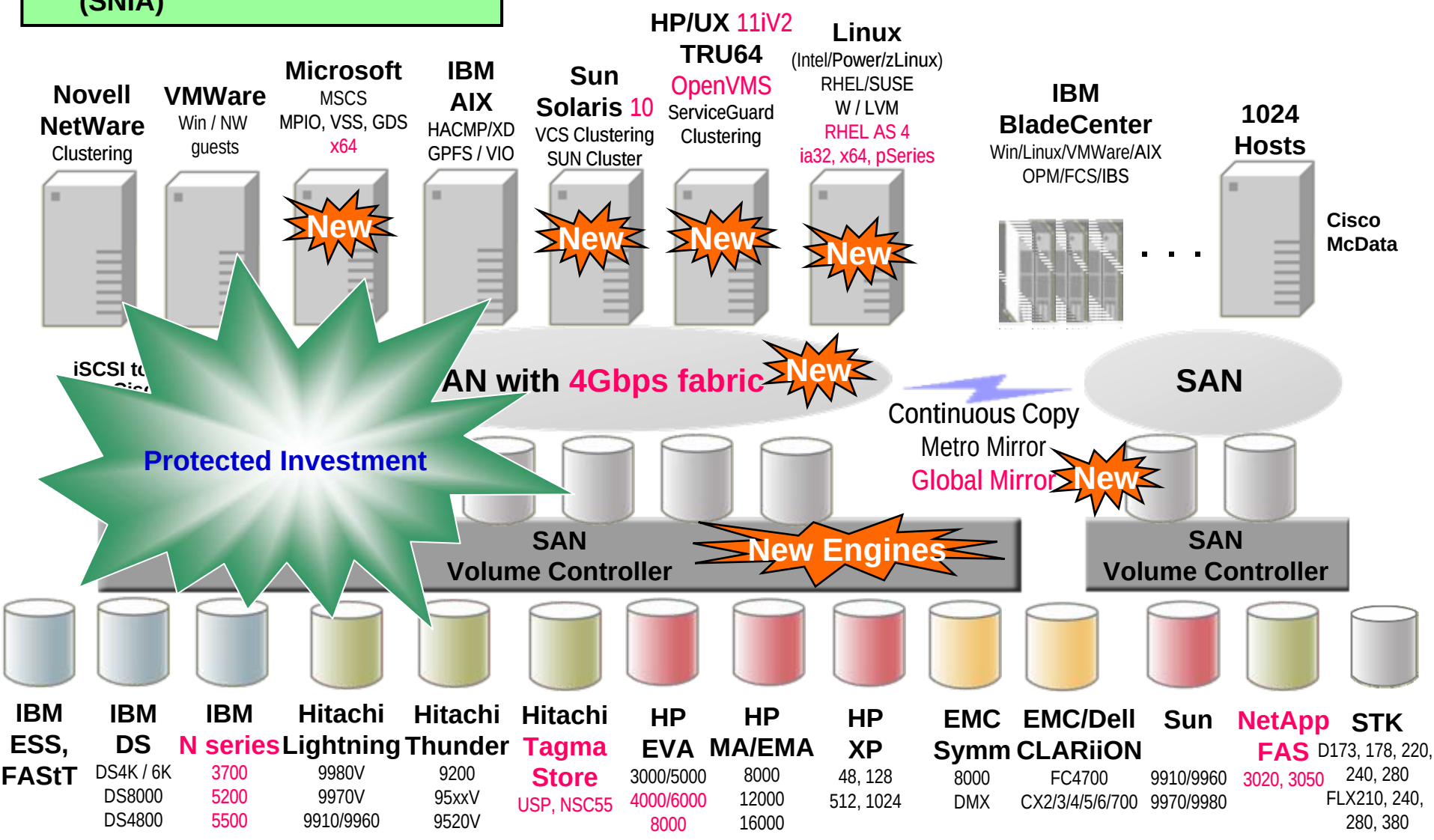
- ✓ Disk Array independant mirroring / flashcopy
- ✓ Lower Secondary Array Cost
- ✓ Flexible Licensing



Cross-device consistency groups

- ✓ Vendor „Indenpendant“
- ✓ Based on Open SAN Standard (SNIA)

System Storage SAN Volume Controller Version 4.1 Supported Environments



Business Values Achieved ??

- **Improve TCO save operation costs**
  - Migrate in ”normal” hours, no downtime, business keep running
  - Save cost on Adv. Function license
  - Save money on Multipath drivers
- **Maximize storage investment**
  - Tier level storage
  - Reuse old storage and adding adv. functions
- **Increase people satisfaction**
  - Eliminate weekend work and overtime when migrating, adding storage
- **Protected investment**
  - Open standard, SNIA, SMI-S
  - Support many vendors, not just IBM storage and servers
- **Improve application availability**
  - Migrate and expand in normal work hours, application independent
  - Adding capacity, changing infrastructur concurrent
- **Enhance storage personnel productivity**
  - Easy to administrate, saves time. Move volumes is easy, just select where to.
  - Single point of administration
- **Improve storage utilisation**
  - Giving the possibility to use capacity on multi disk arrays on same server.
- **Improve performance and connectivity**
  - Improve performance by striping the host LUN across multiple storage controllers and LUNs, using more physical disk drives to improve performance
  - SVC simplify storage connectivity to hosts. Hosts only connect to SVC on diskarrays

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- Competitor claims…
- Competitors virtualisation
- FlashCopy benefits for SAP

Competitor claim..

- SVC is a SPoF
- SVC increase responds time
- SVC is proprietary from IBM
- SVC architecture can’t scale or deliver usable performance

Competitor claim.. I say

- SVC is a SPoF
  - 2 node, 2 UPS, mirror cache – enterprise design no SPoF
- SVC increase responds time
  - If no benefit of cache or striping, SVC adds 60 microsecond, but often increase performance from the disk subsystem
- SVC is proprietary from IBM
  - SVC is based on open standard from SNIA, not IBM proprietary
  - You can move data to and from SVC control, and SVC support other vendors servers, OS and disk subsystems
- SVC architecture can’t scale or deliver usable performance
  - SVC support 1024 hosts, 2 PT data
  - Read Taneja report regarding SVC
  - SVC is in the lead at both SPC-1 and SPC-2

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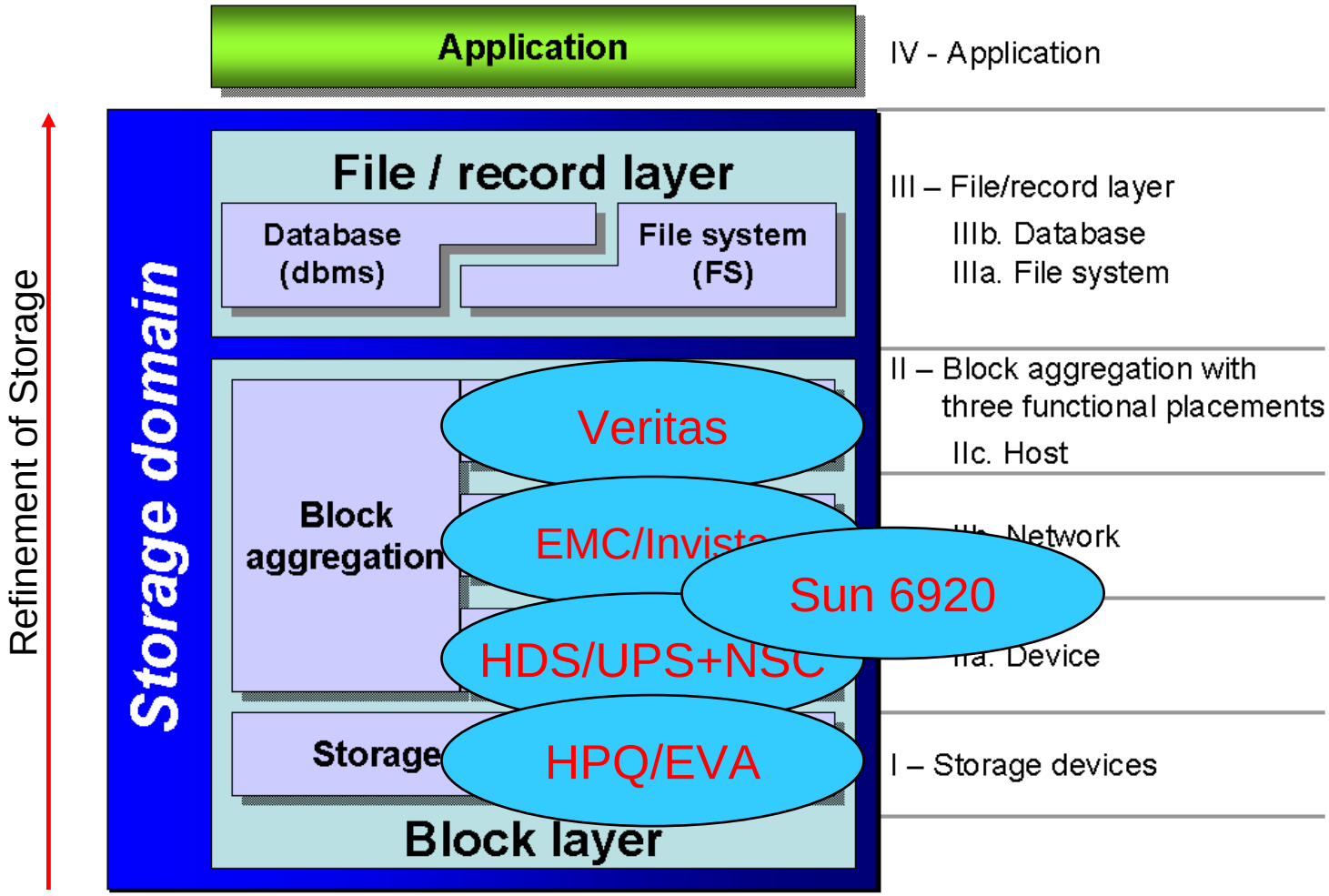
Block Aggregation – Competitors



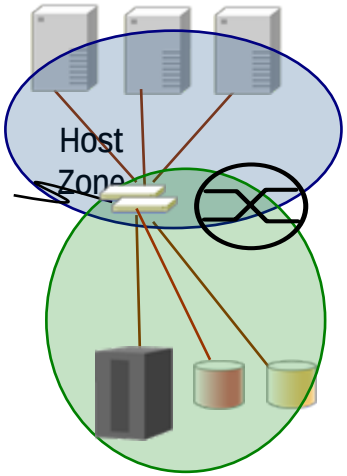
SNIA – www.snia.org - Storage Network Industry Association

Virtualization solution comparisons

IBM SAN Volume Controller

In-band Appliance

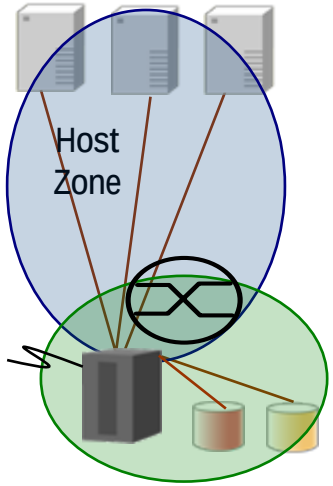
- Scales small to large enterprises
- Caching enhances performance
  - *SPC-1 = 100,000 IOPS ver. 2.1*
  - *SPC-1 = 150,000 IOPS ver. 3.1*
  - *SPC-2 = 3,527 MB/s ver. 3.1*
- Copy services moved to network
  - *Or on array ver. 3.1*
- SAN agnostic
- Multi-pathing SW is free
- 3-yr maturity > *2000+ customers*
- Extensive OS & storage support



HDS TagmaStore

Array Based

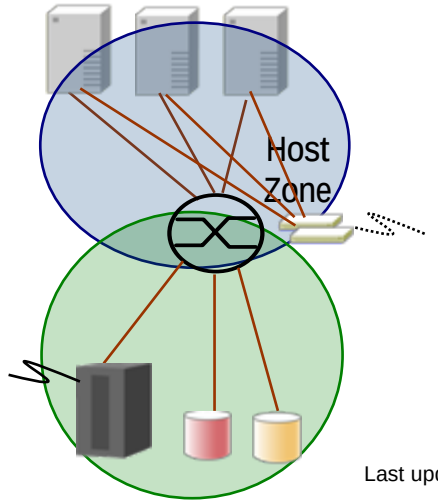
- Targeted at large enterprises
- Claims high performance
  - *no SPC-1 benchmarks*
- Manages both mainframe and open-systems storage
- SAN agnostic
- Copy Services in the array
- 12 month maturity
- Support matrix growing



EMC Invista

Intelligent Switch - based

- Large networks
- Copy Services in arrays
- Performance - *TBD*
- Interoperability - *TBD*
- Requires Powerpath - $$$
- Don't support SMI-S
- Requires new switch blades + control processors – High $
- Cisco / Brocade only initially
- Direct sales only initially



Last update 10-08-06

Virtualization comparisons

	IBM SVC	HDS USP	EMC Invista
Virtualization type	Block virtualization, VDisk striped across multi LUNs, controllers and disk arrays	LUN virtualization, 1:1 LUN virtualization	Block virtualization, VDisk striped across multi LUNs, controllers and disk arrays
Mirror function	SVC based, only need licenses on SVC.	USP based, only need licenses on UPS.	Array based, demand support and licenses on arrays
PiT copy	SVC based, done at VDisk level	UPS based, done at LUN level	Array based, demand support and licenses on arrays Or TimeFinder methods, demanding DPC and CPC communication over TCPIP
SNIA placed virtualization	SAN, in-band	Device	SAN, out-band (according to EMC)
Data flexibility	Change data layout concurrent, Striping – Sequential – Image mode. Move data concurrent	Move data concurrent	Change data layout concurrent, Striping – Sequential – Image mode. Move data concurrent

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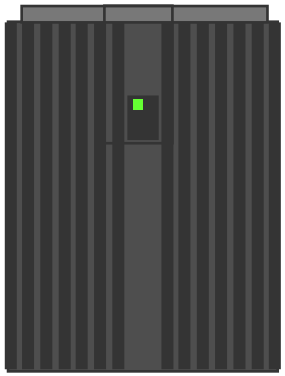
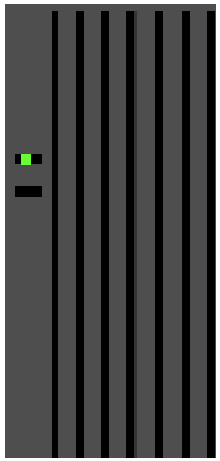
FlashCopy Benefits – *address key Customer Requirements*

- Business Continuity
  - reliable protection for large volumes of vital enterprise data
  - minimum restore window
- Operational Flexibility
  - elimination of backup window constraints
  - adhoc execution
- Total Cost of Ownership
  - integrated tools and automated processes
  - most effective use of resources

FlashCopy – Effective ‘Instant Copy‘ Process



ESS800



DS8000

Effective ‘Instant Copy‘ process

- **command issued when copy is needed, no presync necessary**
- **source and target volumes are immediately available, each with r/w access**
- nocopy (physical copy on change only) or copy option (background copy disk subsystem)
- multiple source-target relations can be maintained
- full or incremental (changed blocks only) copy

SAN VC

DS6000

FlashCopy Solutions use FlashCopy to

- offload the production server
- perform fast disk copies (disk backup, Flashback restore and database cloning)

FlashCopy Solutions Menu

'zero impact' Backup

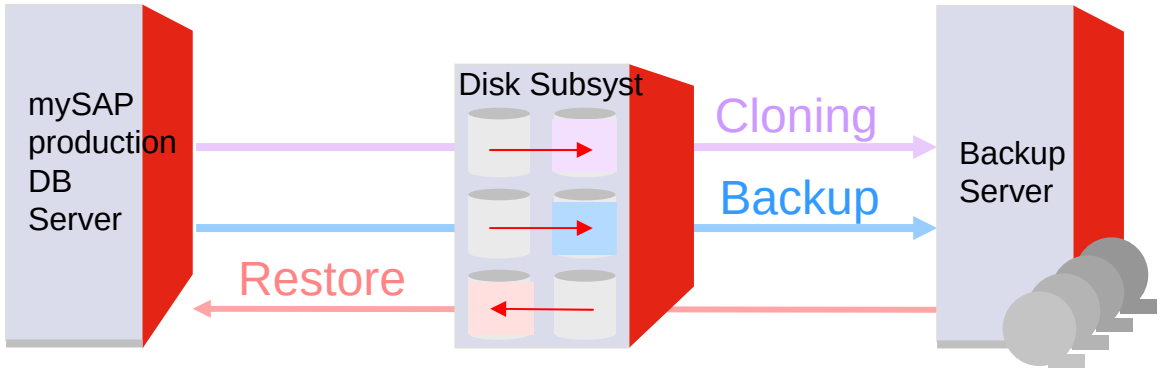
- no load on production server
- short DB backup window
  >fewer redo logs to recover
- disk and/or tape media
- balancing of tape workload

'Flash' Restore

- restore from FlashCopy on disk
- recovery starts immediately after Flash Restore
- consistent process and user interface for tape/disk restore

on demand Cloning
(Service Offering)

- no intermediate backup
- short time to activate clone
- automated, customizable

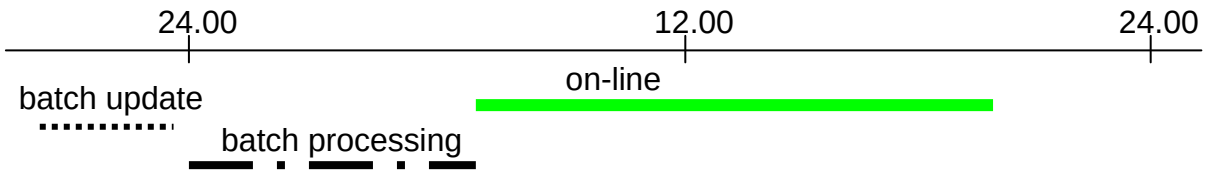


built on a common base product - Tivoli Storage Manager for Hardware

- Data Protection for IBM ESS for mySAP
- Data Protection for Disk Storage and SAN Volume Controller for mySAP

FlashCopy Solutions – *on Demand Backup*

Production schedule



‘ zero impact‘ backups

backup window
Database
FlashCopy
DS8000
background copy
TSM
data transfer to tape

1

frequent (disk) backups

backup window
Database
FlashCopy
DS8000
background copy

2 2 2

delayed tape backups

backup window
Database
FlashCopy
DS8000
TSM
data transfer to tape

3

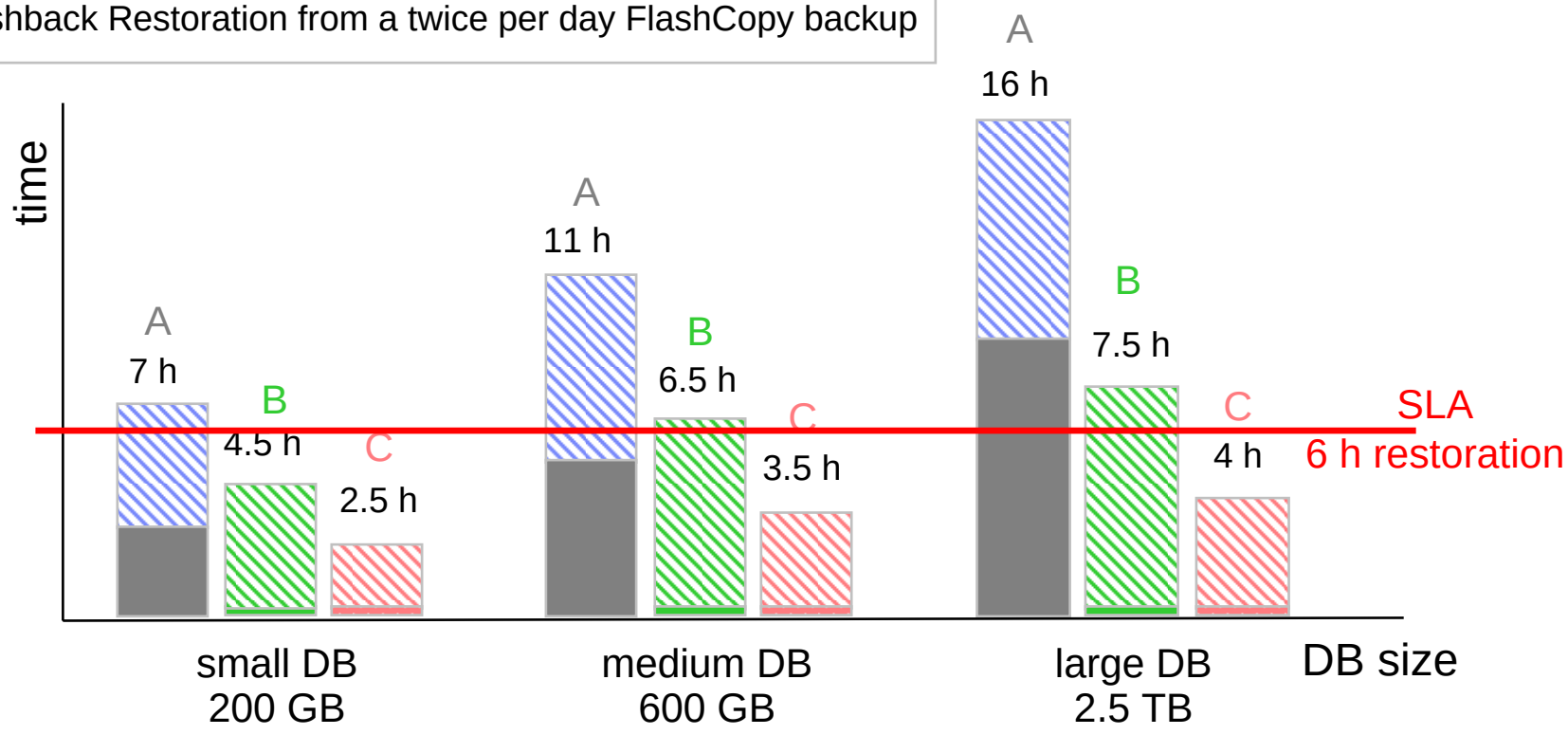
FlashCopy Solutions - *Restoration 'a la carte'*

Restoration = Restore + Forward Recovery

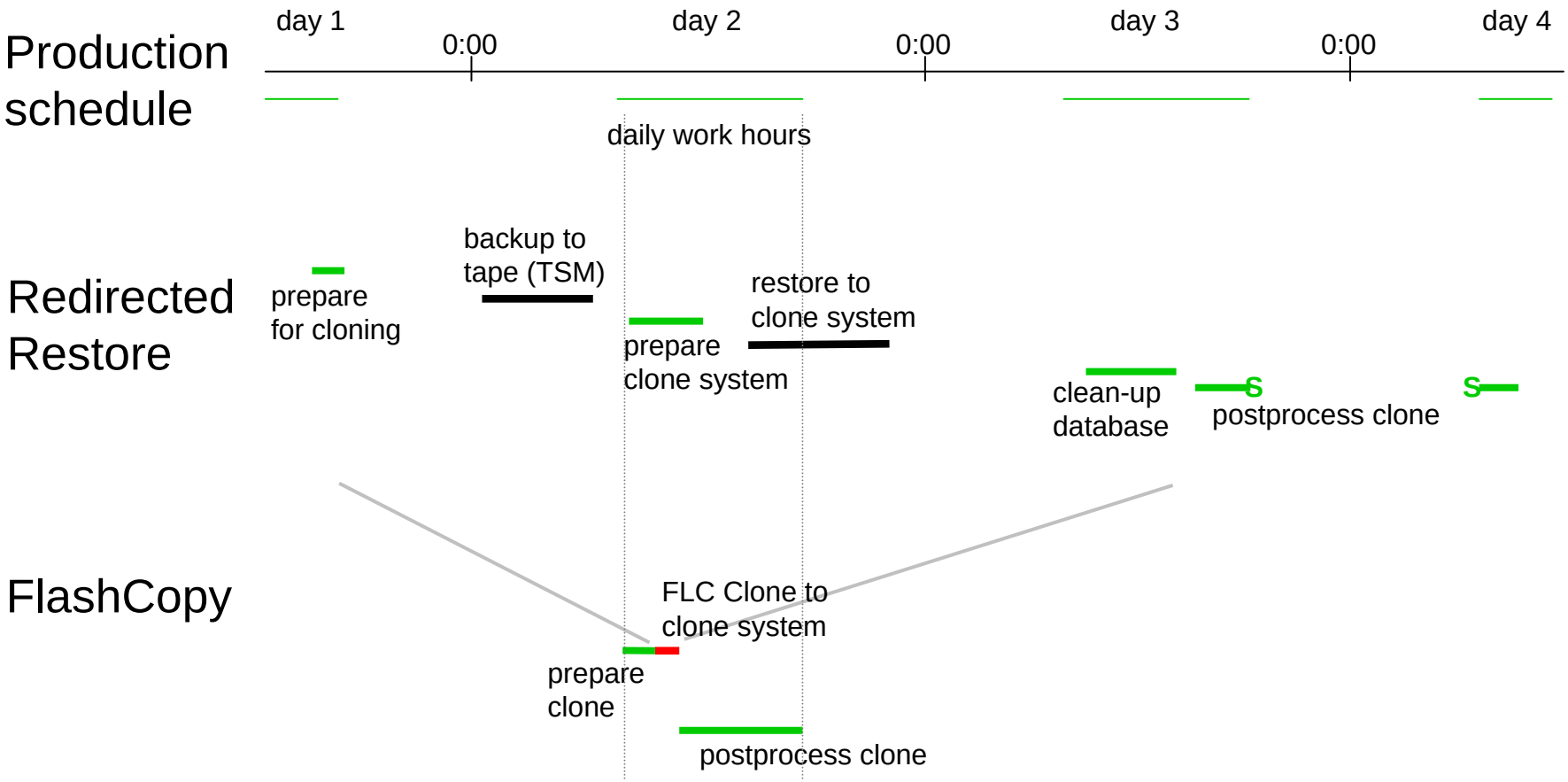
A Tape Restoration from a once per day backup

B Flashback Restoration from a once per day FlashCopy backup

C Flashback Restoration from a twice per day FlashCopy backup



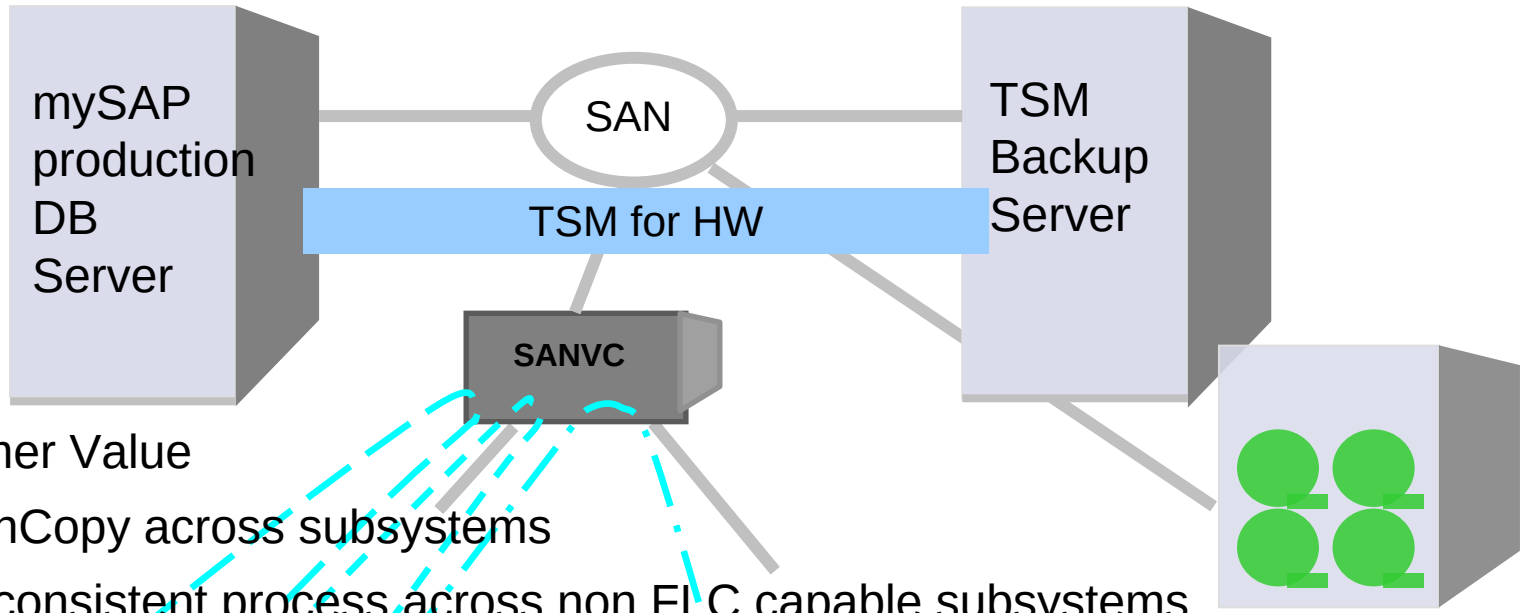
FlashCopy Solutions - *adhoc Database Cloning*



FlashCopy Solutions Highlights

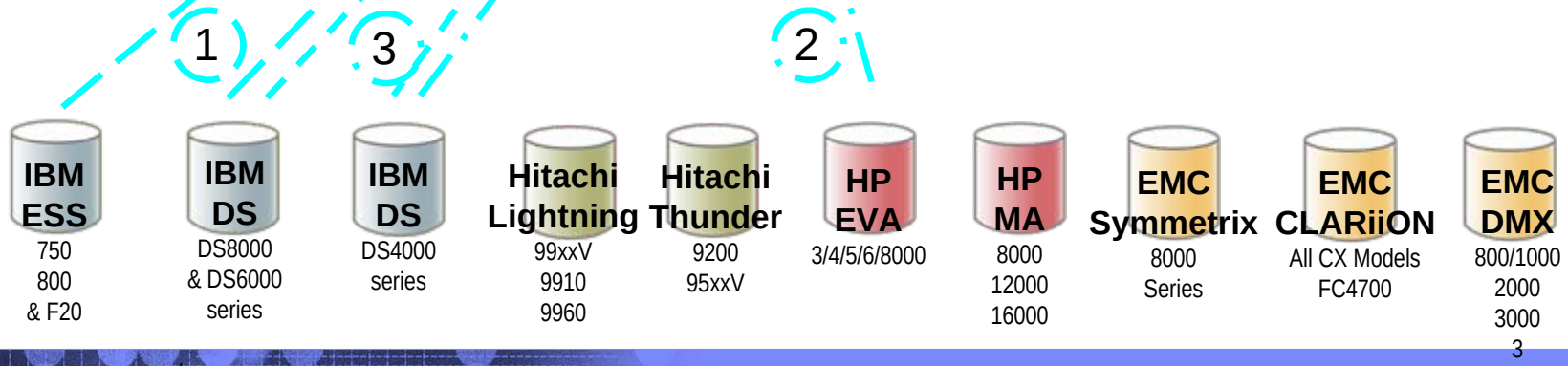
- 'zero impact' on production server
- Database control
  - actual, complete and consistent data
  - logged in backup history
- Common process for tape and FlashCopy
  - leveraging existing skills
  - select optimum technique per system in a mySAP landscape
- Product based
  - time to value – no scripting
  - product maintenance and enhancements
  - worldwide IBM support and SAP endorsement (certification)

FlashCopy Solutions - SAN VC Support



Customer Value

1. FlashCopy across subsystems
2. use consistent process across non FLC capable subsystems
3. optimize storage for cost



SAP Certification

Tivoli Storage Manager
first and only product
to certifiy to the
SAP BC-BRS interface
for
Copy/Mirror backup/restore

CERTIFICATE

Interface Software for SAP NetWeaver™

SAP Certified Integration:
BC-BRS SPLITINT AIX64 620 -
Split-Mirror Backup and Restore
for Oracle Databases with
IBM Tivoli Storage Manager for
Hardware 5.2

SAP AG
hereby confirms that the interface software
for the product
IBM Tivoli Storage Manager for Hardware
Version: **5.2**
of the company
IBM Deutschland Entwicklung GmbH
has been certified for the component
SAP Web AS 6.20.

This certificate confirms the existence of product functionality in accordance with SAP's certification procedure. It does not guarantee that the product is error-free.

The certification test is documented in report: 1656/17606/689635/wdf dating 15 December 2003.

The test has been performed using an SAP Web AS 6.20 System.

Vendor Hardware: **IBM RS6000**
Operating system: **AIX 5L 64Bit**
This configuration meets the requirements for connecting **IBM Tivoli Storage Manager for Hardware** to SAP NetWeaver™.

Certified functions

Database Backup with Split-Mirror commands

Database Restore with Split-Mirror commands

Optional: FlashBack restore

Walldorf, 22 January 2004

ppa. Dr.-Ing. Jochen Höffner

Director Integration & Certification Center
SAP AG

Where to get competitive assistance and Information?

- The CompeteCenter Website → http://cmsc.dk.ibm.com

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– involve us early!

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Thanks for listening

Bent Lerager

(Senior IT Specialist)

IBM Technical SAP Forum