Neues zu Disk, SVC und Tape

Manuel Schweiger
IT Specialist

IBM

Agenda

- Disk
  - DS8800
- SVC
  - SVC Update
  - Storwize – V7000
- Tape
  - LTO5
  - Outlook

Introducing the DS8800

4th-generation DS8000 enterprise disk platform

- Faster hardware throughout
- Higher capacity with more efficient footprint
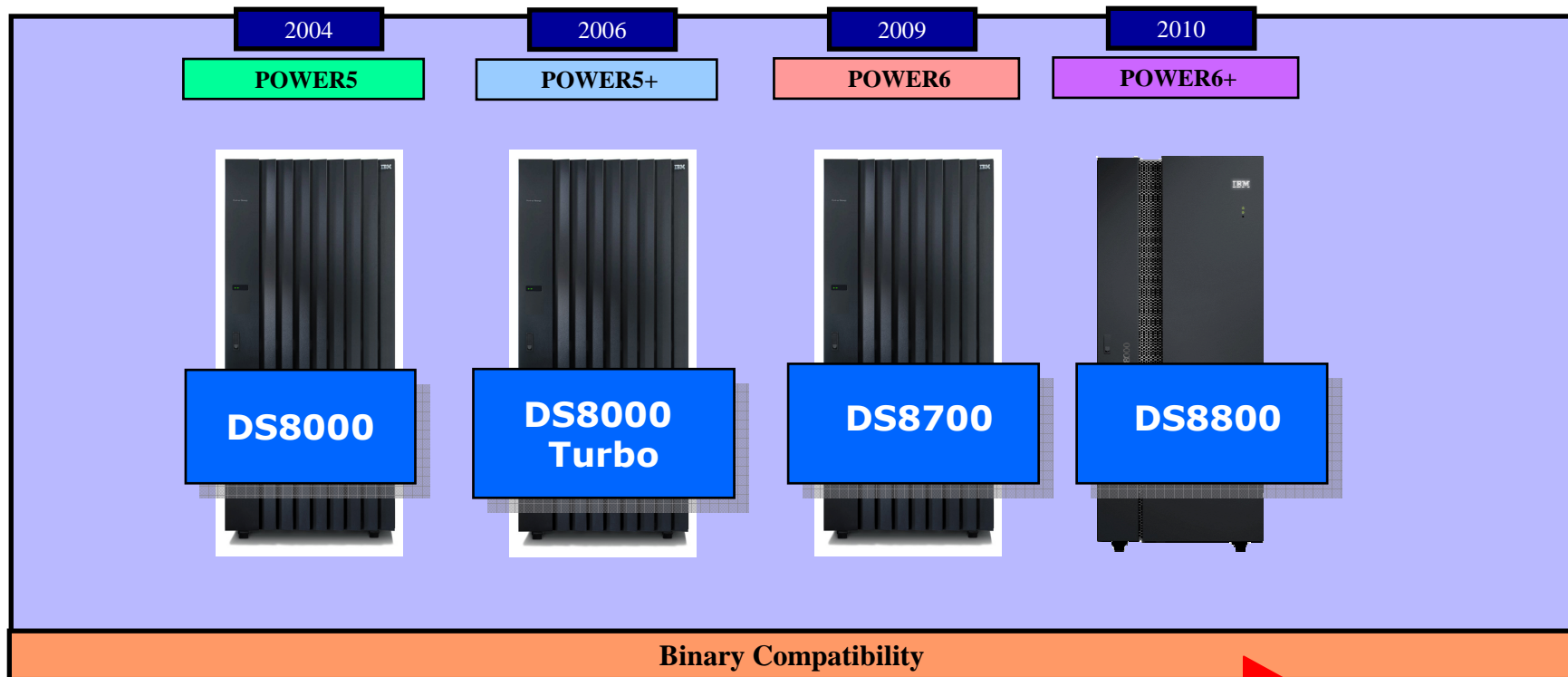- Exceptional reliability for critical workloads

Announced on October 7…

       Generally Available on November 19

DS8800

4th-generation DS8000 enterprise disk system

The IBM POWER processor has been behind the success of IBM enterprise storage beginning with the Enterprise Storage Server in 1999

2004	2006	2009	2010
POWER5	POWER5+	POWER6	POWER6+
DS8000	DS8000 Turbo	DS8700	DS8800

Binary Compatibility

DS8800 builds on a market-proven, reliable code base!

DS8000 family models

Two base models with scalable controllers and capacity

DS8700
- POWER6 controllers (2-way and 4-way)
- 4 Gb/s and 2 Gb/s host and device adapters
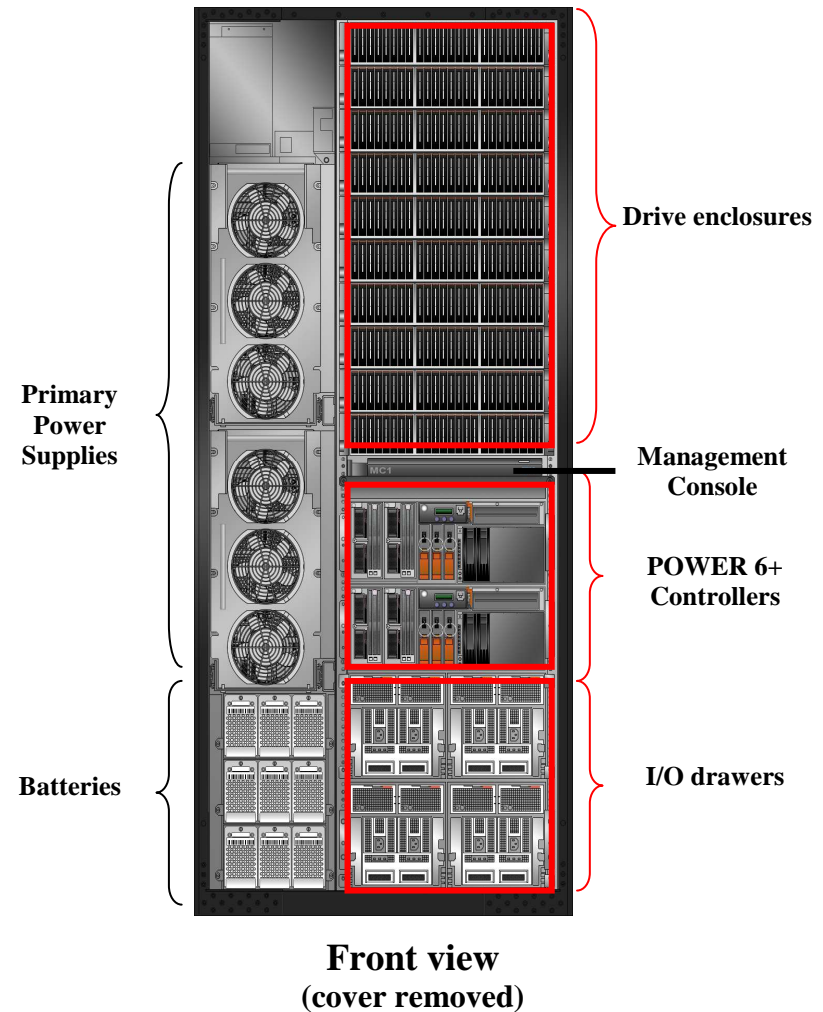- 3.5" Enterprise Fibre Channel drives

DS8800
- POWER6+ controllers (2-way and 4-way)
- 8 Gb/s host and device adapters
- 2.5" Enterprise SAS-2 drives

DS8800 hardware upgrades

Higher performance and efficiency

- Compact and highly efficiency drive enclosures
  - New 2.5", small-form-factor drives
  - 6 Gb/s SAS (SAS-2)
  - New enclosures support 50% more drives

- Upgraded processor complexes
  - IBM POWER6+ for faster performance

- Upgraded I/O adapters
  - 8 Gb/s host adapters
  - 8 Gb/s device adapters

- More efficient airflow
  - Front-to-back cooling
  - Aligns with data center best practices

Primary Power Supplies

Batteries

Drive enclosures

Management Console

POWER 6+ Controllers

I/O drawers

Front view
(cover removed)

Dramatic efficiency and performance benefits

Disk enclosure comparison

New high-density enclosures

DS8700 Megapack

- Disk Technology
  - 3.5" (LFF) Fibre Channel
- Throughput
  - 2Gbps FC interconnect backbone
  - 2Gbps FC to disks
- Density
  - Supports 16 disks per enclosure
  - 3.5U of vertical rack space
- Cabling
  - Passive copper interconnect
- Modularity
  - Rack level power
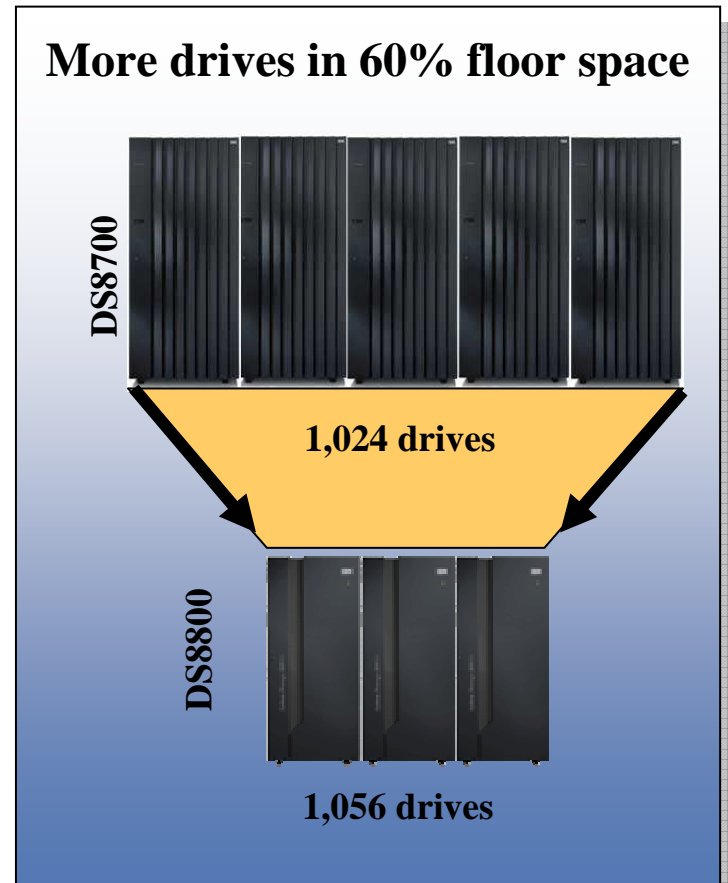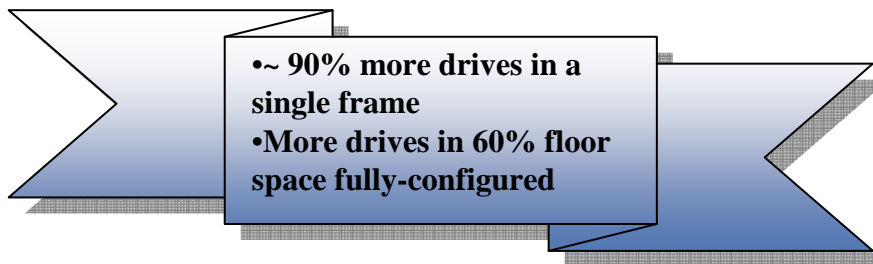 - Rack level cooling

DS8800 Gigapack

- **Disk Technology**
  - 2.5" (SFF) SAS
- **Throughput**
  - 8Gbps FC interconnect backbone
  - 6Gbps SAS to disks
- **Density**
  - Supports 24 disks per enclosure
  - 2U of vertical rack space
- **Cabling**
  - Optical short wave multimode interconnect
- **Modularity**
  - Integrated power
  - Integrated cooling
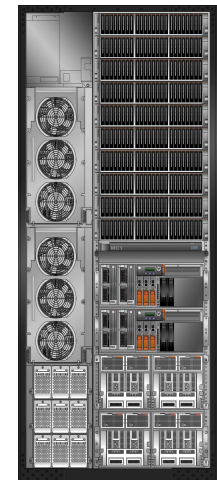
Storage efficiency with space-saving design
Saving money with high-density drives, enclosures, frames

- Client feedback is very positive on space-saving design
  - Small-form-factor drives
  - High-density drive enclosures
  - Almost double the drives in same frame footprint

- Benefits
  - More effective consolidation can lower operating costs
    - Support more workloads with smaller footprint
    - Reduce number of systems to manage
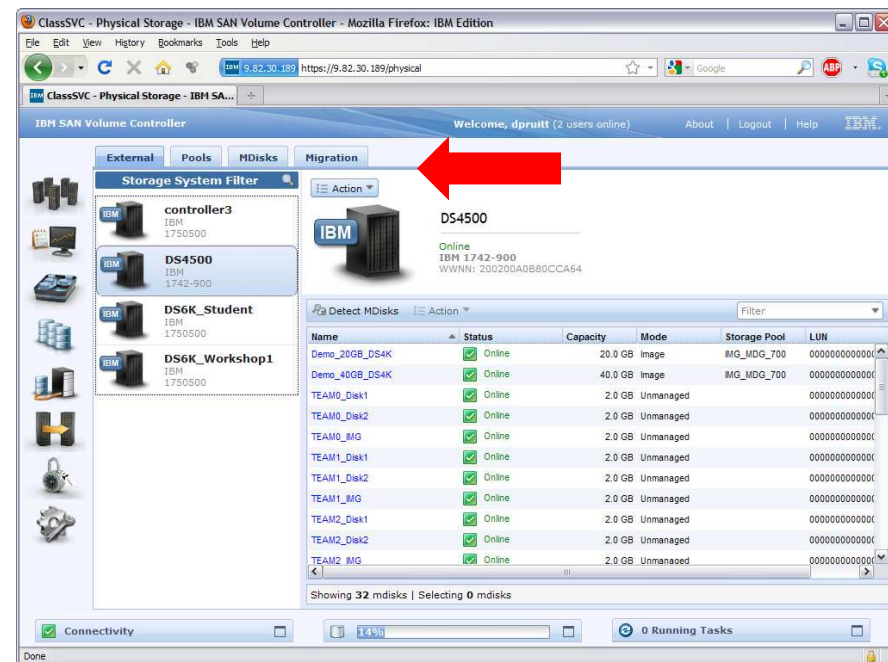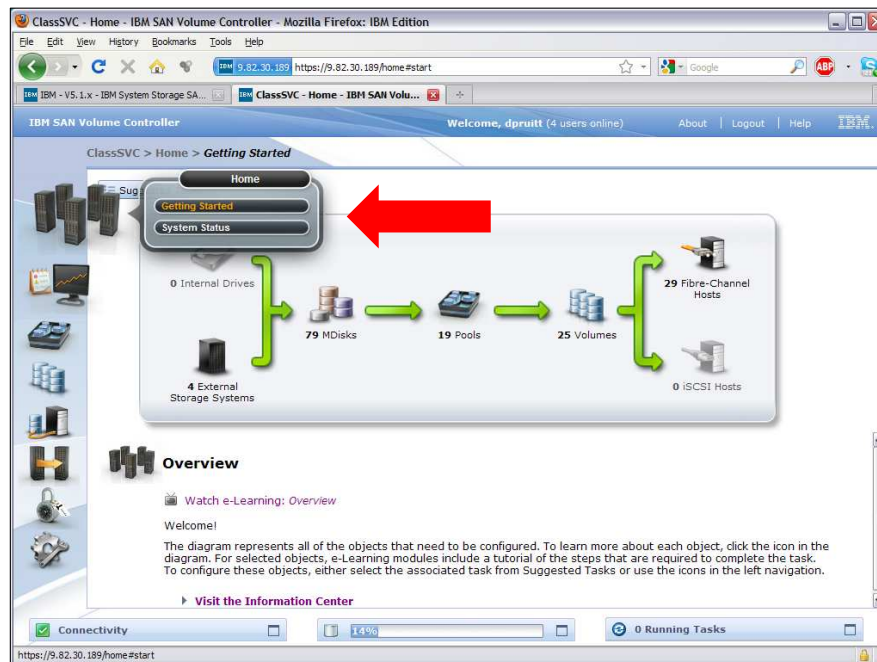   - Reduce power and cooling costs

- ~ 90% more drives in a single frame
- More drives in 60% floor space fully-configured

More drives in 60% floor space

DS8700

1,024 drives

DS8800

1,056 drives

Extremely positive client feedback about substantial footprint reduction
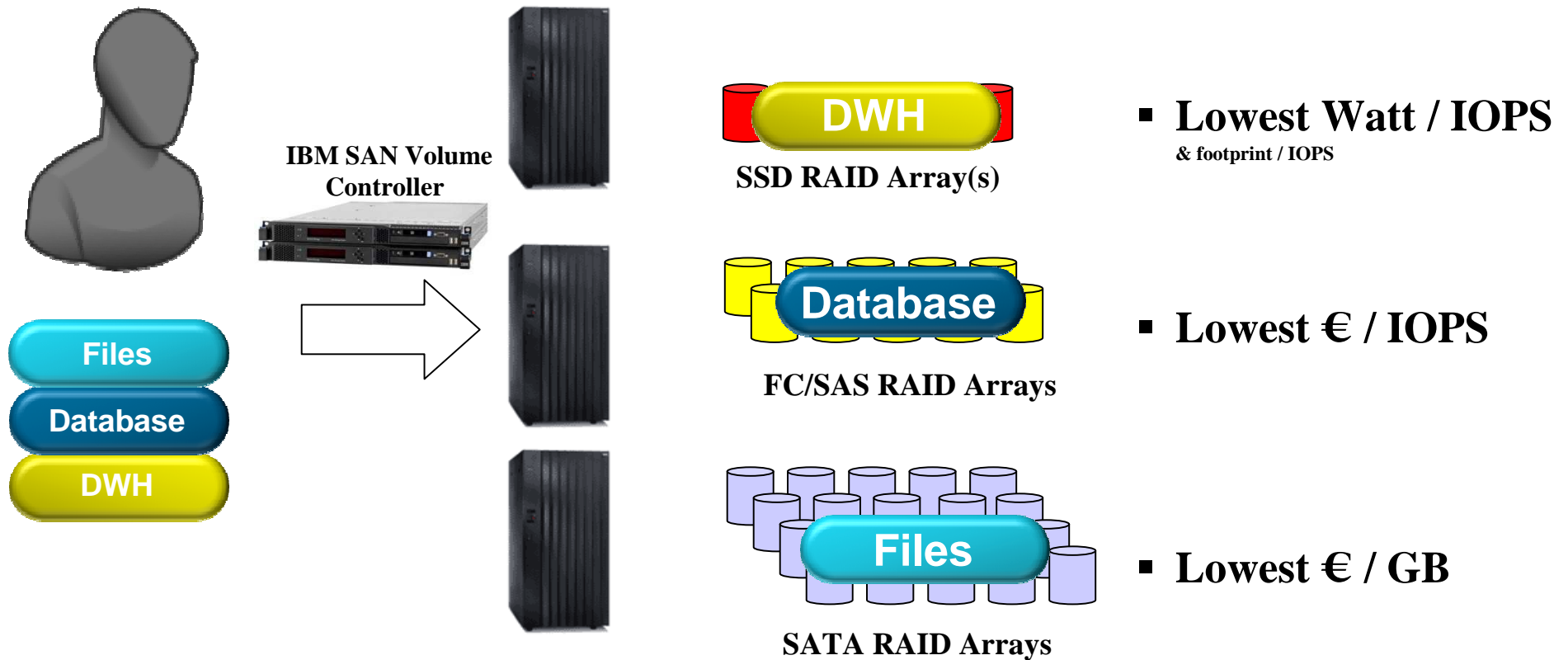
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  - Storwize – V7000
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SVC v6 - New SVC GUI

- Web 2.0 based, connect direct to cluster management IP address
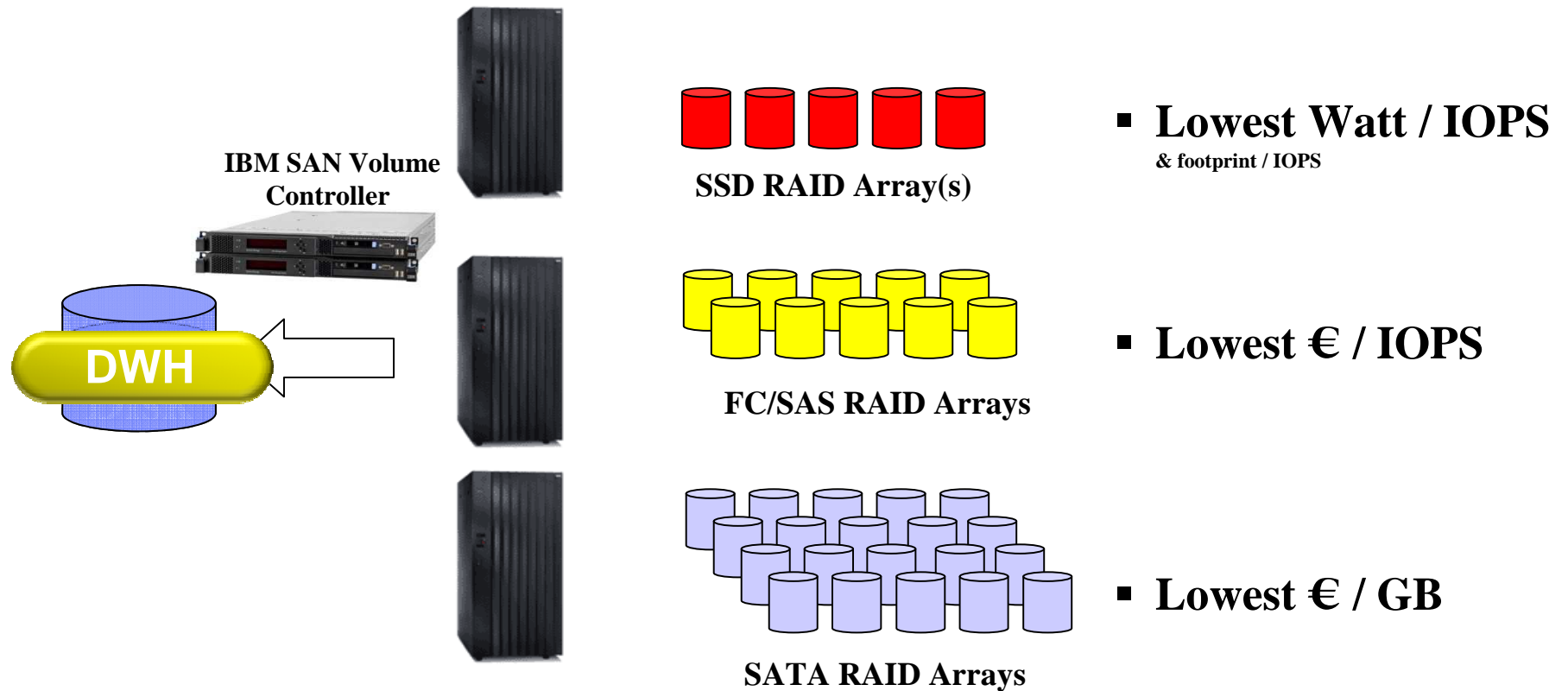- No dedicated SVC GUI server / SSPC / Master Console needed
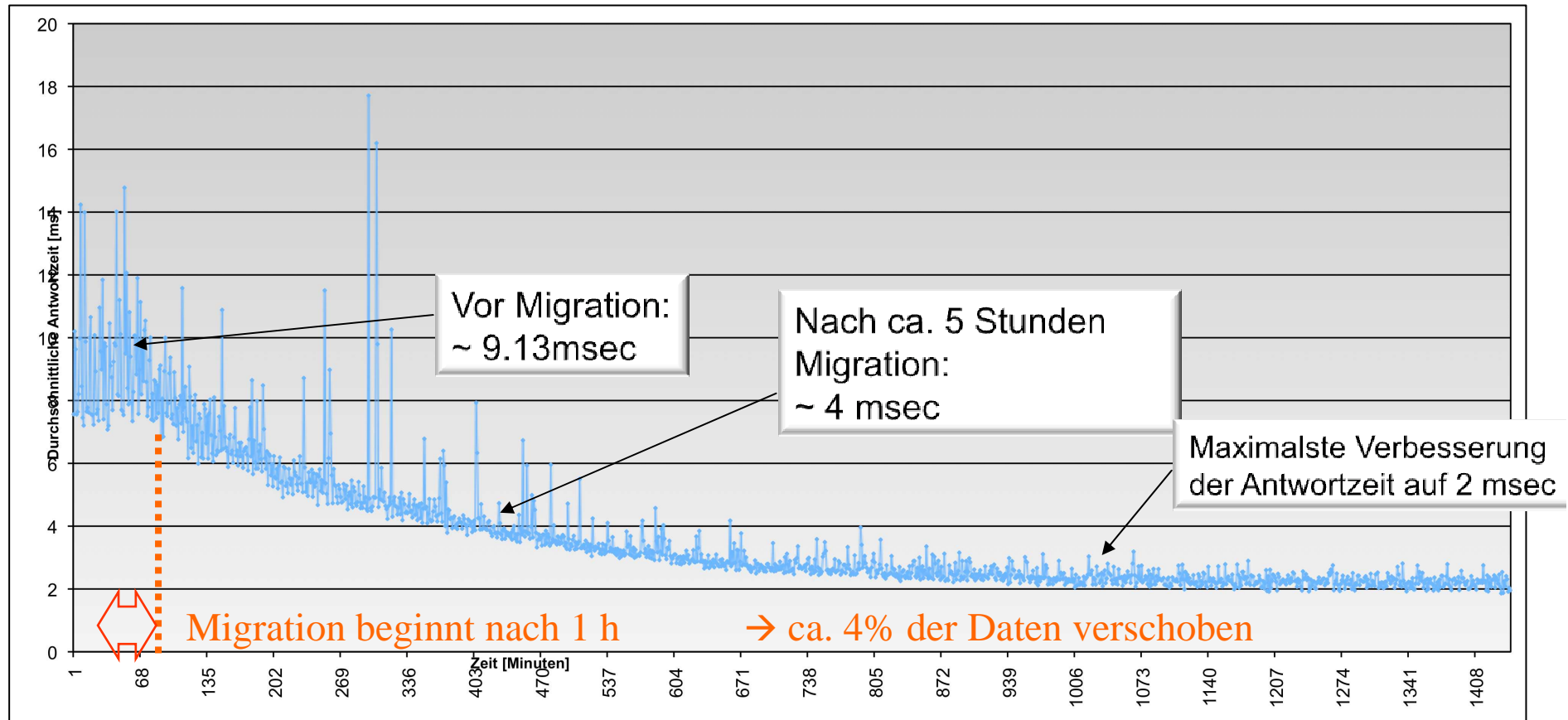
IBM SVC Tiered Storage

IBM SAN Volume Controller

Files

Database

DWH

DWH

SSD RAID Array(s)

- **Lowest Watt / IOPS**
  & footprint / IOPS

Database

FC/SAS RAID Arrays

- **Lowest € / IOPS**

Files

SATA RAID Arrays

- **Lowest € / GB**

11

SVC Easy Tier
Sub-LUN optimized Data Placement!

IBM SAN Volume Controller

DWH

SSD RAID Array(s)

FC/SAS RAID Arrays

SATA RAID Arrays

- **Lowest Watt / IOPS**
  & footprint / IOPS

- **Lowest € / IOPS**

- **Lowest € / GB**

Example – Easy Tier Impact

Storwize – V7000

Modular Hardware Building Blocks in 2U

- Enclosures contain up to twelve 3.5" or twenty-four 2.5" drives in just 2U

- Control enclosure: dual active-active controllers and drives; Expansion enclosure: drives only

- Up to nine expansion enclosures attach to one control enclosure

- Mix drive sizes and HDD/SSD in enclosure

- Eight 8Gbps FC ports plus four 1Gbps iSCSI ports per controller pair; 16GB cache per controller pair

2U

Software inherited from prior offerings plus enhancements

New advanced software functions

- New GUI *(easy-to-use, web based)*

- RAS services and diagnostics

- Additional host, controller and ISV interoperability

- Integration with IBM Systems Director

- Enhancements to TPC, FCM and TSM support

Proven IBM software functionalities

- Easy Tier *(dynamic HDD/SSD management)*

- RAID 0, 1, 5, 6, 10

- Storage virtualization *(internal and external disks)*

- Non-disruptive data migration

- Global & Metro Mirror

- FlashCopy up to 256 copies of each volume

- Thin provisioning

Start Small and Grow Easily

Drive choices

- 2.5-inch (SFF)
  - 300GB 10K RPM SAS
  - 450GB 10K RPM SAS
  - 600GB 10K RPM SAS
- 3.5-inch (LFF)
  - 2TB 7,200 RPM NL-SAS
- Solid-State (SFF)
  - 300GB SAS

Grow Big

Start small

One 24-bay control enclosure
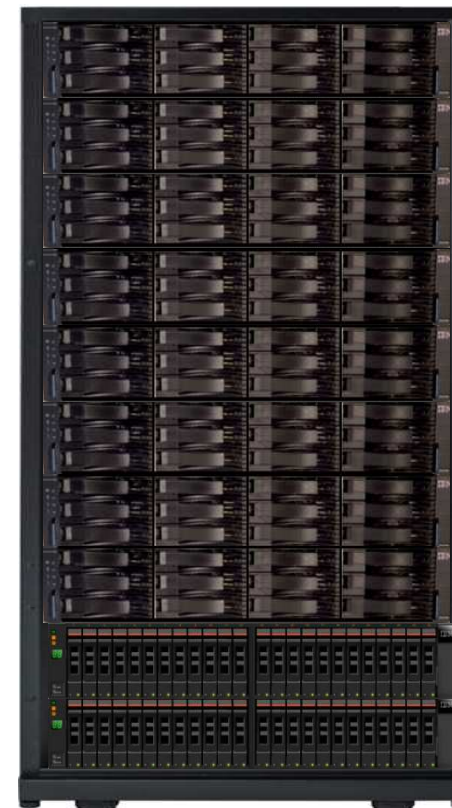
Scale Up

Easily add up to 9 expansion enclosures

Expand capacity up to 240TB

Drive sizes can be intermixed in an enclosure

12- and 24-bay expansion enclosures can be intermixed in a system

20 U = 1 M

Availability: November 12, 2010: Systems with up to five enclosures (up to 120 drives or 120TB) plus external storage
March 2011: Systems with up to ten enclosures (up to 240 drives or 240TB) plus external storage
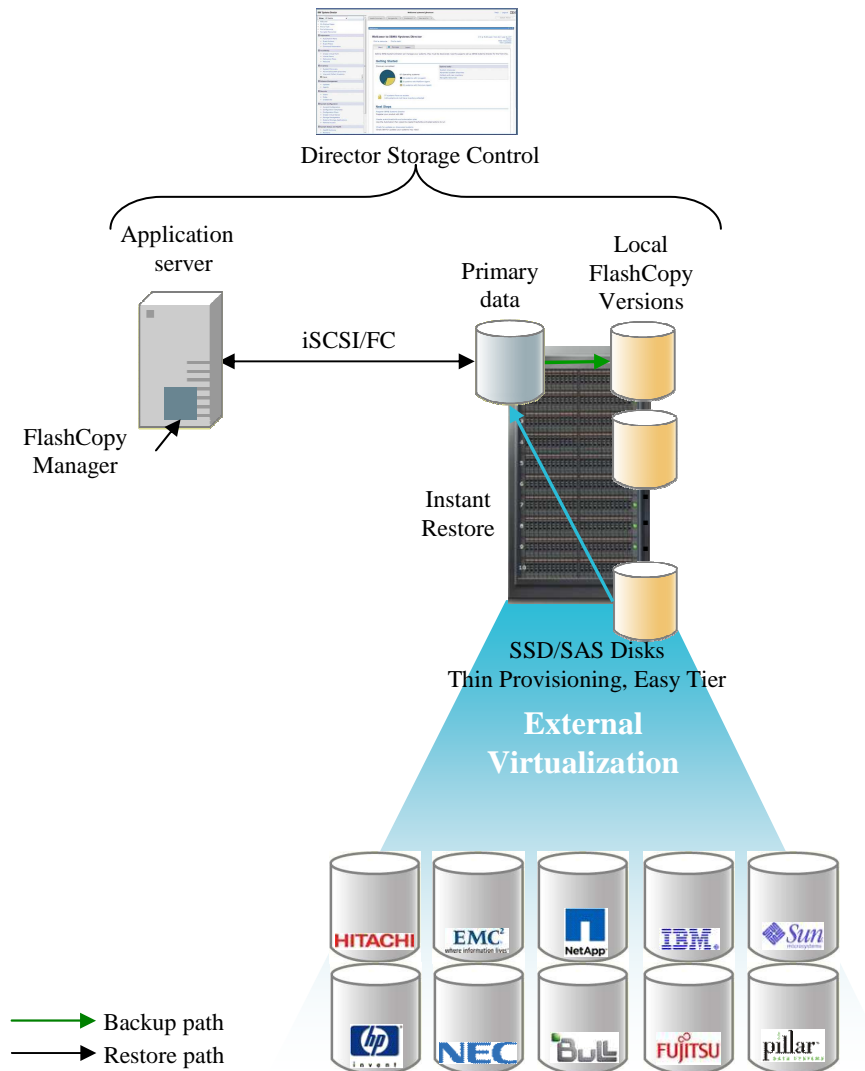
Fresh New User Interface
Based on the well-received XIV interface

Storwize V7000 - Solutions at a Glance

Director Storage Control

Application server

iSCSI/FC

Primary data

Local FlashCopy Versions

FlashCopy Manager

Instant Restore

SSD/SAS Disks
Thin Provisioning, Easy Tier

External Virtualization

HITACHI
EMC²
where information lives
NetApp
IBM.
Sun
microsystems

hp
invent
NEC
BuLL
FUJITSU
pillar
data storage

Backup path
Restore path

- For smaller clients looking for easy-to-use, scalable storage with intelligent support for their business applications
- IBM offers an integrated solution formed from extraordinary building blocks
  - Scalable storage
  - Efficient utilization of space
  - Application-integrated data protection
  - Simple manageability
  - Virtualization of external disks
- For clients with IBM servers, a single point of management for both servers and storage

Storwize V7000 - Solutions at a Glance

Productivity Center

Application server

Primary data

Local FlashCopy Versions

iSCSI/FC

FC Mirroring (Sync or Async)

FlashCopy Manager

Or

FastBack agent

Instant Restore

IP Replication (Copy)

SSD/SAS Disks
Thin Provisioning, Easy Tier

(SAS/NL-SAS)

External Virtualization

Backup path

Restore path
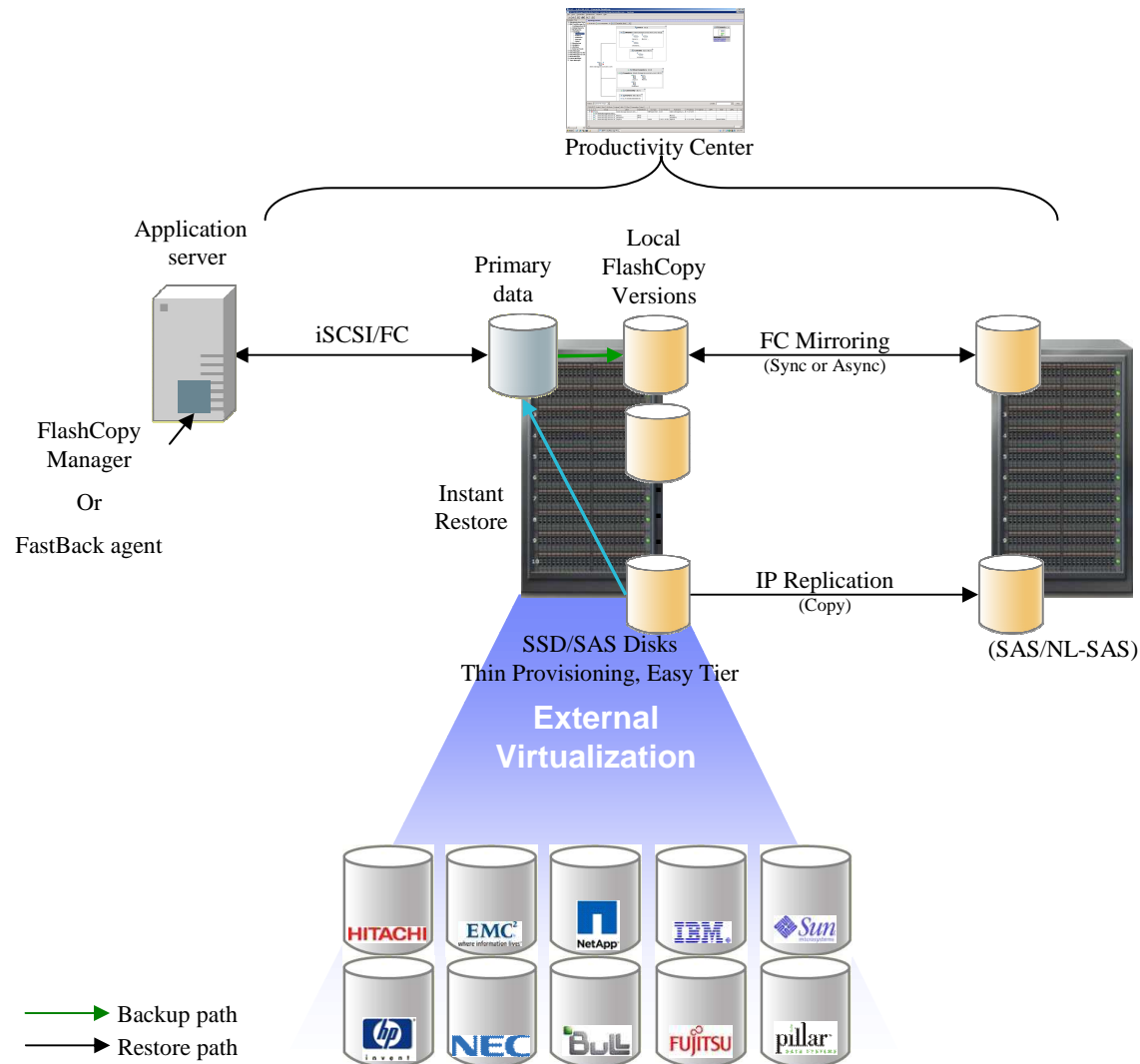
- For clients looking to expand the intelligent support for their business applications across sites for disaster recovery protection
- IBM offers
  - IP replication
  - Fibre Channel Mirroring
  - Enterprise SAN-wide management

Storwize V7000 - Solutions at a Glance

Productivity Center

TSM Admin Center

Application server

Primary data

Local FlashCopy Versions

iSCSI/FC

FC Mirroring
(Sync or Async)

FlashCopy Manager

Or

FastBack agent

Instant Restore

IP Replication
(Copy)

(SAS/NL-SAS)

SSD/SAS Disks
Thin Provisioning, Easy Tier

FC or IP Replication
(Deduplicated Copy)

External Virtualization

Application data

Tivoli
Storage Manager 6

FastBack agent

HITACHI   EMC²   NetApp   IBM.   ◆Sun

hp   NEC   BULL   FUJITSU   pillar

ProtecTIER deduplication gateway

Storwize V7000

→ Backup path
→ Restore path

- For clients looking to integrate with enterprise recovery management or to extend these solutions to data not currently stored on Storwize V7000

- IBM offers
  - Application-integrated software snapshot for external data
  - Unified recovery management with Tivoli Storage Manager

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IBM Ultrium 5

- New IBM LTO Ultrium Generation 5 Tape Drives:
- 1.5 TB Native Physical Capacity (3.0 TB compressed)
- Up to 140 MB/s native data transfer rate
- Encryption capable
- Media partitioning
  - New: **Long Term File System**
- SAS at 6 Gbit/sec
- FC at 8 Gbit/sec
- Dualport
- Capability to Read/Write Ultrium 4 and read Ultrium 3 cartridges
- Multiple format support – customers can reuse existing media
- Roadmap over 8 Generations to 12.8 TB

LTO Ultrium Roadmap für acht Generationen
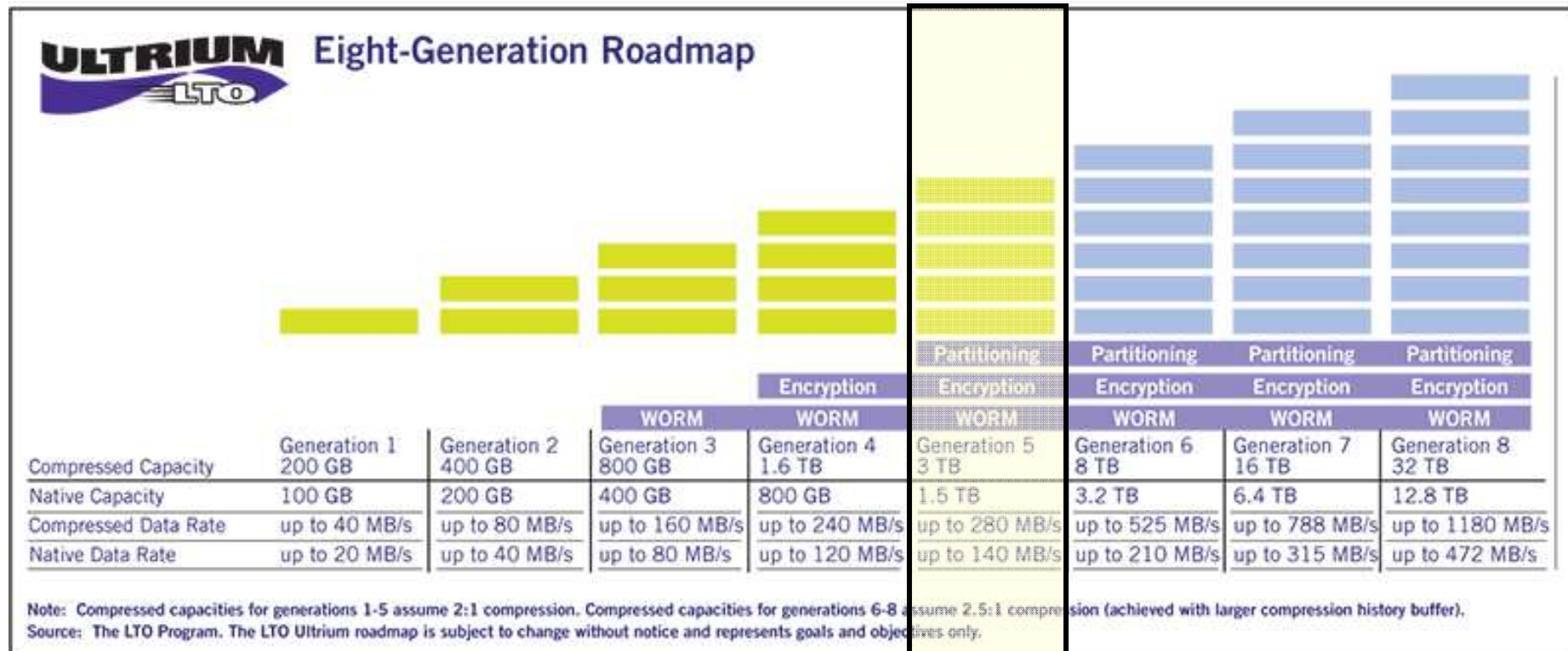
Long Term File System Example - The Smarter Tape

- Efficient: can utilize new dual-partition planned for LTO Gen-5

- Index partition and data partition: Mount a tape as if it was a hard drive

- Self describing tape enabling hierarchical directory structure, file names, file properties, metadata files, fast search indexes, domain-specific information

BOT ← → EOT

Partition 0

F123DesrLoc1344

Guard Wraps

Partition 1

F123
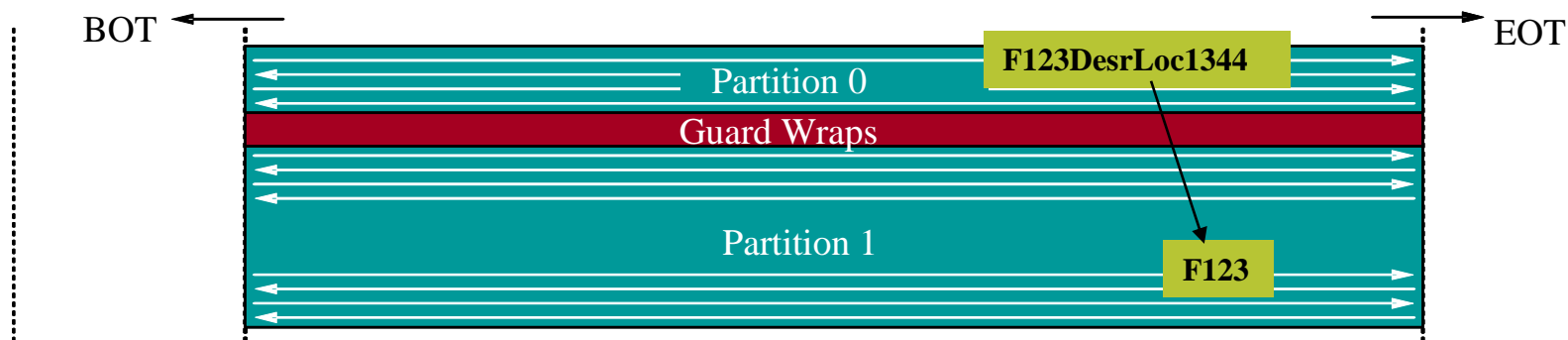
Potential Applications:
- *Video archive and individual scene access*
- *Design and drawing content for manufacturing, architecture, and more*
- *Medical / Health industry images*
- *e-discovery*

Enterprise Tape Drive Roadmap

Technology Demonstration
1 TB - April , 2002
8 TB – May, 2006
35 TB – Jan 2010

|	Gen 1	Gen 2	Gen 3	Gen 4	Gen 5	Gen 6
3592 Model M/T Model	3592	TS1120	TS1130			
Native capacity	300 GB	500 GB	640 GB			
		700 GB	1 TB	> 1 TB		
				>= 3 TB	5 TB	8 TB
Data transfer rate MB/S With Compression	40 Up to 120	100 Up to 300	160 360 +	240 min	360 min	540 min
Cartridge Type WORM	JJ/JA JR/JW	JJ/JA/JB JR/JW	JJ/JA/JB JR/JW/JX	JA/JB/JC JW/JX/JY	JB/JC JX/JY	JB/JC/JD JX/JY/JZ
Encryption	N/A	Yes	Yes	Yes	Yes	Yes
Sever Attachment	Fibre FICON ESCON	Fibre FICON ESCON	Fibre FICON	Fibre FICON	Fibre FICON	Fibre FICON

Tape Storage: Demonstrating 29.5 Gb/in² (01/2010)

35TB!!!

Demonstration shows: Tape can sustain roadmap for at least another decade while maintaining a cost advantage over other storage technologies.

Magnetic Tape (R)evolution

Product / Year:	IBM 726 /1952	JAG3 / 2008	LTO6 / 2012	Demo 2010
Capacity:	2.3MByte	1TByte	3TByte	35TByte
Areal Density:	1400 bit/in^2 29.5Gbit/in^2	790Mbit/in^2	1.87Gbit/in^2	
Linear Density:	100 bit/in	343 kbit/in	488 kbit/in	518 kbit/in
Track Density:	14 tracks/in	2.3 ktracks/in	3.84 ktracks/in	57 ktracks/in

25x

(a)   (b)
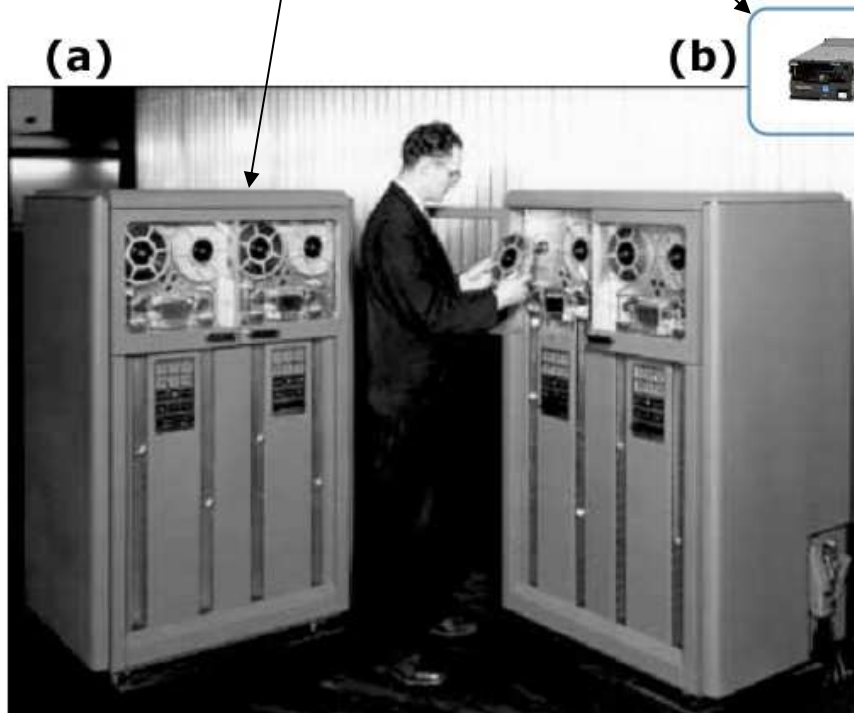
Track density increase will be the key contributor for future tape capacity increase