



Citius, Altius, Fortius
Daha Hızlı, Daha Yukarı, Daha Güçlü

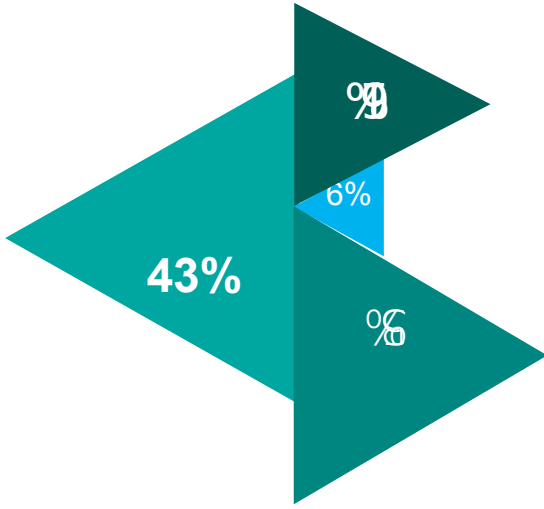
Disk Sanallaştırma

IBM Disk Sanallaştırma Çözümleri

Alpay ÖZER
Veri Depolama – Satış Müdürü
E-mail : alpay@tr.ibm.com

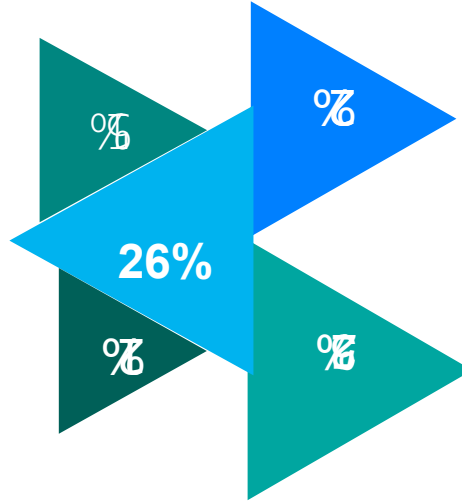
Yüz yüze 3,000 CIO ile yapılan araştırmanın analizi

71 ülke



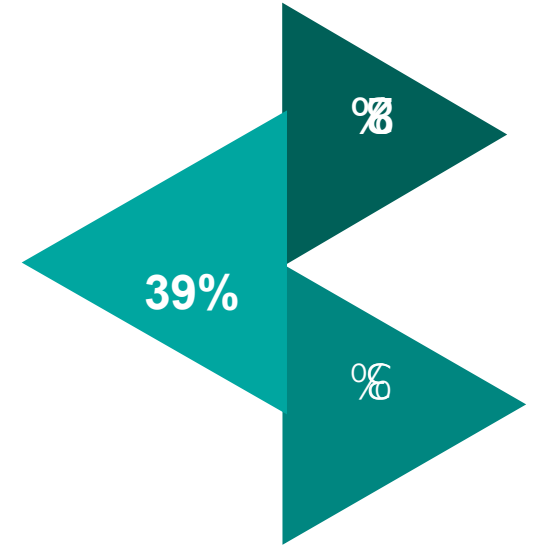
- ▲ 6% Japan
- ▲ 16% North America
- ▲ 35% Europe
- ▲ 43% Growth markets

18 Endüstri



- ▲ 12% Communications
- ▲ 15% Public
- ▲ 22% Financial Services
- ▲ 25% Industrial
- ▲ 26% Distribution

Şirket Büyüklükleri

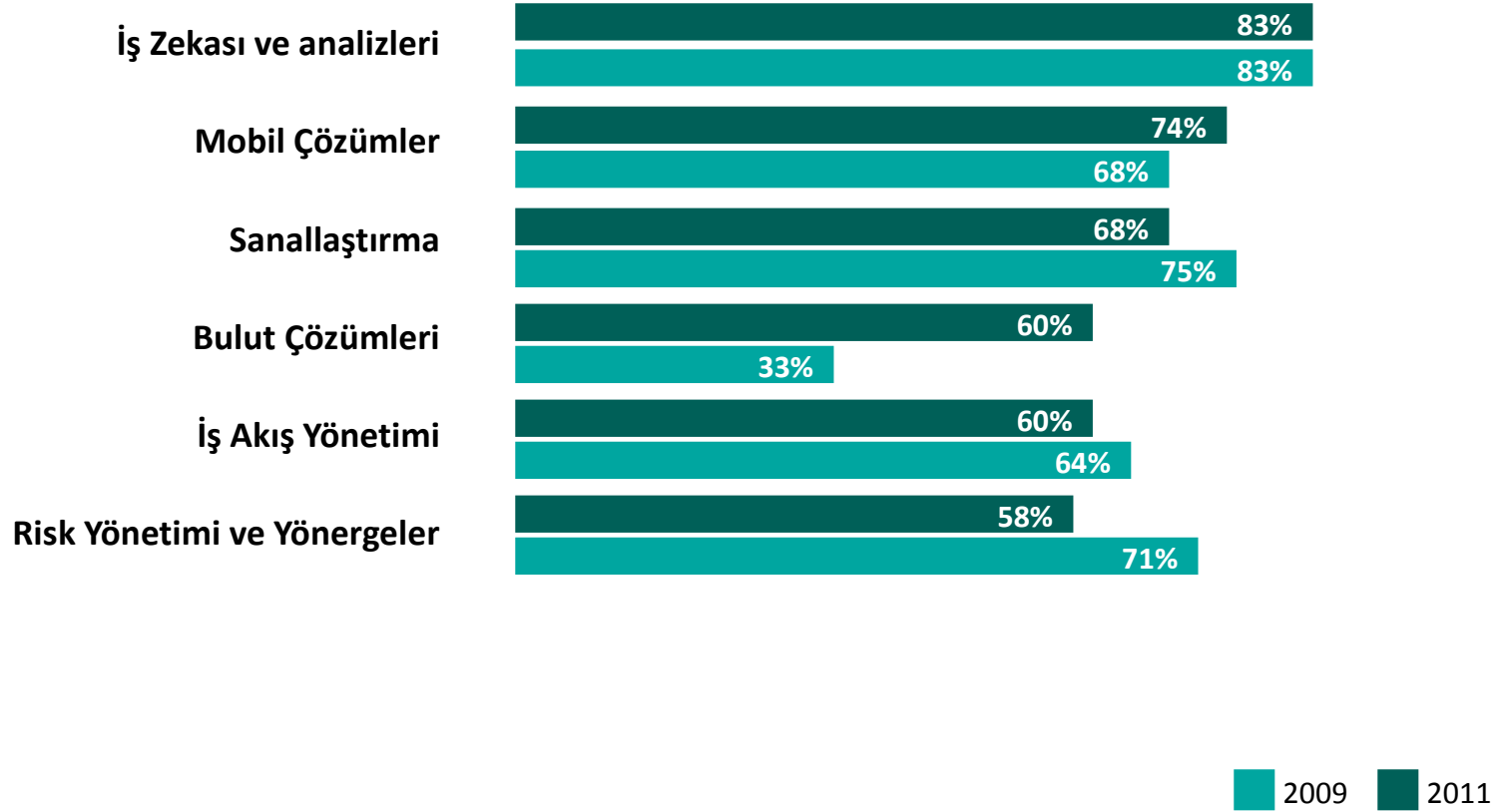


- ▲ 28% <1,000 employees
- ▲ 33% >10,000 employees
- ▲ 39% 1,000 to 10,000 employees

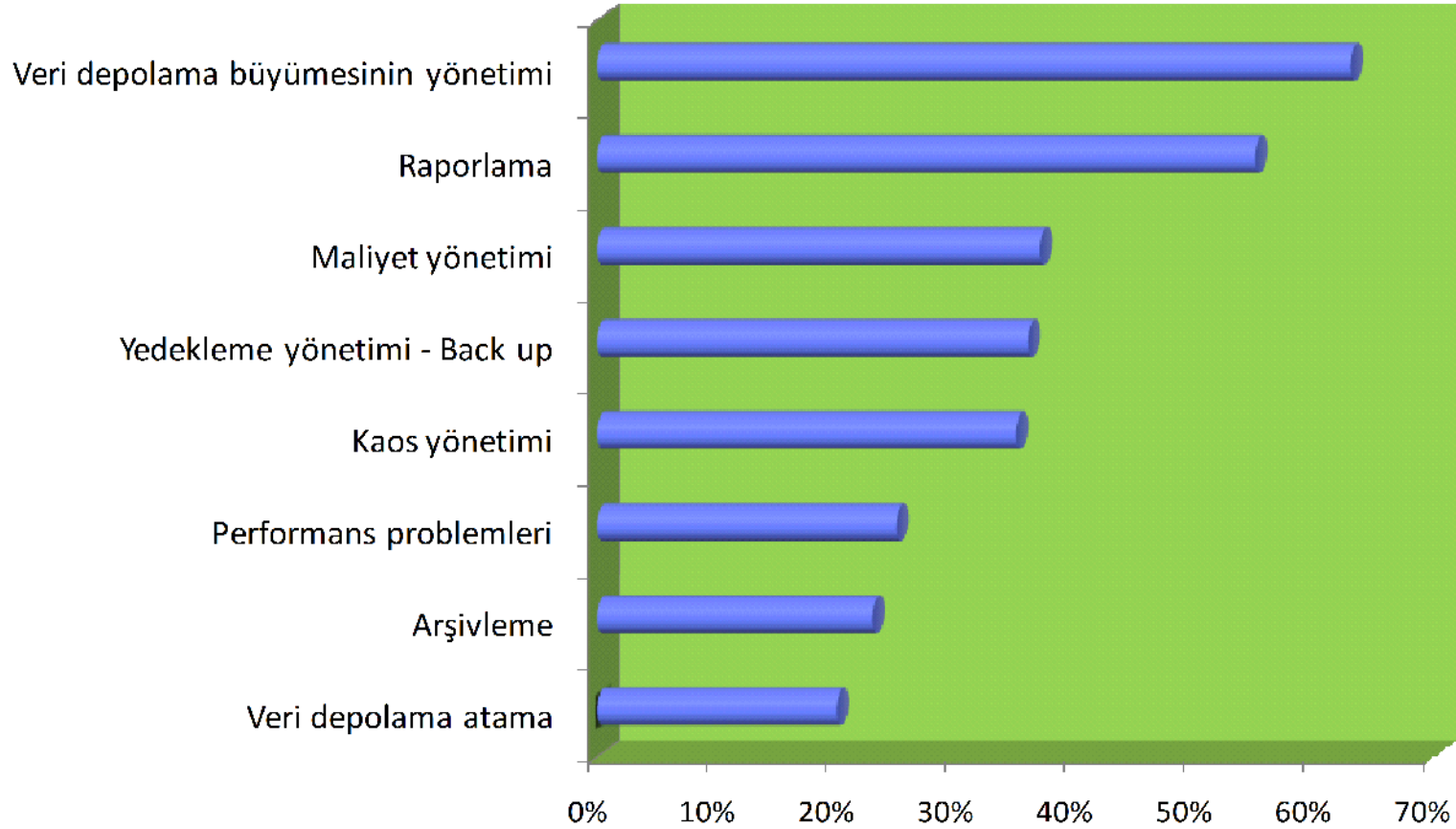
Note: Growth Markets include Latin America, Asia Pacific (excluding Japan), Central and Eastern Europe, Middle East and Africa

Yüz yüze 3,000 CIO ile yapılan araştırmanın analizi

En Önemli Gelecek Planları



Veri depolama yöneticilerinin gördüğü zorluklar



Müşterilerimizin Yaşadığı Zorluklar



- Maliyetlerin artması
- Disk altyapısının yönetim ve kullanım zorlukları
- Yeni donanımların devreye alınma süresinin uzun olması ve zorlukları (*Eski donanımların devreden çıkarılma süresinin uzun olması ve zorlukları*)
- Kapasite planlamasının zorlukları



- Production
- Test ve Geliştirme
- Arşiv
- Yedekleme

Önerilen Yöntemler



Mevcut Ortam ile Daha Fazla Veri Depolama

- Disk Sanallaştırma
- Thin Provisioning



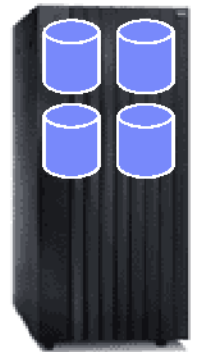
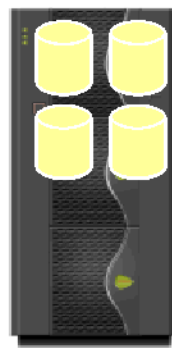
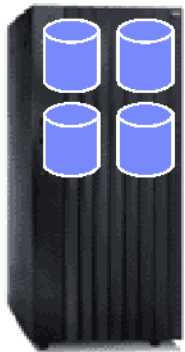
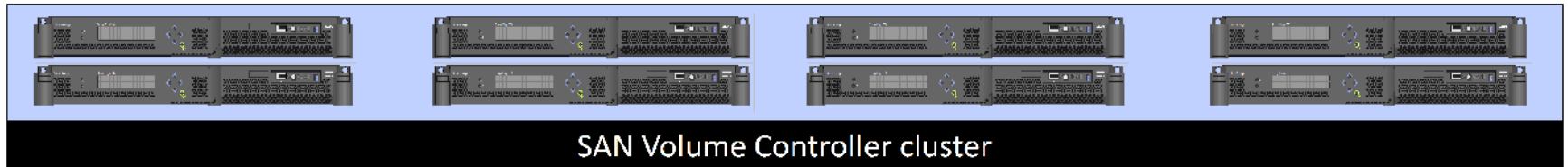
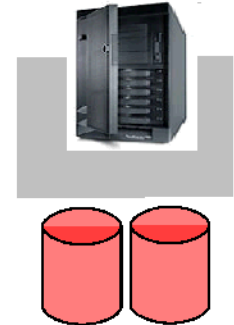
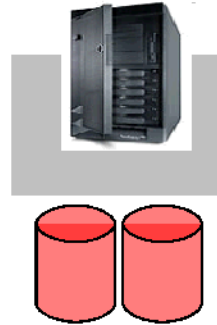
Verinin Doğru Katmanda Tutulması
Güvenli Katmanlar
SANALLAŞTIRMA
■ Otomatik Veri taşıma



Depolama alanlarının azaltılması

- Veri Sıkıştırma
- Veri Tekilleştirme

IBM SAN Volume Controller



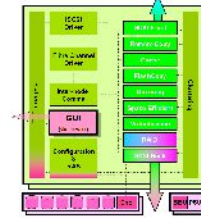
Storwize V7000



SVC:

- Sanallaştırma

IBM Storwize V7000



DS8000:

- RAID protection
- Easy Tier

XIV:

- Usability
- GUI design



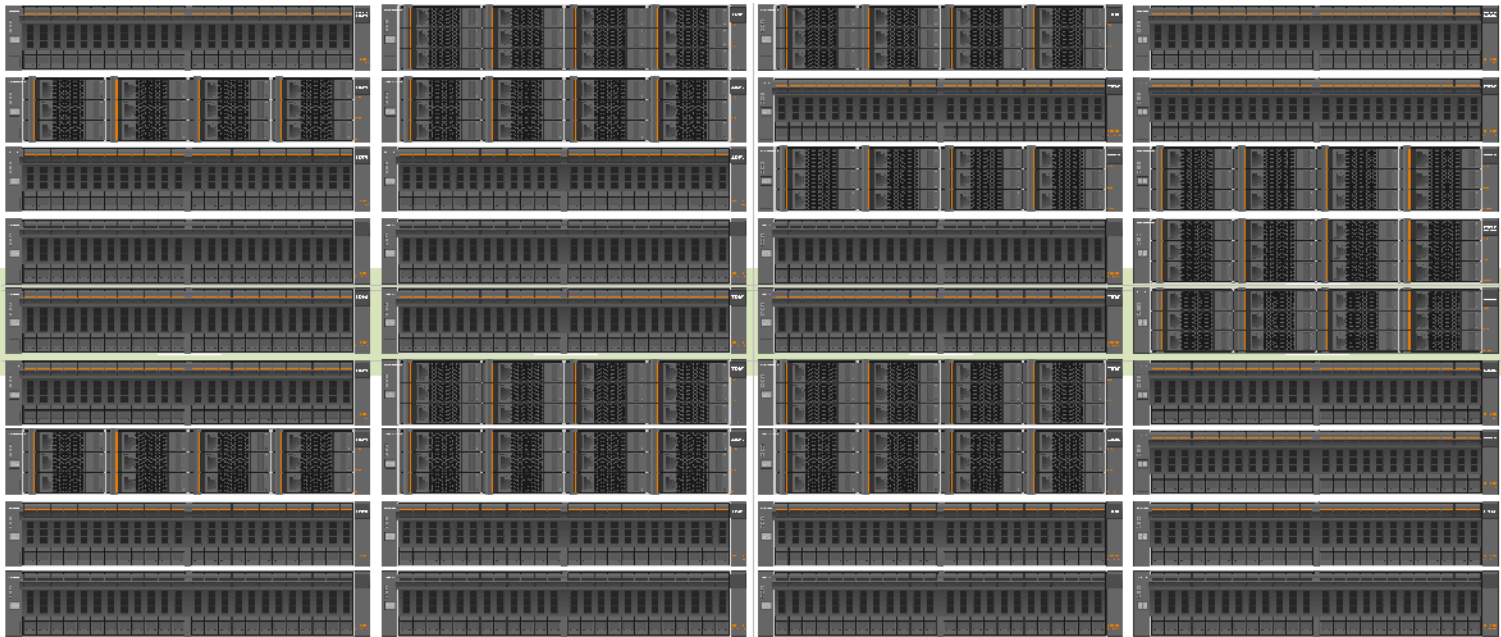
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Modular Scalability

Control Enclosures



Expansion Enclosures



Citius, Altius, Fortius
Daha Hızlı, Daha Yukarı, Daha Güçlü

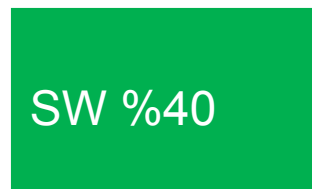
İlk satınalma maliyetlerinin azalması

Sistem Yenilemelerinde SW Yatırımı Tekrarlanmaz

Geleneksel Yöntem



Yenileme
3/5 Yıl



SVC



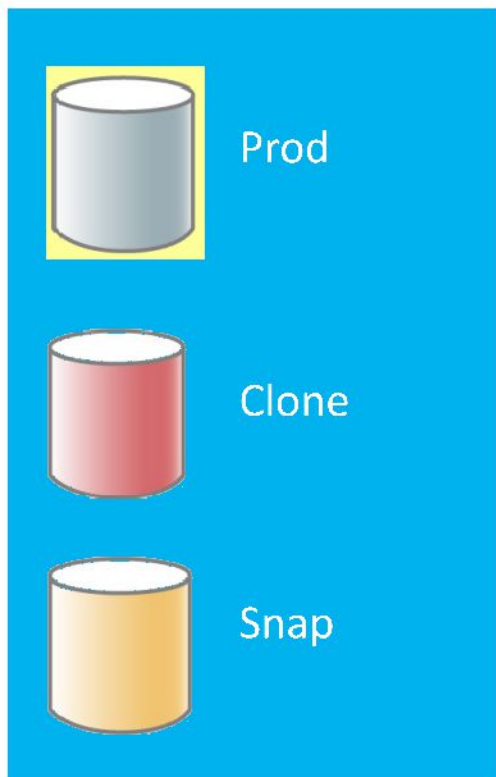
Yenileme
3/5 Yıl



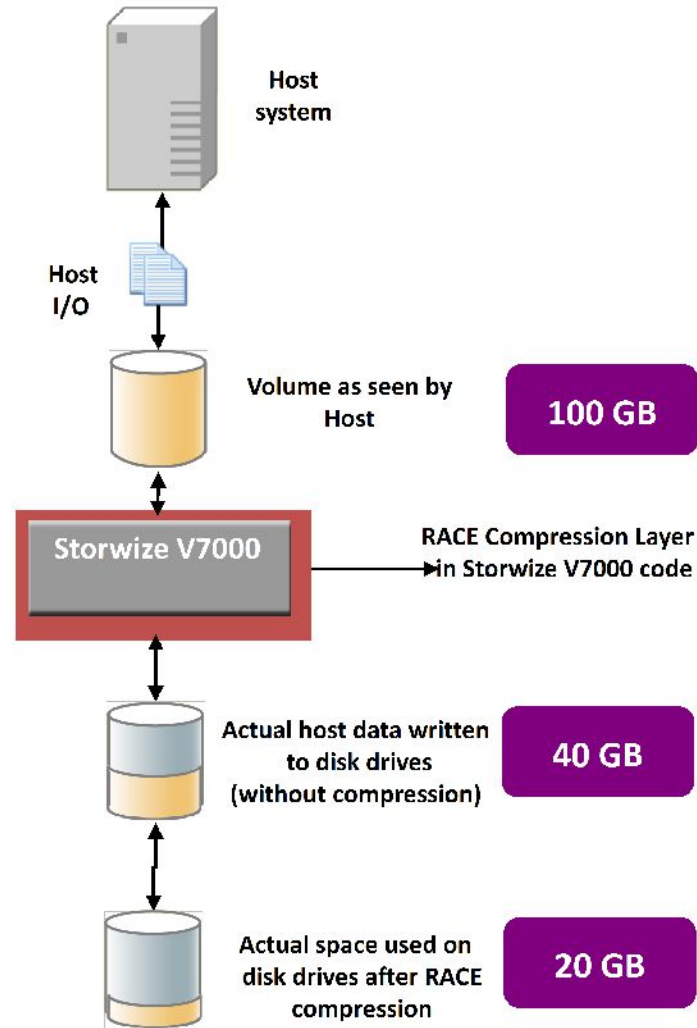
İlk satınalma maliyetlerinin azalması

Clone ve Snap kopyaları farklı sistemler üzerine alınabilir

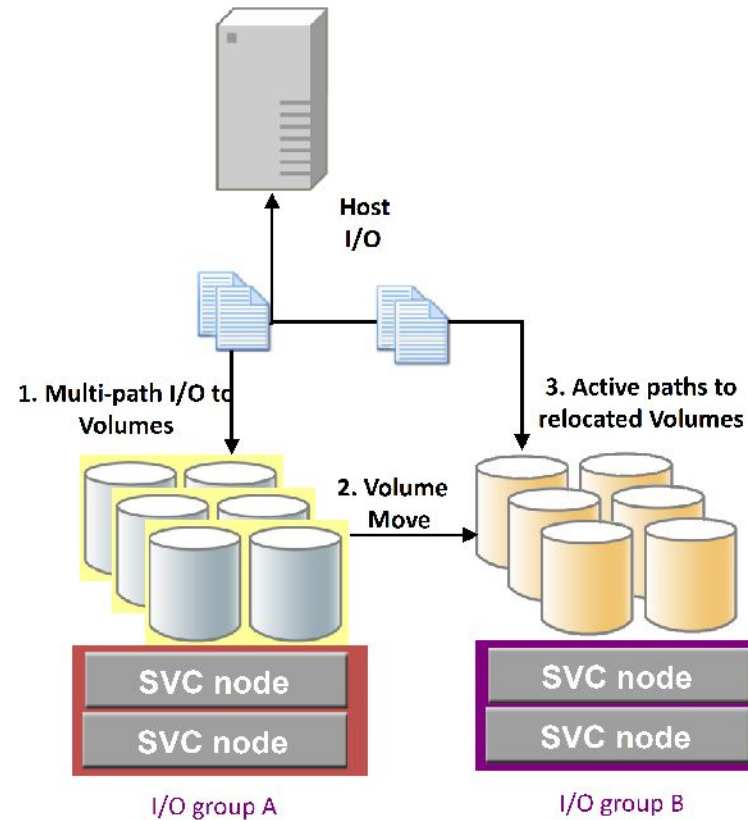
SVC



Sıkıştırma



Kesintisiz IO Grup deđiřimi



Toplam satınalma maliyetlerinin azalması

Kullanım kolaylığı

IBM SAN Volume Controller

Welcome, superuser

About

Logout

Help



SVC-72-73 > Home > Getting Started

Suggested Tasks



Overview

Watch e-Learning: [Click here](#)

Welcome!

The diagram represents the system architecture. For more information, click on the icon in the diagram. For more information, click on the icons in the left navigation pane.

[Visit the Information Center](#)

Connectivity

IBM SAN Volume Controller

SVC-72-73 > Home > System Status

Info	VPD	Manage
General		
Name	SVC-72	
ID	1	
Status	Online	
Hardware	CFR	
WWNN	500507680100A159	
I/O Group	io_grp0 (0)	
Redundancy		
Configuration Node	No	
Failover Partner Node	SVC-73	
iSCSI		



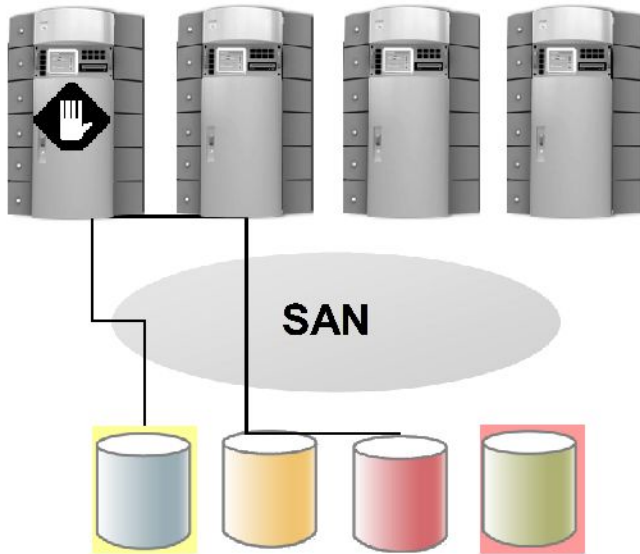
Optus, Altus, Fortus
Daha Hızlı, Daha Yukarı, Daha Güçlü

Toplam satınalma maliyetlerinin azalması

Kesintisiz Veri Taşıma

Geleneksel SAN

1. Durdur
2. Veriyi taşı
3. Bağlantıları tekrar yap
4. Uygulamayı Restart et



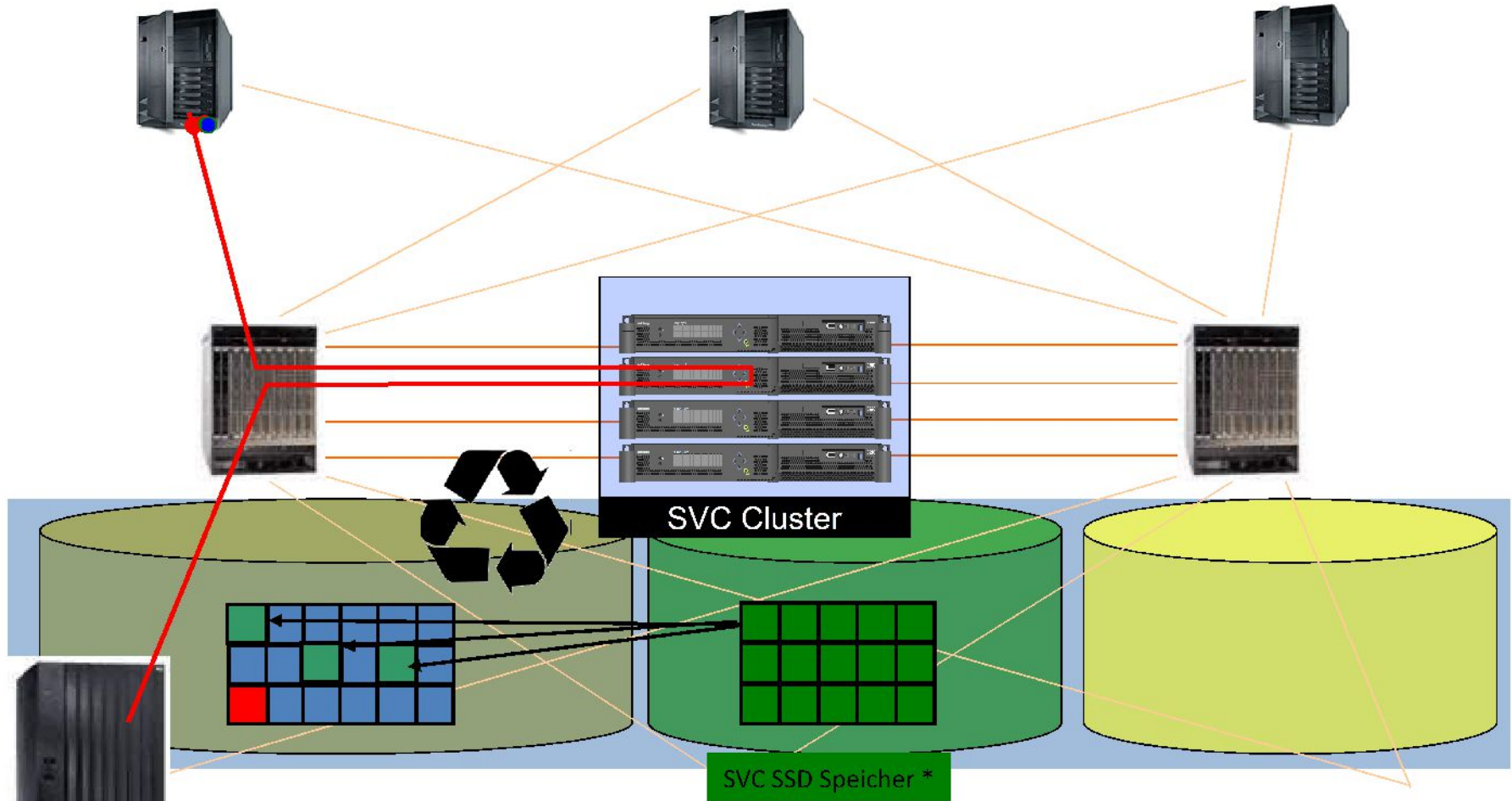
SVC

1. Sanal Diski seç
2. Hedef Diski Seç
3. Kopyalamayı Başlat
4. Son



Performans artışının sağlanması

Mevcut Ortamlarda performans artışı sağlar

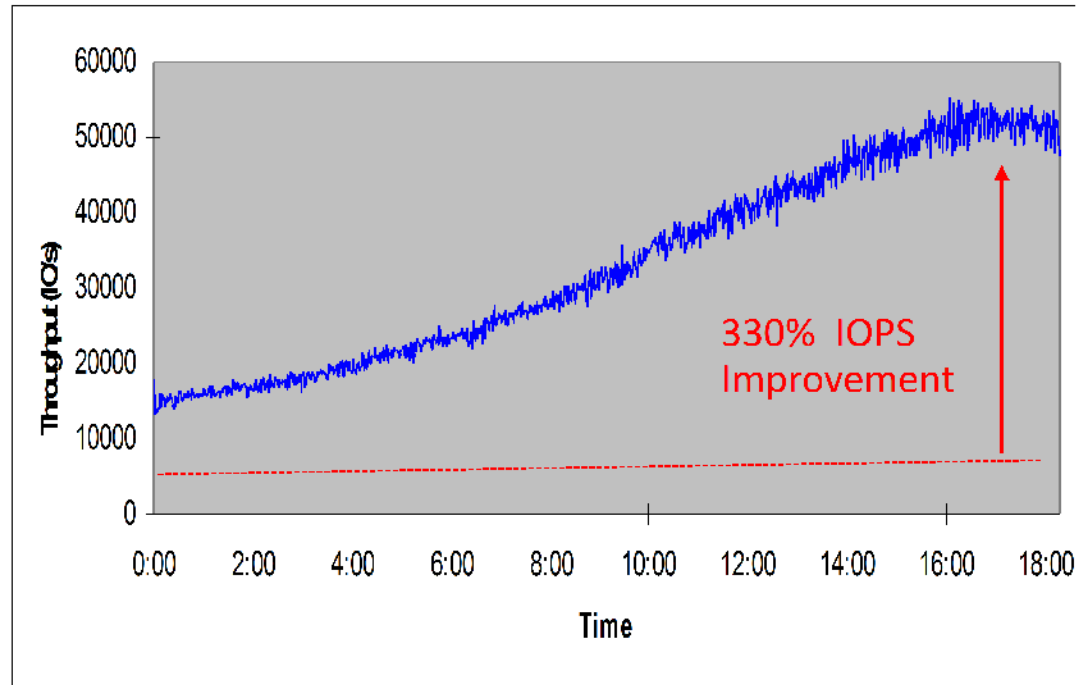
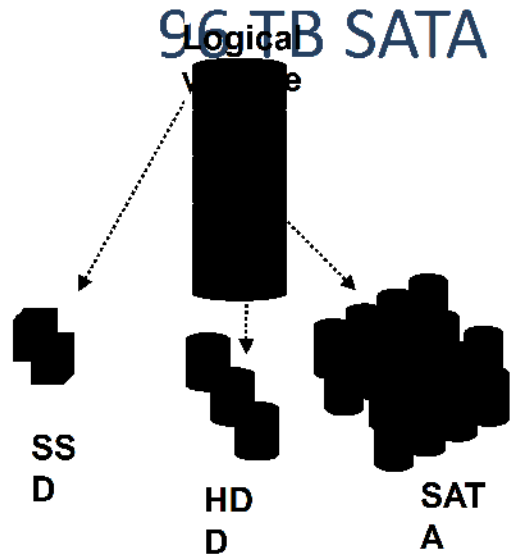


Performans artışının sağlanması

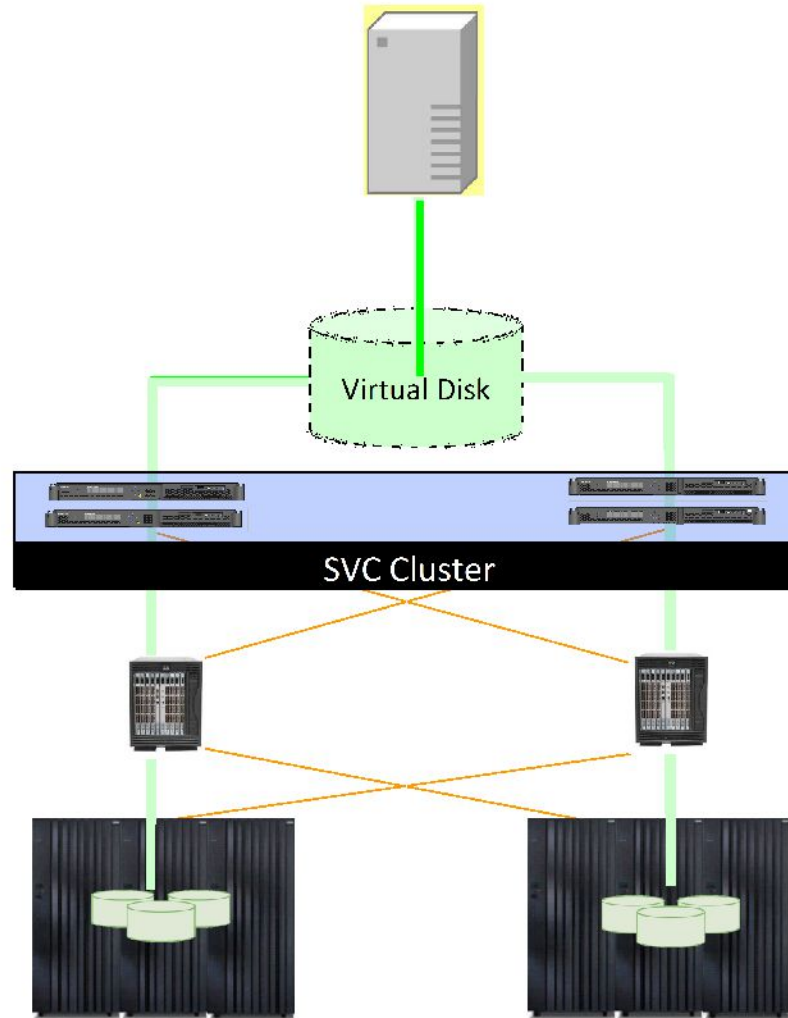
Mevcut Ortamlarda performans artışı sağlar

- SATA and SSD ile yapılan Tek (SPC-1) benchmark testi

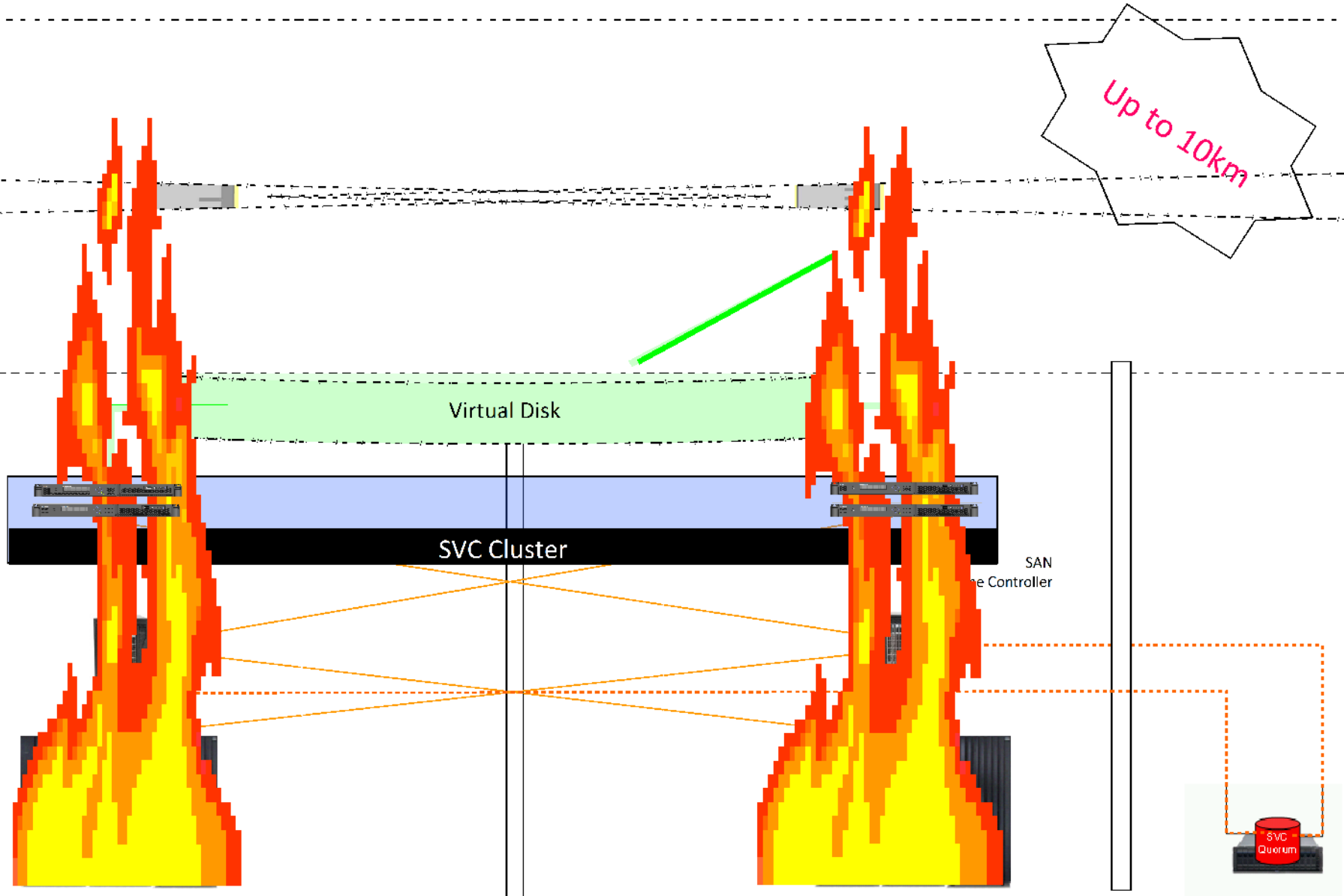
330%!
Performans Artışı



Yüksek Kullanılabilirlik - VDISK Mirroring

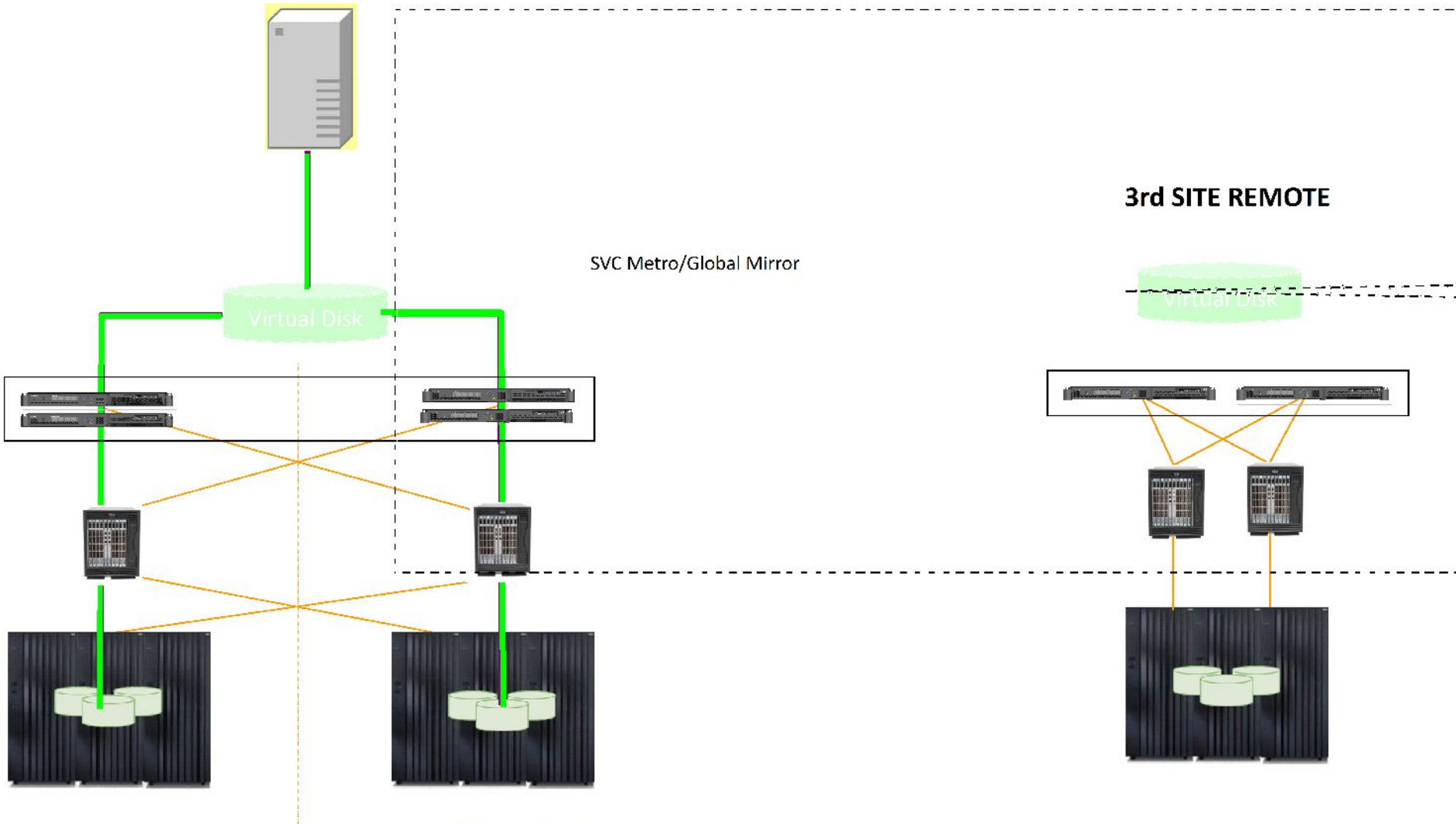


Felaket Kurtarma - VDISK Mirroring



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Felaket Kurtarma (3 Site) - VDISK Mirroring



IBM Storwize V7000 Unified

- Mevcut Yapıya
NFS/CIFS/FTP/HTTPS/SCP
protocol desteği (FCP and
iSCSI)



Disk Sanallaştırma Çözümlerinin Kazandırdıkları

- İlk satınalma maliyetlerini azaltır
- Toplam satınalma maliyetlerini azaltır
 - Yönetim maliyetlerinin azaltır
 - Atıl yatırım sürelerinin azaltır
 - Kapasite kullanım verimliliğinin arttırır
- Mevcut sistemlerde performans artışına yardımcı olur

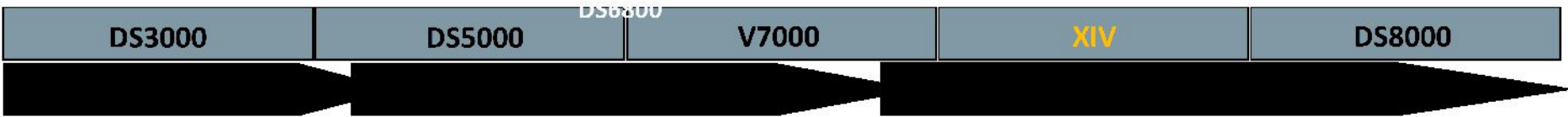
SAN Disk + NAS Portfolio 2011



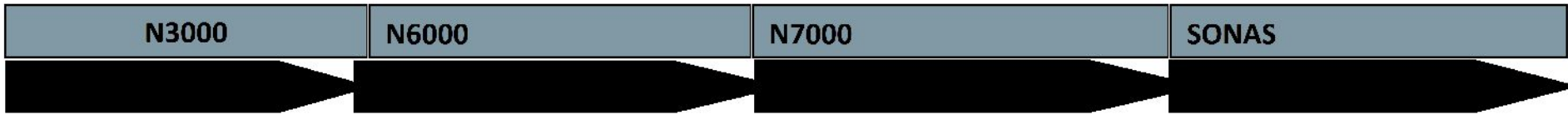
SAN



DS6000



NAS



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Tape + VTS Portfolio 2010

TS



TS2900, TS3100



TS3200



TS3310



TS3400



TS3500, -HD

VTS

ProtectTIER family



Deduplication



System Z



Information Archive



TS7610 express

TS7650 / TS7680



Citius, Altius, Fortius
Daha Hızlı, Daha Yukarı, Daha Güçlü

SAN FibreChannel Switch Portfolio 2010

IBM/Brocade*



* Brocade Inc. Technology

Switches

Directors

Entry-level

Midrange

Enterprise

Cisco



Switches

Directors

Entry-level

Midrange

Enterprise



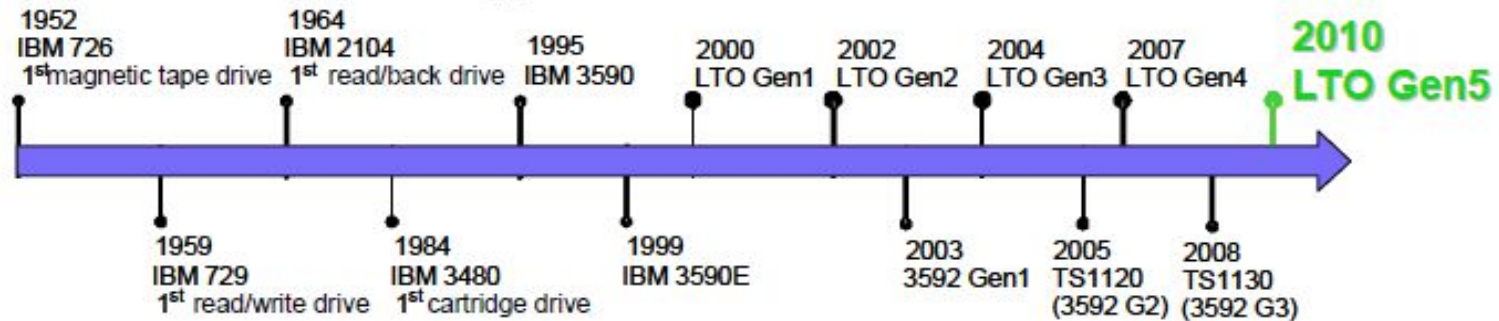
Citius, Altius, Fortius
Daha Hızlı, Daha Yukarı, Daha Güçlü

- 1952 – İlk Ticari Tape Kartuş ve Yedekleme Sistemi icat edildi (IBM)
- LTO5 , IBM726 dan 2 milyon kez fazla veri saklayabiliyor.
- Ocak 2010 - Testlerde 35TB veri tape üzerine yazıldı.
- Halen en ucuz veri saklama ortamı

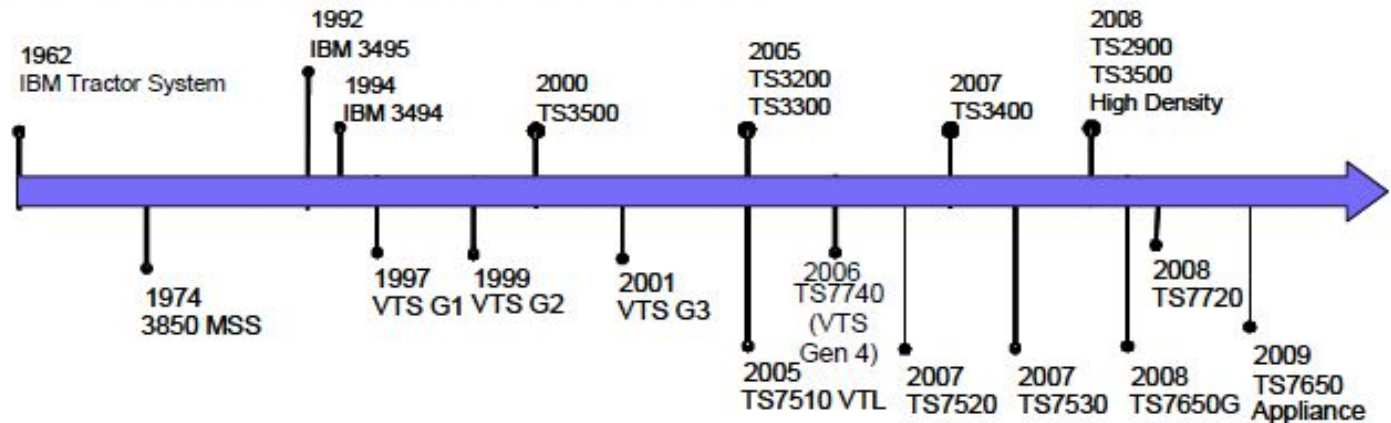
IBM's Tape Innovation history



In tape drive technology



In tape automation and virtualization



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Citius, Altius, Fortius
Daha Hızlı, Daha Yukarı, Daha Güçlü

- Güvenli mi?
- Verilerime ihtiyaç duyduğumda erişebilecek miyim?
- Çok Yavaş.
- Restore işlemleri ayrı dert
- Yönetimi çok zor

IBM LTO G5 and G4 FH and HH Comparison

Function	IBM LTO 4 FH	IBM LTO 4 HH	IBM LTO 5 FH	IBM LTO 5 HH
Capacity (Native)	800 GB	800 GB	1.5 TB	1.5 TB
Data rate	120 MB/s	120MB/s	140 MB/s	140 MB/s
Max Sustained transfer rate	140 MB/s (SCSI) 240 MB/s (SAS) 280 MB/s (FC)	240 MB/s (SAS) 280 MB/s (FC)	450 MB/s (SAS) 500 MB/s (FC)	400 MB/s (SAS) 450 MB/s (FC)
Host Interfaces	SCSI 160&320 SAS 3Gb FC-4Gb	SAS 3Gb SCSI320 FC-4Gb	SAS-6Gb FC-8Gb Both dual ports	SAS-6Gb FC-8Gb Both dual ports
Speed Matching	30 to 120 MB/s	30 to 120 MB/s	40 to 140 MB/s	40 to 140MB/s
Power W/R / Idle	29.5W / 14.5W	26W / 14.5W	27W / 7.5W	24W / 6.5W
mW per GB	37 mW	33 mW	18 mW	16 mW
Encryption/WORM/Partition	Yes/Yes/No	Yes/Yes/No	Yes/Yes/Yes	Yes/Yes/Yes
Buffer	256 MB	256 MB	512 MB	256 MB
MTBF	250K Hours	250K Hours	250K Hours	250K Hours
Load/Unload MSBF	100K	100K	100K	100K
Media to Load / Unload	12 sec / 17 sec	12 sec / 17 sec	12 sec / 17 sec	12 sec / 17 sec
Rewind speed	8 m/s	6.4 m/s	10 m/s	6.4 m/s
Locate speed	8 m/s	6.4 m/s	10 m/s	6.4 m/s
Acceleration	10 m/s^2	5 m/s^2	10 m/s^2	5 m/s^2
Back hitch time	3.2 s	4.5 s	3.2 s	4.5 s
Average file access	57 s	72 s	49 s	72 s

Parity (clear)
 Some subjectivity
 Advantaged
 Disadvantaged

LTFS – Long Term File System



WIKIPEDIA
The Free Encyclopedia

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Linear Tape File System

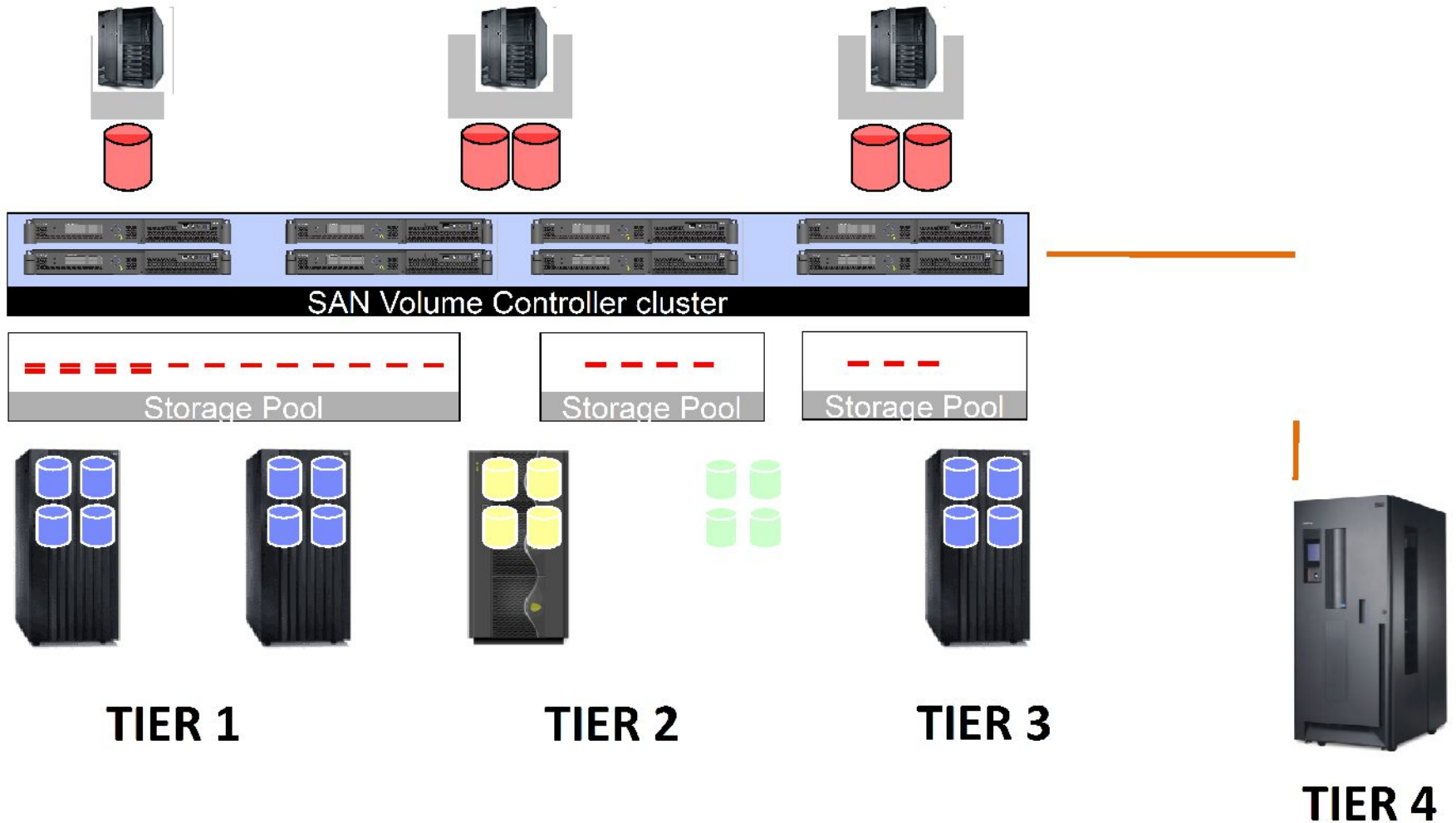
From Wikipedia, the free encyclopedia

Linear Tape File System (LTFS) refers to both the format of data recorded on [magnetic tape](#) media and the implementation of specific software that uses data stored on magnetic tape. The Linear Tape File System format is a self-describing tape format developed by [IBM](#) to address tape archive requirements. by the [LTO Technology Provider Companies](#), defines the organization of data and [metadata](#) on tape - files stored in hierarchical [directory structure](#). Data tape independently of any external database or storage system allowing direct access to file content data and file metadata. This format makes it possible to im system view of the data stored in the tape media. This file system view makes accessing files stored on the LTFS formatted media similar to accessing file *disk or removable flash drives*.

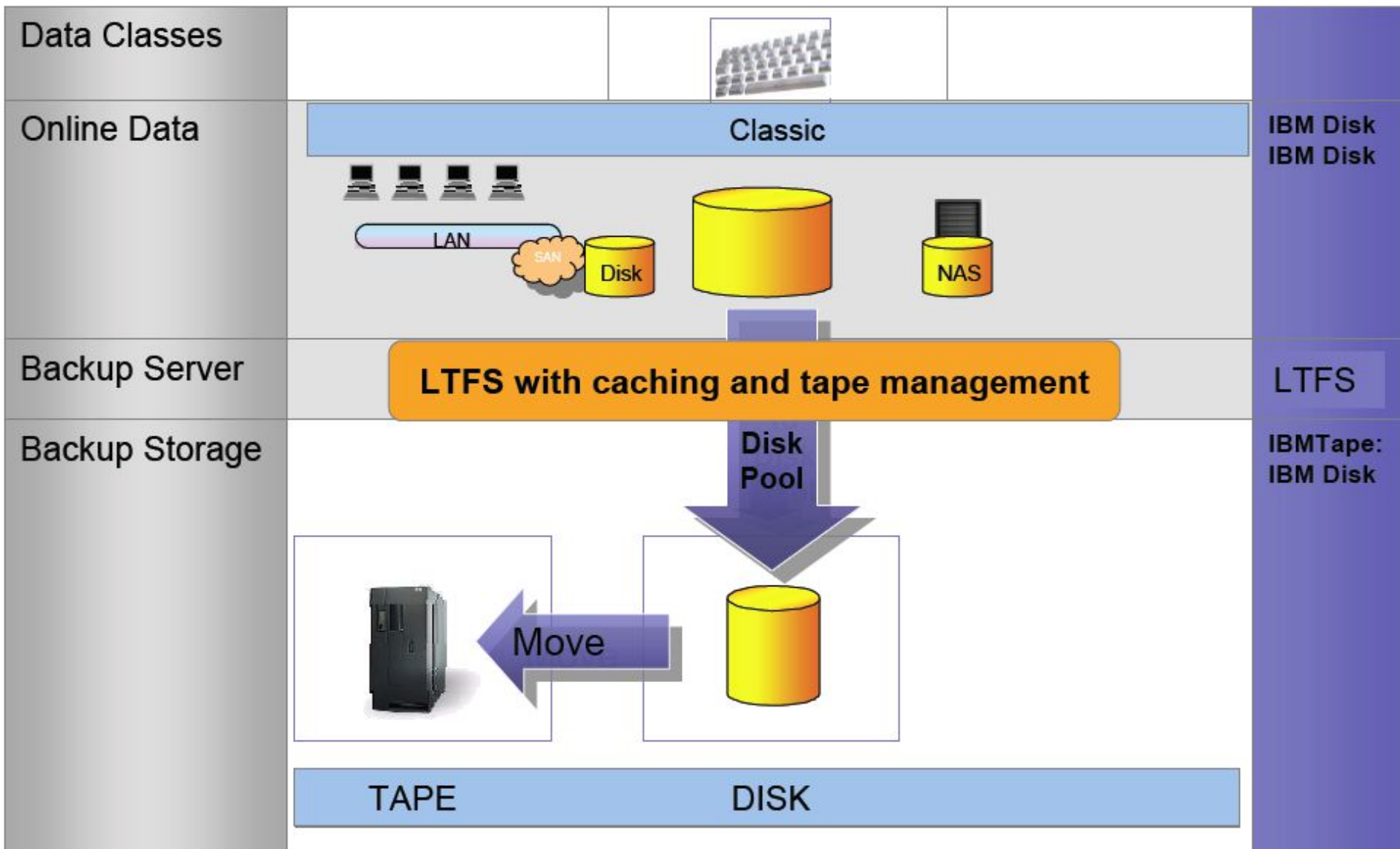


Citius, Altius, Fortius
Daha Hızlı, Daha Yukarı, Daha Güçlü

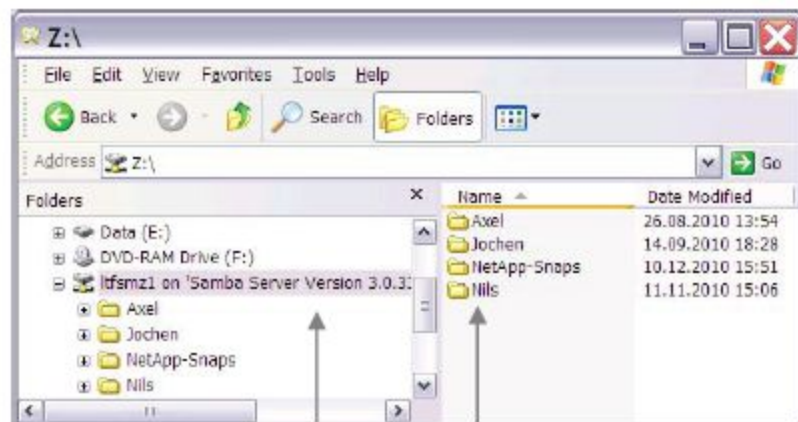
IBM SAN Volume Controller



LTFS moves tape closer to customer data

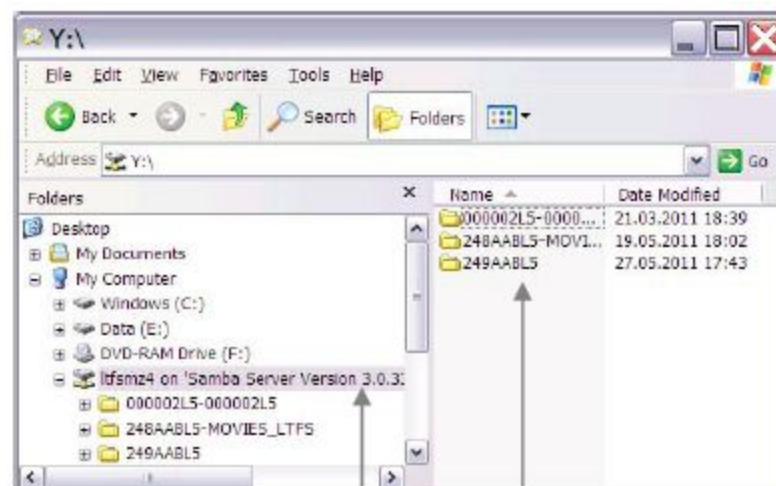


LTFS Versions



LTFS-1 file system

Single LTFS Tape



LTFS-2 file system

LTFS Tapes in Library

Kolay Kullanım ve Eriřim

- ▶ Tüm yedekleme ortamının tek bir yerden izlenmesine olanak sağlar
- ▶ Sorunlara hızlıca ulaşabilirsiniz
- ▶ Gerçek zamanlı analizler yapabilirsiniz
 - ▶ Kütüphaneler
 - ▶ Sürücüler
 - ▶ Kartuşlar
- ▶ Anlık ve geçmişe dair raporlar hazırlanabilir.

The screenshot displays the ReadVerify Appliance web interface. The top navigation bar includes the product name, user information, and various menu options like Overview, View, Archive/Verify, Reports, Alerts, and System. The main content area is titled 'Library: Overview' and is divided into several sections:

- Library Status:** Shows a warning icon and a message: 'Communicating with 1 out of 2 drives that are enabled for polling, with 2 reporting errors. The library reports 2 drives.'
- Alerts (last 24 hours):** A table listing recent alerts with columns for Date, Alert Name, and Message.

Date	Alert Name	Message
02/09/10 03:05:07 CST	Drive Status	Drive 1110136790 status changed to Not ready.
02/09/10 03:02:07 CST	Polling Drives	Drive 1110136790 is no longer responding.
02/09/10 02:57:08 CST	Drive Status	Drive 1110136790 status changed to Not ready.
02/09/10 02:56:41 CST	Polling Drives	Drive 1110136790 is no longer responding.
- Archive/Verify Status:** Shows 'Verifier State: Suspended' and 'Drive Status: No drives selected for use'. There are links to 'Edit verification settings' and 'View more Archive/Verify status'.
- Current Drive Stabases:** A table showing drive status with columns for Name, Product, Status Condition, and Last Status Time.

Name	Product	Status Condition	Last Status Time
336000021034	STK 9640 rev. 1.30.110	Critical (4 issues)	02/05/10 12:19:47 CST
1110136790	IBM ULTRUM-T02 rev. 73V1	Critical (2 issues)	02/06/10 01:03:08 CST
- Current Tape Stabases:** A table showing tape status with columns for Barcode, Media Type, Status Reason, and Last Verification.

Barcode	Media Type	Status Reason	Last Verification
NLX446	LTO2	Soft Errors	
SLV111	LTO2	Soft Errors	
NLX419	LTO2	Soft Errors	
NLX437	LTO2	Soft Errors	
SLV126	LTO2	Soft Errors	
PUJ157	LTO2	Soft Errors	
SLV106	LTO2	Soft Errors	
SLV048	LTO2	Soft Errors	
SLV051	LTO2	Soft Errors	
SLV129	LTO2	Soft Errors	

Hata Analiz Raporu

Drive-Tape Error Correlation

Tape Barcode	1210XXXXXX Err/GiB Affect	1210XXXXXX Err/GiB Affect	1210XXXXXX Err/GiB Affect	1210XXXXXX Err/GiB Affect	1210XXXXXX Err/GiB Affect	1210XXXXXX Err/GiB Affect	1210XXXXXX Err/GiB Affect
SRA341	0.05 ●	1.28 ●	0.00 ■	0.00 ■	0.00 ■	0.03 ●	
SRB750	0.01 ■	0.46 ●	0.00 ■	0.00 ■	0.00 ■	0.13 ■	0.01 ■
SRA385	0.00 ■	0.36 ●	0.00 ■	0.00 ■	0.00 ■	0.00 ■	0.00 ■
SRA436		0.33 ●			0 ■	0.00 ■	0.00 ■
SRA361	0.00 ■	0.31 ●	0.00 ■	0.00 ■	0.00 ■	0.00 ■	0.00 ■
SRB566		0.22 ●	0.00 ■	0.00 ■	0 ■	0.00 ■	0.00 ■
SRA239	0.03 ■	0.18 ■	0.00 ■	0.29 ●	0.00 ■	0.00 ■	0.00 ■
SRB768		0.15 ●	0.02 ■		0 ■	0.01 ■	
SRB352	0.03 ■	0.13 ■	0.00 ■	0.03 ■		0.03 ■	0.00 ■
SRA780	0.00 ■	0.12 ●				0.03 ■	0.00 ■
SRB511		0.12 ●	0.00 ■			0.03 ■	0.00 ■
SRB781	13.02 ●	0.12 ■	0.00 ■			0.01 ■	
SRB050	0.01 ■	0.11 ●				0.00 ■	0.00 ■
SRB492		0.11 ●	0.01 ■		0 ■		0.00 ■
SRA498	0.02 ■	0.11 ●			0.02 ■		
SRA405	0.00 ■	0.11 ●			0.00 ■	0.00 ■	0.00 ■
SRB419	0.03 ■	0.10 ●	0.02 ■	0.04 ■	0.00 ■	0.00 ■	0.00 ■
SRB214	0.02 ■	0.10 ■	0.03 ■		0.00 ■	0.04 ■	
SRB442		0.08 ●	0.00 ■			0.09 ■	0.00 ■
SRB095		0.08 ●	0.00 ■		0 ■	0.02 ■	0.00 ■
SRB687		0.08 ■				0.05 ■	
SRB028	0.00 ■	0.08 ●	0.00 ■	0.00 ■	0.00 ■	0.00 ■	0.00 ■
SRB223	0.00 ■	0.07 ●		0.02 ■		0.01 ■	0.00 ■
SRB257	0.00 ■	0.07 ●	0.00 ■	0.00 ■	0.00 ■	0.00 ■	0.00 ■
SRB482	0.01 ■	0.07 ●				0.00 ■	
SRA364	0.02 ■	0.07 ●			0.00 ■	0.00 ■	
SRB420	0.02 ■	0.07 ●	0.00 ■			0.01 ■	
SRB232		0.07 ●	0.00 ■		0 ■	0.00 ■	0.00 ■

Sürücü - Farklı kartuşlarla dahi çok fazla hata veriyor, sürücü bakım gerektiriyor.

Kartuş - farklı sürücülerde bir çok hata veriyor, kartuş arızalı olabilir.

- Çıkarılırsa - Tape Error rate limitin altına düşer
- Çıkarılırsa - Tape Error rate limitin altına düşer - Sadece okuma hataları
- ▼ Çıkarılırsa - Tape Error rate %50 den fazla düşer
- Normal

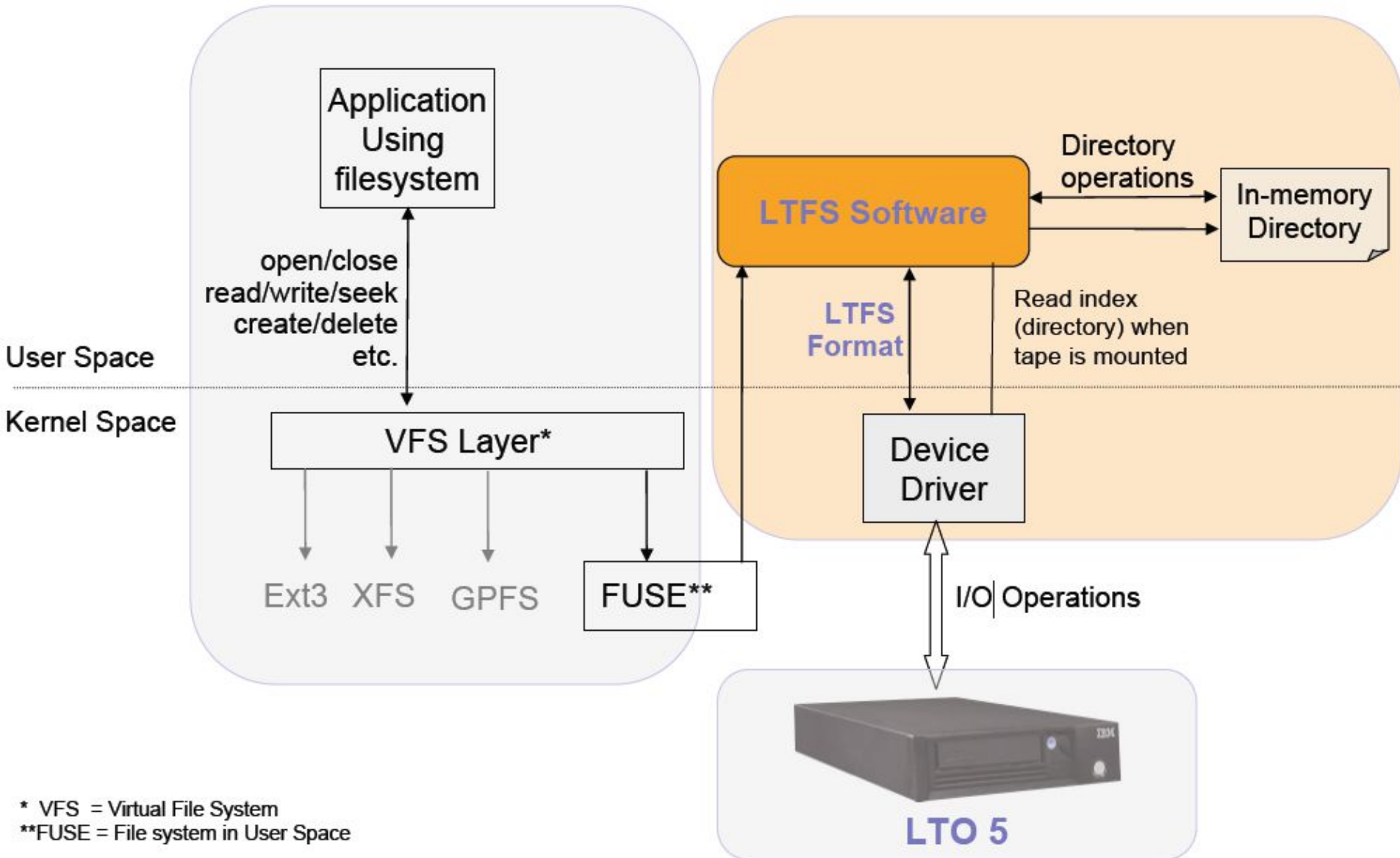
IBM



Citius, Altius, Fortius
Daha Hızlı, Daha Yukarı, Daha Güçlü



LTFS software



* VFS = Virtual File System
**FUSE = File system in User Space