PowerProtect

Data Domain DD6400

What is new? Why? Architecture

Security

Speed

Open

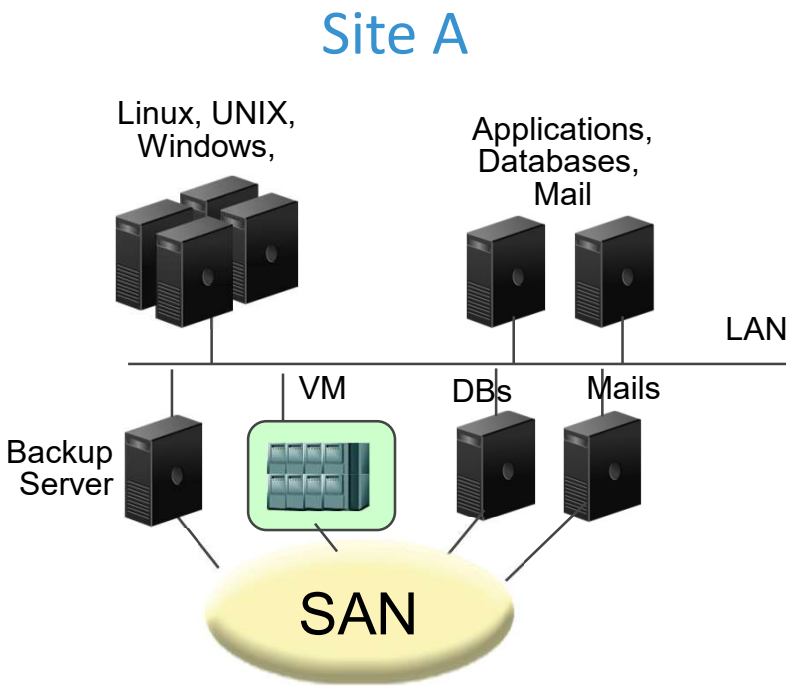
DELL Technologies

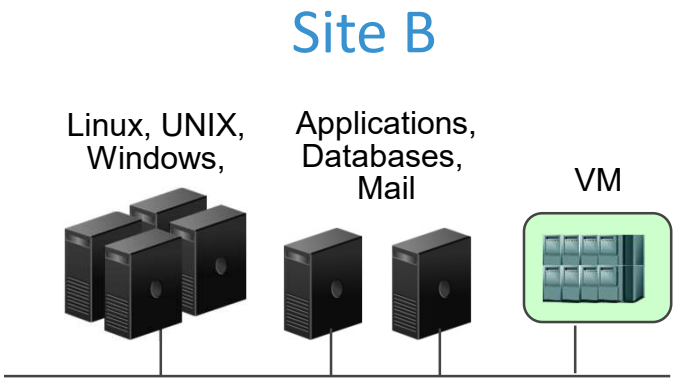
Daniel.Olkowski@dell.com

Agenda

- What is / why Data Domain?
- Performance
- Security
- Scaling
- Decreasing cost
- Parameters
- Materials

Backup environment





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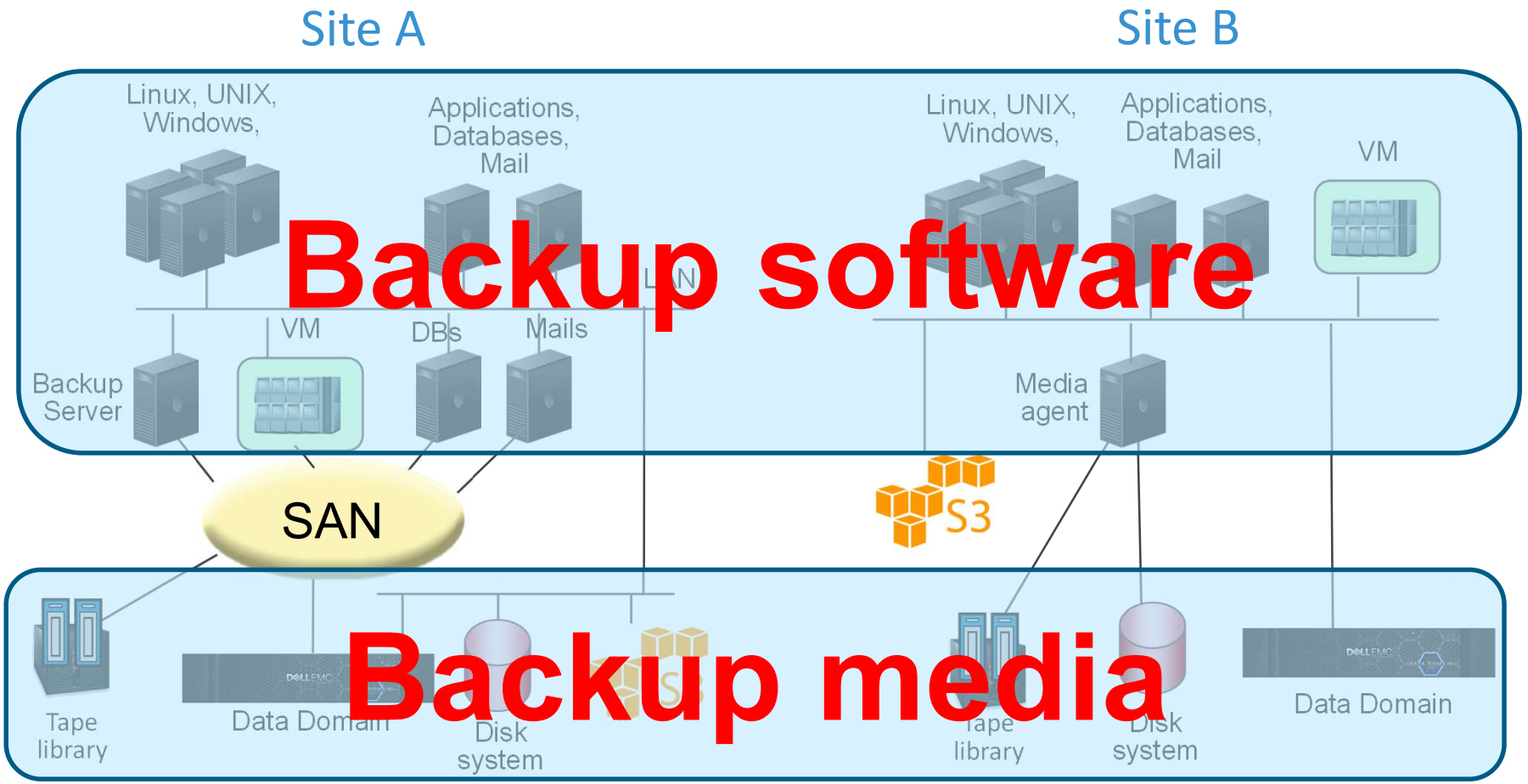
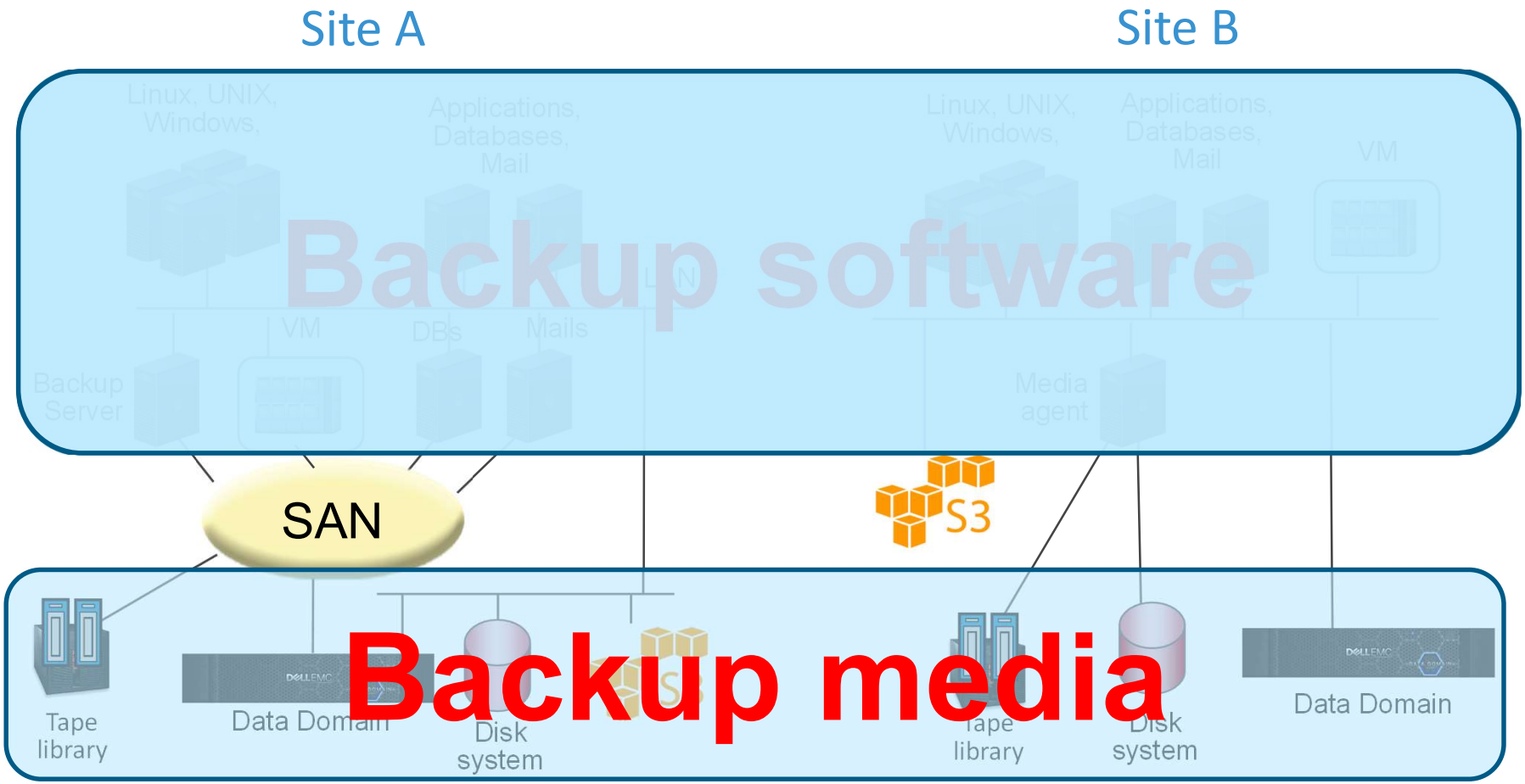
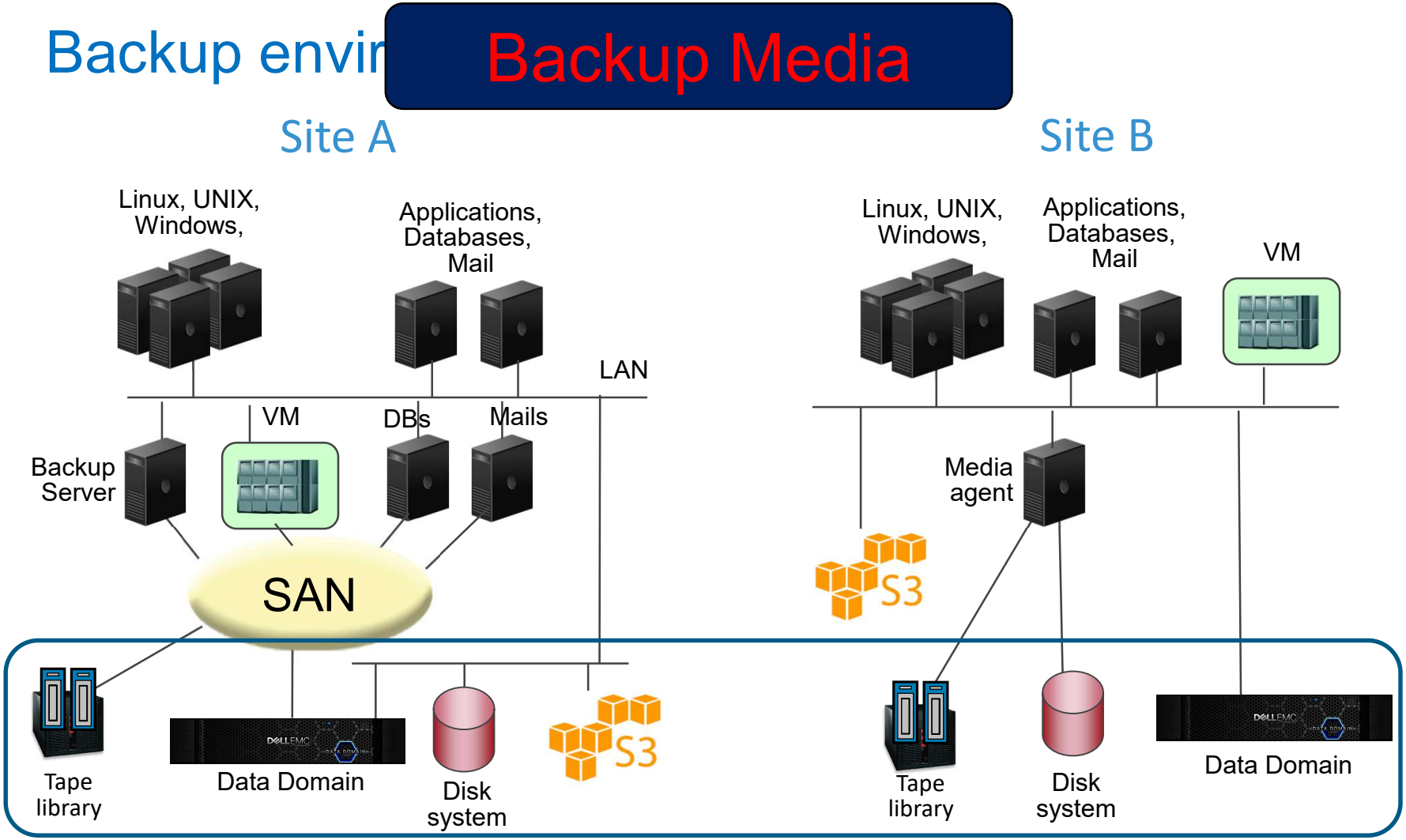


Backup environment

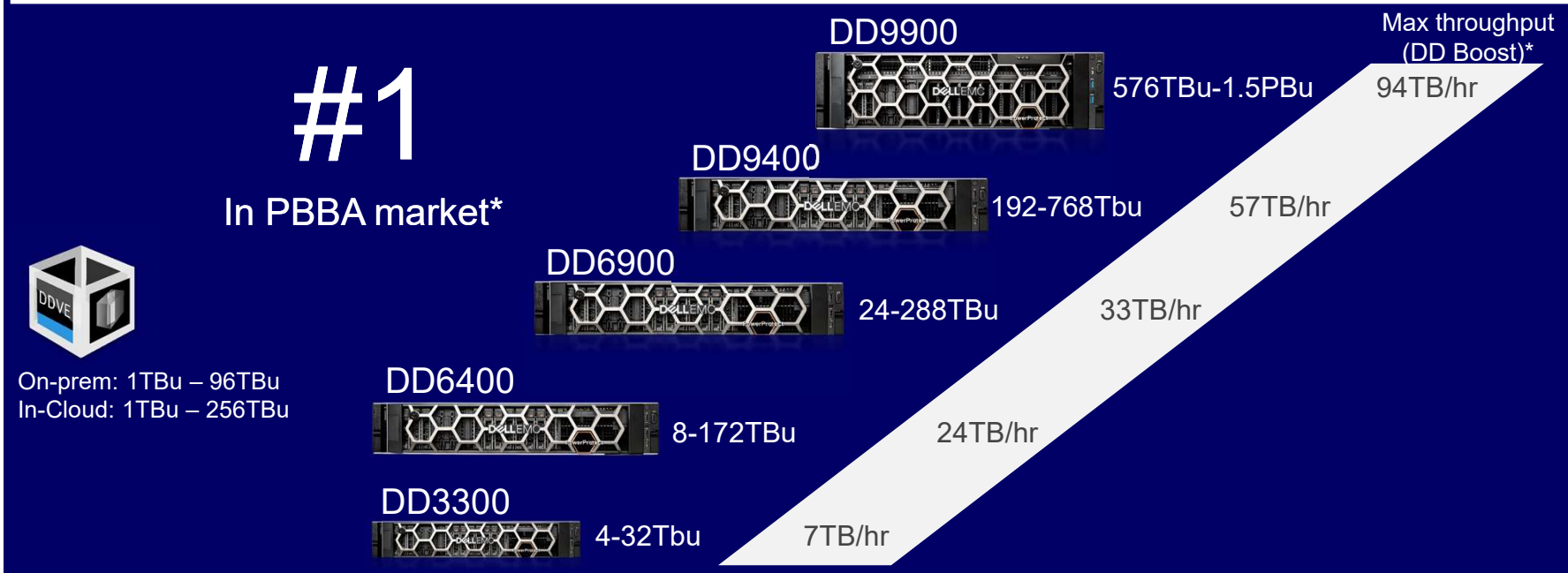


Backup envir

Backup Media



PowerProtect Data Domain Portfolio



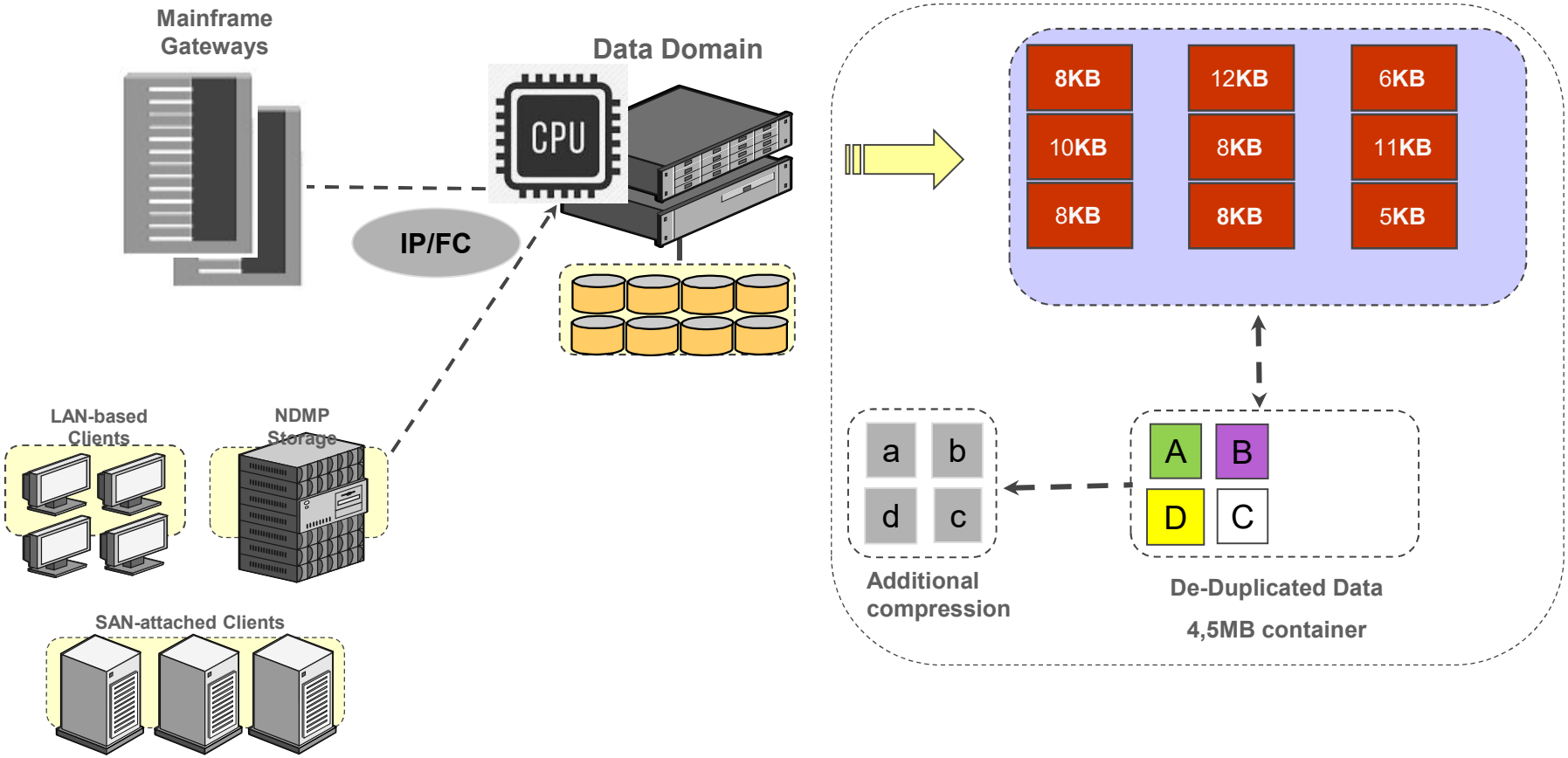
* Based on IDC WW Purpose-Built Backup Appliance Systems Tracker, 1Q21 (revenue), June 2021.

Performance

DD6400

DELL Technologies

DD Invulnerability Architecture



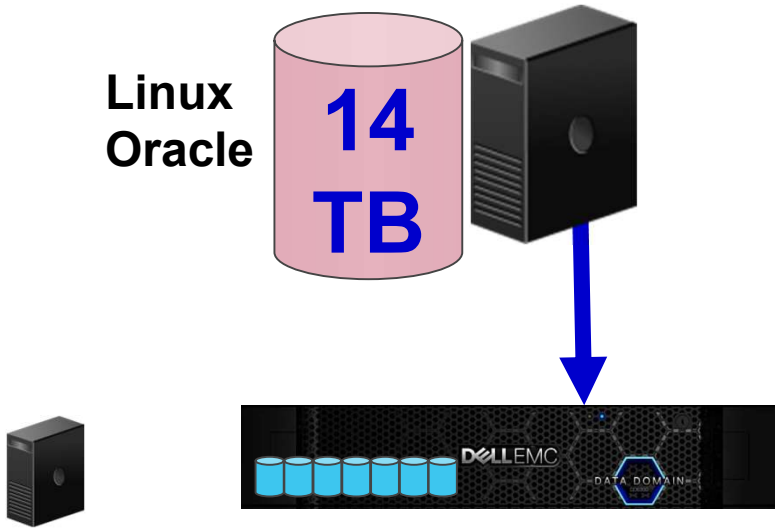
POC backup results achieved yesterday for MS SQL @ Partners Healthcare

Microsoft for Apps (SQL) – 1st Full, ***14 TB's /Hr***

Environment

- Database on SSD, 128 core system
- DD9800, DDOS 7.0, (4-10GigE ports) across 2-10GigE cards, 32 stripes
- SQL Server 2017

We haven't observed performance like this on a single node SQL Server – Ever!
And this isn't even on our fastest device or DDOS!



Production results

Backup speed: 5TB/h
from single Oracle server

Speed limited by production storage (1.5GB/s max read)

Data Domain DD6300
with just 7 disk

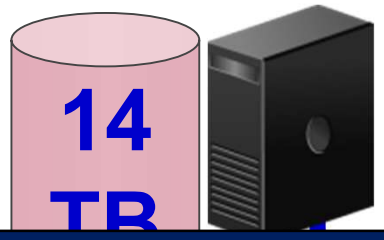
Policies

Name	Status	Group	Start Time	Duration	Next Run	Save Set N...	Rate	Size
Rman	✓		12/8/20 8:40:50 PM					
WF_ORA_RMAN	✓	RMAN	12/8/20 8:40:50 PM	02:45:21		disabled		
backup	✓	RMAN	12/8/20 8:40:50 PM			disabled		
RMAN	✓	RMAN					1383 MB/S	14 TB

Production results

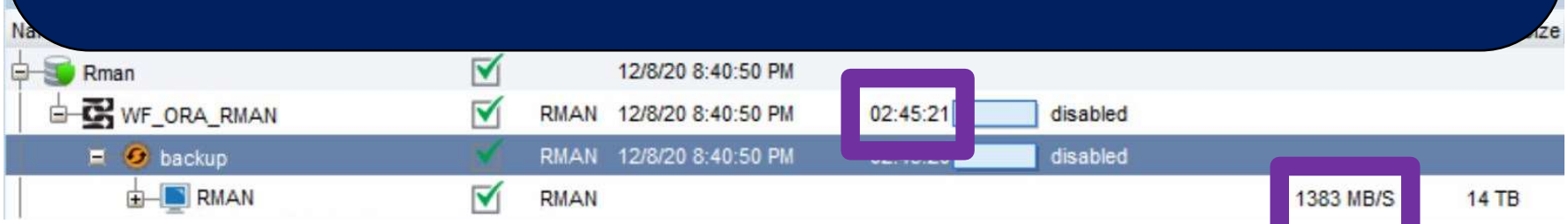
Backup speed: 5TB/h

Linux
Oracle



Public case:

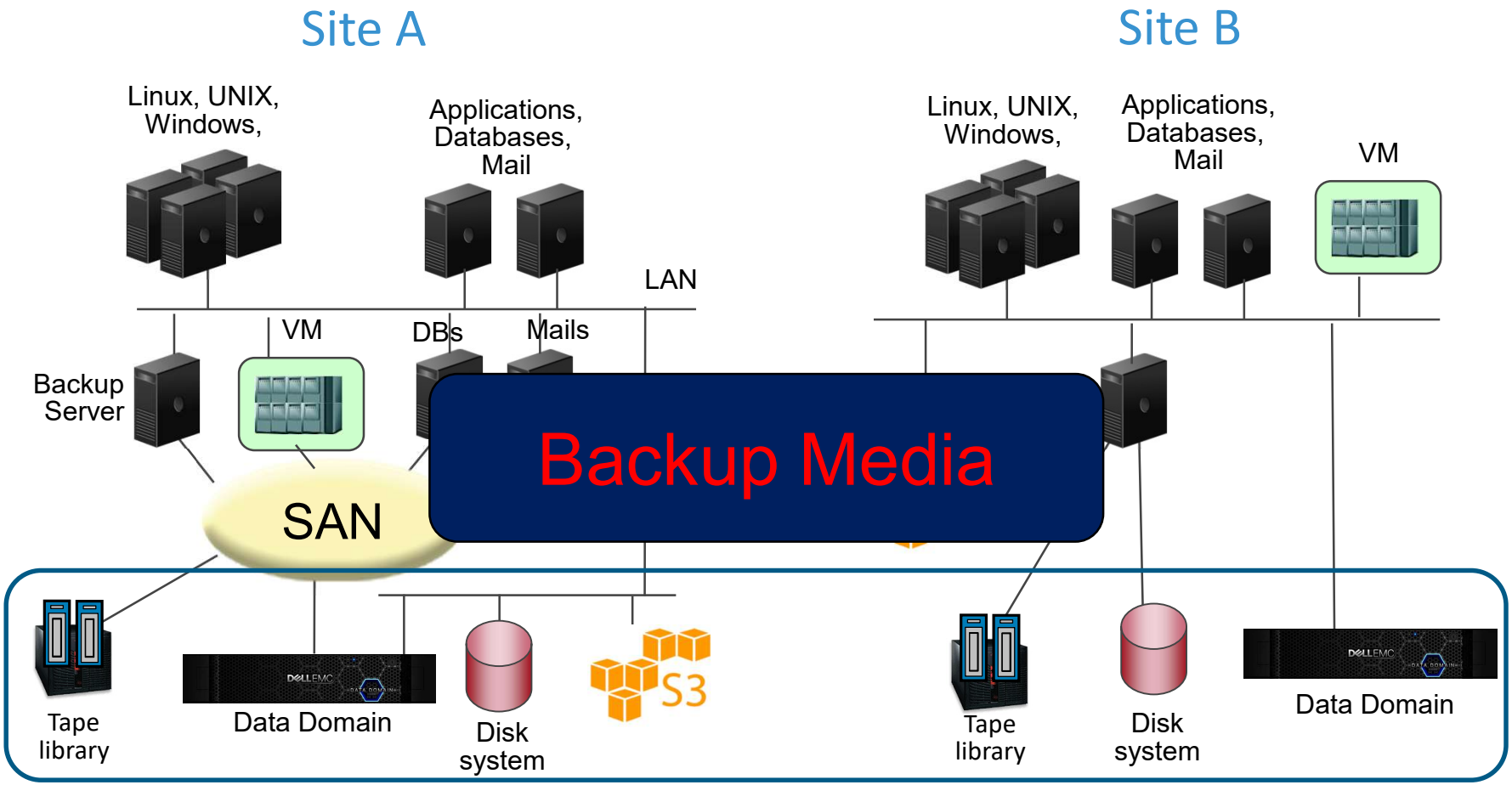
https://www.linkedin.com/feed/urn:li:activity:6750719326635995136/



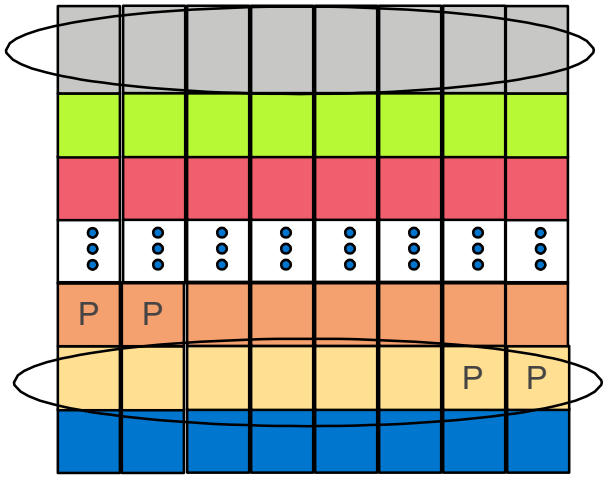
DD6400

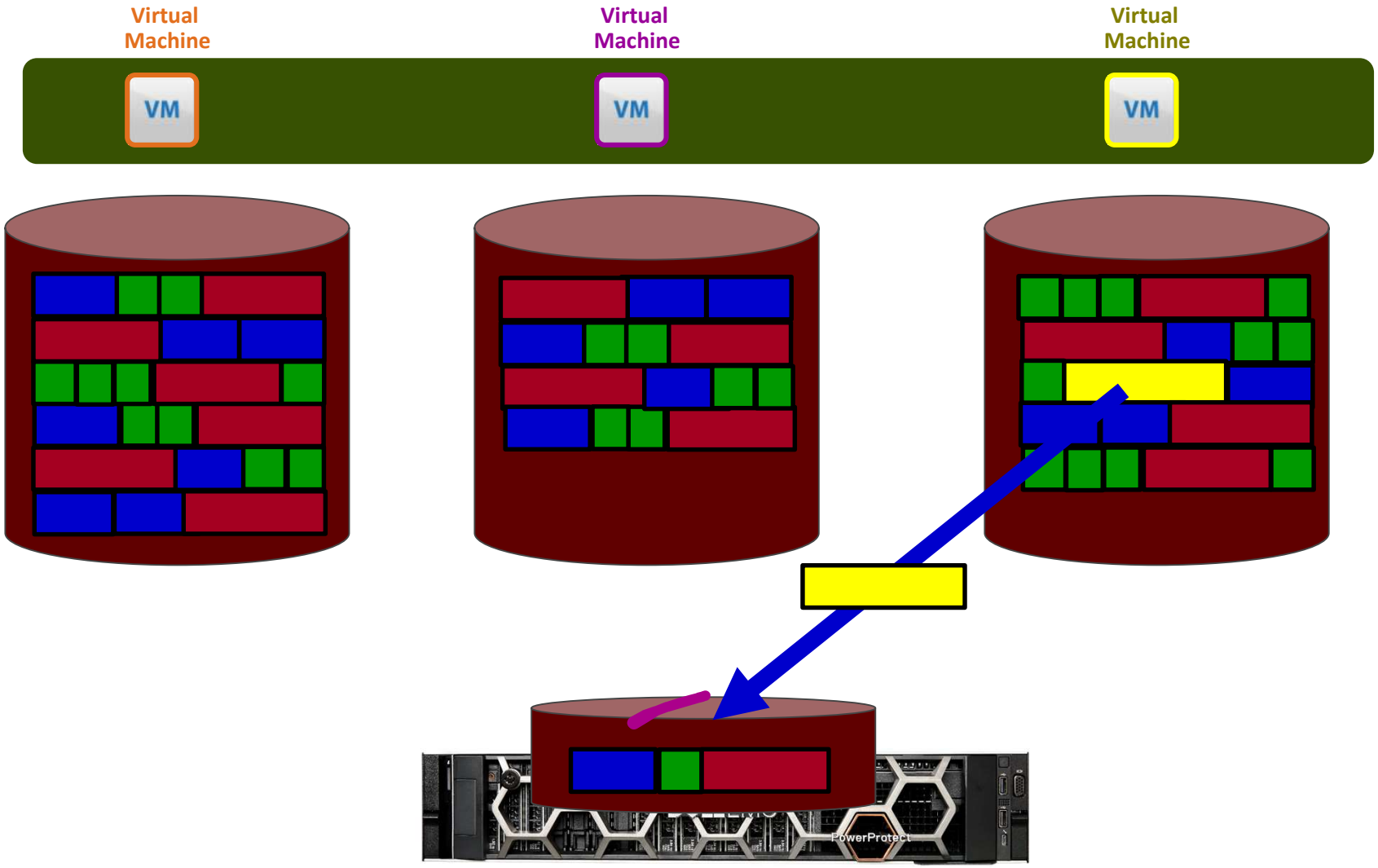
270 parallel backups

Backup environment



Storage Pool




Virtual Machine
Virtual Machine
Virtual Machine
VM
VM
VM
PowerProtect

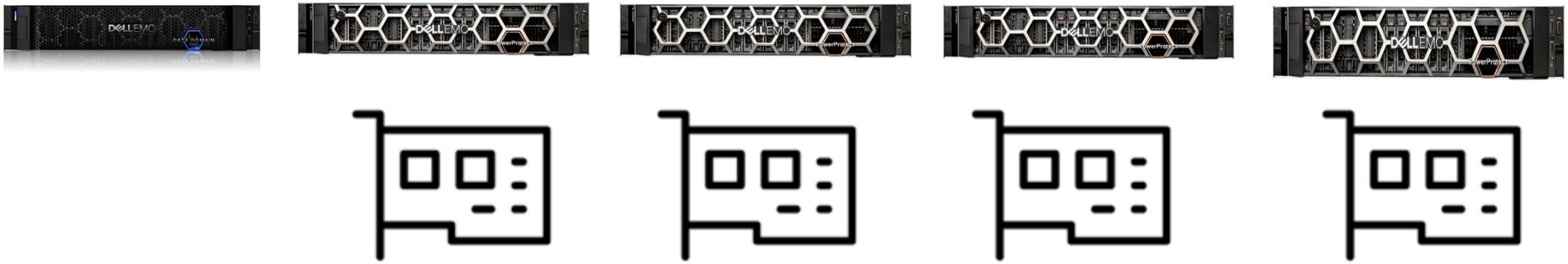
Hardware Compression Card

DD3300	DD6400	DD6900	DD9400	DD9900
				
				

DDVE

Hardware Compression Card

DD3300 DD6400 DD6900 DD9400 DD9900



Data Domain main processor is faster

Faster backups

Faster restores

Instant Access

DD6400

100% READS

#VMs	Total IOPS
4	31379
8	25223
12	24775

70% READS
30% WRITES

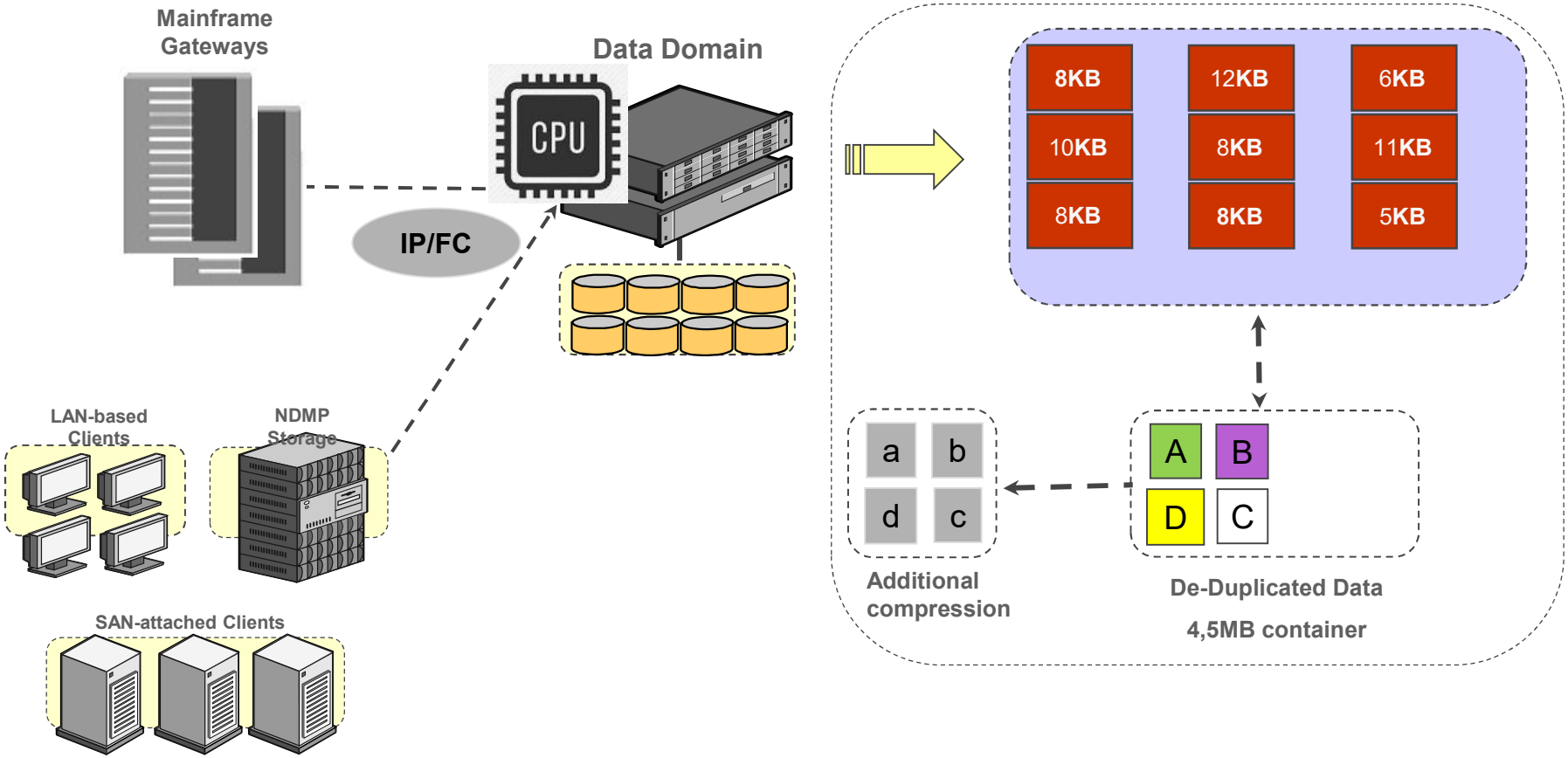
#VMs	READ IOPS	WRITE IOPS
4	13935	5970
8	12709	5446
12	12325	5281

Security

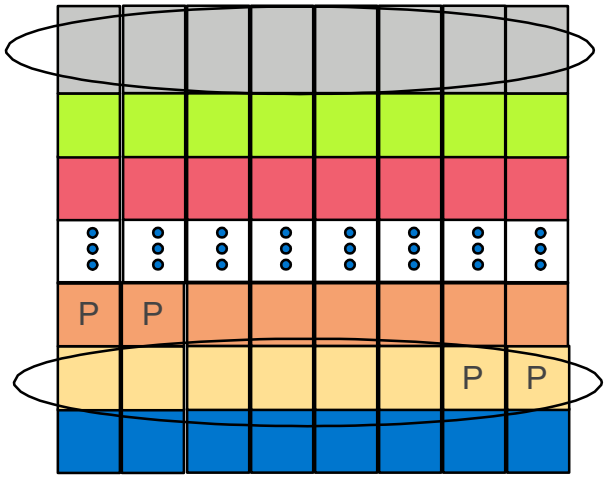
DD6400

DELL Technologies

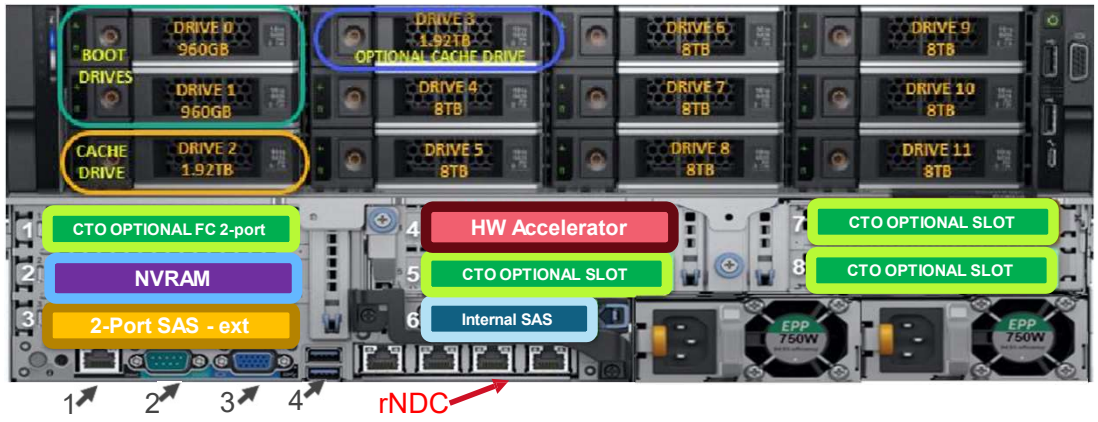
DD Invulnerability Architecture



Storage Pool



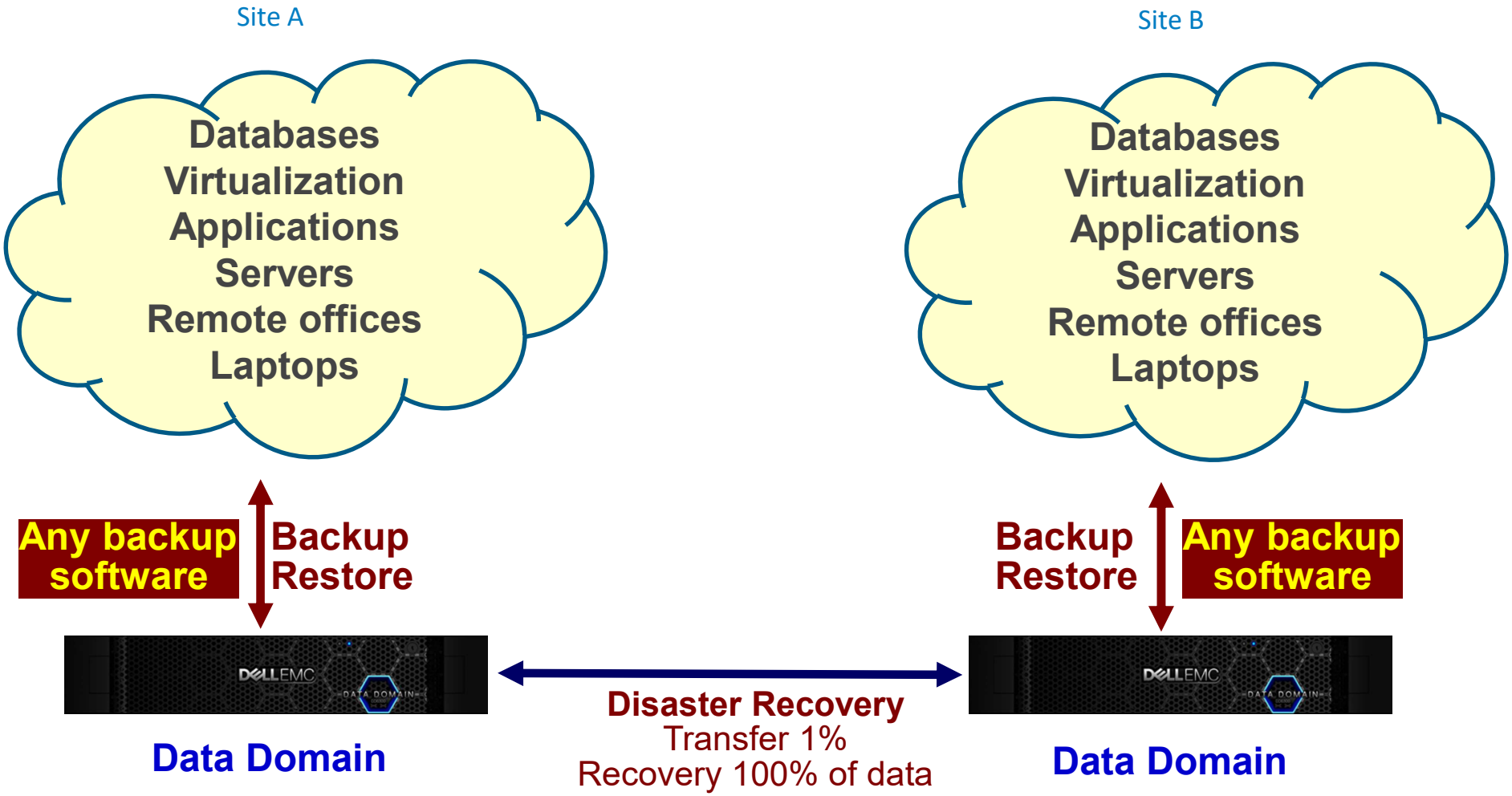
Seperated Data / Operating System



Seperated Data / Operating System

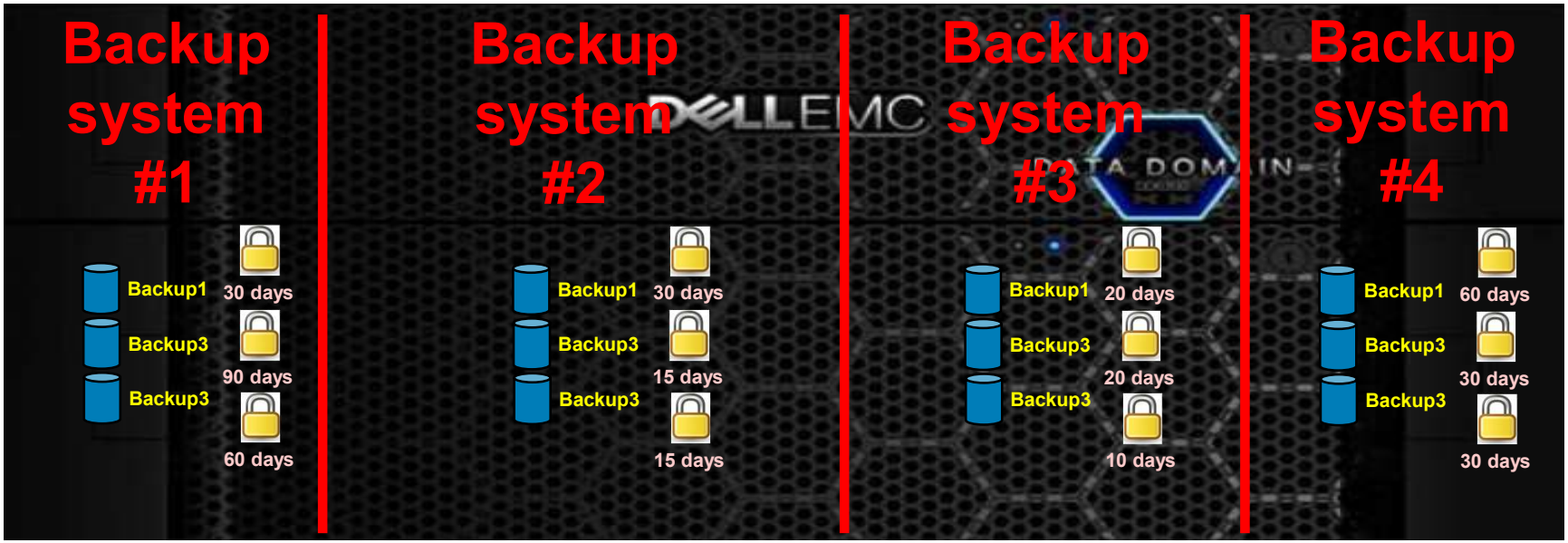
System Partitions

Partition	Size	Used	Available
/ddvar	49.1 GiB	8289.6 MiB	38.5 GiB
/ddvar/core	158.3 GiB	136.4 MiB	150.2 GiB


Site A
Site B
Databases
Virtualization
Applications
Servers
Remote offices
Laptops
Databases
Virtualization
Applications
Servers
Remote offices
Laptops
Any backup software
Backup
Restore
Backup
Restore
Any backup software
Data Domain
Disaster Recovery
Transfer 1%
Recovery 100% of data
Data Domain

Data Domain can lock (compliance) data.

No one can modify / delete file



Compliance Assessments - Summary and Conclusions

EMC Data Domain
Retention Lock Compliance Edition

Prepared by: **Cohasset Associates, Inc.**

Cohasset Associates was engaged to independently and objectively assess the Retention Lock Compliance Edition capabilities against the storage-related electronic records management requirements of the following U.S. and International regulations and standards:

- Securities & Exchange Commission Regulation 17 CFR 240.17a-4(f)
- Commodity Futures Trading Commission Rule 1.31(b)
- Food and Drug Administration 21 CFR Part 11, Electronic Records; Electronic Signatures
- Sarbanes-Oxley Act
- IRS Revenue Procedures 98-25 and 97-22
- ISO Standard 15489-1 and ISO/TR 15489-2
- MoReq2010®: Modular Requirements for Records Systems — Volume 1: Core Services & Plug-in Modules1, Version 1.1 ("MoReq2010®")

For each of these regulations and international standards, Cohasset's assessed the capabilities of the Retention Lock Compliance in the following areas:

- Protection against erasure, overwrite or modification for the required retention period
- Retention, legal hold and disposition
- Accuracy and quality of the recording and retrieval process
- Backup and recovery from a duplicate or replica copy

Conclusions: It is Cohasset Associates' conclusion that the Retention Lock Compliance Edition, when properly configured and utilized, meets all of the requirements that are attributable to storage management systems for storing and retaining electronic records in compliance with the aforementioned regulations and standards.

Cohasset Associates

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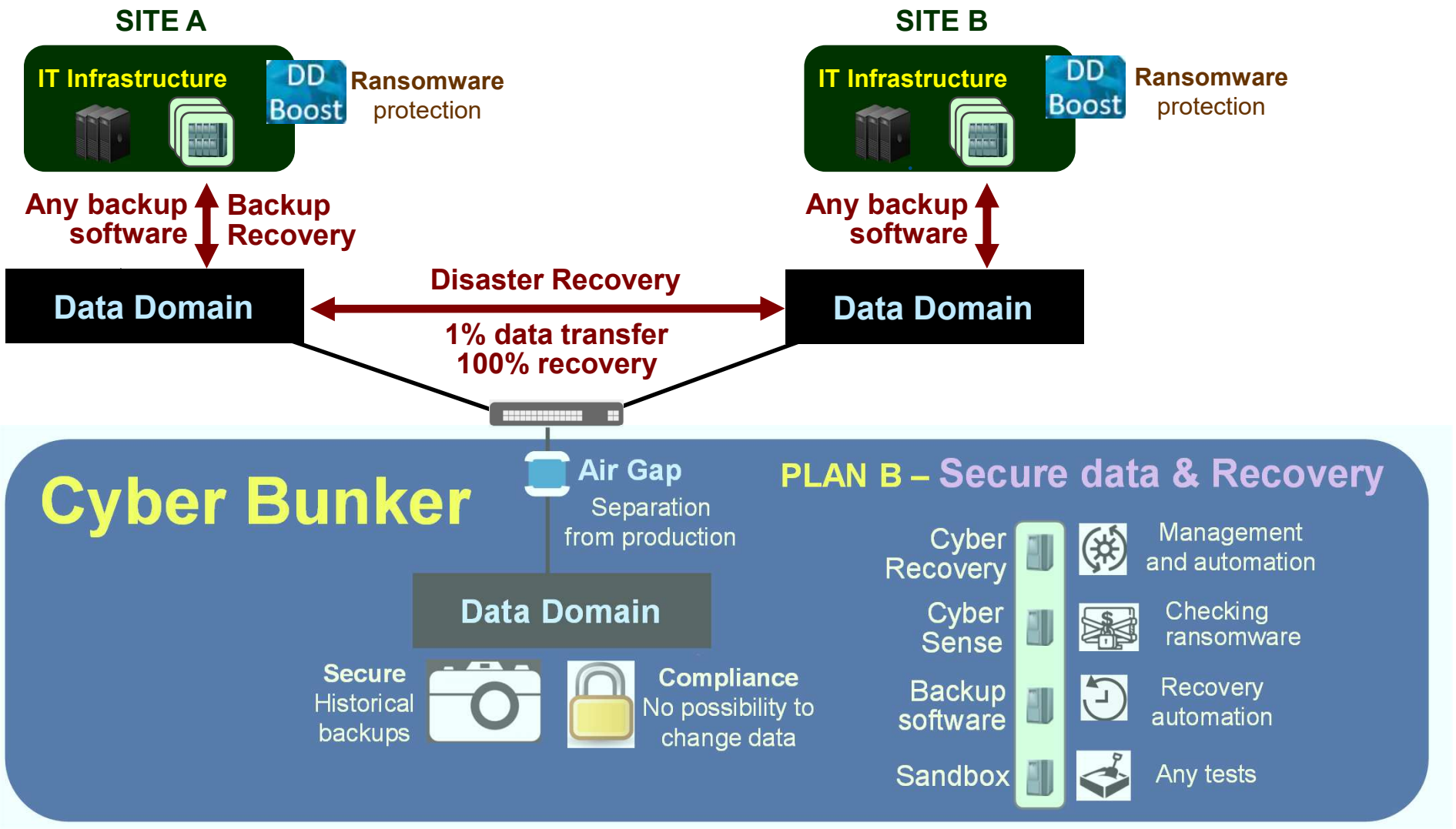
505 N. Lake Shore Drive
Chicago, IL 60611 USA

www.cohasset.com

312.527.1550

1.0

About Cohasset: Cohasset Associates, Inc. is one of the nation's foremost consulting firms specializing in records and information management. Cohasset provides thought-leadership and award-winning professional services in three areas: management consulting, education, and legal research. Cohasset's goal is to help its clients reduce regulatory and legal risks and improve business processes associated with the management of records and information.


SITE A
IT Infrastructure
DD Boost
Ransomware protection
Any backup software
Backup Recovery
Data Domain
SITE B
IT Infrastructure
DD Boost
Ransomware protection
Any backup software
Data Domain
Disaster Recovery
1% data transfer
100% recovery
Cyber Bunker
Air Gap
Separation from production
Data Domain
Secure
Historical backups
Compliance
No possibility to change data
PLAN B – Secure data & Recovery
Cyber Recovery
Management and automation
Cyber Sense
Checking ransomware
Backup software
Recovery automation
Sandbox
Any tests

Scaling

DD6400

DELL Technologies

PowerProtect Data Domain Series Appliances

DD3300

DD6400

DD6900

DD9400

DD9900

PowerProtect Data Domain Series Appliances

DD3300

DD6400

4TB net extensions

- Capacity on demand
- We extend with licenses or adding shelve if required

DD6900

48TB net extensions

Minimum extensions 48TB net
as full 15 disks group in
* 3U shelf
or in
* 5U dense shelf

DD9400

48TB net extensions

DD9900

48TB net extensions

Minimum extensions 48TB net
as half of 15 disks group in 3U shelf

DD6400 Expansion Details

Start with 2U DD6400
- Minimum capacity: 8TBu
- Grow via licenses
- 4TBu increments
- Maximum capacity: 32TBu
- Cloud Tier license: 64TBu

Add a 3U ES40
- Minimum capacity: 40TBu
- Grow via licenses
- 4TBu increments
- Maximum capacity: 104TBu
- Cloud Tier license: 208TBu

Add a 3U ES40
- Minimum capacity: 112TBu
- Grow via licenses
- 4TBu increments
- Maximum capacity: 172TBu
- Cloud Tier license: 344TBu

- Fine Grained incremental growth
- Simple expansion

DD6400 with the same capacity net is comparable or cheaper than DD6300

I want to keep my backups
on Data Domain

How big Data Domain do I need?

Data Domain has
the best market de-duplication:

- Smallest block (4K – 12K)
- Global de-duplication
- The fastest engine
- Source de-duplication

Thus, Data Domain requires 2-3 less

- space
- bandwidth for replication

than most of the market solutions

Mail from the customer

I have to praise myself because yesterday **we started DDVE tests and the results are spectacular**.

Mail from the customer

After First Backup (just after 1 backup):
On a sample of 80 virtual machines (mixed Windows and Linux), we achieved

- **De-duplication of 94%**
- **9TB VMWare occupies 0,6TB on Data Domain**
- **Backup time decreased by half comparing to current solution (just 1st backup).**
    - **Further backups are huge faster**

Mail from the customer

Effect better than on Data Domain workshop!

PoC Feedback

Environment

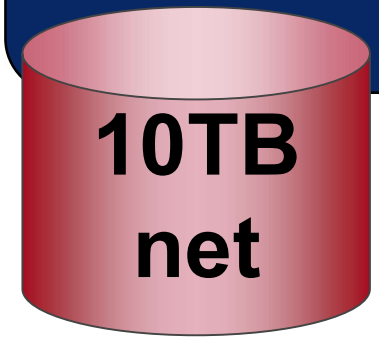
- 300GB SAP/Oracle

POC results

- Backup speed to Data Domain**: 5TB/h**
- Backup time: 4 minutes
- De-duplication after 4 backups: **1:15**

Rule of thumb

I have **10TB** production environment



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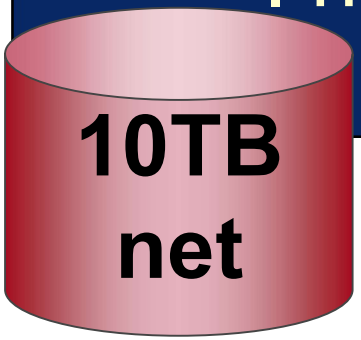
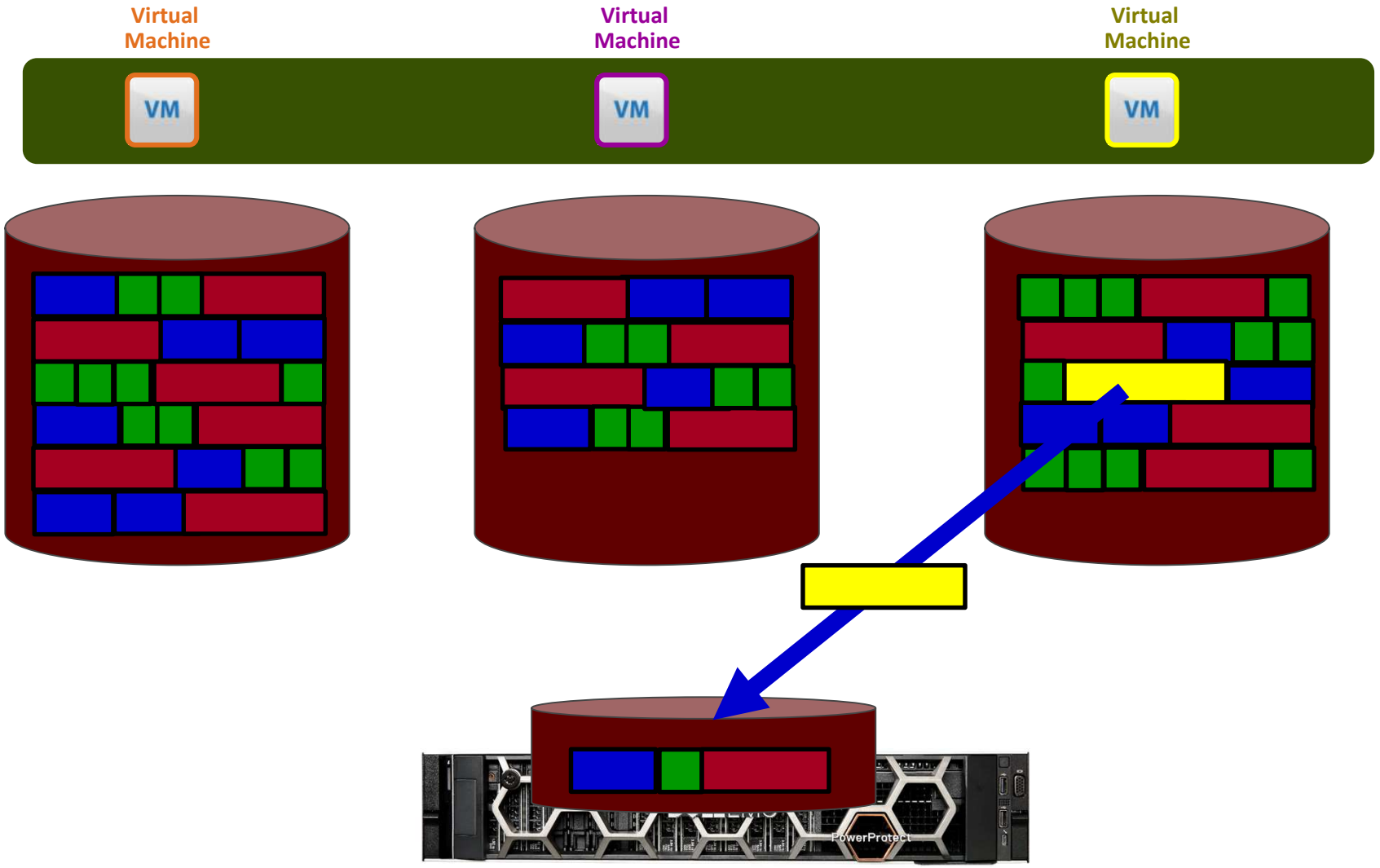


For **10TB** production environment we need **8TB** Data Domain with 1 month retention

Decreasing cost

DD6400

DELL Technologies


Virtual Machine
Virtual Machine
Virtual Machine
VM
VM
VM
PowerProtect

Hardware Compression Card

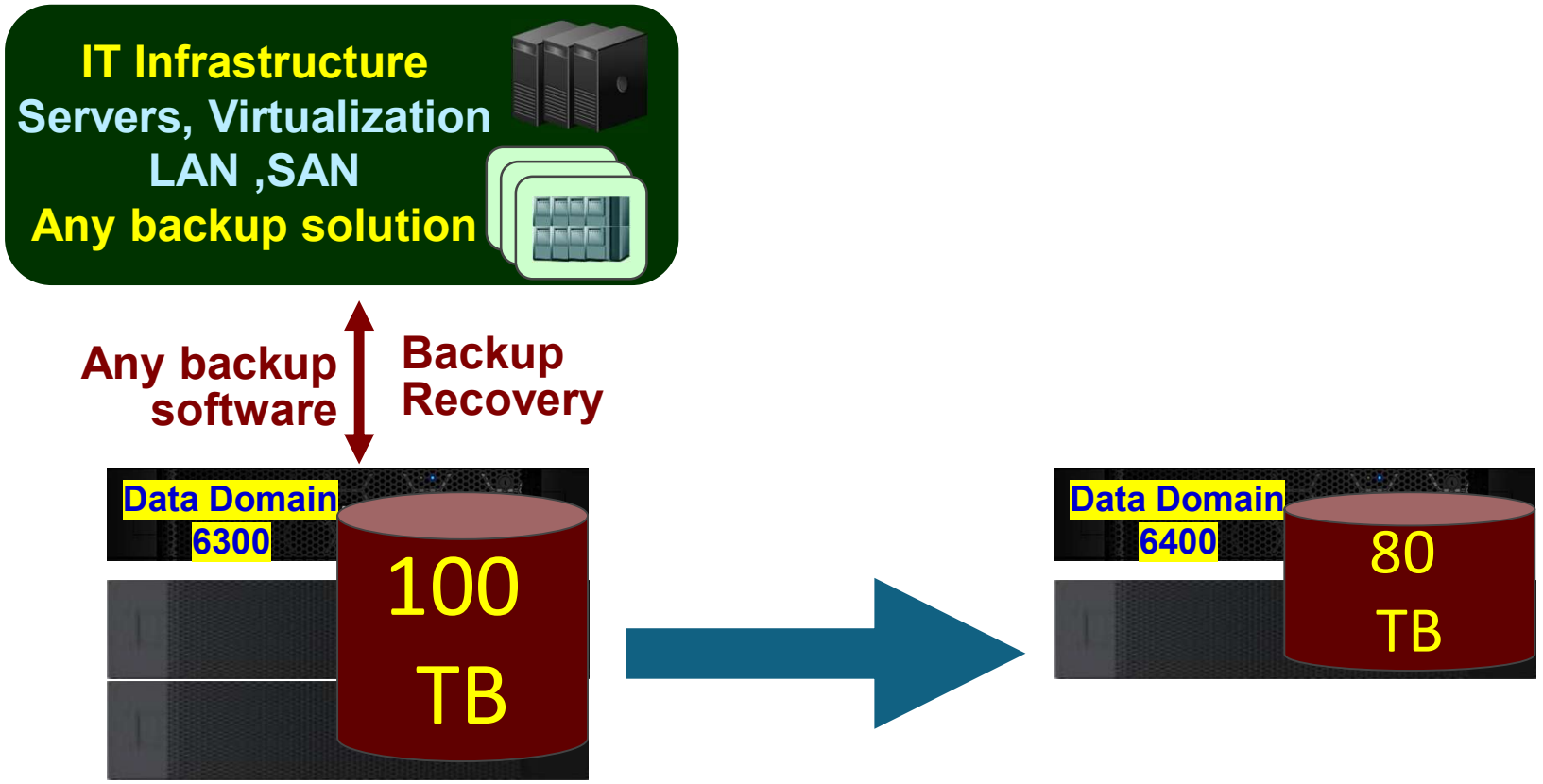
DD3300	DD6400	DD6900	DD9400	DD9900
				
				

DDVE

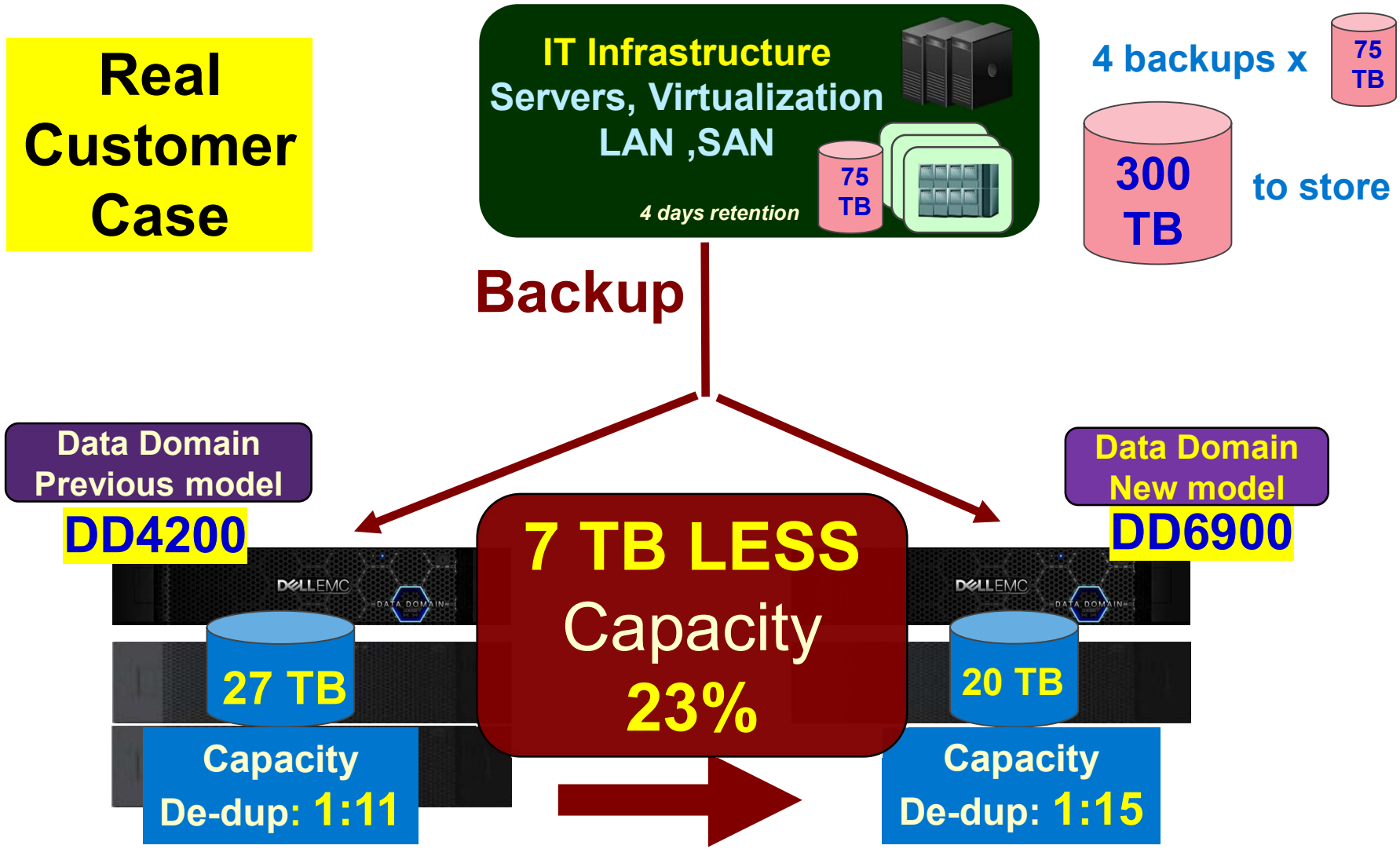
PowerProtect DD: Hardware-Assist Compression

- A PCIe card for offloading CPU
  - Compression gzfast
- Product usage
  - Enabled by default on all DD6400/DD6900/DD9400/DD9900 systems
- Capacity Improvement
  - Lab Testing
    - Up to **30%** more logical capacity comparing with previous DD (lz compression)
    - Average **15%** improvement in capacity reduction in sizing tool
  - Production Data (based on ASUP) – April 2020 update
    - Up to **23%** improvement in capacity reduction from prior DD

Workload	lz -> gzfast Improvement
Non-database (FS, Email, etc.)	23%
SQL	15%
Oracle	16%


IT Infrastructure
Servers, Virtualization
LAN ,SAN
Any backup solution
Any backup software
Backup Recovery
Data Domain 6300
100 TB
Data Domain 6400
80 TB

Real Customer Case



DD6400 with the same capacity net is comparable or cheaper than DD6300

Capacity starts just from 8TB net

Much lower than DD6300

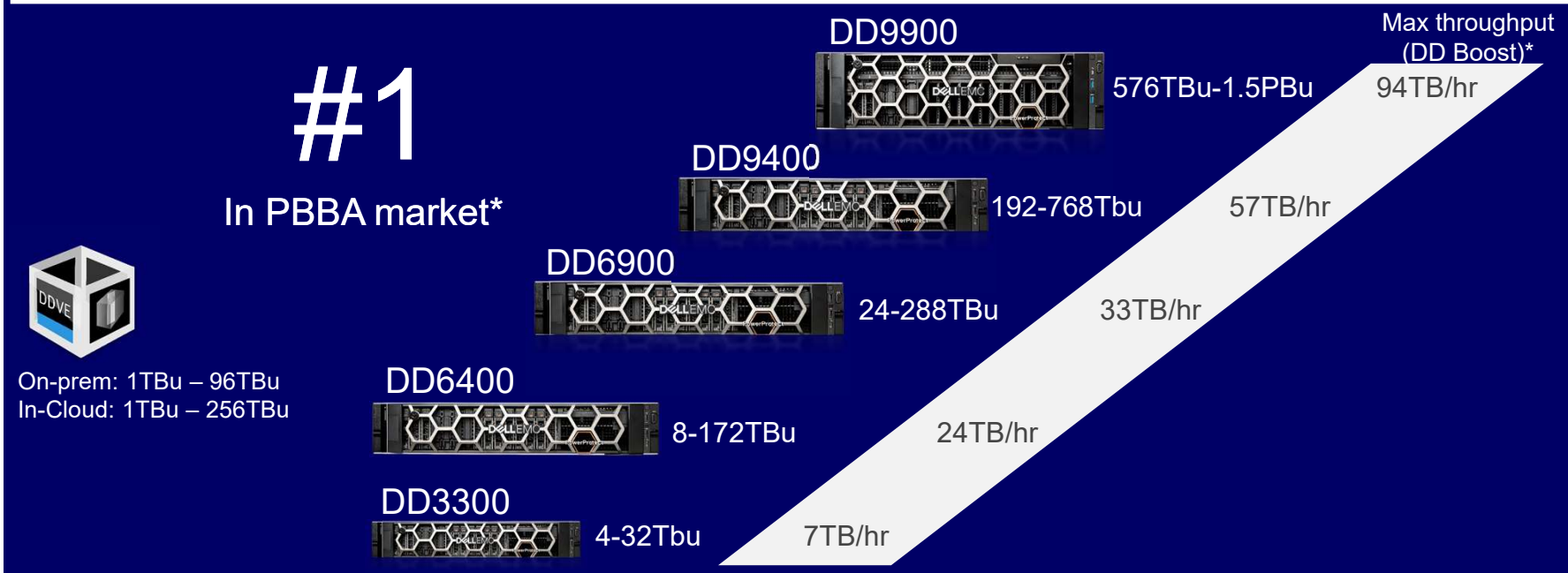
Smaller increments

Parameters

DD6400

DELL Technologies

PowerProtect Data Domain Portfolio



* Based on IDC WW Purpose-Built Backup Appliance Systems Tracker, 1Q21 (revenue), June 2021.

PowerProtect Data Domain Series Appliances

DD3300

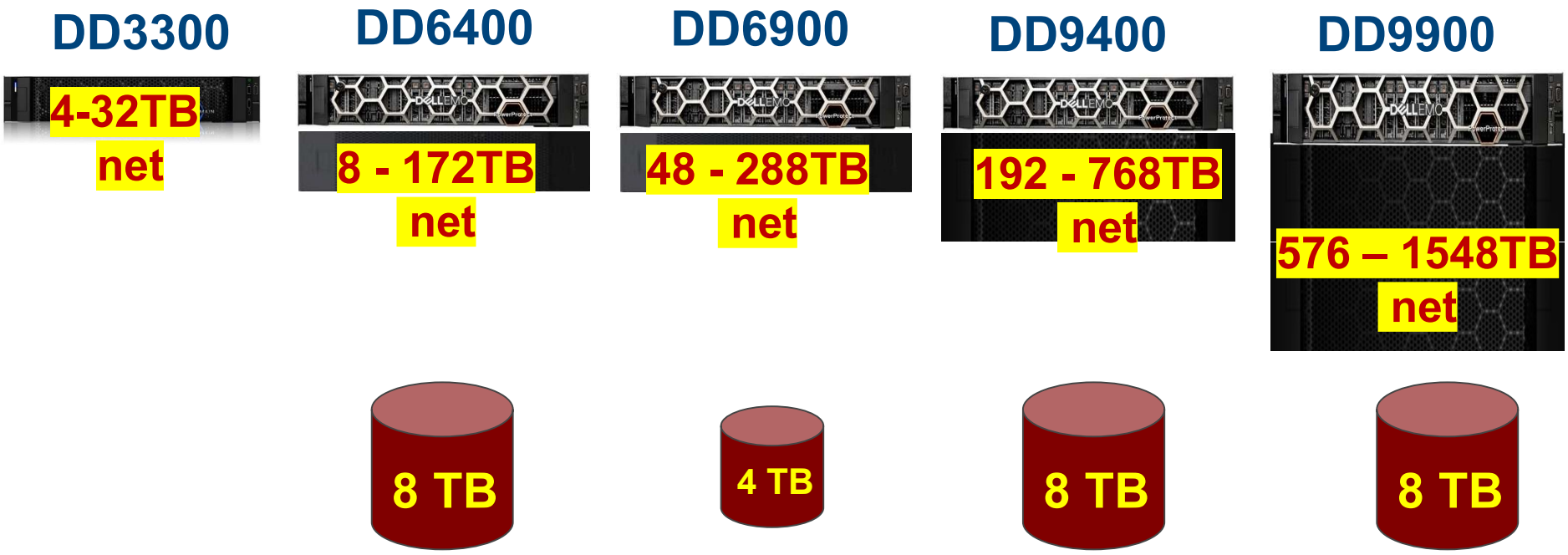
DD6400

DD6900

DD9400

DD9900

PowerProtect Data Domain Series Appliances



PowerProtect Data Domain Series Appliances

DD3300

DD6400

4TB net extensions

- Capacity on demand
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Minimum extensions 48TB net
as full 15 disks group in
* 3U shelf
or in
* 5U dense shelf

DD9400

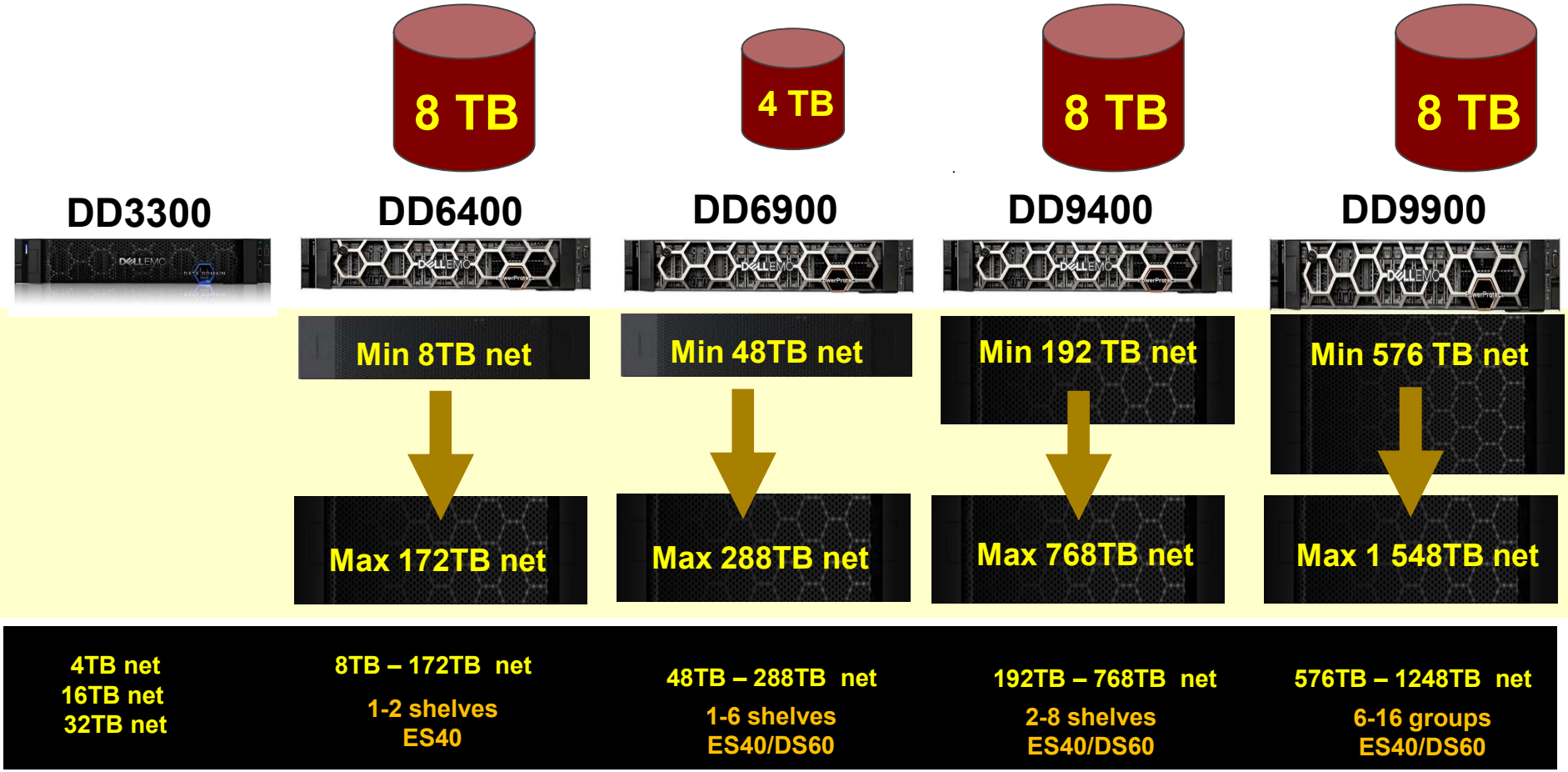
48TB net extensions

DD9900

48TB net extensions

Minimum extensions 48TB net
as half of 15 disks group in 3U shelf

Minimum / Maximum capacity



4TB net 16TB net 32TB net	8TB – 172TB net 1-2 shelves ES40	48TB – 288TB net 1-6 shelves ES40/DS60	192TB – 768TB net 2-8 shelves ES40/DS60	576TB – 1248TB net 6-16 groups ES40/DS60

Streams

DD3300	DD6400	DD6900	DD9400	DD9900
				
140/50	270/75	405/112	810/225	1885/300

Streams (all/read)

DDVE
96TB

180/50

Mtrees (Logical Data Domains)

DD3300	DD6400	DD6900	DD9400	DD9900
				
100/6	128/128	128/128	128/128	256/256

Streams (all/read)

DDVE
96TB

100/6

Height

DD3300	DD6400	DD6900	DD9400	DD9900
				
2U	2U	2U	2U	3U

Extension Cards

DD3300

DD6400

DD6900

DD9400

DD9900

4-port QL41000 10 GbE-SP+ FasLinQ
4-port QL41164 10GBASE-T

Built-in 1 card:
4 port 10Gb Ethernet card, either SFP or BASE-T
This card does not count toward total number of cards

10Gb BASE-T
can negotiate 1Gb

Apart of the above we can ADD:

- DD 10GBASE-T ENET 4PT
- DD 10GSFP ENET
- DD 25GSFP ENET 2PT
- DD 16GBIT FC IO MODULE 2PORT

2-port QL41000 25 GbE-SFP28	4 maximum
4-port QL41164 10 GbE-SFP+	3 maximum
4-port QL41164 10GBASE-T	4 maximum
4-port QLE2694 16 Gb FC	3 maximum

Maximum additional cards
*** 3 Ethernet – any of above comb.**
*** 1 FC card**

2-port QL41000 25 GbE-SFP28	4 maximum
4-port QL41164 10 GbE-SFP+	4 maximum
4-port QL41164 10GBASE-T	4 maximum
4-port QLE2694 16 Gb FC	3 maximum

No more than 4 additional cards

2-port 100 GbE-QSFP28	4 maximum
2-port QL41000 25 GbE-SFP28	4 maximum
4-port QL41164 10 GbE-SFP+	4 maximum
4-port QL41164 10GBASE-T	4 maximum
4-port QLE2694 16 Gb FC	4 maximum

No more than 4 additional cards

No more than 7 additional cards

Materials

Data Domain

DELL Technologies

Links public

- DD6400
  Shortly
- New generation of Data Domains DD6900 / DD9400 / DD9900
  Video: https://youtu.be/xx-xZC9JtoM
  Article:http://backuprecoveryguy.blogspot.com/2019/12/why-new-data-domain-models-dd6900.html
- What is new in Data Domain 7.2?
  Video: https://youtu.be/m1XNy6IXzOo
  Article:http://backuprecoveryguy.blogspot.com/2020/08/data-domain-72-what-is-new.html

Links public

- Performance in backup
  Video: https://youtu.be/05fFtGH7YCQ

DD6400

- Polskie video opisujące DD6400: https://youtu.be/4pCERr02eoo
- Artykuł opisujący DD6400 https://backuprecoveryman.pl/data-domain-dd6400-omowienie-dlaczego-architektura-koszty/

Consider

DD6400

DELL Technologies

Purpose Built Backup Appliances

Q3 2021 Total Revenue Target Systems; Top Vendors

Company	Q3 2021 Revenue (M)	Q3 2021 Share	Q3 2020 Revenue (M)	Q3 2020 Share	Y/Y Growth
Dell Technologies	$393.04	78.3%	$389.72	81.7%	0.9%
#2	$43.63	8.7%	$31.83	6.7%	37.1%
#3	$25.74	5.1%	$16.38	3.4%	57.1%
Others	$39.80	7.9%	$39.32	8.2%	1.2%
Total	**$502.21**		**$477.25**		5.2%

Purpose Built Backup Appliances

Q3 2021 Total Revenue Target Systems; Top Vendors

Company	Q3 2021 Revenue (M)	Q3 2021 Share	Q3 2020 Revenue (M)	Q3 2020 Share	Y/Y Growth
Dell Technologies	$393.04	78.3%	$389.72	81.7%	0.9%
Others	$39.80	7.9%	$39.32	8.2%	1.2%
Total	**$502.21**		**$477.25**		5.2%

Performance, Security, Open

Questions

Daniel.Olkowski@dell.com