Data Protection
For the Modern Data Center

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Technology Consultant
Dell EMC
Tale of two worlds

Traditional Apps
IT
On Premise

Next Gen Apps
Developers
Cloud

You Need **Both** for Trust and Agility
Are You Protected?

$914K
Average Cost of Data Loss

2.36T
Data Loss

90%
Laggards or Evaluators

Global Data Protection Index

73%
Unable to keep pace with Flash

82%
Unprepared for future business challenges

50%
Unprotected in the Cloud
Dell EMC Data Protection – by the numbers

• World’s Largest Data Protection Company
• Market Share Leader in Purpose Built Backup Appliances
  • Leaders in Open & Mainframe Systems
  • 3x share our closest competitor
• 70,000+ Systems Shipped and Installed
• 4,000+ Data Protection Solution Employees
• Recognized as Leader by Gartner!
DATA PROTECTION CONTINUUM
AVAILABILITY, REPLICATION, BACKUP AND ARCHIVE

COMPLEMENTARY TIERS TO MEET ANY RECOVERY REQUIREMENT

DATA AVAILABILITY
- Availability
- Replication
- Snapshot

DATA DURABILITY
- Backup
- Archive

Zero Seconds Minutes Hours
DATA PROTECTION CONTINUUM

CONTINUOUS AVAILABILITY
Access Anywhere stretched storage volumes

CONTINUOUS REPLICATION
Recovery to any point-in-time
LOCAL OR REMOTE

SNAPSHOTS
Recovery points between backups
HOURLY
12AM 6AM 12PM 6PM 12AM

BACKUPS
Copies on capacity optimized protection storage
DAILY
MONDAY TUESDAY

ARCHIVE
Archive and search on capacity optimized protection storage
DAILY
MONDAY TUESDAY WEDNESDAY THURSDAY FRIDAY
**DATA PROTECTION & AVAILABILITY**

**EMC VPLEX**
EMC Continuous Availability Platform
Zero RPO/RTO Within And Across Data Centers

**EMC RecoverPoint**
EMC Continuous Data Protection (CDP) Platform
Minutes Of RTO And RPO
Local And Remote Replication For Block-based Storage

**EMC Protection Storage (Data Domain)**
EMC Storage Of Last Resort (DIA, Et Al)
Storage Efficiency Benefits From Deduplication + Compression
Consolidation Of Backup And Archive Environments

**EMC Data Protection Suite (Avamar, Networker, SourceOne, DPA)**
EMC Backup Software Portfolio
Hours And Days Of RTO And RPO
Backup/Recovery For Virtual, Enterprise Applications, ROBO, And DTLT
MODERNIZE, TRANSFORM and AUTOMATE DATA PROTECTION with

Dell EMC Data Protection Portfolio
Protection and recovery for cloud

Best of breed  Integrated
Protection Storage

ARE YOU ON SOLID GROUND?
The Evolution of Data Protection

**Analytics & Search**

**Backup software**

- Backup servers/agents
  - APP
  - Database
  - Cloud

**Intelligent copy oversight**

- Protection storage
  - Database
  - Cloud

- Self service (from data source)
  - APP
  - Database
  - VM
  - Cloud

**Traditional backup**

**Modern data management**
The Ultimate Protection Storage

Data Domain - Protect everything on a single platform

Backup
- Database
- Mainframe
- IBMi
- Big Data
- File/E-mail
- VMware
- NAS
- ROBO

Archive
- File
- E-mail
- Big data
- Content management
- Storage tiering
- Database

Standard network protocols
DD Boost, CIFS, NFS, VTL, NDMP

Inline Encryption

Disaster recovery

Long-term retention
Why Dell EMC protection storage

**EFFICIENT**
- Protect more data faster with industry leading speed and scale
- Reduce storage required by 10–30x

**RELIABLE**
- End-to-end data verification, fault detection, and self healing

**FLEXIBLE**
- Integrates with leading backup, archiving, enterprise applications and big data applications or directly with primary storage
- Deploy protection storage however you want it

**CLOUD-ENABLED**
- Natively tier deduplicated data to the cloud for modern long-term retention
- Deliver data protection as a service with logical data isolation
Not All Dedupe is Created Equal

- Superior efficiency with variable-length deduplication

### Backup Data

<table>
<thead>
<tr>
<th>Backup Type</th>
<th>Logical</th>
<th>Estimated Reduction</th>
<th>Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday full</td>
<td>1 TB</td>
<td>2–4x</td>
<td>250 GB</td>
</tr>
<tr>
<td>Monday incremental</td>
<td>50 GB</td>
<td>7–10x</td>
<td>5 GB</td>
</tr>
<tr>
<td>Tuesday incremental</td>
<td>50 GB</td>
<td>7–10x</td>
<td>5 GB</td>
</tr>
<tr>
<td>Wednesday incremental</td>
<td>50 GB</td>
<td>7–10x</td>
<td>5 GB</td>
</tr>
<tr>
<td>Thursday incremental</td>
<td>50 GB</td>
<td>7–10x</td>
<td>5 GB</td>
</tr>
<tr>
<td>Second Friday full</td>
<td>1 TB</td>
<td>50–60x</td>
<td>18 GB</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2.2 tb</strong></td>
<td><strong>7.6x</strong></td>
<td><strong>288 GB</strong></td>
</tr>
</tbody>
</table>
Savings of Deduplication

A Real Life Customer Example

66:1
Deduplication

21 PB

322 TB

98.5% Data Reduction - 66 to 1
58% utilized in Data Center #1
66% utilized in Data Center #2
Cost: 3.5 cents per Logical GB
Cost to Serve: $0.0009868

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre-Comp TB</th>
<th>Post-Comp TB</th>
<th>Dedup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Center #1</td>
<td>10,715.05</td>
<td>161.85</td>
<td>66:1</td>
</tr>
<tr>
<td>Data Center #2</td>
<td>10,461.07</td>
<td>160.34</td>
<td>65:1</td>
</tr>
<tr>
<td>Total</td>
<td>21,176.12</td>
<td>322.19</td>
<td>65.7:1</td>
</tr>
</tbody>
</table>

28 TB
Faster, More Efficient Backup

Data Domain Boost

- Advanced integration with leading backup and enterprise applications
- Speeds backups by up to 50%
- Reduce network utilization by up to 99%
Global deduplication across clients

**Data Domain** offers a single deduplication pool per system, thus tremendously reducing data redundancy.

Reducing the number of dedupe pools reduces overall speed.
Data Domain Boost Ecosystem

Supported over LAN

Supported over SAN

Supported over WAN

For everything else, use the DD Boost file system plug-in
Encryption

- Encrypts incoming data and store the data on the disk in an encrypted format

- Inline Encryption ensures that data does not reside in a vulnerable state on the disk subsystem
Most Reliable Protection Storage

- Data Domain Data Invulnerability Architecture

- Stored correctly
  - Inline data verification ✓

- Stays correct
  - Continuous fault detection and self-healing ✓

- Recovers correctly
  - Recovery/access
  - Verification ✓
Storage integrated protection

ProtectPoint

- **Faster** backup & recovery
- **Eliminate** impact on application
- **Reduce** cost and complexity

20x Faster backup

10x Faster recovery
Data Domain Cloud Tier

Unparalleled efficiency for tiering protection storage to the cloud

- **Simple**: automated, native tiering to public, private or hybrid cloud
- **Cost-effective**: send and retrieve only unique data for lower TCO
- **Open**: broad ecosystem and flexible deployment options
Secure Multi-Tenancy

Delivering data protection as a service

- Deliver data domain in a private/hybrid cloud
- Logically isolate user data for secure self-service
- Tenant-level management and reporting

Tenant A

Tenant unit A

Tenant unit B

Tenant B
## Modernized Data Domain Portfolio

### Small Enterprise/ROBO – Midsize Enterprise

- **Speed (DD Boost):** 5.6 TB/hr (16TB), 11.2 TB/hr (96 TB)
- **Usable capacity:** 0.5 TB – 96 TB, **Logical capacity:** Up to 4.8 PB

<table>
<thead>
<tr>
<th></th>
<th>DD3300</th>
<th>DD6300</th>
<th>DD6800</th>
<th>DD9300</th>
<th>DD9800</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speed (DD Boost)</strong></td>
<td>7.0 TB/hr</td>
<td>24 TB/hr</td>
<td>32 TB/hr</td>
<td>41 TB/hr</td>
<td>68 TB/hr</td>
</tr>
<tr>
<td><strong>Speed (other)</strong></td>
<td>4.2 TB/hr</td>
<td>8.5 TB/hr</td>
<td>14 TB/hr</td>
<td>20 TB/hr</td>
<td>31 TB/hr</td>
</tr>
</tbody>
</table>
| **Logical capacity** | 200 TB–1.6 PB<sup>1</sup>  
600 TB–4.8 PB<sup>2</sup> | 1.8–8.9 PB | 2.8–14.4 PB<sup>1</sup>  
8.4–43.2 PB<sup>2</sup> | 7.2–36 PB<sup>1</sup>  
21.6–108 PB<sup>2</sup> | 10–50 PB<sup>1</sup>  
30–150 PB<sup>2</sup> |
| **Usable capacity**  | 4 TB–32 TB<sup>1</sup>  
12 TB–96 TB<sup>2</sup> | Up to 178TB | Up to 288 TB<sup>1</sup>  
Up to 864 TB<sup>2</sup> | Up to 720 TB<sup>1</sup>  
Up to 2.16 PB<sup>2</sup> | Up to 1 PB<sup>1</sup>  
Up to 3 PB<sup>2</sup> |

<sup>1</sup> Total capacity on Active Tier only  
<sup>2</sup> Total capacity with DD Cloud Tier software for long-term retention
Dell EMC Protection Storage – How You Want It

Data Domain
Integrated Data Protection Appliance
Data Protection for Converged Infrastructures
Data Domain Virtual Edition
Data Domain delivered by a Service Provider

How You Want It
Best of Breed
Integrated
Converged
Software Defined
As-a-Service
Protection Software

ARE YOU ON SOLID GROUND?
Why Dell EMC protection software

**COMPREHENSIVE PROTECTION**
- Delivers protection across the data protection continuum
- Covers all consumption models, from on-premise traditional infrastructures to virtualized environments to hybrid and public clouds
- Delivers backups of data and applications WITHIN the public cloud as well as provides secure long-term retention of backups TO the cloud

**FLEXIBLE**
- Includes 5 purpose-built offerings, protecting environments rich in mission critical applications, fully virtualized, focused on backup and recovery, requiring archive and compliance, or a complex assortment of these
- Supports a wide range of protection technologies including deduplication backup, backup to disk, snapshot-based backup, and backup to tape
- Delivers application owner visibility and control

**HIGH PERFORMANCE**
- Up to 20x faster backup
- Up to 30x faster image-level recovery
- Industry’s tightest integration with Data Domain, yielding deduplication rates nearly 4x that of our competitors
  - Reduces backup storage by up to 38x
  - Reduces network traffic by up to 99%
  - Reduces backup times by up to 50%
Data Protection Suite Family

- Comprehensive, industry-leading data protection

Choose the right solution for your environment:
Protection and Continuity
Based on Data Value and Business Objectives
# Data Protection Suite Family

- **What’s included**

## Data Protection Suite Enterprise Edition

**What’s Included:**
- Avamar
- NetWorker
- ProtectPoint
- DD Boost for Enterprise Apps
- RecoverPoint for VMs
- AppSync
- Data Protection Advisor
- Enterprise Copy Data Management
- SourceOne for Email, Files and Microsoft SharePoint
- CloudBoost
- DP Search

## Data Protection Suite For Backup

**What’s Included:**
- Avamar
- NetWorker
- DD Boost for Enterprise Apps
- Data Protection Advisor
- CloudBoost
- DP Search

## Data Protection Suite For VMware

**What’s Included:**
- Avamar
- Avamar Virtual Edition
- RecoverPoint for VMs
- Data Protection Advisor
- DP Search

## Data Protection Suite For Applications

**What’s Included:**
- ProtectPoint technology
- DD Boost for Enterprise Apps
- Enterprise Copy Data Management
- Data Protection Advisor

## Data Protection Suite For Archive

**What’s Included:**
- SourceOne Email Management
- SourceOne for File Systems
- SourceOne for Microsoft SharePoint

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The combination of components within each Suite offering are hand-picked to meet your data requirements
Data Domain + Data Protection Suite for Backup

Better Together

Average dedupe rate by backup software

- Veeam: 6.0x
- IBM TSM: 6.2x
- CommVault: 7.1x
- Veritas NetBackup: 9.8x
- Veritas Backup Exec: 10.5x
- Dell EMC NetWorker: 15.3x
- Dell EMC Avamar: 38.2x

Based on >12,000 OF data domain systems deployed worldwide
INTEGRATED HARDWARE & SOFTWARE
Integrated Data Protection Appliance

Fast and modern
Converged and comprehensive
High value and low cost

20% Faster
10X Faster Time to Protect
55:1 Avg Deduplication Rate

Scale 34TB – 1PB

Copy storage
Backup software
Flash
Search & analytics
Backup servers
Backup storage
# IDPA – Maximum Choice & Flexibility

<table>
<thead>
<tr>
<th></th>
<th>MID-SIZE &amp; ROBO</th>
<th>MID-SIZE ENTERPRISE</th>
<th>LARGE ENTERPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BACKUP INGEST</strong></td>
<td>DP4400 9 TB/hr</td>
<td>DP5300 24 TB/hr</td>
<td>DP8300 41 TB/hr</td>
</tr>
<tr>
<td></td>
<td>DP5800 32 TB/hr</td>
<td>DP8800 68 TB/hr</td>
<td></td>
</tr>
<tr>
<td><strong>LOGICAL CAPACITY</strong></td>
<td>240 TB to 4.8 PB(^1)</td>
<td>340 TB to 6.5 PB(^1)</td>
<td>1.9 to 36 PB(^1)</td>
</tr>
<tr>
<td></td>
<td>720 TB to 14.4 PB(^2)</td>
<td>960 TB to 14.4 PB(^1)</td>
<td>5.7 to 108 PB(^2)</td>
</tr>
<tr>
<td><strong>USABLE CAPACITY</strong></td>
<td>24 to 96 TBu(^1)</td>
<td>34 to 130 TBu(^1)</td>
<td>192 to 720 TBu(^1)</td>
</tr>
<tr>
<td></td>
<td>72 to 288 TBu(^2)</td>
<td>Up to 864 TBu(^1)</td>
<td>Up to 2.16 PBu(^2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>96 to 288 TBu(^1)</td>
<td>Up to 1 PBu(^1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up to 864 TBu(^2)</td>
<td>Up to 3 PBu(^2)</td>
</tr>
</tbody>
</table>

1 Total capacity on active tier only
2 Total capacity with cloud tier for long-term retention
3 Logical capacity based on 10x to 50x deduplication
Simplicity is a Converged Solution

DELL EMC DP4400

Backup servers & storage
Search & analytics¹
Cloud DR + LTR

2U and 10x¹ faster
Easy to deploy & upgrade

Days

Backup software
System management
NVMe flash

Densest 2U appliance—up to 20% more capacity²

24TB–96TB
+ 192TB with cloud
without additional HW

¹Based on Dell EMC internal testing, May 2018, compared to traditional deployments. Actual results will vary.
²Based on Dell EMC internal analysis, May 2018, using Rubrik’s and Cohesity’s published data. Actual results will vary.
DP4400 Configuration Details

- Available in 12TB Increments
  - 24TB, 36TB, 48TB, 60TB, 72TB, 84TB, 96TB
  - Any capacity point can be ordered from the factory
  - Can be upgraded to any supported capacity point in the field

- All Required Hardware is Shipped at New Purchase
  - Upgrades and field options only require license enablement

- Networking: 10GbE SFP+ optical (negotiates to 1GbE)

- DP4400 Licensing via ELMS Portal
Easy and Fast Deployment
Appliance Configuration Manager Install Wizard
Modern and simplified customer experience

- Centralized Protection Experience
- Modern HTML5 UI
- VMware vSphere Plugin
- Customized Dashboards / Widgets
WHY Dell EMC for data protection

• Data Protection Everywhere
  • One vendor delivering simplicity, flexibility, and investment protection

• Market & Technology Leadership
  – #1 In Deduplication
  – #1 In Purpose Built Backup Appliances
  – #1 In Combined Data Protection Software & Storage
  – #1 In Replication
  – Isolated Recovery Solutions

• Unparalleled Investment
  • $16.5B cumulative R&D investment, $17B in technology acquisitions
  • 4,000+ team members dedicated to helping our customers