

Dell EMC Unity & SC Series: Midrange Storage Portfolio Overview

GLOBAL SPONSORS



Microsoft

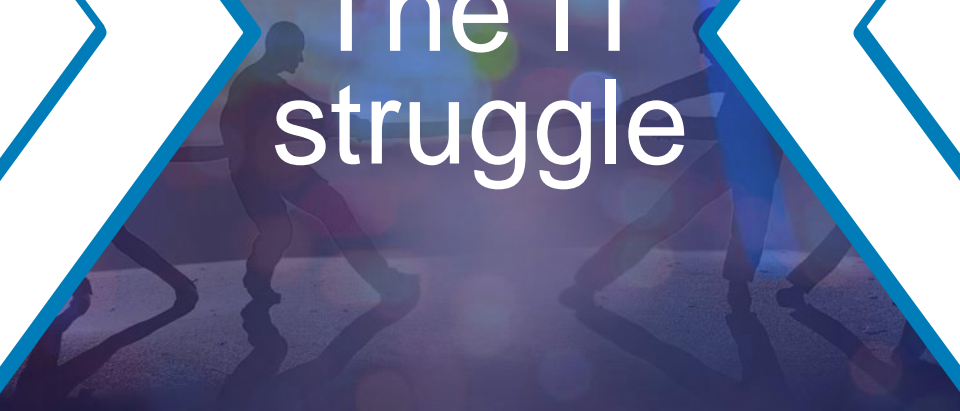
Internal Use - Confidential

DELLEMC/Forum

& agility

Innovation

The IT struggle



Traditional

APPLICATIONS

Cloud-native

APPLICATIONS

IT INVESTMENT \$\$

IT Transformation
Optimize IT For The Business

Digital Transformation
IT Is The Business

2000

2015

2030

Internal Use - Confidential

What the Research shows

Achieving Stage 4 IT Transformation leads to:

6x Faster Time
To Provision

8x More Coop
With LOB

2x More Likely
To Beat Earnings

4x Faster App
Delivery

3x IT Projects Ahead
Of Schedule

14% Cost Reduction
For Critical Apps

\$44M More On New
Innovation Projects

Where to begin

3 Phase Transformation Process

MODERNIZE

- Leverage Modern Infrastructure
- Right tool for the job
- Simple & Powerful

AUTOMATE

- Self-service provisioning capabilities
- Running IT like a service provider/public cloud

TRANSFORM

- With Senior Exec Support
- Transform
 - People
 - Process
- Business & IT Alignment

Internal Use - Confidential

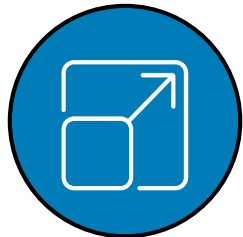
Foundation of the Modern Data Center



All Flash

Reduce costs (# of drives, power, floor space, more)

Consistent and predictable performance



Scale-Out

Lower entry costs and scale as you grow

Manage massive capacity with fewer resources



Software-Defined

Automated provisioning and business agility

Flexible and programmable data services



Cloud-Enabled

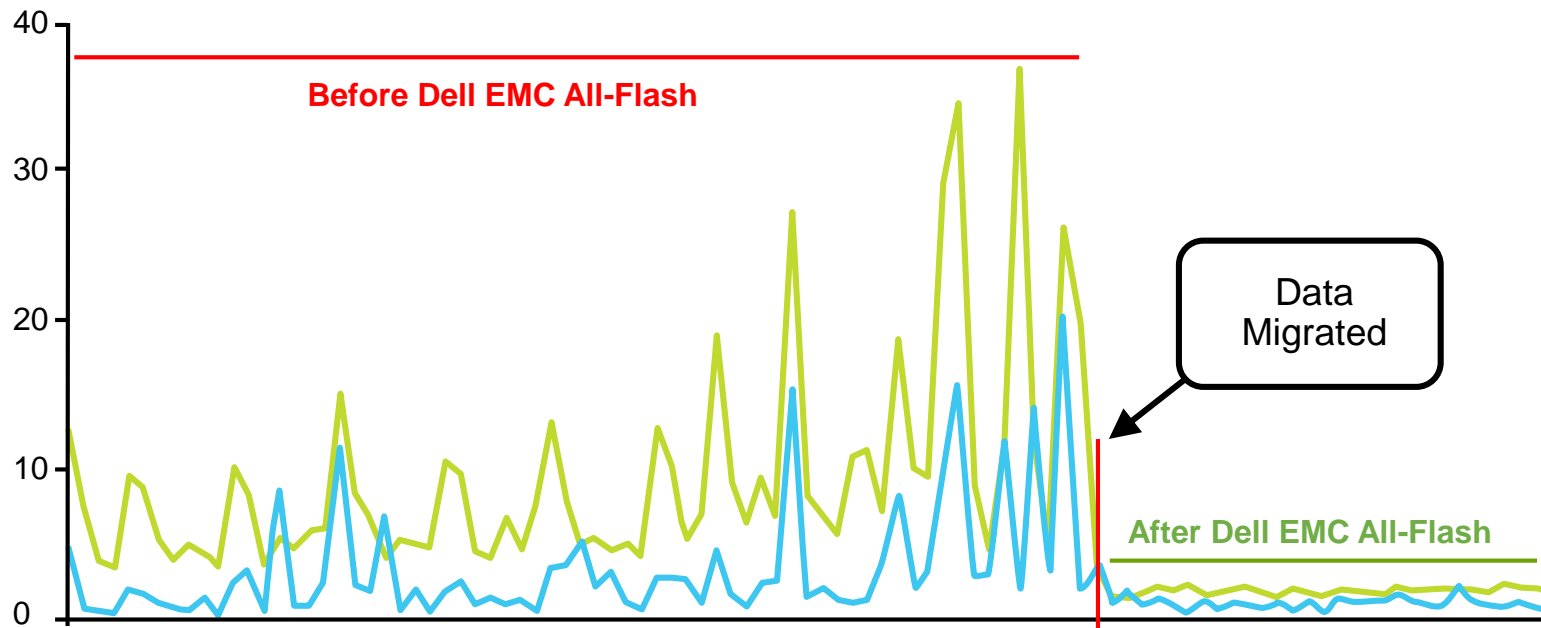
Policy driven service delivery

On/off premises data and/or application mobility

Protection and Trust

Security/Governance | Encryption | Data Protection | Services/Support

Sudden impact of All Flash on applications



Internal Use - Confidential

The new Dell EMC Midrange Family

The diagram illustrates the Dell EMC Midrange Family architecture, divided into two main sections: the SC Series and the Dell EMC Unity series.

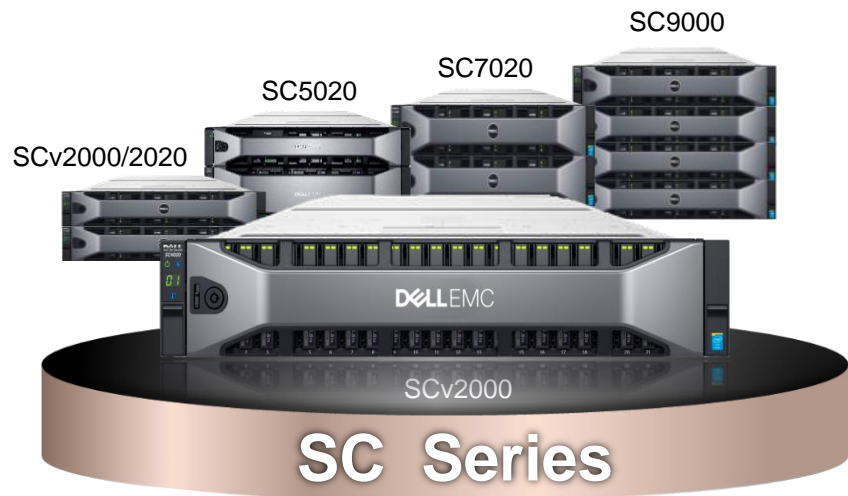
SC Series: This section features a large Dell EMC SCv2000 storage unit in the foreground. Behind it, several other SC Series units are shown, including SC5020, SC7020, and SC9000. A smaller SCv2000/2020 unit is also visible. The SC Series is associated with the CloudIQ MANAGEMENT logo.

Dell EMC Unity: This section features a large Dell EMC Unity 300/350F storage unit in the foreground. Behind it, several other Unity units are shown, including Dell EMC Unity 600/650F, Dell EMC Unity 500/550F, and Dell EMC Unity 400/450F.

COMMON TOOLS FOR MANAGEMENT, MOBILITY & PROTECTION: A large blue arrow points from the SC Series towards the Dell EMC Unity series, indicating shared capabilities. Below this arrow, several logos are displayed, representing tools for management, mobility, and protection:

- POWERPATH
- Internal Use - Confidential
- VPLEX
- RECOVERPOINT
- AVAMAR NETWORKER
- DATA DOMAIN

SC Series Hybrid-Flash value



**MOST ECONOMICAL
STORAGE SOLUTION**



**MIXED MAINSTREAM
WORKLOADS**



**SCALABLE GENERAL
PURPOSE STORAGE**

Internal Use - Confidential

SC Series flexible Hybrid-Flash configurations



ALL HDD

ALL FLASH

All Flash,
Some Flash
or No Flash

Start with one
configuration,
convert to another

Designed to fit all
block workloads
and budgets

Internal Use - Confidential

SC Series Hybrid-Flash family

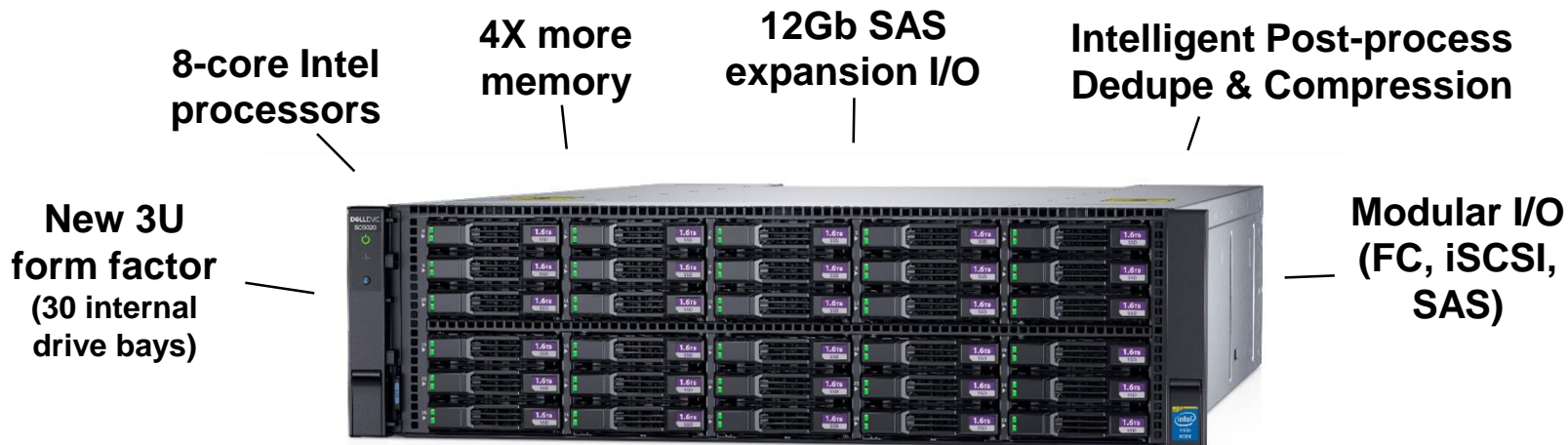
672TB 168 drives  SCv2000/2020	1PB 192 drives  SC4020	2PB 222 drives  SC5020	3PB 500 drives  SC7020	4PB 1024 drives  SC9000
--	--	--	--	---

Memory/Proc.	16GB, 2.5Ghz 4c	32GB, 2.5GHz 4c	128GB, 2.4GHz 8c	256GB, 2.5GHz 8c	512GB, 3.2GHZ 8c
Network I/O	FC, iSCSI, SAS	FC, iSCSI, SAS	FC, iSCSI, SAS	FC, iSCSI	FC, iSCSI, FCoE
Data reduction	NA	Intelligent deduplication & compression (SSDs and HDDs)			
Multi-array	Repl. (SCv)	Replication (SC, multi-hop), federation, DR / Business Continuity			
Tiering	Single Tier	Full auto-tiering (1-3 tiers), 0-100% flash (Hybrid)			
Management	Dell Storage Manager, 3rd-party integrations, QoS, VVols				
Architecture	Dynamic RAID tiering, "thin" snapshots, virtualized page pool				

**DIP upgrade
from SC4020**

Internal Use - Confidential

The new Dell EMC SC5020



Accelerate your workloads, automate your cost savings



Major upgrade to popular SC4020

- ✓ Up to 45% more IOPS than SC4020
- ✓ 3X bandwidth, 2X capacity
- ✓ Lower install cost (ProDeploy)
- ✓ Federation, Business Continuity
- ✓ Data Progression, RAID tiering

Internal Use - Confidential

SC5020: More I/O flexibility, redundancy

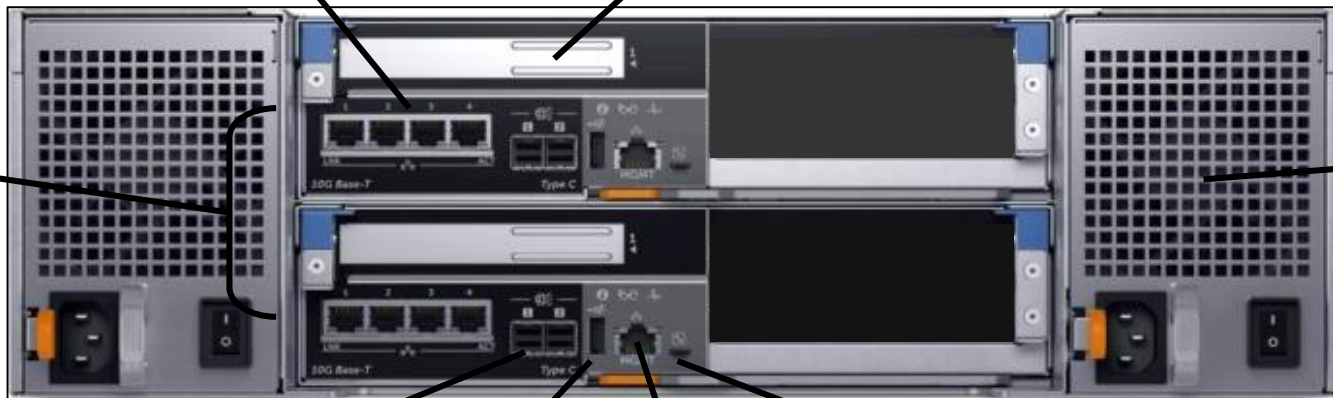
Mezzanine options

(4) 10Gb iSCSI SFP+
(4) 10Gb iSCSI Base-T

PCIe options

(2, 4) 16/32Gb Fibre Channel
(4) 12Gb SAS
(2, 4) 10Gb iSCSI SFP+
(2) 10Gb iSCSI Base-T

Dual
hot-swap
controllers



Dual
hot-swap
PSUs

(2) Mini-SAS-HD
X4 12Gb SAS

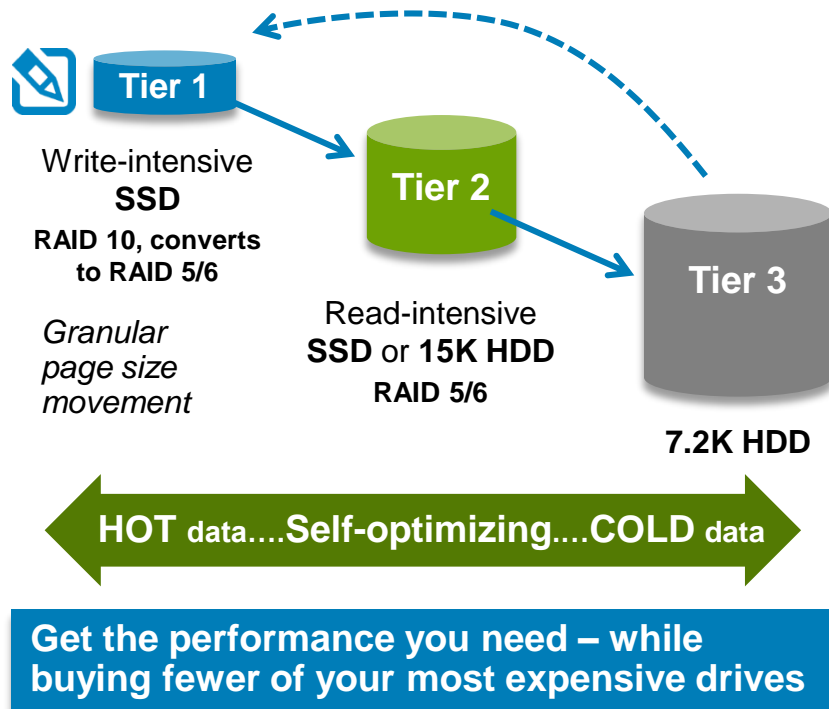
Internal Use - Confidential

USB

1Gb Mgmt. LAN

Micro USB /
Serial Debug

Granular auto-tiering (data progression)



Internal Use - Confidential

Achieve simultaneous performance and cost goals

- Directs ALL incoming writes to Tier 1 drives at fastest RAID levels
- Moves inactive data to lower-cost drives, space-efficient RAID levels

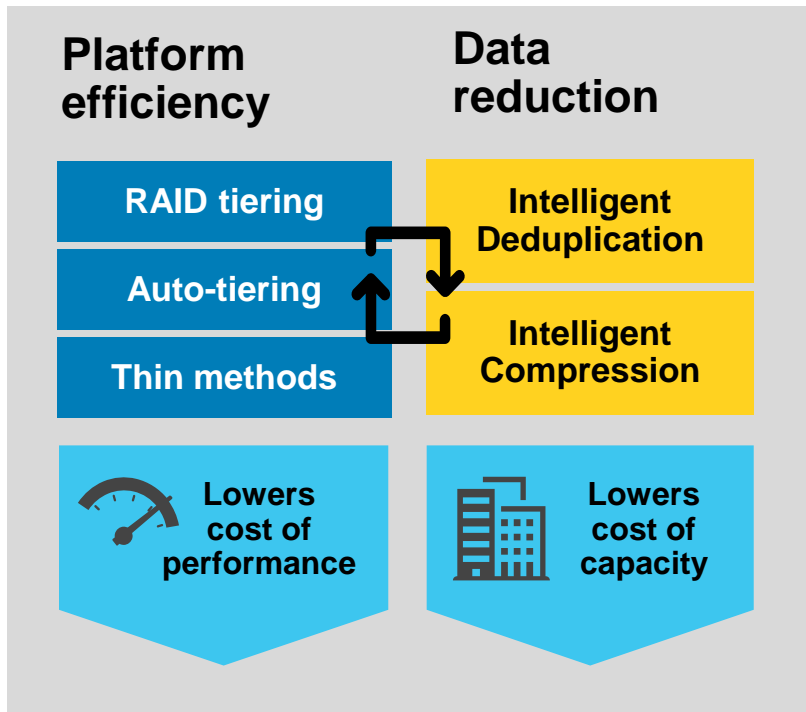
Enables cost-effective all-flash and hybrid solutions

- Separates reads from writes

Seamless integration with Storage Center OS

- Snapshots, Replication

Intelligent compression and deduplication



- ✓ Automated efficiency methods work together to maximize your savings
- ✓ Post-process operation compresses and dedupes inactive data
- ✓ Delivers the lowest \$/GB with hybrid and data efficiencies

Internal Use - Confidential

SC Series storage efficiency features

Thin Provisioning

Automatically recover free space. On average, customers reduce storage by 2.3x

Thin Clones

Create clones from replays with no additional copies. Perfect for cloning Virtual servers or virtual desktops

Thin RAID

Dynamic RAID provisioning, no need to pre-allocate. Use the performance of ALL the drives in your array for any RAID level, anytime

RAID Tiering

Write data at RAID 10, then automatically convert to RAID 5/6 *on the same drives*. Performance of RAID 10 @ cost of RAID 5/6

Deduplication

Data reduction on an average of 4:1 and up to 10:1 for VMWare environments

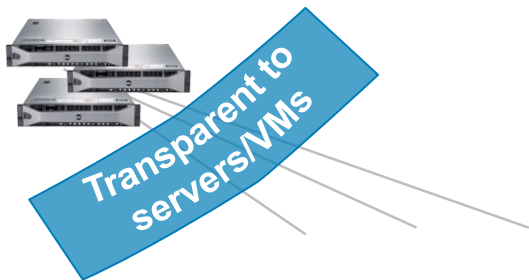
Thin Writes

Pattern recognition reduces writes on thick provisioned volumes and VMs

Compression

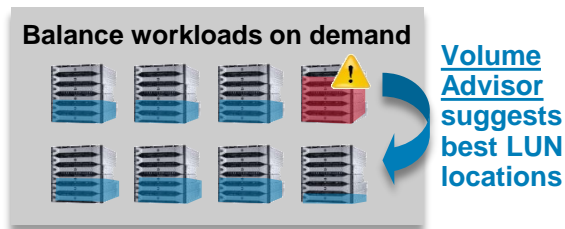
An average of ~60% in MS environments of data reduction on data that is compressed

Live Volume Federation: Scale, DR, migrate, & more



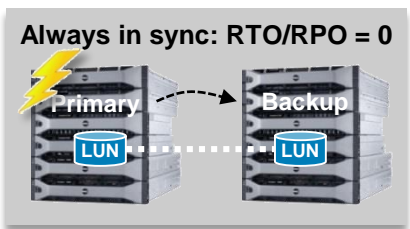
Virtualized LUN mapping allows moving LUNs between systems without interrupting workloads

Federated systems



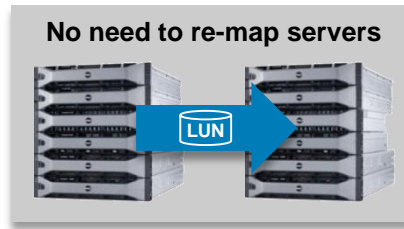
Easy optimization of multiple arrays under unified management

Disaster recovery



Auto-failover to 100% synchronized backup volumes

Data migration



Move volumes seamlessly between arrays

Internal Use - Confidential

Investment protection: Cross platform replication



SC SERIES



PS SERIES



SC SERIES

Internal Use - Confidential



VMAX

XTREMIO



Dell EMC Unity

Built-in migration



Migrates LUNs (no snaps) from PS and MD series to SC series



Built-in solution: self-service without requiring any third party tool



Offers both offline and online thin import depending on use case



Online minimally disruptive: requires unmount and mount

Internal Use - Confidential

Harnessing a Cloud of opportunity

Opportunity:

With the cloud services market continuing to grow, Itconic wanted to create a highly flexible platform on which to bring cloud IT to its customers.

Solution:

The company deployed a Dell end-to-end solution featuring Dell PowerEdge servers and Dell Storage SC Series arrays with Intel® Xeon® processors, and Dell Networking technology. Dell ProSupport helps maximize uptime.

Results:

Supports innovation for customers through flexible IT

Drives up to 50 per cent business growth with cloud services offering

Achieves 50 per cent saving on cost of alternative switching technology

Avoids vendor lock-in to **maintain efficiencies**

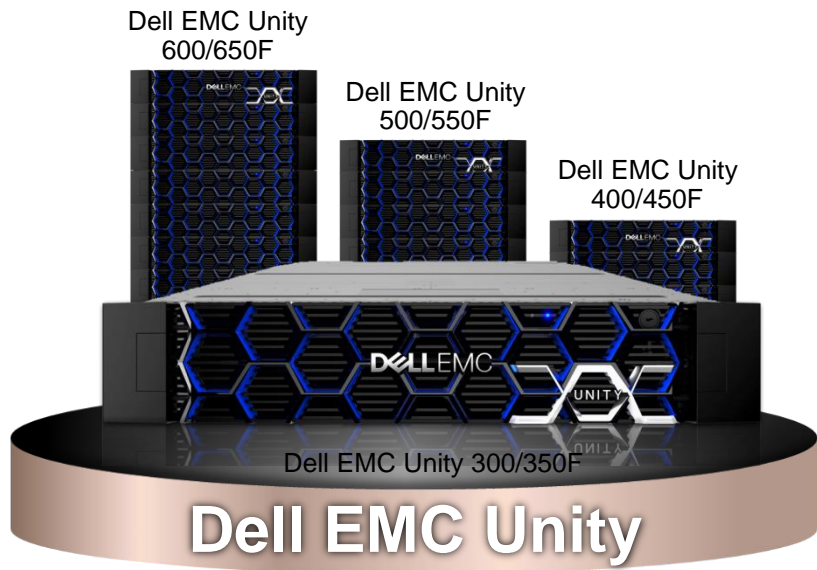
Ensures enterprise-class client services with **responsive support**



We gained a future-ready network for our cloud services by working with Dell. Our goal from the start was to avoid any technology that would limit the business in the future.

— José Ignacio López García, Head of Cloud Services, Itconic

Dell EMC Unity's All-Flash value



**CONSISTENT
RESPONSE TIME**



**SIMPLE TO SETUP,
MANAGE AND USE**



**NEW USES & APPLICATION
OPPORTUNITIES**

Internal Use - Confidential

The Dell EMC Unity All-Flash line-up

Covered In-Depth in
"Storage.40 Dell EMC Unity:
All Flash What's New"

Optimized for All-Flash Performance and Simplicity



All-Flash Storage
Efficiency Guarantee
Use - Confidential

MORE FIREPOWER

4 NEW ALL FLASH BROADWELL MODELS

Up to 40% more cores; 2X the memory

SUPER DENSE DISK SHELF

500TBe per rack unit All-Flash density

New 80 drive 3U disk shelf

4X MORE FILE POWER

256TB File System

Compression (inline) for both Block & File

INTEGRATED COPY DATA MANAGEMENT

AppSync support and snapshot mobility

Combined with thin clones - application integration for iCDM

Block snapshot archive to Cloud

DYNAMIC POOLS

New advanced RAID technology

Enables single-drive expansion and faster rebuilds

SECURE

D@RE External Key Manager

More firepower









Grow with Dell EMC Unity All-Flash



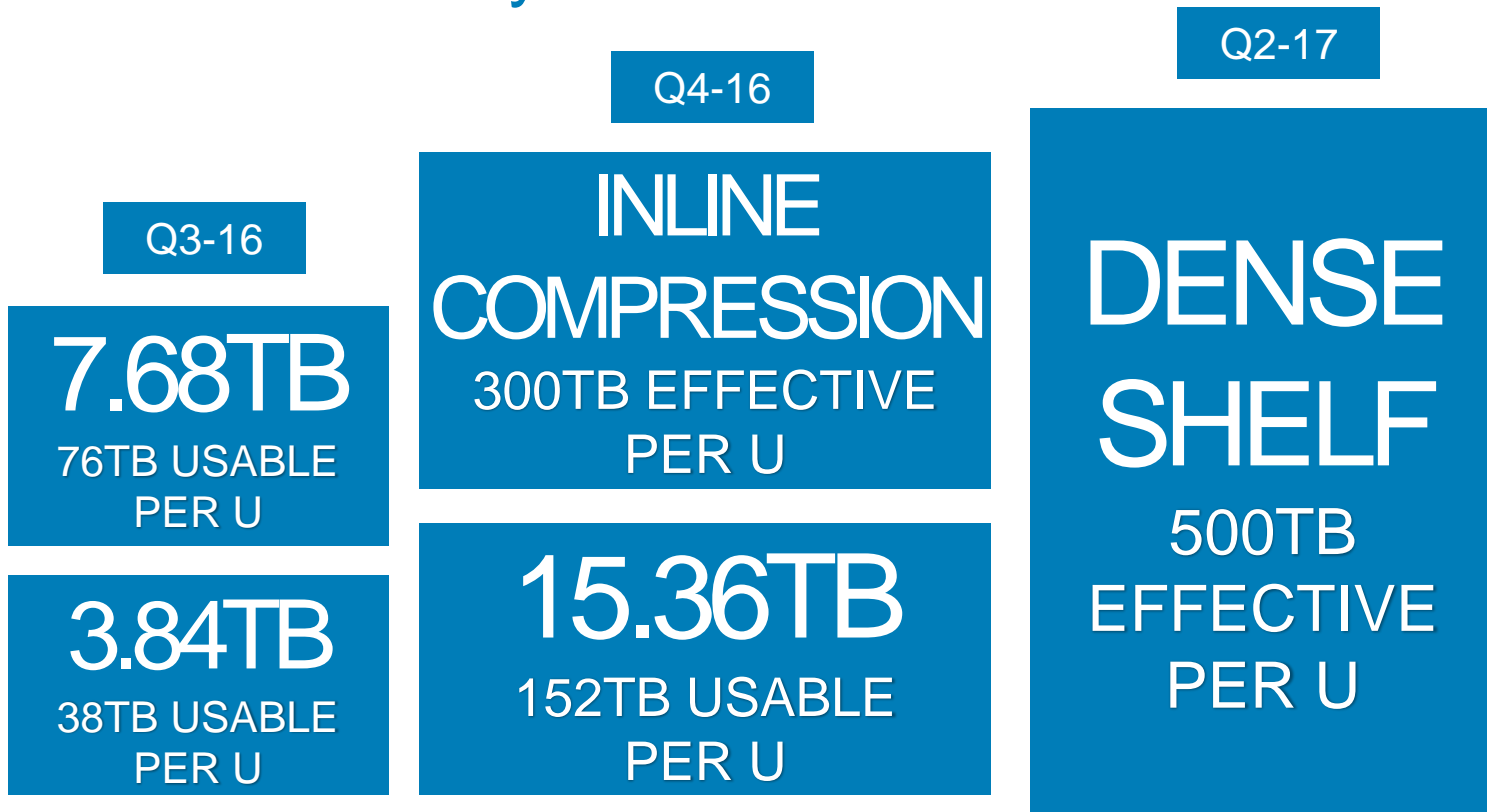
PROCESSOR	6c / 1.7GHz 96 GB Memory	10c / 2.2GHz 128 GB Memory	14c / 2.0GHz 256 GB Memory	14c / 2.4GHz 512 GB Memory
CAPACITY	150 Drives 2.4 PB	250 Drives 4 PB	500 Drives 8 PB	1000 Drives 16 PB
LUN	1000 256 TB	1500 256 TB	2000 256 TB	6000 256 TB
FILE SYSTEM	1000 64 TB → 256 TB	1500 64 TB → 256 TB	2000 64 TB → 256 TB	4000 64 TB → 256 TB
VVOL	9000 64 TB	9000 64 TB	13500 64 TB	30000 64 TB

Use - Confidential

Dell EMC Unity: Architected for All-Flash

-  3D TLC NAND flash drive
-  Multi-core optimized for best CPU utilization and low latency
-  Intelligent flash wear leveling
-  Zero impact drive firmware based garbage collection
-  Per object in-memory log for consistent low response time
-  Write coalescing with full stripe writes to minimize IO
-  Inline compression
-  Mix different flash drive types and capacities for lowest cost

Unmatched Flash density



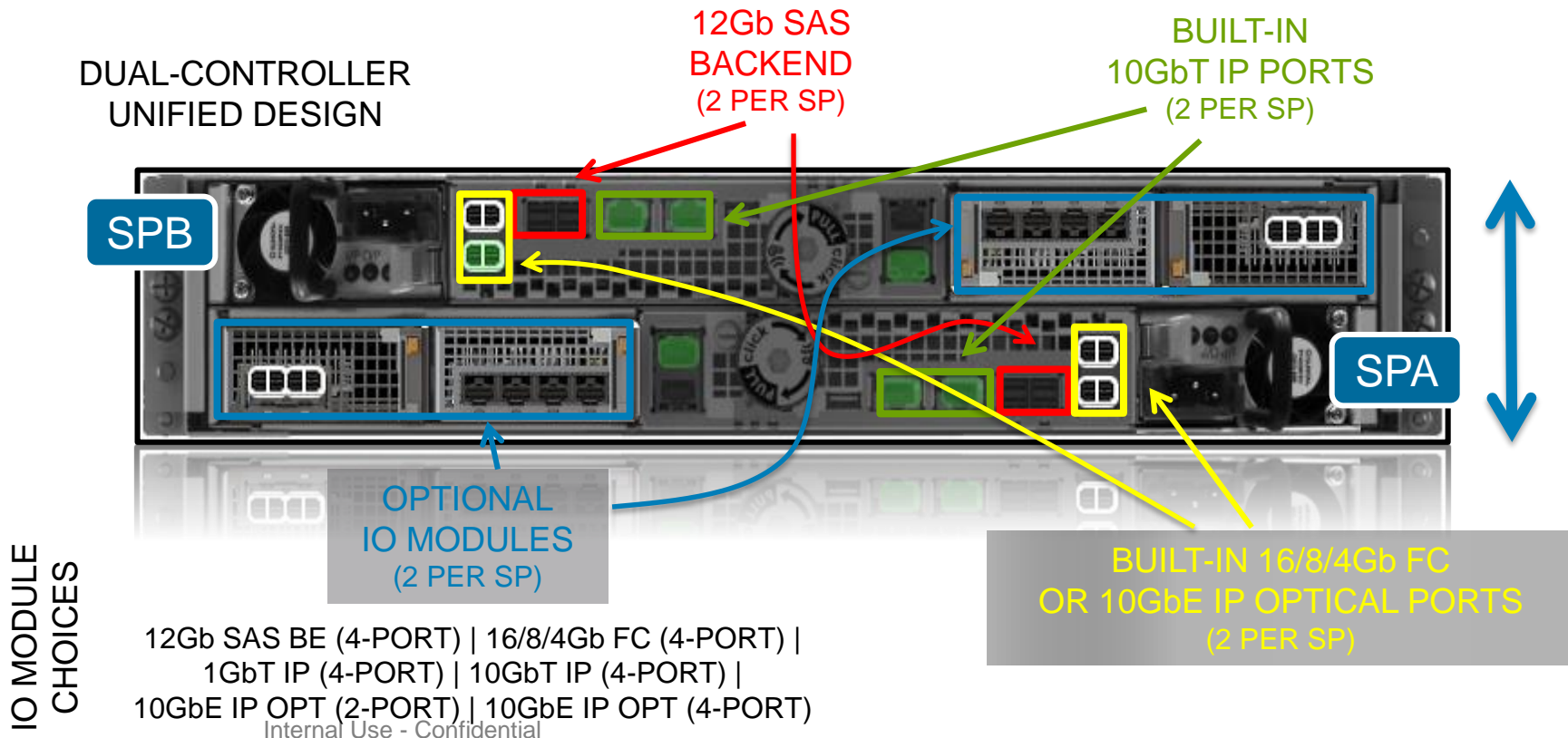
Internal Use - Confidential

Intelligent wear leveling for Flash drives

- ✓ Wear information of Flash drives propagated up the software stack to other Dell EMC Unity OE software components
 - ✓ Slice allocation requests now take into account wear level
 - ✓ Wear information is propagated at the RAID Group level per storage resource
 - ✓ Decide which RAID Group to allocate new slices to balance wear across other RAID Groups
 - ✓ Dell EMC Unity's additional Intelligence
 - ✓ Wear leveling is implemented to extend the life of flash drives and the algorithm ensures that the flash drives within a private RAID group wears evenly
 - ✓ Dell EMC Unity has implemented additional SSD replacement procedure to account for this behavior
- ✓ Wear alerts are generated at 180, 90, and 30 days
- ✓ Proactive copy (PACO) is automatically initiated at 30 days to spare drive

Unified architecture: Installs in <30 minutes

DUAL-CONTROLLER
UNIFIED DESIGN

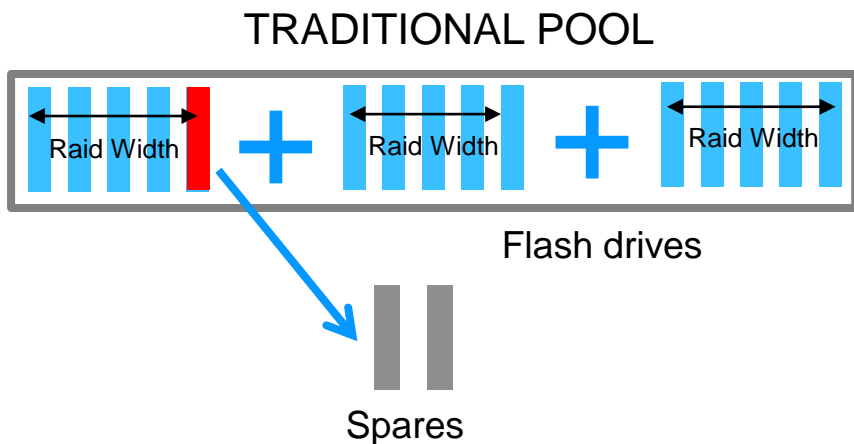


Internal Use - Confidential

Dell EMC Unity All-Flash array: Dynamic Pools

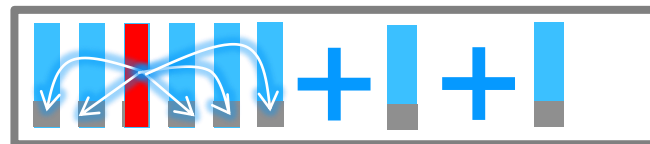
Q2
2017

Maximize performance & efficiently save space and budget



Internal Use - Confidential

DYNAMIC POOL



Flash drives

Distributed sparing and more flexible pool size

ADD SINGLE
DRIVE TO
POOL

HIGHER
SPACE
UTILIZATION

FASTER
REBUILD
TIME

SIMPLER
AND
LOWER TCO

Automated iCDM with Dell EMC Unity & AppSync

Minimize copy costs, extend the business value of your AFA storage with app-aware copy data management



AppSync iCDM Starter
Bundle for Dell EMC Unity

Business Challenge: Everyone Needs a Copy



Different stakeholders



Different applications



Different storage



Different destinations



Data protection

Solution: Application-aware Automation

SIMPLE: Copy creation & scheduling across applications with self service for app owners

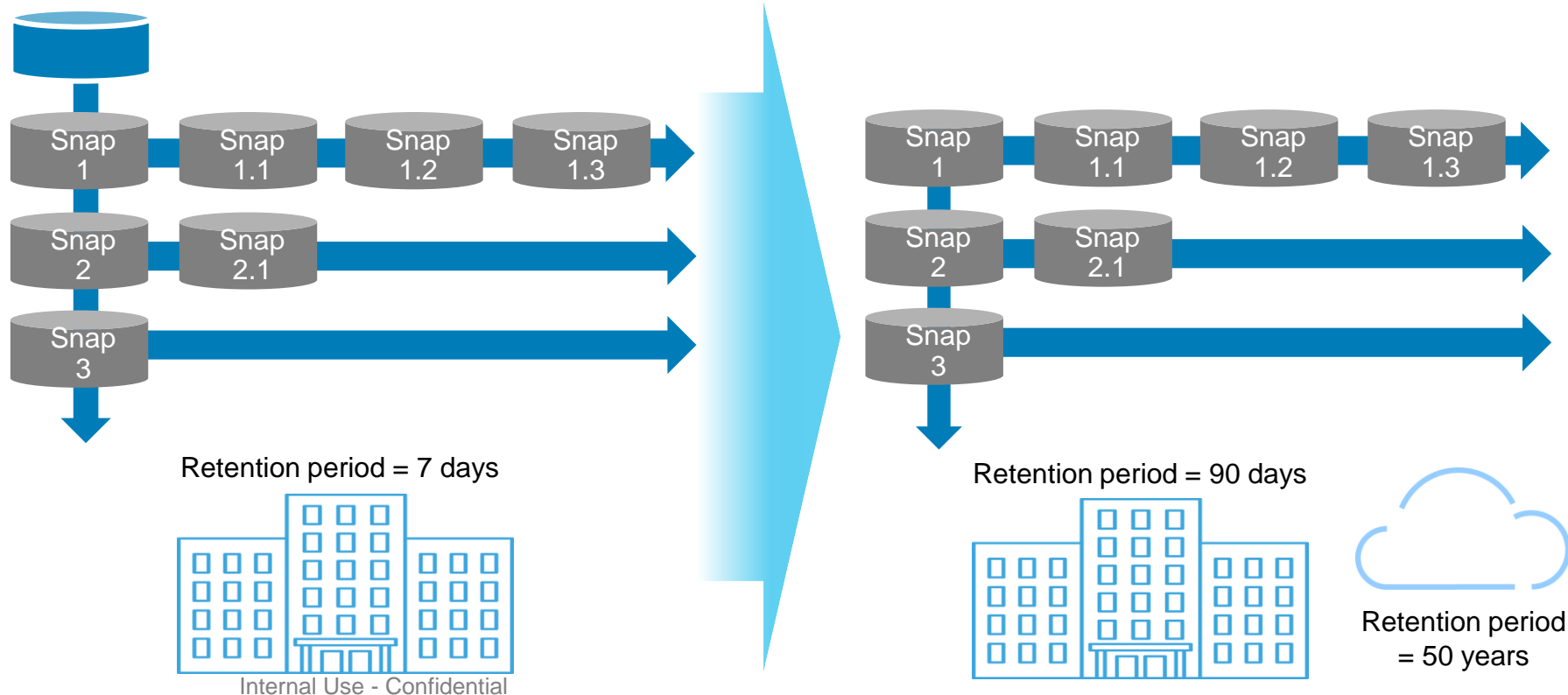
SMART: Automates discovery and awareness of applications & Dell EMC Unity copy/replication services relationship & adapts to changes

FRictionLESS: Everyone is on the same page with a transparent copy workflow

Internal Use - Confidential

Snapshot shipping

Q2
2017



Simple built-in migration from VNX

Q2
2017



FC, iSCSI, NFS & SMB
MIGRATION FROM VNX



BUILT-IN SOLUTION: SELF-SERVICE WITHOUT
REQUIRING ANY THIRD PARTY
TOOL



MIGRATES LUNS,
FILESYSTEMS, QUOTAS, ACLS,
AND EXPORTS



TRANSPARENT TO FILE
APPLICATIONS, MINIMALLY
DISRUPTIVE FOR BLOCK

Internal Use - Confidential

DELL EMC

Scalable enterprise file system

4x more File Power!

Q2
2017

Addresses traditional and transactional NAS use cases



256 TB SCALE-UP FILE SYSTEM

Scales to 256TB usable capacity per file system with higher overall limits



INLINE COMPRESSION

Pointer based snaps with simple space reclaim and low IO impact



FILE SYSTEM SHRINK

Reclaim free blocks and shrink file system to reflect new capacity



NEW VMDK IMPLEMENTATION

Independent VMDK clones with up to 256 clones across multiple levels



SPACE EFFICIENT SNAPSHOTS

Pointer based snaps with simple space reclaim and snap mobility to remote site



SIMPLIFIED QUOTAS

User and Tree Quotas with ability to change online



FAST FAILOVERS

In-memory log replay for fast non-disruptive failovers

Policy-based cloud tiering using CTA

Free up capacity with the benefits of cloud economics

- Reduce backup windows
- Improve TCO
- Physical, Virtual, HA



Archive 'cold' data to cloud

FILE TIERING &
SNAPSHOT ARCHIVE



**AUTOMATIC
POLICY-BASED**

**PUSH OUT SELECTED DATA
BASED ON-POLICIES**

**TRANSPARENT,
NON-DISRUPTIVE**

**NO CHANGE TO APPS; NO
IMPACT TO USERS**

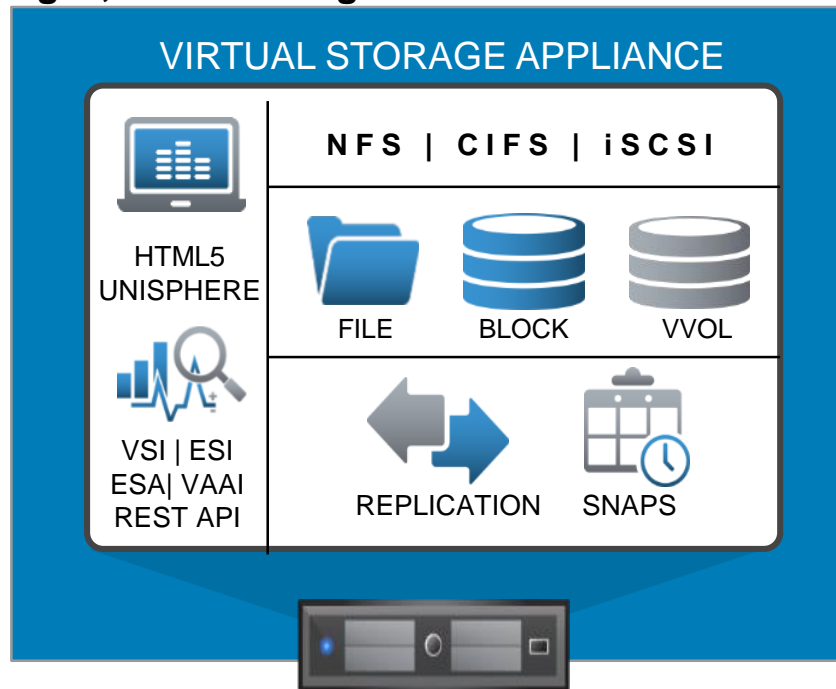
**ON DEMAND
RECALL**

**EASILY RECALL DATA
WHEN NEEDED**

Internal Use - Confidential

Software Defined, Dell EMC Unity VSA

Agile, virtual storage



Internal Use - Confidential
VMWARE ESX

COMMUNITY EDITION



Easy In-Place Upgrade



PROFESSIONAL EDITION

- COMMUNITY SUPPORT
- FREE DOWNLOAD
- 4TB CAPACITY LIMIT

- EMC SUPPORT
- SUBSCRIPTION LICENSE
- 10TB | 25TB | 50TB

USE CASES

TEST DEV | RAPID DEPLOYMENT

REMOTE BRANCH OFFICES | LOW-COST STORAGE
RETAIL | EDUCATION | HEALTHCARE | CLOUD | NAS
IN SOFTWARE DEFINED INFRASTRUCTURE
(SCALEIO OR VSAN)

Supply chain experts streamline logistics management with Dell EMC Unity



Challenges

- Data growth overloading legacy storage
- Poor application performance sapping employee productivity

Solutions

- Dell EMC Unity
- VMware vSphere

Applications

- Microsoft SQL Server & Dynamics
- Manhattan Associates
- TMW Systems

Results

- **Improved** I/O performance by **1,600 percent**
- **Reduced** heavy-duty reporting from four minutes to 30 seconds
- **Simplified** LUN reconfiguration from 24 hours to nearly instantaneous
- **Shrunk** data center footprint from 20 **to two rack units**



"People notice how much faster everything is now. They don't need to sit around waiting for reports anymore."

John Zei
Senior Director of IT Services

Internal Use - Confidential *"Everyone is more productive."*

Dell EMC Unity delivers

Flash Efficiency

- *Inline compression*
- *Dynamic Pools*
- *Very Dense Shelving*
- *Many Drive Types*

Simplifies Management

- *HTML5 UI, CLI and REST API*
- *Extensive Storage Analytics*
- *Built-In Migration from VNX*

New Enterprise Features

- *Broadwell AFA platforms*
- *256TB file system*
- *Snapshot Shipping*
- *Integrated Copy Data Management*
- *D@RE: Internal & External Key Management*
- *Native Replication*

Product strengths



DELL EMC UNITY

ALL FLASH

- SIMPLE ▪ FLASH DENSITY ▪ INLINE EFFICIENCY
- CONSISTENT RESPONSE TIME ▪ CLOUD TIER

UNIFIED

- UNIFIED FILE & BLOCK ▪ APP, SW DEFINED OR CONVERGED ▪ DATA IN PLACE UPGRADES

Internal Use - Confidential



SC SERIES

HYBRID

- GRANULAR TIERING ▪ 0-100% FLASH
- EFFICIENCY FOR HYBRID

BEST ECONOMICS

- INTELLIGENT COMPRESSION & DEDUPE
- PERSISTENT SOFTWARE LICENSES

SC Series & Dell EMC Unity benefits

Simple	Customer installable and serviceable with CloudIQ™
Inline Compression	Inline compression for balanced cost/performance
Unified	Transactional and traditional file workloads with block
Flexible	Converged, software defined or cloud enabled. DIP upgrades.



Dell EMC Unity



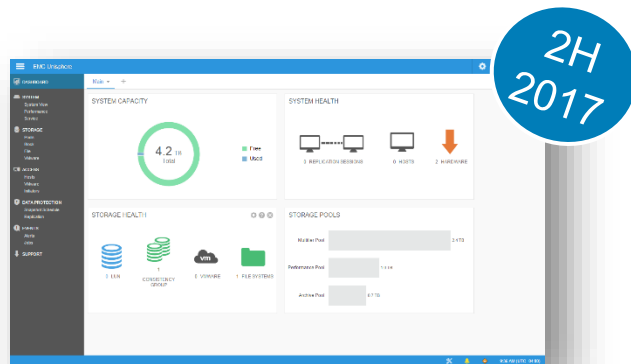
Federated	Scale-up block with the ability to federate arrays
Compression & Deduplication	Post-process compression/dedupe for flash & hybrid max cost savings
SAS Front-end	Option to connect using SAS interconnect
Metro DR	Transparent Metro DR for block with Live Volume Auto Failover



SC Series



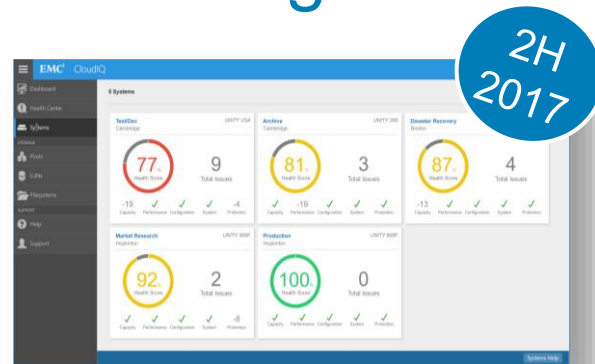
Centralized Cloud and Web-based management



HTML-5 BASED UNISPHERE

- ✓ COMPATIBLE WITH MOST MODERN BROWSERS
- ✓ UNISPHERE STYLE MODERN LOOK AND FEEL
- ✓ NO SEPARATE DOWNLOAD OR INSTALL REQUIRED

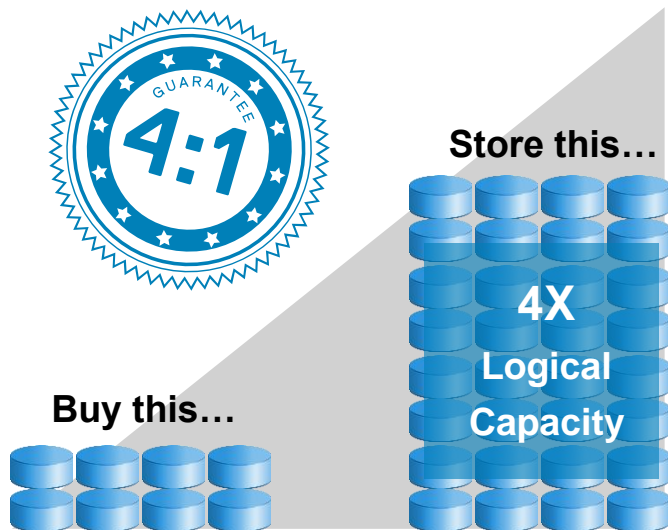
Internal Use - Confidential



CloudIQ

- ✓ CENTRAL SERVICE MONITORING MIDRANGE
- ✓ CLOUD BASED PRO-ACTIVE ANALYSIS AND SUPPORT
- ✓ SUPPORT PLANNING AND OPTIMIZATION

New Dell EMC All-Flash storage efficiency guarantee



- Increase storage efficiency by 75%
- Includes 4 different All Flash arrays
- Proven data efficiency technologies
- No assessment required



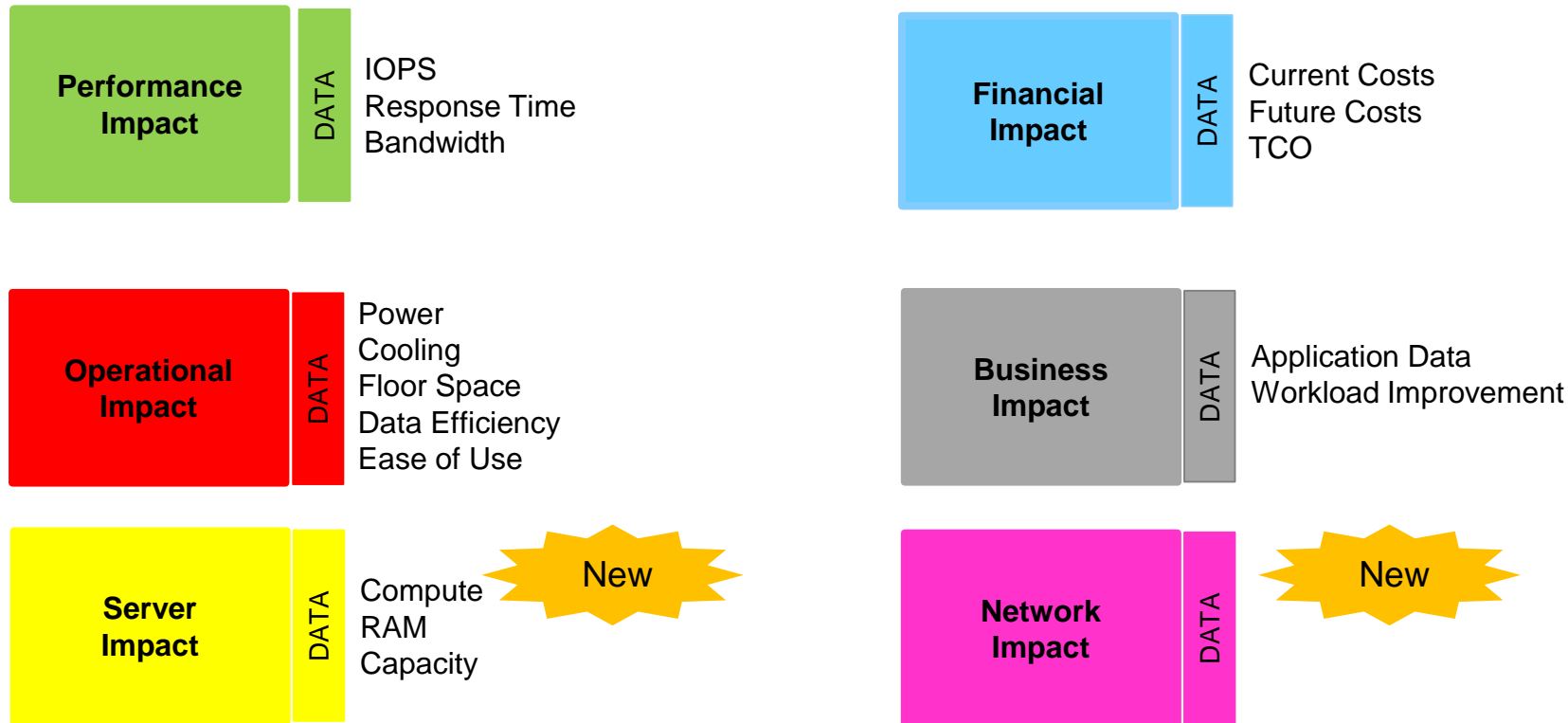
Dell EMC Unity
All-Flash



SC Series
All-Flash

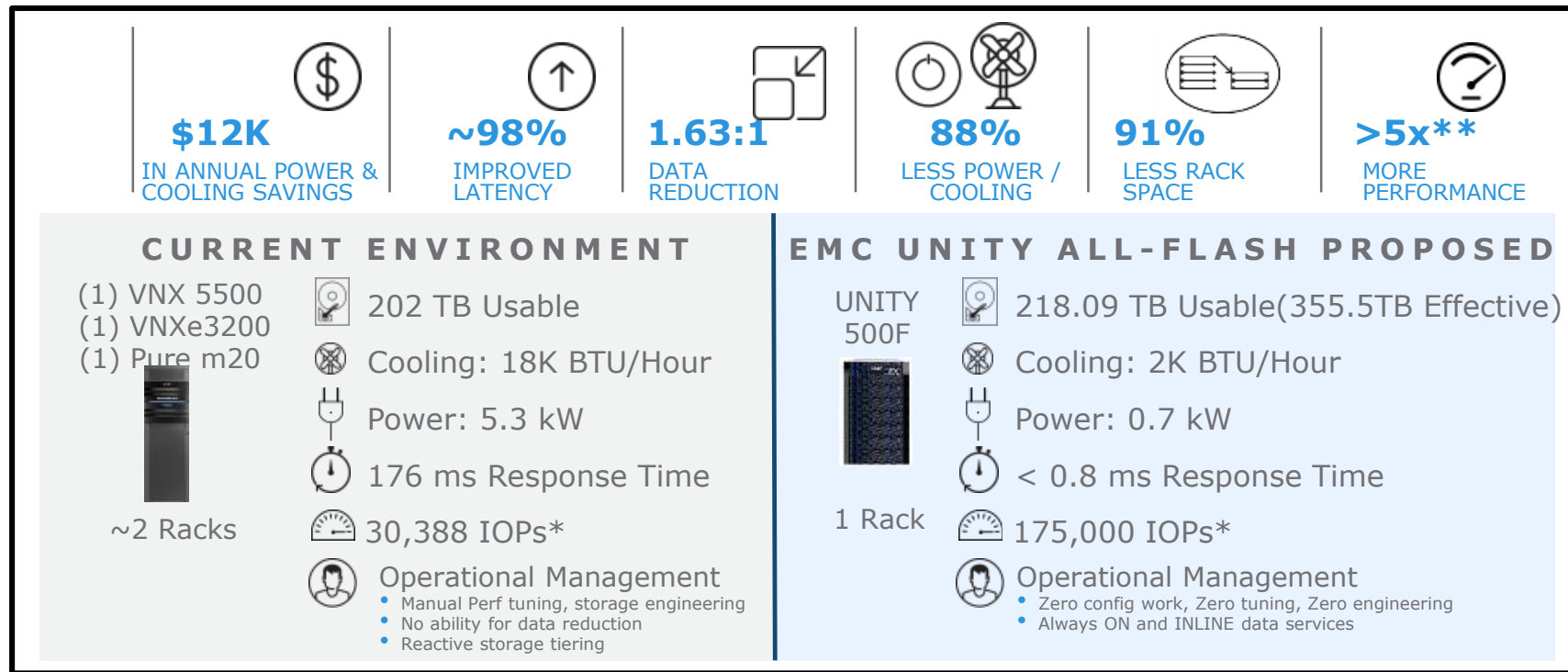
Visit: www.dell EMC.com/4to1guarantee

Modern Infrastructure Assessment



Internal Use - Confidential

Assessment Output Example



Internal Use - Confidential

#GetModern

Our customer commitment

“Because our combination is very complementary... **we are fully committed to, supporting and investing in both Dell EMC Unity and Dell EMC SC.**”



Michael Dell

D~~E~~LL EMC