Dell EMC Ready Solutions for Microsoft S2D

DELLEMC

Mission

Empower every person and every organization on the planet to achieve more.

Our world view

Intelligent Edge
Intelligent Cloud

Solution areas
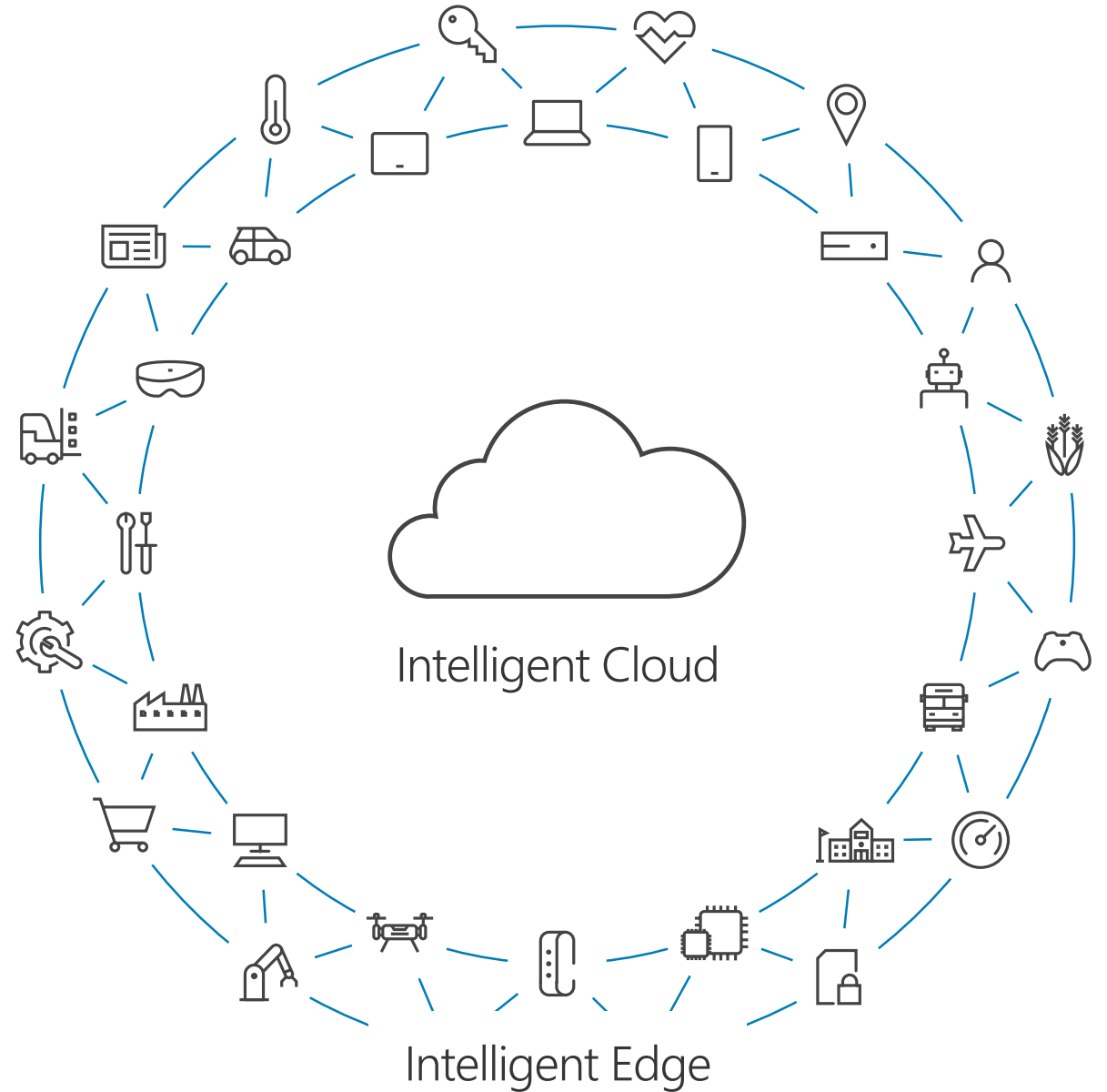
Modern workplace

Business Apps

Apps & Infra

Data & AI

Gaming

Intelligent Cloud

Intelligent Edge
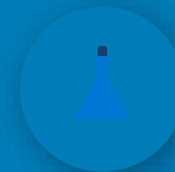
There is a **revolution** happening in the server market.

Ethernet Switches

Misc. Appliances

Hypervisors

Storage Fabric

Storage (SAN)

Ethernet Switches

Standard x86 servers
+
Local drives
+
The magic of software

Traditional "Three Tier" Infrastructure

Hyper-Converged Infrastructure (HCI)

Increasing demand for HCI on Hyper-V

HCI TAM $B

+$3.1B
CAGR: 62%

$4.08

$0.90

CY2015

CY2018
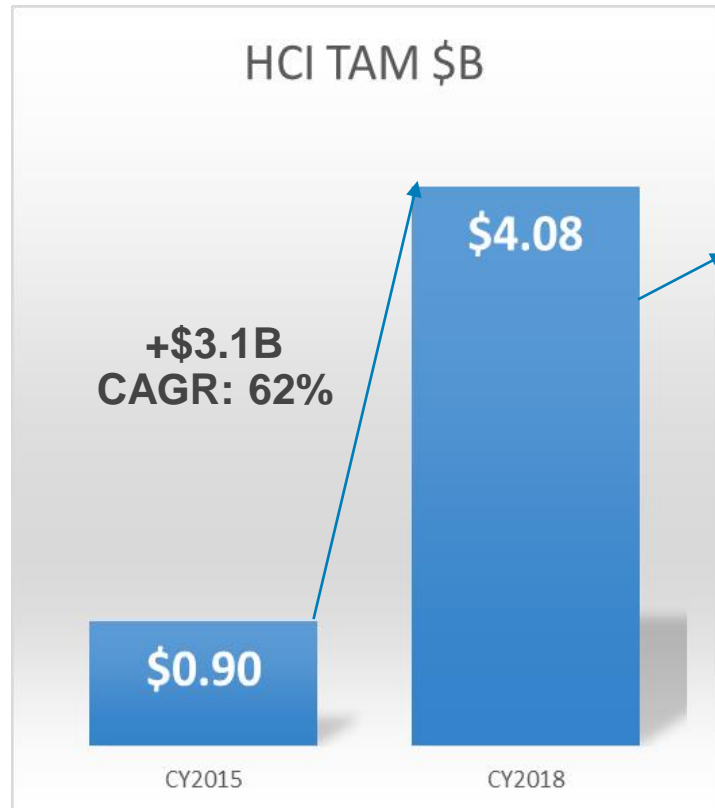
Over 60% of HCI incremental TAM coming from growth in Midmarket segments

VCIO Team info sources: IDC, Gartner, Trefis, Wikibon Survey, Dell internal data (XC series sales)
1. SB (1-99), Lower MM (100-1000), Upper MM (1000-5000), LE (5000+), SP (excl. Telco), Hyperscale (top 10 Hyperscale players);

CY2018 HCI TAM by Primary Hypervisor

KVM/Other
5-10%

Hyper-V
30-40%
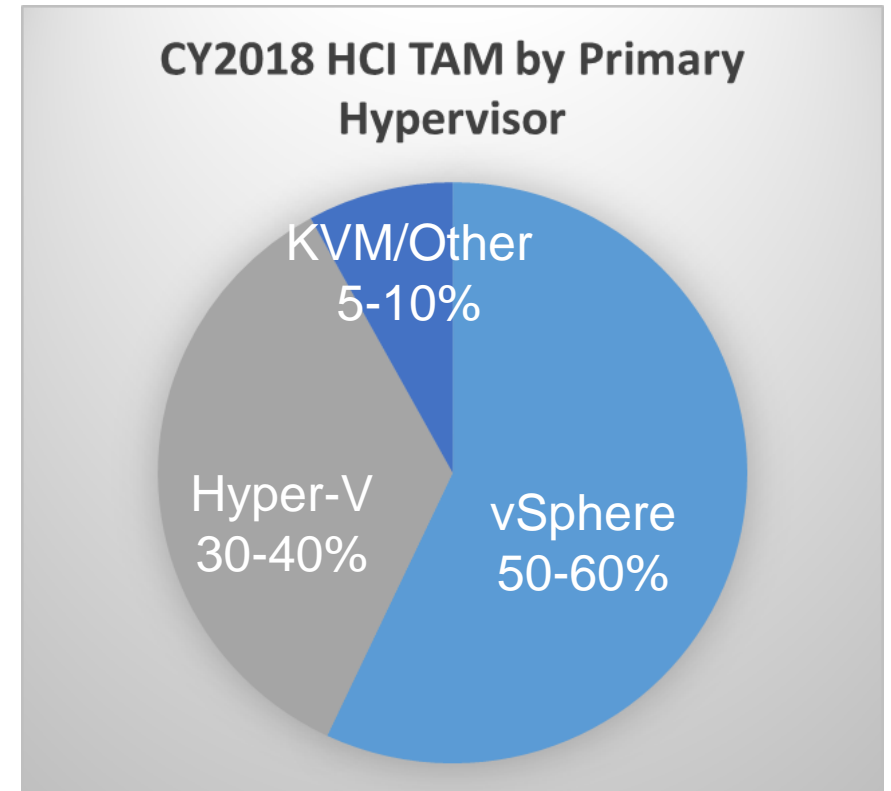
vSphere
50-60%

Leadership in HCI will require competitive vSphere and Hyper-V based offerings

Check also Server Virtualization usage across company sizes
(August 2016) – SpiceWorks (url)

Microsoft

Windows Server: Power your business.

DELLEMC

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Target customers and typical use cases

Midrange and up	Public-sector (tends to be Microsoft heavy)	Customers or managed service providers invested in Microsoft Hyper-V®

Typical Use Cases are customers who want to:

- Continue to use their known, industry-standard Microsoft Windows Server environments

- Upgrade to Windows Server 2016 and take advantage of its improvements

- Upgrade or host data-heavy applications, such as Microsoft SQL Server®, Microsoft SharePoint®, and Virtual Desktop Infrastructure (VDI)

- Deploy end-to-end, HCI client virtualization solutions using Microsoft RDS or Citrix XenDesktop/XenApp

- Improve storage capacity utilization and make storage management and operations more efficient

- Move forward in their virtualization strategies

- Remote Office / Branch Office (ROBO)

- Those with expiring PS/SC/VNX platforms (3/2/1 program)

Microsoft

Windows Server: Power your business.

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Windows Server Editions Summary

Windows Server 2016 Essentials	Windows Server 2016 Standard	Windows Server 2016 Datacenter
Small companies with basic IT needs purchasing a first server; likely small or no dedicated IT department	SMBs that need advanced features, support for distributed office locations, and require a flexible way to virtualize their environment	Companies of all sizes that have demanding IT workloads, require advanced storage, virtualization and application deployment
25 users / **50** devices No server CALs required	**Unlimited**, based on CALs	**Unlimited**, based on CALs
1 physical or virtual[1]	**2** VMs	**Unlimited** VMs
Must be root of domain	**2** Hyper-V containers[2]	**Unlimited** Hyper-V containers
	Unlimited Windows Server containers	Unlimited Windows Server containers
		Storage features including: **Storage Replica & Storage Spaces Direct** ← S2D
		New Networking Stack
		Shielded VMs and Host Guardian Service

Windows Server: Power your business.

Microsoft Storage Spaces Direct overview

- Architecture
  - Shared nothing cluster
  - Smallest fault domain—each Node
  - Dark fiber required for split site cluster

- Fault tolerance

Resiliency	Failure tolerance	Storage efficiency	Minimum hosts
Two-way mirror	1	50%	2
Three-way mirror	2	33.3%	3
Dual parity	2	50-80%	4
Mixed	2	33-80%	4

Node

Chassis

Rack

Site

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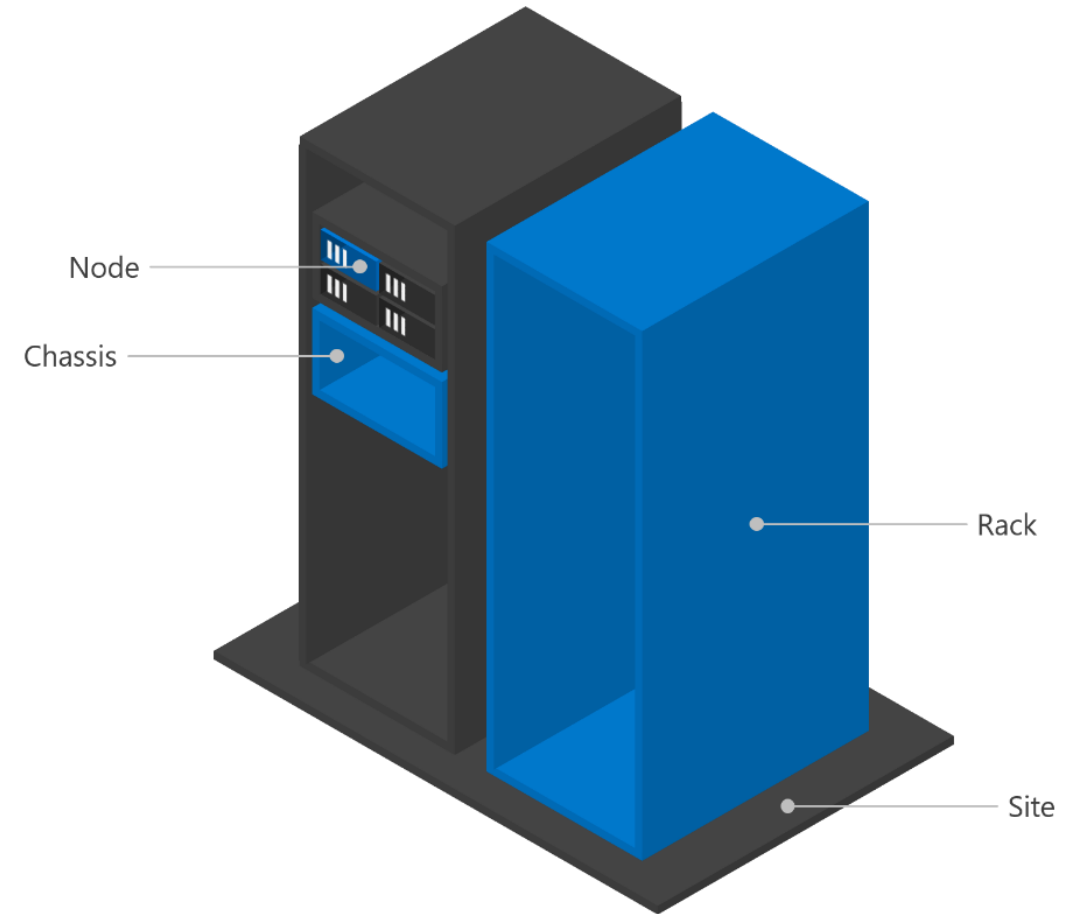
2-Node Cluster

- 2 way mirror
- Lowest cost of entry
- Ideal for branch office scenarios
- Allows scaling out
- Allows failure of 1 node
- Cluster requires external witness for quorum
    - File share witness
    - Cloud witness

3-Node Cluster

- 3 way mirror recommended
- Lower cost of entry
- Allows scaling out
- Allows failure of 1 node and a disk and in some cases 2 nodes
- No external cluster witness required for quorum (but is recommended)
    - File share witness
    - Cloud witness

4-Node Cluster

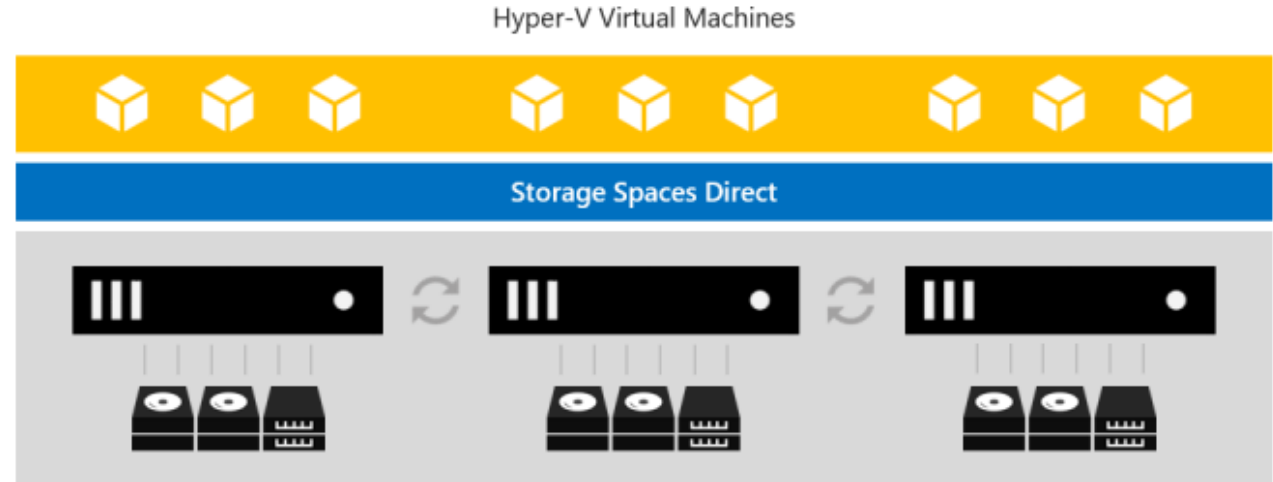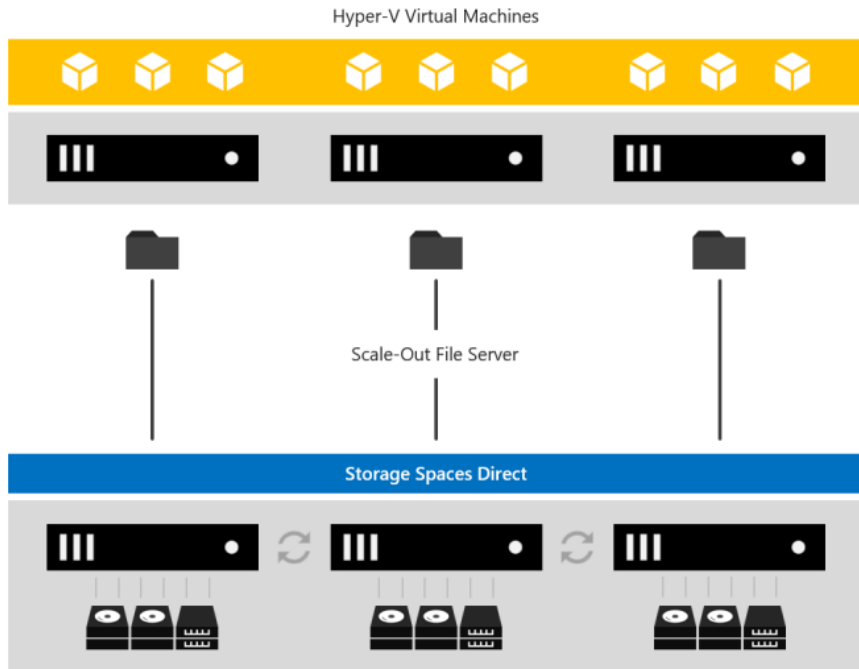- Erasure coding (dual parity)
- 50% efficiency

8-Node

- Improves to 66% efficiency

16-Node

- Improves to 72% (SSD and HDD) or 80% all SSD) efficiency

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Microsoft Storage Spaces Deployment

... with 15,000 clusters deployed as of October!

Worldwide adoption of Storage Spaces Direct

10,000

in 18 months since general availability

March 27, 2018

Storage Spaces Direct adoption

+50%

in just the last 6 months

October2, 2018

dataON DELL EMC FUJITSU Hewlett Packard Enterprise inspur Lenovo QCT SUPERMICRO

Storage at Microsoft - The official blog of the Windows and Windows Server storage engineering teams
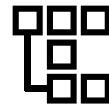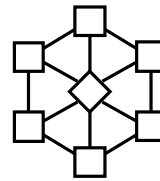October 2, 2018 url

Dell EMC industry leadership

#1

Servers

Storage

Converged

And HYPER-CONVERGED

Internal Use - Confidential

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Microsoft WSSD Certification Value

Dell EMC certification - WSSD "Standard" for Hyper-Converged

Premium options

| System Center – VMM and OM | Security | Defender, Credential Guard, Device Guard |
	Networking	NIC Teaming, vSwitch, SMB Direct
	Compute	Hyper-V
	Storage	Storage Spaces Direct – Software-Defined Storage
	Server	Industry-standard x86 Hardware

BitLocker, Shielded VM's

SDN (Network Controller, Load Balancer, Gateway)

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PowerEdge Designed for HCI

150
Custom requirements for
Dell EMC HCI portfolio
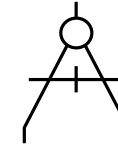
ACROSS ALL CATEGORIES

Platform
- Base platform shared for all solutions
- Highly flexible storage options
- Superior cooling allows complex configs

Boot and recovery
- BOSS boot (PCI-card)
- HCI variant tag in BIOS
- Controlled firmware & drivers updating

Hardware Adaptation & Validation
- Drives – SSD, HDD and NVMe
- Networking
- Systems management
- Adapter (HBA/PERC)

Invest in hardware designed for Microsoft Storage Spaces Direct

Pre-configured, validated and certified server nodes designed to run Microsoft S2D to deploy a Microsoft Hyper-Converged Infrastructure solution

Benefits

1 **Confidence** — Pre-configured, tested and certified components take the guesswork out of building Storage Spaces Direct clusters

2 **Convenience** — Pre-configured solutions make adoption very convenient

3 **Customer support** — Enjoy the simplicity of a solution that's supported globally by Dell EMC for streamlined, collaborative support from the first call

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Dell EMC Ready Nodes for Storage Spaces Direct

- **Dell EMC is #1 –** top partner with Microsoft on S2D and clear leader with ~ 45% of installed S2D base on Dell hw
  - → More options than others
  - → Superior deployment offering
  - → Superior support offering

Storage Spaces Direct Cluster
Solution Overview

OOB network
1 GbE

(Uplinks to core)

Converged
RDMA & Hyper-V network
25GbE SFP28
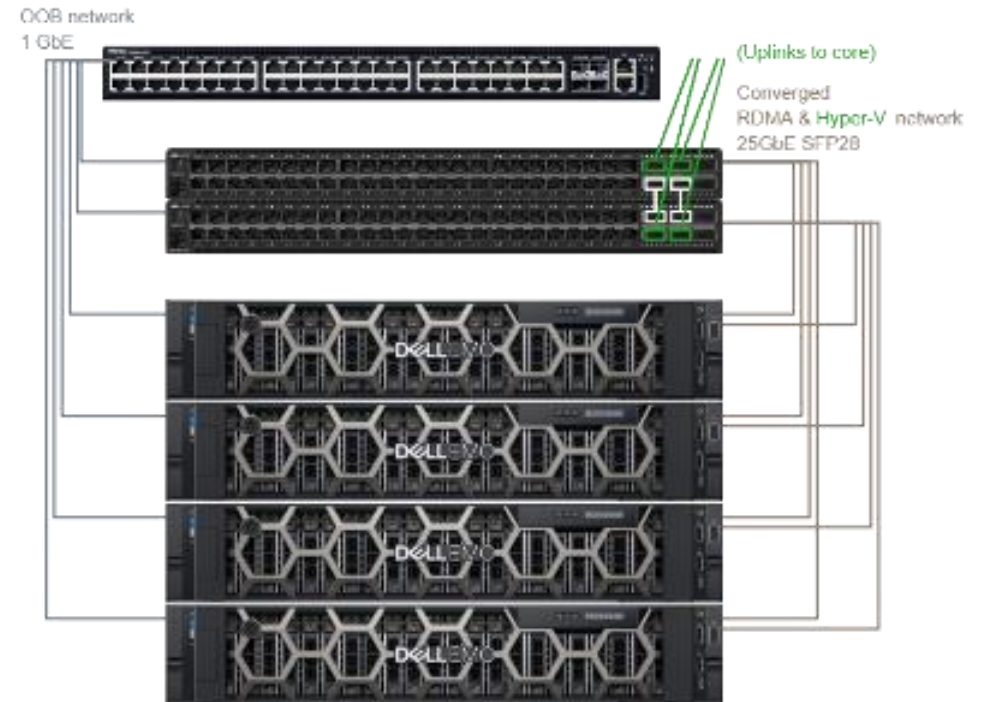
Dell EMC Microsoft Storage Spaces Direct Ready Nodes

There are 15 Dell EMC Microsoft Storage Spaces Direct Ready Nodes configuration options:

- Two Hybrid Configurations
- One All Flash Configuration
- Four NVMe Configurations

R740xd Storage Spaces Direct RN

- Two Hybrid Configuration
- Two All Flash Configuration
- Two ROBO Configurations (All Flash and Hybrid)

R640 Storage Spaces Direct RN

- One Hybrid Configuration
- One All Flash Configuration

R440 PowerEdge

Please see the Solution Overview for detailed configuration options

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Chassis, Bases and Configurations

R740xd

Hybrid (SSD + HDD)

- R740xd (12 x 3.5")
- R740xd (18 x 3.5")

Flash (All SSD)

- R740xd (24 x 2.5")

NVMe

- All NVMe
  - R740xd (24 x 2.5" – up to 12 NVMe)
- NVMe + HDD
  - R740xd (12 x 3.5" + NVMe AIC)[2]
  - R740xd (24 x 2.5" – up to 4 NVMe)[3]
- NVMe + SSD
  - R740xd (24 x 2.5" – up to 4 NVMe)[3]

R640

Hybrid (SSD + HDD)

- R640 (10 x 2.5")
- R640 (12 x 2.5)

### Flash (All SSD)

- R640 (10 x 2.5")
- R640 (12 x 2.5")

ROBO

Hybrid (SSD + HDD) or All Flash

- R640 (10 x 2.5")
- R440 (10 x 2.5") –

[3] At release, plan is to enable the 4 NVMe chassis as part of S2D Solution. PowerEdge, as part of simplification effort had disabled this as shipping option.

[2] As part of S2D Ready Node release, we have enabled adding 2 x NVMe AIC cards as DIB and Rack Rails have to be ordered as CUS KITs. (PowerEdge has a restriction where only 1 card can be added as DIB if Rack Rails are ordered as CUS KIT). NVMe AIC card configuration

C

Offer Details

- Flexible Storage Spaces Direct Ready Node configuration options

- Supported Deployment : Brownfield*
  - Without Microsoft System Center
    - Manual OS (Bring your own license) deployment
    - Factory OS (OEM license) deployment
  - Instructions on integration with Microsoft System Center (optional)

- Delivery Methods
  - Deployment Services (Dell, Partner)
  - Customer DIY

- Full implementation guidance in the form of a step by step Deployment Guide.

- Solution-level Support
  - Warranty SKU to track S2D Node Sales

- Complies with Microsoft Windows Server Software Defined (WSSD) Standard edition

*Brownfield in the context here means that the net new S2D ready node is being integrated into customers existing AD/DNS or System Center (Optional)
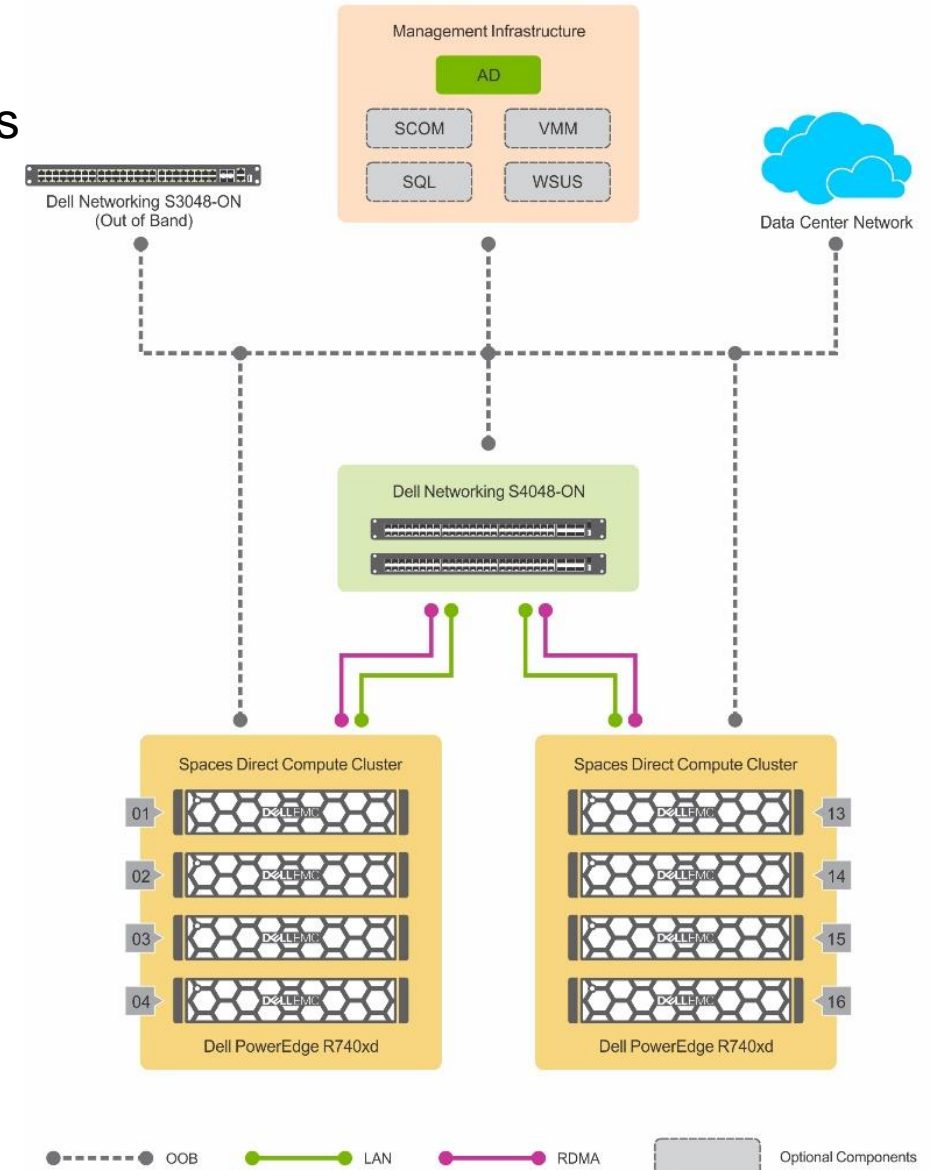
Dell EMC QuickStart for Microsoft WSSD

Highly available, end-to-end HCI solution : Simplify design, ordering, deployment and support

1U

4U

4x R640 S2D Ready Nodes

Windows Server 2016
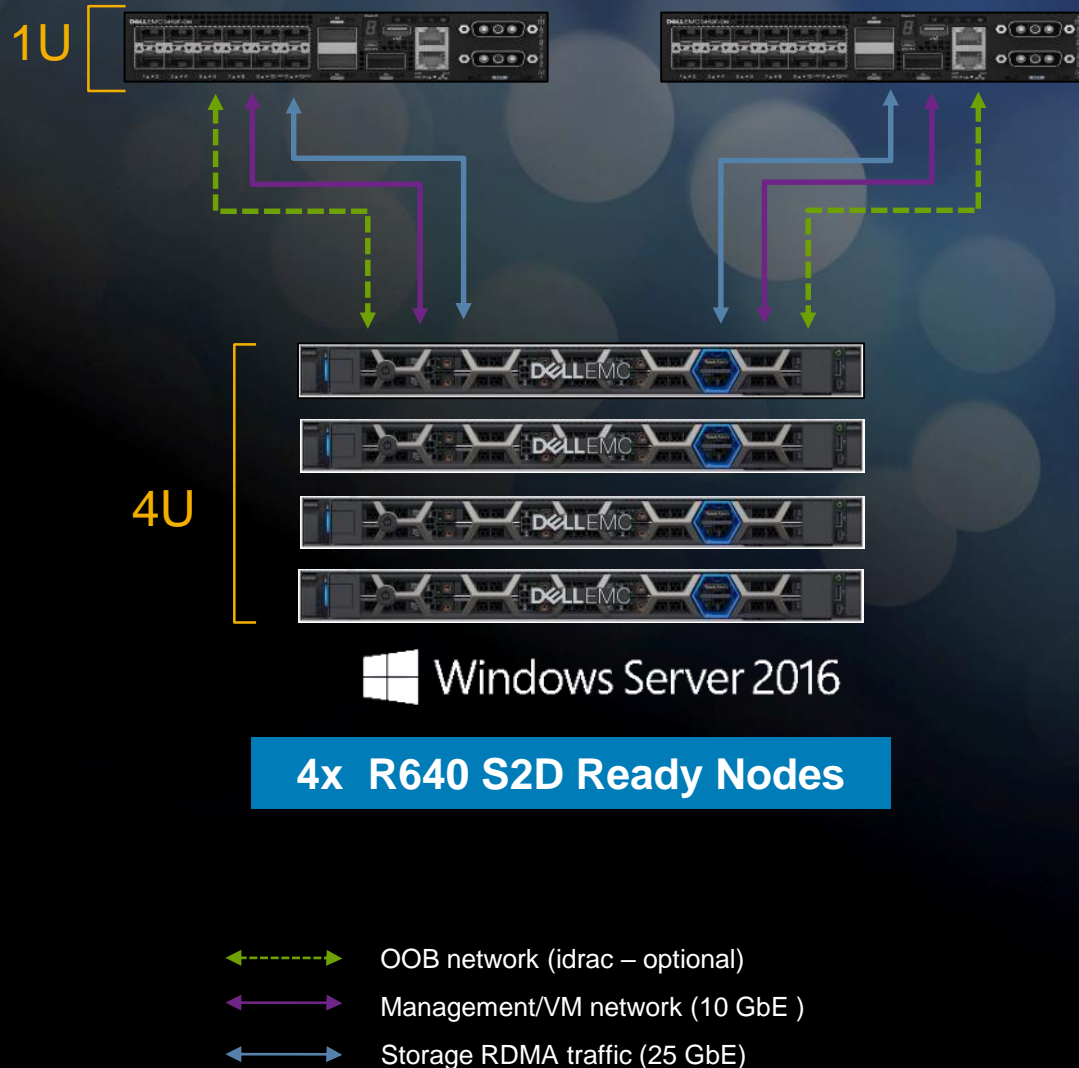
QuickStart for WSSD

- 4 R640 / R740xd S2D Ready Nodes
  - All Flash (R640) and Hybrid (R740xd)
- 2 Fully redundant S4112-ON Switches
  - 25 GbE networking for RDMA (Qlogic)

    and

    10 GbE for management
- Easy to order for Direct and Partners
- Easy to Deploy
- Solution level support for HW/SW
  - ProSupport or ProSupport Plus
  - ProDeploy or ProDeploy Plus

- - - - > OOB network (idrac – optional)

◄——► Management/VM network (10 GbE)

◄——► Storage RDMA traffic (25 GbE)

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Storage Spaces Direct Hyper-Converged Infrastructure Solutions

2 x S4048/S4148/S4124/S5048 (TOR)
1 x S3048 (OOB)

Dell EMC completed WSSD Certification and will provide support for 16 node clusters
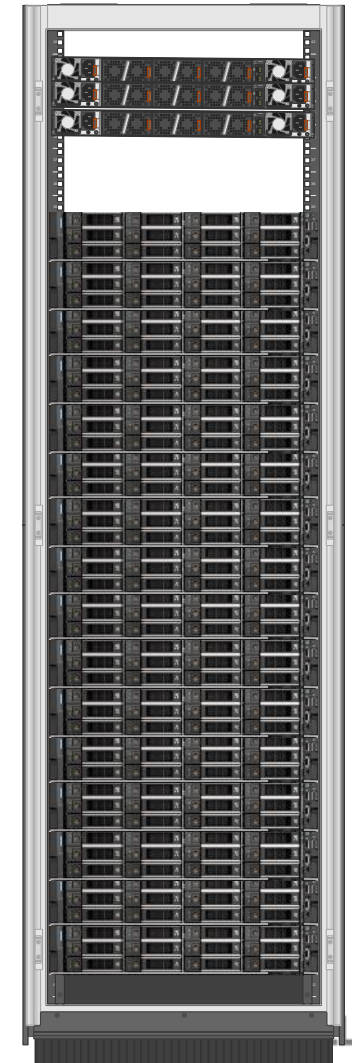
Storage Spaces Direct RN as a hyper-converged building block

- Compute and Storage hyper-converged

- Scalable building block

- Storage and Network fabrics converged

- RoCE with DCB enabled on switches for configurations with Mellanox Cards

- iWARP based network configuration with Qlogic card

- Converged or separated networking supported

4 x 2U or 1U Storage Spaces Direct RN*

*Storage Spaces Direct 2 Node Clusters, with data in place, cannot be expanded at this time.

EMC

Benefit of Dell EMC Ready Node Architecture

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Based on 14G

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Windows Server Storage Spaces Direct Ready Node specific Personality Module
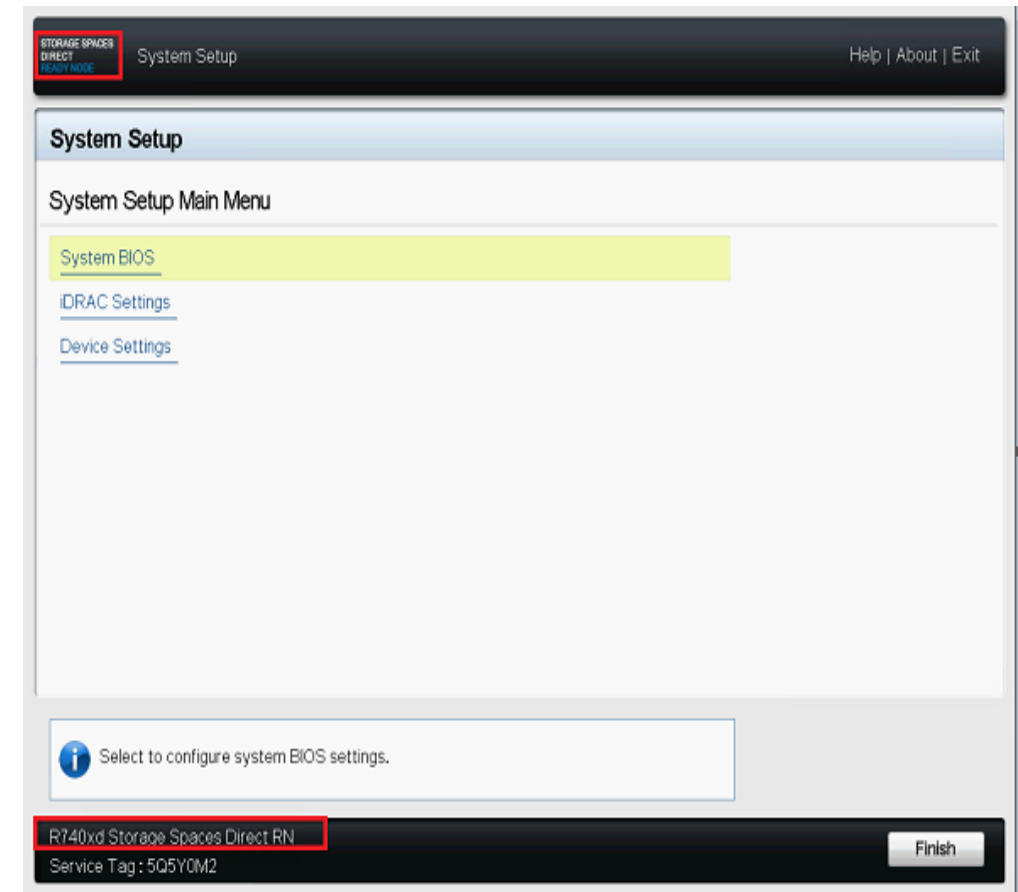
Unique Personality Modules identifies Ready Nodes within Dell EMC Management tools

System Information

Power State	ON
Model	R640 Storage Spaces Direct RN
Host Name	PROTO1.S2D9.lab
Operating System	Microsoft Windows Server 2016 Datacenter

iDRAC

Details | Alerts | Non-Compliant Systems

Viewing 4 Devices

Drag a column header and drop it here to group by that column

Health Status	Connection Status	Device Name	Model	RAC Name	Service Tag	Device Type
✓	On	PROTO1	R640 Storage Spaces Direct RN	idrac-TXPS220	TXPS220	Server
✓	On	PROTO2	PowerEdge R740xd	idrac-TXPS221	TXPS221	Server
✓	On	PROTO3	PowerEdge R740xd	iDRAC-S2D0001	S2D0001	Server
✓	On	PROTO4	PowerEdge R740xd	idrac-7160113	7160113	Server

Open Manage

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Solution-level single source support

ProSupport Enterprise Suite

ProSupport Plus
Proactive and predictive support for critical systems

- Designated Technical Account Manager and priority access to support experts
- Predictive issue detection by SupportAssist[2]
- Systems Maintenance guidance

ProSupport
Comprehensive hardware and software support[1] with 24x7 access via phone, chat and email

or

Includes support for hardware, OS and hypervisor

+

Extended software support
One contact! Single handshake.

ProSupport for Software
For Dell EMC Microsoft Storage Spaces Direct Ready Nodes

- One-stop cluster-level support for Storage Spaces Direct issues and escalations
- Comprehensive coverage whether software purchased from Microsoft or Dell EMC

Required

[1]Software included under ProSupport and ProSupport Plus can be found here

[2]SupportAssist predictive analysis failure detection includes server hard drives and backplanes.

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ProSupport for S2D Statement of Work

link

Commercial Service Contracts

Please choose your region and country below or consult the FAQ section for further information.

Americas | Europe, Middle East & Africa | Asia, Pacific & Japan

- How to locate
- If you purchased from Dell
- If you purchased from a Dell reseller
- For assistance

North America

- United States
- Anguilla (English)
- Anguilla (Spanish)
- Antigua & Barbuda (English)
- Antigua & Barbuda (Spanish)
- St. Lucia (English)
- St. Lucia (Spanish)
- Aruba (English)
- Aruba (Spanish)
- Bahamas (English)
- Bahamas (Spanish)
- Barbados (English)
- Barbados (Spanish)
- Bermuda (English)
- Bermuda (Spanish)
- British Virgin Islands (English)
- British Virgin Islands (Spanish)

Latin America

- Argentina (Spanish)
- Belize (English)
- Belize (Spanish)
- Bolivia (English)
- Bolivia (Spanish)
- Chile (Spanish)
- Colombia (Spanish)
- Costa Rica (English)
- Costa Rica (Spanish)
- Dominican Republic (English)
- Dominican Republic (Spanish)
- Ecuador (English)
- Ecuador (Spanish)
- El Salvador (English)
- El Salvador (Spanish)
- Guatemala (English)
- Guatemala (Spanish)
- Mexico (Spanish)

South America

- Brazil (Portuguese)
- Guyana (English)
- Guyana (Spanish)
- Suriname (Spanish)
- Suriname (English)

Service Description Supplement

Dell EMC ProSupport for Software for Storage Spaces Direct Ready Nodes Supplement

Introduction

Dell EMC[1] is pleased to provide Dell EMC ProSupport for Software for Dell EMC Storage Spaces Direct Ready Nodes Supplement together with corresponding ProSupport for Software service on Dell EMC Storage Spaces Direct Ready Nodes solution as set forth on the Order Form, the "Service". This document supplements the ProSupport for Software service description, (this document, together with your corresponding ProSupport for Software service description, are the "**Service Description**"), and amends, supplements, is incorporated by reference into, and shall be read together with your corresponding ProSupport for Software service description, and with your applicable master agreement, as described in the Dell Services Terms & Conditions section of the service description for your ProSupport for Enterprise Suite service. The terms of the ProSupport for Software and ProSupport Enterprise Suite service descriptions are available at www.dell.com/servicecontracts/global.

Dell EMC ProSupport for Software for Storage Spaces Direct Ready Nodes is offered only on Dell EMC Storage Spaces Direct Ready Nodes and is only available in conjunction with ProSupport, ProSupport Plus for Enterprise, ProSupport One, or ProSupport Flex for Data Center service (the "**ProSupport Enterprise Suite**") offers on the Ready Node.

For additional assistance, or to request a copy of your governing agreement applicable to the Services, contact your Dell EMC sales representative or reseller.

Scope of Service

- Call handling by the Dell EMC ProSupport team and Storage Spaces Direct solution specialists with knowledge of the Dell EMC hardware, software-defined storage, networking technologies, and MS Windows, and how these products and technologies interoperate to provide a hyper-converged storage solution.
- One-stop cluster level support for hardware and software which encompasses the entire solution rather than piece parts. Combined with the deployment guide and support matrix, it offers complete solution value.
- When required, we offer correct replacement disk parts that are validated for Dell EMC Storage Spaces Direct Ready Node, ensuring that there is little downtime of the environment.
- ProSupport for Software for Dell EMC Storage Spaces Direct Ready Nodes support includes cluster-level support for both OEM and Bring Your Own License (BYOL).
- Support is available only on Dell EMC Storage Spaces Direct Ready Node configuration.
- The following Dell EMC Storage Spaces Direct Ready Node features are covered: Hyper-V, Failover Clustering, Storage Spaces Direct, Storage Replica, native Windows Backup, and Windows Volume Snapshot Service (VSS).
- The following operating system features vis-à-vis MS Storage Spaces Direct are *not* covered: Windows Server Software Defined (WSSD) Premium, BitLocker, Shielded VM's and SDN.

The Storage Spaces Direct solution specialists will provide remote support in the following areas:

- Advise on features, functionality, cluster configuration issues, firmware versions, interoperability, and other cluster concerns. This is done in alignment with the best practices set forth in the Dell

[1] "Dell EMC", as used in this document, means the applicable Dell sales entity ("Dell") specified on your Dell Order Form and the applicable EMC sales entity ("EMC") specified on your EMC Order Form. The use of "Dell EMC" in this document does not indicate a change to the legal name of the Dell or EMC entity with whom you have dealt.

Ewel Inc.
https://www.emc.com/collateral/solution-overview/ewel-case-study.pdf

University of Pisa
https://www.emc.com/collateral/solution-overview/pisa-ready-case-study.pdf

Ferranti MECOMS
https://www.emc.com/collateral/customer-profiles/ferranti-mescom-casestudy.pdf

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