

SmartFabric Storage Software

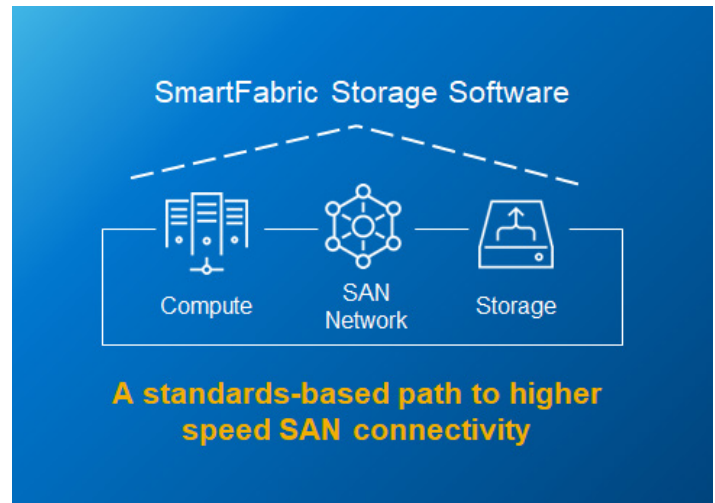
Standards based Centralized Discovery Controller for NVMe™/TCP storage solutions

The needs of modern applications and distributed workloads is causing an explosion in the demands of data transport and storage requirements, bringing about the need for new low-latency/high-bandwidth storage technologies to provide customers the agility to keep pace. NVMe/TCP (NVMe over Fabric via TCP), is a communication protocol that provides high performance, low-latency access to NVMe flash storage solutions over a network without the complexity and cost of other NVMe connectivity methodologies that use special switches, adapters and configuration settings that are more expensive to purchase and operate.

Dell SmartFabric storage Software (SFSS) for NVMe enables automation of Storage services on a wide range of existing 25GbE / 100GbE IP Fabrics. Additional software-driven automation and life cycle management capabilities can be achieved by using Dell Ethernet Interconnects running SmartFabric OS10, SmartFabric Services, and OpenManage Network Integration (OMNI). These components work together to provide fibre channel-like security and reliability with automated storage service discovery, end point registration, connectivity, and zoning. SFSS orchestrates NVMe-oF fabric setup, provides discovery, naming and zone services to the SAN.

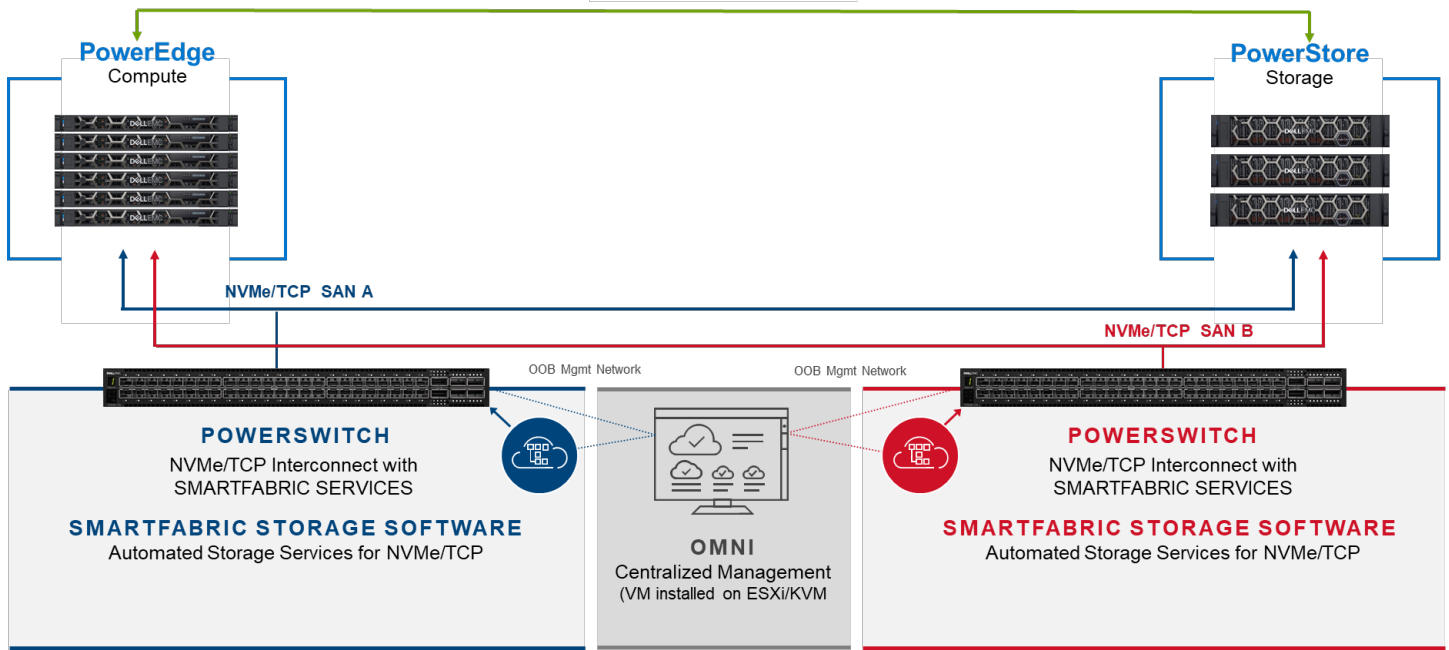
SFSS is a standards-based NVMe/TCP Centralized Discovery Controller (CDC) that provides automated discovery, end point management, and zoning services like Fibre Channel. SFSS automates the establishment of IP-based connectivity between NVMe over Fabrics (NVMe-oF) Hosts and the NVMe subsystem. SFSS supports fabric services including:

- Discovery Service
 - NVMe/TCP end points dynamically discover the SFSS instance
 - Listen and respond to mDNS queries from end points in the fabric



- End Point Registration Service
 - NVMe-oF end point – host or subsystem register their information with SFSS
- End Point Query Service
 - NVMe/TCP Hosts query SFSS to discover the NVMe/TCP subsystems they can communicate with
 - NVMe/TCP subsystems query SFSS to discover the NVMe/TCP hosts that can connect to them
- Zone Service
 - Soft Zoning – Get Log Page responses only include sub-systems zoned for the querying host
- Asynchronous Notifications
 - Asynchronous Event Registration – subscribe to state change notifications from end points
 - Asynchronous Event Notifications – send notifications to end points for state changes

ETHERNET LAN CONNECTIVITY



Dell NVMe IP SAN key features and benefits

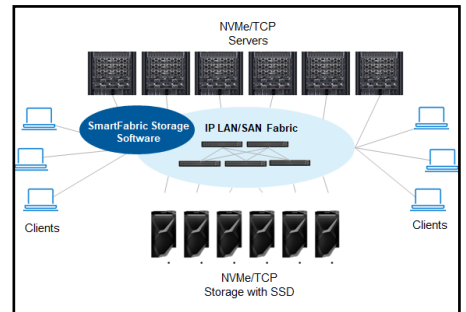
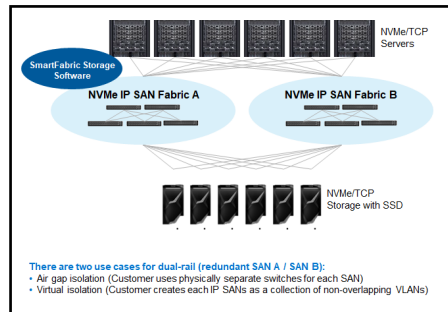
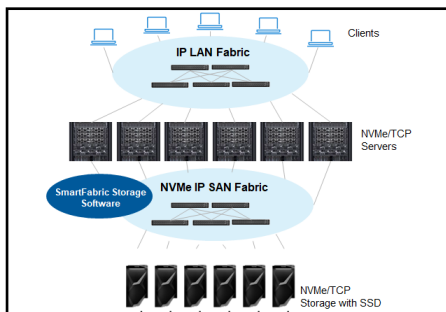
Dell NVMe IP SAN Features	Customer Benefits
Centralized Discovery Controller – SmartFabric Storage Software	Enables a Fibre Channel-like user experience, customers can control connectivity from a single centralized location instead of having to configure each host manually.
PowerStore NVMe/TCP connectivity with VMware	Enables Fibre Channel-like performance for mid-range storage systems
Runs over standard IP Ethernet networks	<ul style="list-style-type: none"> Take advantage of a ubiquitous transport medium that is widely deployed at scale in demanding environments and lower CAPEX Keep pace with growing storage traffic by utilizing 25GbE, 100GbE and 400 GbE connections
Complete end-to-end solution with full testing and validation	Confidence deploying cutting-edge NVMe/TCP solution across Dell servers, storage and networking that can keep up with capacity and performance needs to help drive revenue growth and unparalleled efficiencies across the infrastructure
Dell Technologies global support & services	An integrated NVMe/TCP solution that is backed by market-leading global support and services to help minimize connectivity downtime and loss of service

Technical specifications

NVM Express over Fabrics Revision 1.1
 TP 8009 – Automated Discovery of NVMe-oF Discovery Controllers
 Host or subsystem can send query and discover a CDC in a fabric
 TP8010 - Central Discovery Services
 CDC aggregates discovery information for hosts and subsystems
 Groups host and subsystem information for access control (zoning)
 Generates fabric events to report changes

Supported Endpoints:
 Host: PowerEdge servers with NVMe capability running VMware ESXi 7.0U3c or later
 R640, R650, R650XS, R740, R740XD, R750, R840, R940, R940XA, R6115, R6525, R750XS, R7515, R7525
 MX740c, MX750c, MX840c
 Subsystem: PowerStore T/X OS2.1 or later, PowerStore T/X OS2.1 and later, Cisco UCS M5, HPE Synergy Gen 10

Supported IP Fabric when using Dell switches
 PowerSwitch S5200, S5448, Z9264, Z9332, Z9432
 3rd party Switch support
 Arista DCS-7050CX3-32S
 Juniper QFX5120-32C, QFX5120-48Y
 Security for management of user accounts
 RADIUS
 TACACS+



Key Features and Functions

SFSS helps simplify NVMe/TCP end to end configuration of a NVMe/TCP enabled Host and NVMe Subsystem. SFSS is available as an OVA or qcow2 file format that can be deployed on VMware ESXi or Linux KVM respectively.

- **SFSS Services**

- Automated discovery of End Points
- End point registration - Explicit and Pull registration
- End point query service
- Soft Zoning
- Asynchronous Event Notifications

- **Deployed as a Virtual Appliance in VMware ESXi Hypervisors**

- **Automation:** All SFSS configuration including Storage services and Life cycle management are provisioned using OMNI. CLI, Web UI and APIs are also available as other options.
 - Integration with OpenManage Network (OMNI) for integration with VMware vCenter UI
 - Single pane of management* for SFSS and SFS with OMNI
 - Embedded GUI
 - Ansible role and collections
 - APIs for integration with external orchestrators

SmartFabric Storage Software Deployment

SFSS in its initial release is deployed as a standalone VM (ESXi) (KVM) on an external server platform and comes pre-packaged with all images/packages necessary for a standalone deployment.

Infrastructure for SFSS

Resources	Minimum requirement
ESXi Host Configuration	7.0U3c or later
Linux Host Configuration	SUSE SLES15 SP3 with KVM version 4.19
OMNI plugin for vCenter	3.0.0
Hardware Processor	16 vCPUs
Hardware RAM	16GB
Network	1x Management Network 1x Storage Area Network **
Hard disk	40GB
**can add additional storage networks on demand	

* indicates in 'future'

SmartFabric Storage Software Deployment Topologies

There are three typical deployment topologies for SFSS:

- **Single separate NVMe IP SAN** - The NVMe IP SAN is a physically separate network dedicated to storage traffic and is separated from the IP LAN traffic that runs workloads and applications.
- **Redundant separate NVMe IP SAN** - using single switch or Leaf-Spine IP Fabric: Dual redundant NVMe IP SAN networks enable HA for storage traffic and is physically separate from IP LAN traffic that runs workloads and applications.
- **Converged NVMe IP LAN/SAN** - A single IP fabric infrastructure for LAN and SAN traffic enables optimized infrastructure for best performance and Cost trade-off

Licensing

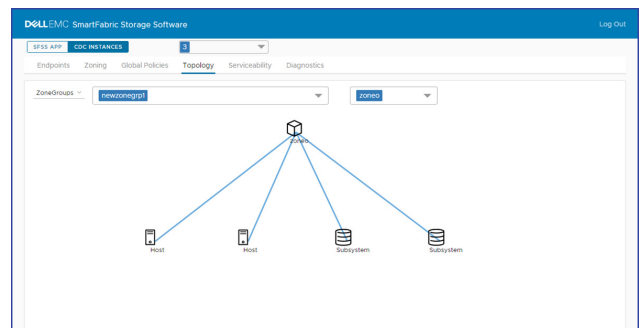
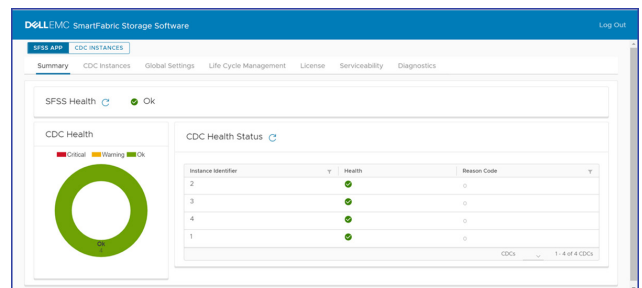
SFSS supports a licensing mechanism to activate SFSS services. Customers have the option to start with a Base 48 port Endpoint license and an optional expansion license to support expansion up-to 2048 End Points.

Base License Options:

- SFSS Enterprise License (48 Endpoints, Perpetual)
- SFSS Partner License (10 endpoints, perpetual, no expansions allowed, non-production deployment)

Expansion License Options:

- SFSS Expansion License (16 endpoints increments, perpetual)
- SFSS Expansion License (48 endpoint increments, perpetual)



Scale

Number	Total
Max number of storage networks per SFSS instance	16
Max number of SFSS instances	16
Max number of end points (TCP connections to SFSS) per SFSS App	2048
Max number of end points (TCP connections to SFSS) per SFSS Instance	2048
Max number of sub systems returned to a host in a getLogPage response	16
Max number of ZoneGroup	16
Max number of zones per Zonegroup	26
Max number of members per zone	80

Ordering Information

Software
Dell EMC SmartFabric Storage Software
<ul style="list-style-type: none">Enterprise License, 48 Endpoints (528-CSSK)Partner License (528-CSSL)
Dell EMC SmartFabric Storage Software Expansion License
<ul style="list-style-type: none">Expansion License 16 Endpoints (528-CTMP)Expansion License, 48 Endpoints (528-CSSM)

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