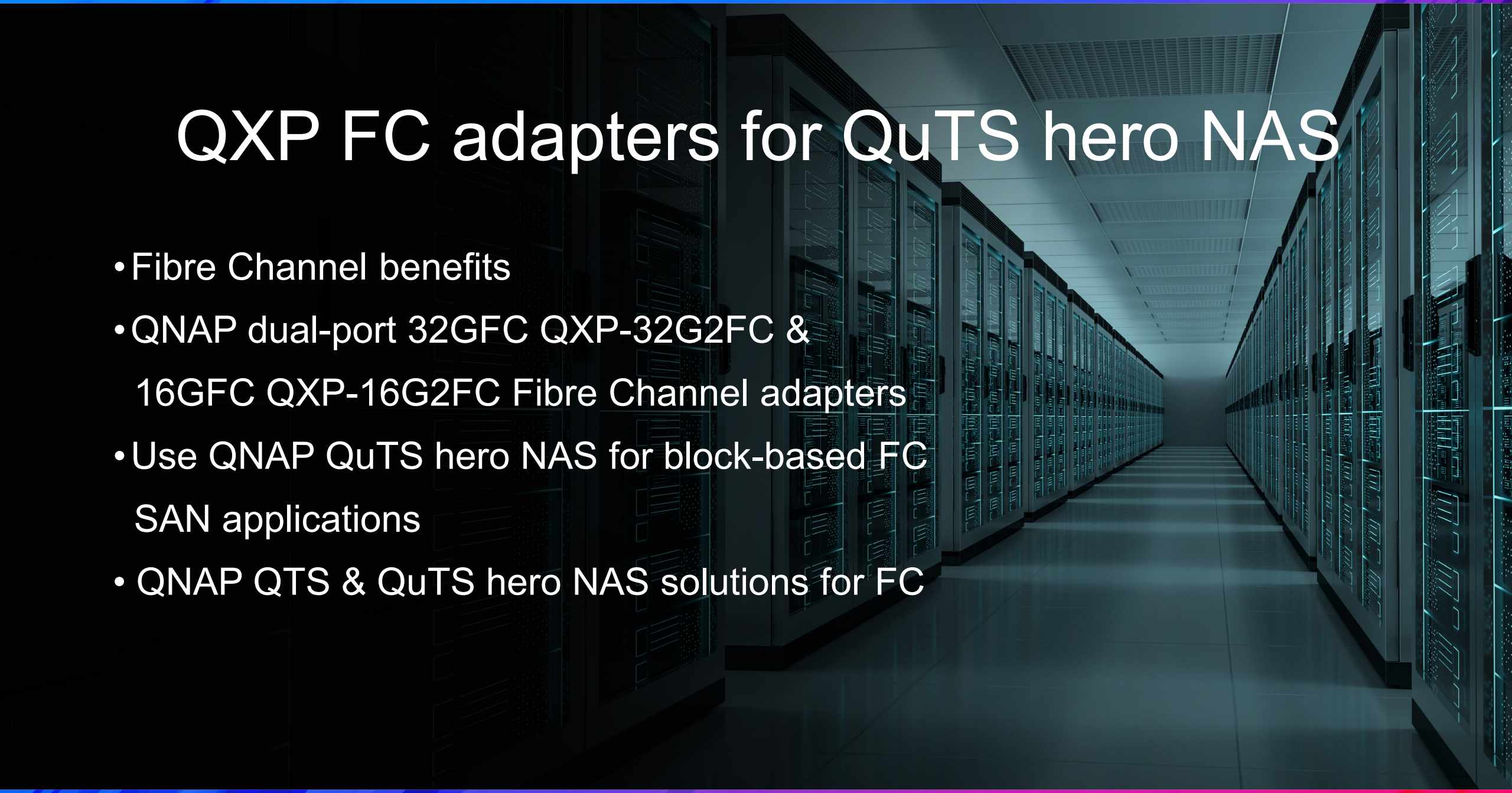
QNAP

Build FC SAN solutions with 16GFC QXP-16G2FC & 32GFC QXP-32G2FC

Fibre Channel Cards on QuTS hero NAS

QXP FC adapters for QuTS hero NAS

- Fibre Channel benefits
- QNAP dual-port 32GFC QXP-32G2FC & 16GFC QXP-16G2FC Fibre Channel adapters
- Use QNAP QuTS hero NAS for block-based FC SAN applications
- QNAP QTS & QuTS hero NAS solutions for FC



The benefits of businesses using FC SAN

Good connectivity

In a Fibre Channel Storage Area Network (SAN) architecture, any server can be directly connected to any storage device, and any storage device can be directly connected to each other.

Good expandability

Enterprises can easily expand storage without increasing the load on the server and the local area network.

Good data sharing ability

Since the storage device is no longer connected to a specific server, resources can be shared by many servers and the main network performance is not affected when a large number of files are transmitted.

Fast and stable performance

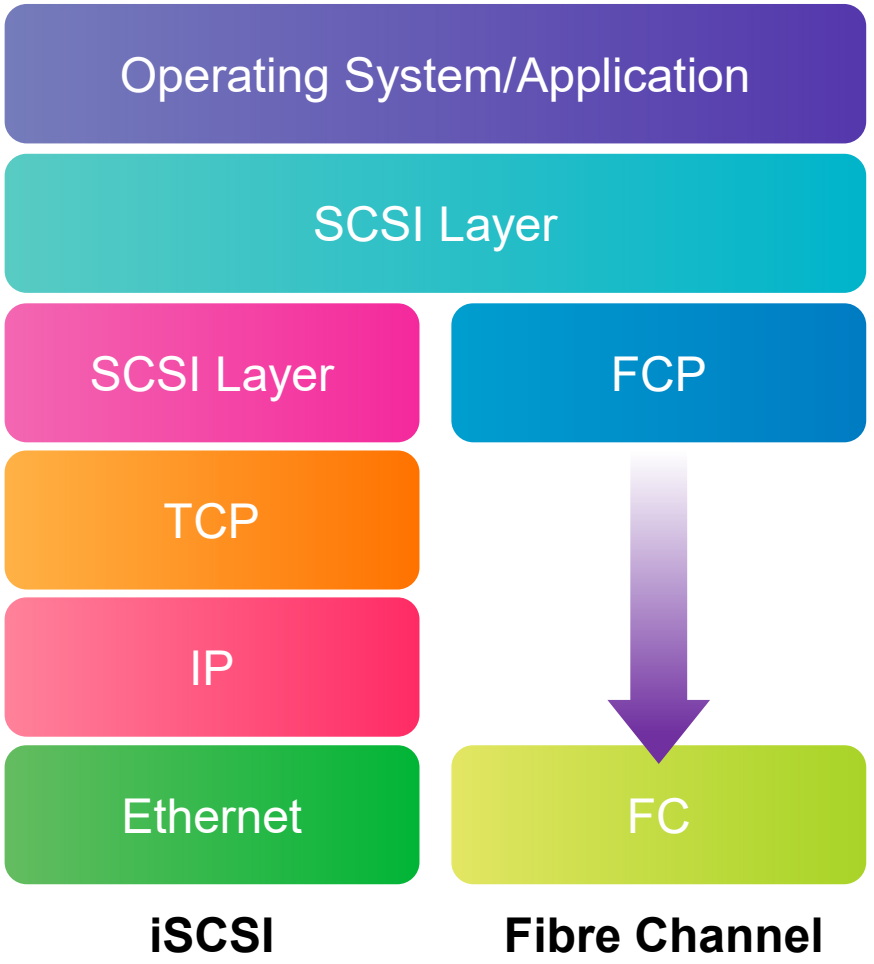
Continue to use the same video editing software with FC SAN storage as a local drive for high and stable performance.

iSCSI vs. Fibre Channel Architecture

- Fibre Channel does not need to pass through Ethernet, and the physical layer in the system is less than iSCSI. When expanding the block-level storage network, Fibre Channel can be used to avoid network load.

(FC fibre cable)

- iSCSI needs to expand the block-level storage network via Ethernet. **(fibre or ethernet cable)**



QXP-32G2FC dual-port 32Gbps fibre channel HBA

Part number:

QXP-32G2FC

2 x 32Gbps FC ports

- Gen 6 fibre channel HBA, supporting 32Gbps/16Gbps/8Gbps speed.
- Low profile 10.68 x 6.89 cm (4.20 x 2.71 inches) .
- Bundled with 2 x 32Gbps SFP+ short wavelength short distance multi-mode fibre channel transceivers.
- Not supported on non-QNAP NAS QTS and QuTS hero operating systems such as Windows and Linux.

Includes the necessary brackets for all NAS models.

FC LC cables are not included.

QXP-16G2FC dual-port 16Gbps fibre channel HBA

Part number:

QXP-16G2FC

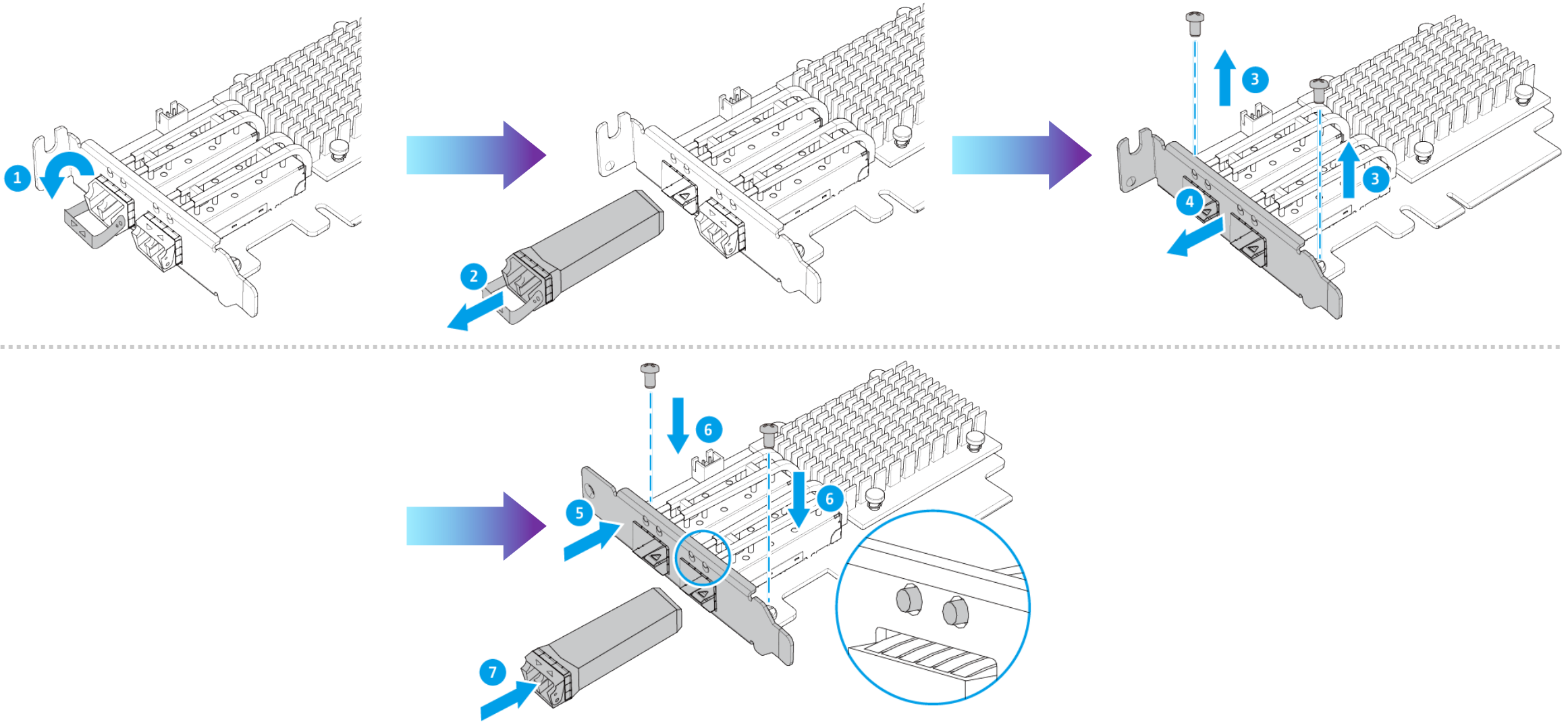
2 x 16Gbps FC ports

- Enhanced Gen 5 fibre channel HBA, supporting 16Gbps/8Gbps/4Gbps speed.
- Low profile 10.68 x 6.89 cm (4.20 x 2.71 inches).
- Bundled with 2 x 16Gbps SFP+ short wavelength short distance multi-mode fibre channel transceivers.
- Not supported on non-QNAP NAS QTS and QuTS hero operating systems such as Windows and Linux.

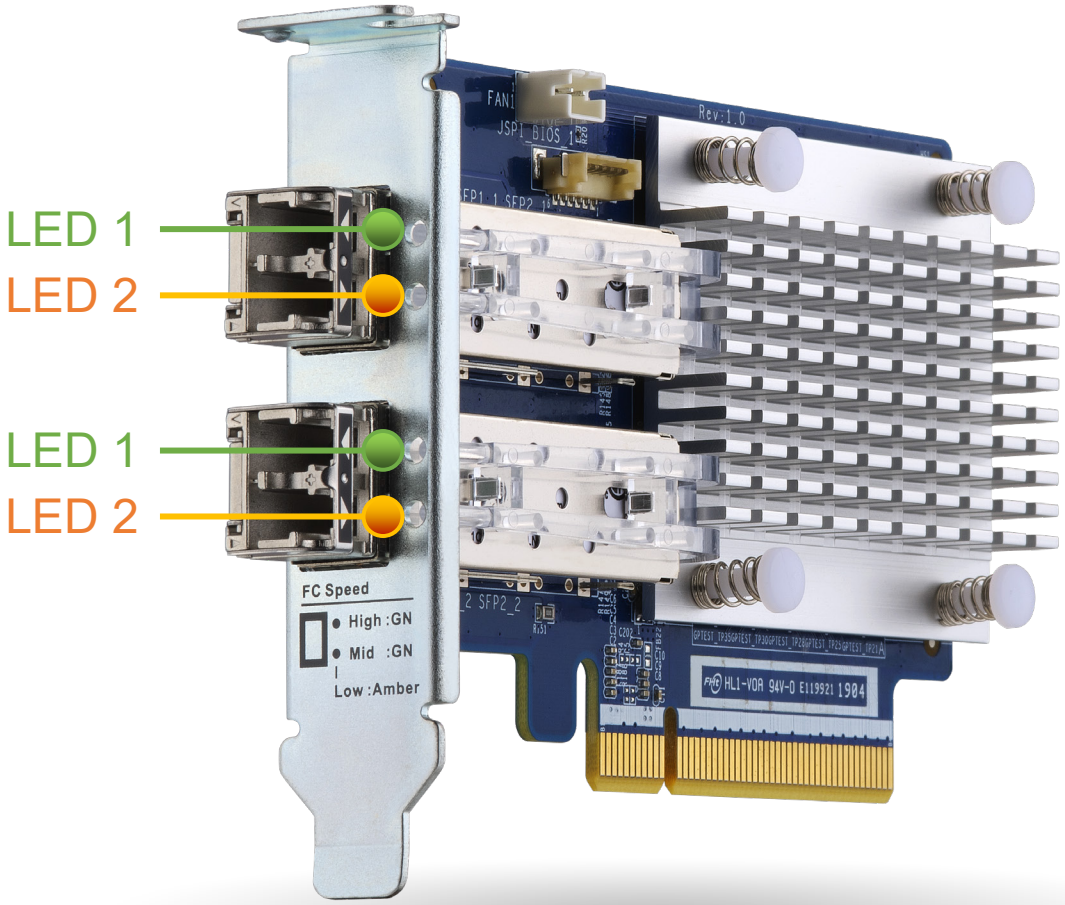
Includes the necessary brackets for all NAS models.

FC LC cables are not included.

Replace the bracket for a different NAS Model



LED indicators for various status display



	LED 1 (Green)	LED 2 (Green / Amber)
Speed: High	On/Flashing*	Off
Speed: Mid	Off	Green /Flashing*
Speed: Low	Off	Amber/Flashing*
FW not initialized	On	On (Both)
FW initialized	Flashing	Flashing (Both)

*Note: LED flashing occurs during I/O activity.

32Gbps and 16Gbps FC transceiver accessories

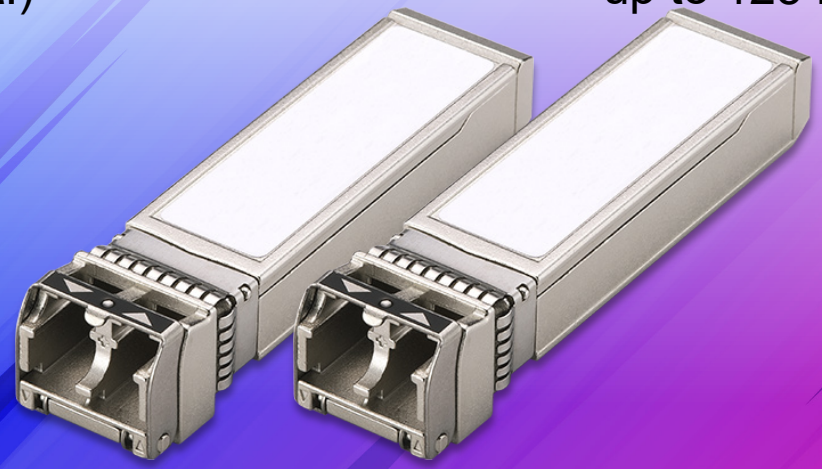
You can buy additional FC transceivers if the included ones are broken or missing.

32Gb fibre channel SFP+ transceiver
Part number: **TRX-32GFCSFP-SR**

- Tri-speed: 28.05Gbps/14.025Gpbs/8.5Gbps
- Support multimode LC FC cables with 32Gbps up to 100 meters (328.08 ft.)

16Gb fibre channel SFP+ transceiver
Part number **TRX-16GFCSFP-SR**

- Tri-speed: 14.025Gbps/8.5Gpbs/4.25Gbps
- Support multimode LC FC cables with 16Gbps up to 125 meters (410.10 ft.)



How to choose the right FC cable

Speed	Multimode optic cable and distance (m)			
	OM1	OM2	OM3	OM4
4GFC	70	150	380	400
8GFC	21	50	150	190
16GFC	---	35	100	125
32GFC	---	20	70	100

LC (Little Connector)

QuTS hero for the optimal FC SAN performance

- QuTS hero NAS are optimized for FC operation with advanced features that ensure the best performance with exceptional user experience for enterprise requirements.

TS-h977XU-RP

TS-h1283XU-RP

TS-h1277XU-RP

TS-h1283XU-RP with Xeon CPU and 10GbE

TS-h1283XU-RP-E2236-32G

- 2U 12-bay rackmount NAS
- Intel Xeon E-2236 **6 cores/12 threads 3.4GHz processor, max boost to 4.8GHz**
- **32GB** DDR4 **ECC** RAM (**16GB x2**), expand up to 128GB
- 2 x 10GbE SFP+, 2 x 10GBASE-T, 4 x 1GbE ports

TS-h1283XU-RP-E2236-128G

- 2U 12-bay rackmount NAS
- Intel Xeon E-2236 **6 cores/12 threads 3.4GHz** processor, max boost to **4.8GHz**
- **128GB** DDR4 **ECC** RAM (**32GB x4**)
- 2 x 10GbE SFP+, 2 x 10GBASE-T, 4 x 1GbE ports

TS-h1277XU-RP with Ryzen CPU and 10GbE

TS-h1277XU-RP-3700X-32G

- 2U 12-bay rackmount NAS
- AMD Ryzen 7 **3700X 8 cores/16 threads 3.6GHz** processor, boost to **4.4GHz**
- **32GB** DDR4 RAM (**16GB x2**)
- 2 x 10GbE SFP+, 2 x 10GBASE-T, 2 x 1GbE ports

TS-h1277XU-RP-3700X-128G

- 2U 12-bay rackmount NAS
- AMD Ryzen 7 **3700X 8 cores/16 threads 3.6GHz** processor, boost to **4.4GHz**
- **128GB** DDR4 RAM (**32GB x4**)
- 2 x 10GbE SFP+, 2 x 10GBASE-T, 2 x 1GbE ports

TS-h977XU-RP with Ryzen CPU and 10GbE

vmware READY · citrix ready · Windows Server 2019 Certified

TS-h977XU-RP-3700X-32G

- 1U 9-bay rackmount NAS
- 5 x 2.5-inch SATA SSD ports
- AMD Ryzen 7 3700X **8 cores/16 threads 3.6GHz** processor, boost to **4.4GHz**
- 32GB DDR4 RAM (16GB x2)
- 2 x 10GbE SFP+, 2 x 10GBASE-T, 2 x 1GbE ports

QTS hero: Unified Hybrid Storage

Affordable Hybrid Storage

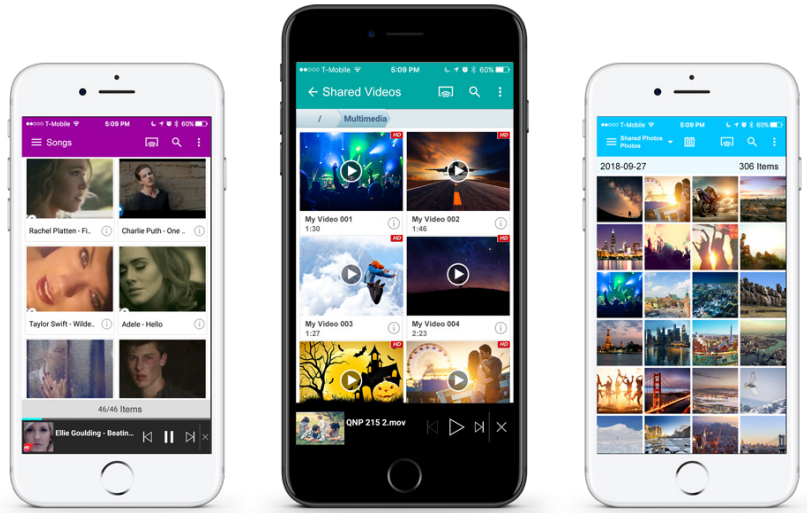
- Data self-healing
- Cloud ready
- Virtualization ready
- ZFS on Linux
- Flash endurance
- 65536 snapshots

Unified

Google Azure aws 阿里云

Microsoft vmware

Combines applications and converged business services



Multimedia App Extensibility

BLOCK FILE

Unified Storage

Virtualization

Deduplication Compression

Snapshot

SnapSync

OpenZFS

Enterprise Business Continuity

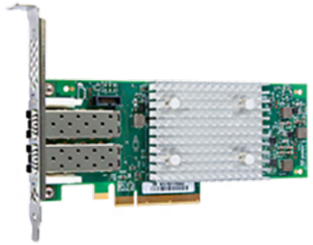
QuTS hero edition

Lowering the cost to add a NAS to a FC SAN

Windows / Linux / VMware host (initiator mode) + NAS (target mode):

Marvell® QLogic® 2742
(32Gb) Fibre Channel adapter

ATTO Celerity 32Gb
Fibre Channel adapter



Windows / Linux / VMware host

FC SAN

Other FC SAN storage

Fibre channel switch

Fibre channel

QNAP **QXP-32G2FC**
Fibre channel adapter

TS-h1283XU-RP

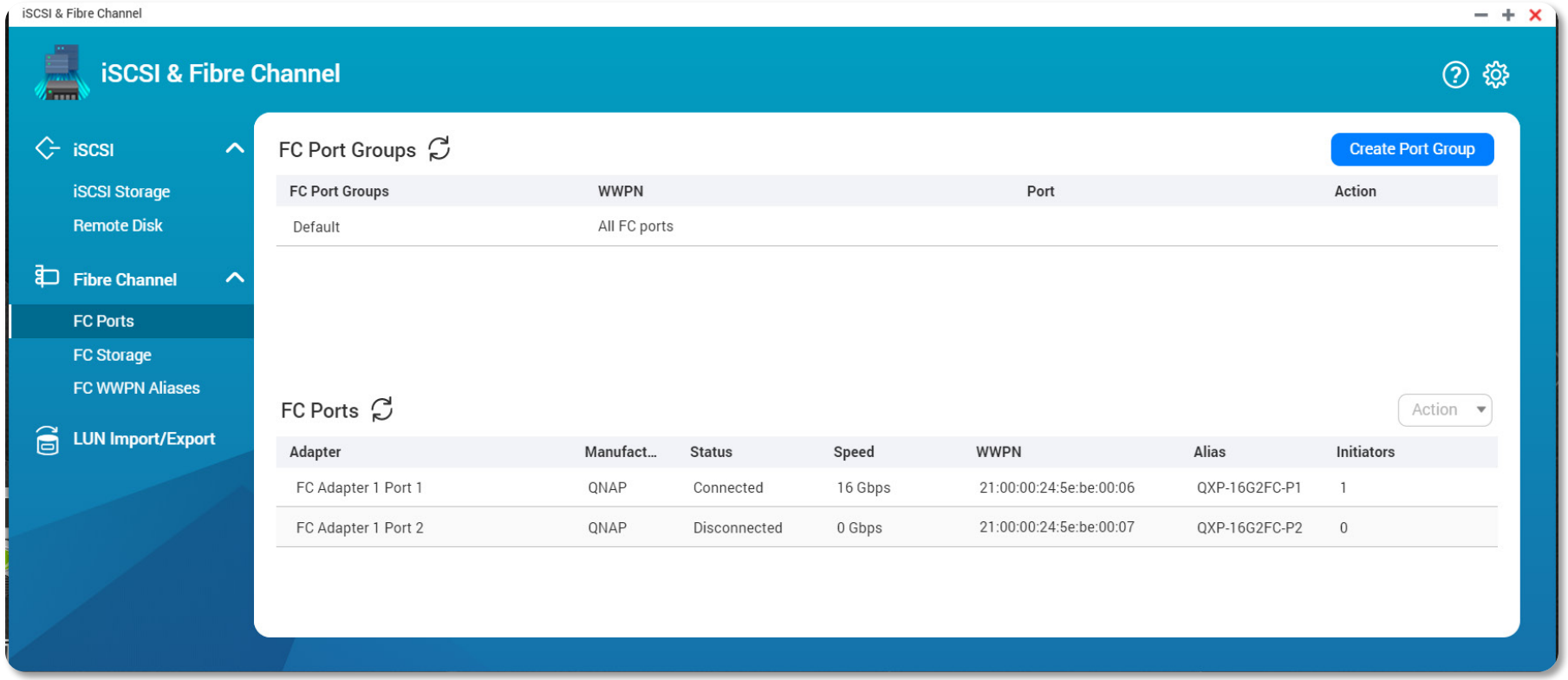
QuTS hero edition

TS-h1283XU-RP

QNAP **QXP-32G2FC**
Fibre channel adapter

iSCSI and Fibre Channel Manager in QuTS hero

You can easily add your NAS to a SAN environment. Once a Marvell®, ATTO® or QNAP Fibre Channel card has been installed in the QNAP NAS, you can set a Fibre Channel Target using the iSCSI & Fibre Channel app. In addition, the LUN Masking and Port Binding features provide an additional layer of security for your data.



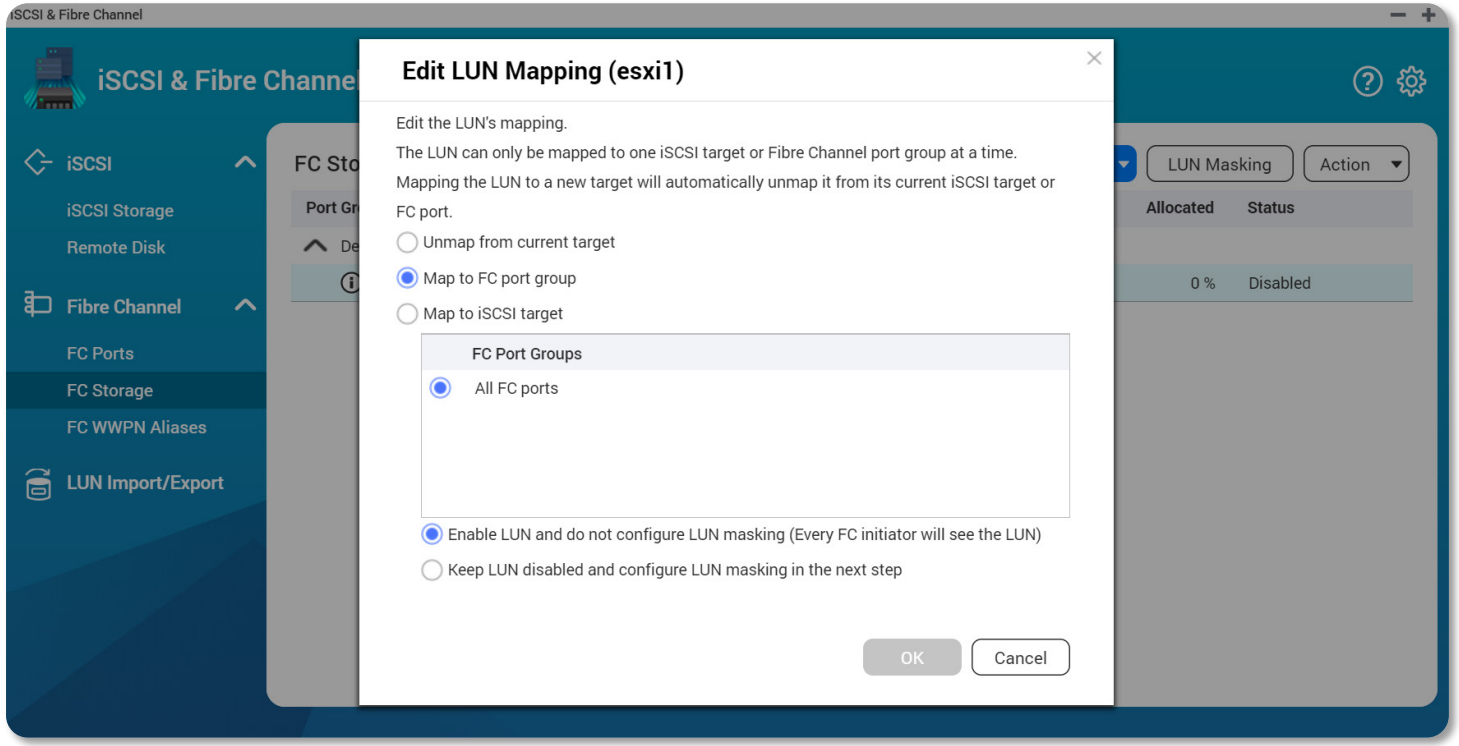
Set up the FC Connection on NAS QTS

- **Flexible settings**

1. LUN Mapping : LUN can be mapped to iSCSI or FC.
2. LUN Masking: Set which server access LUN.
3. FC Port Binding: which server can access which ports.

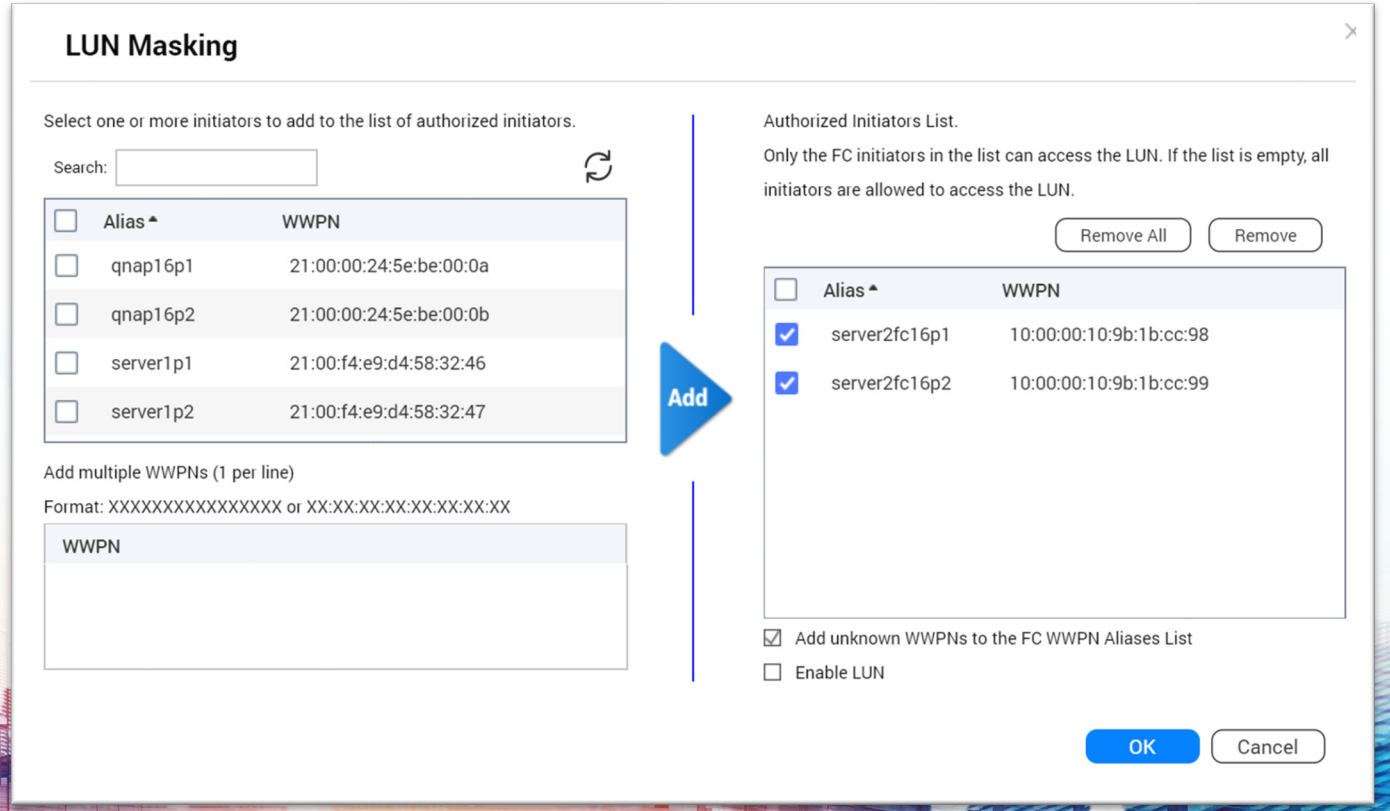
- **Easy to identify**

  You can edit Fibre Channel's WWPN aliases.



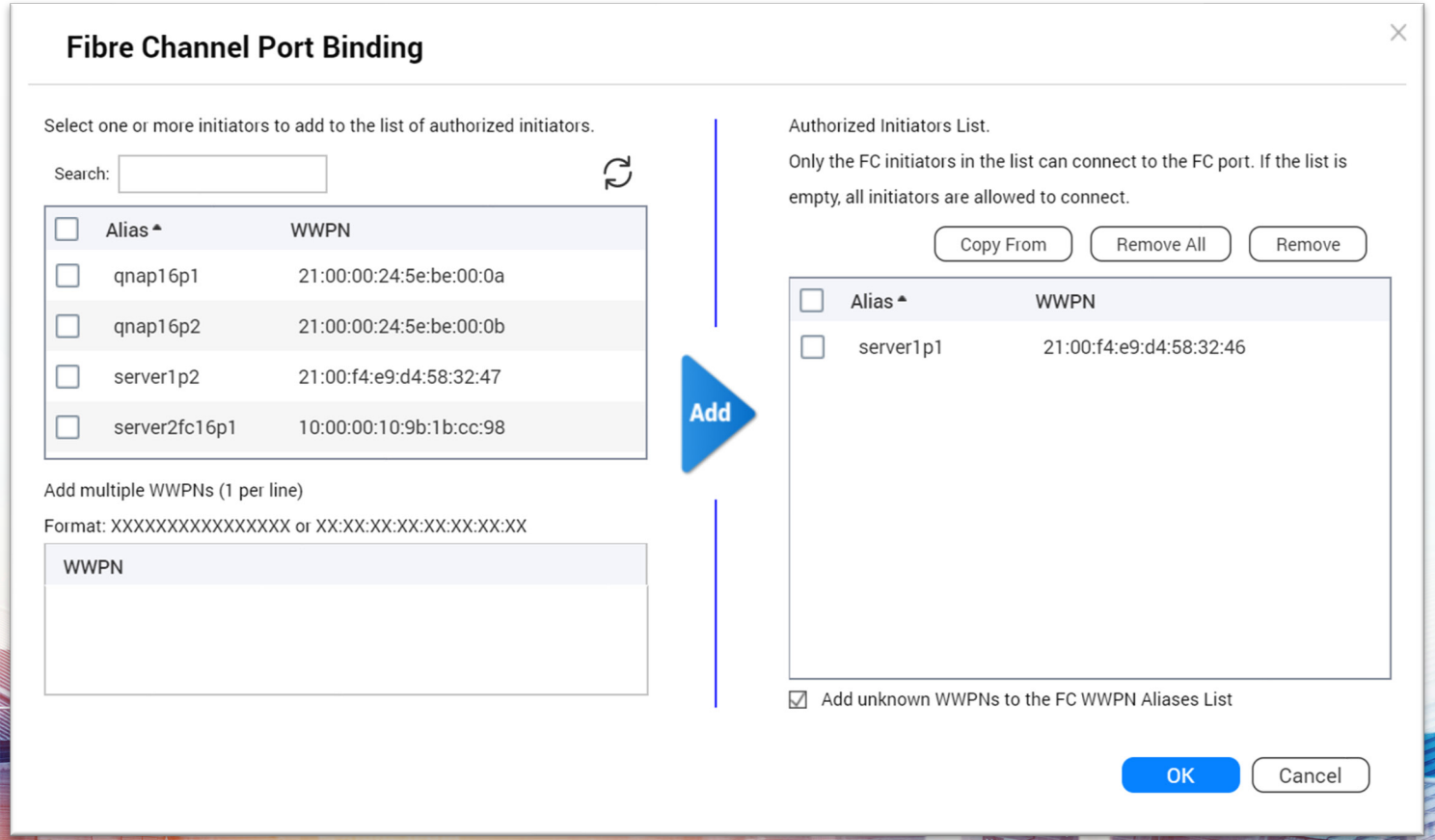
Set LUN Masking

- **LUN masking:**
Specify which server can access which LUN.



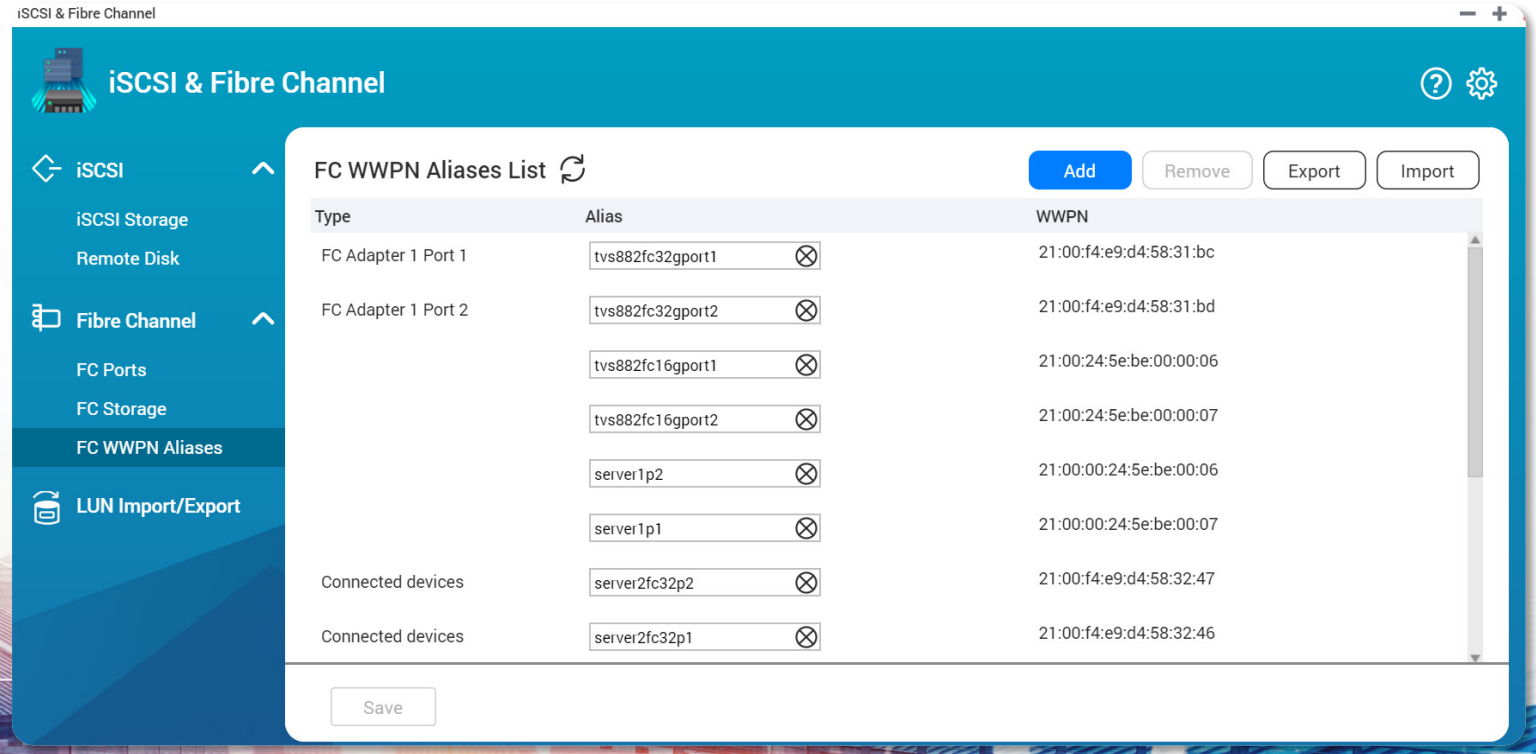
Set up FC port binding for better security

- **FC port binding:**
Set which server can bind which ports.



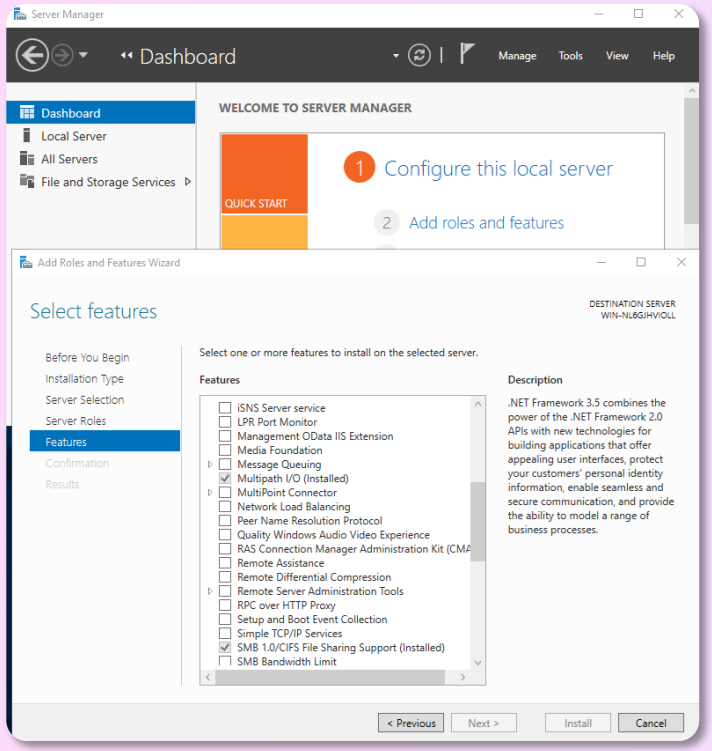
Identify the server and fibre channel connections through the alias list

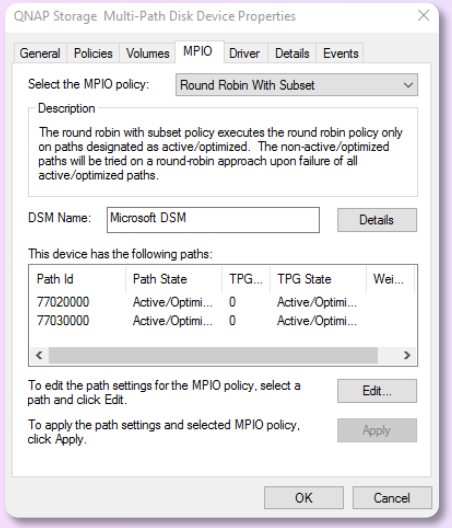
- **Edit alias:**
  Specifies a list of WWPN aliases for Fibre Channel. The user can easily identify the server and Fibre Channel ports in the storage area network.

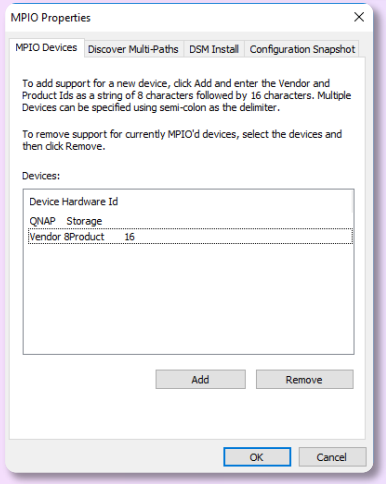


Support server FC multi-path I/O

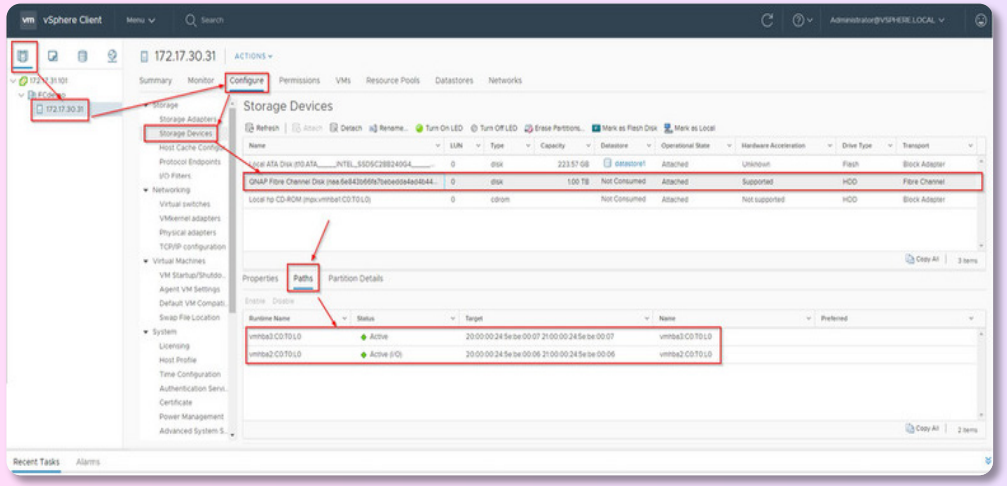
Windows Server







VMware vSphere



FC & QuTS hero ZFS, Perfect Match for the Professional Applications

iSCSI & Fibre Channel management

Simple and fast creation of a Fibre SAN environment

QuTS hero edition

ZFS high performance high reliability

Inline data deduplication, compression, compaction

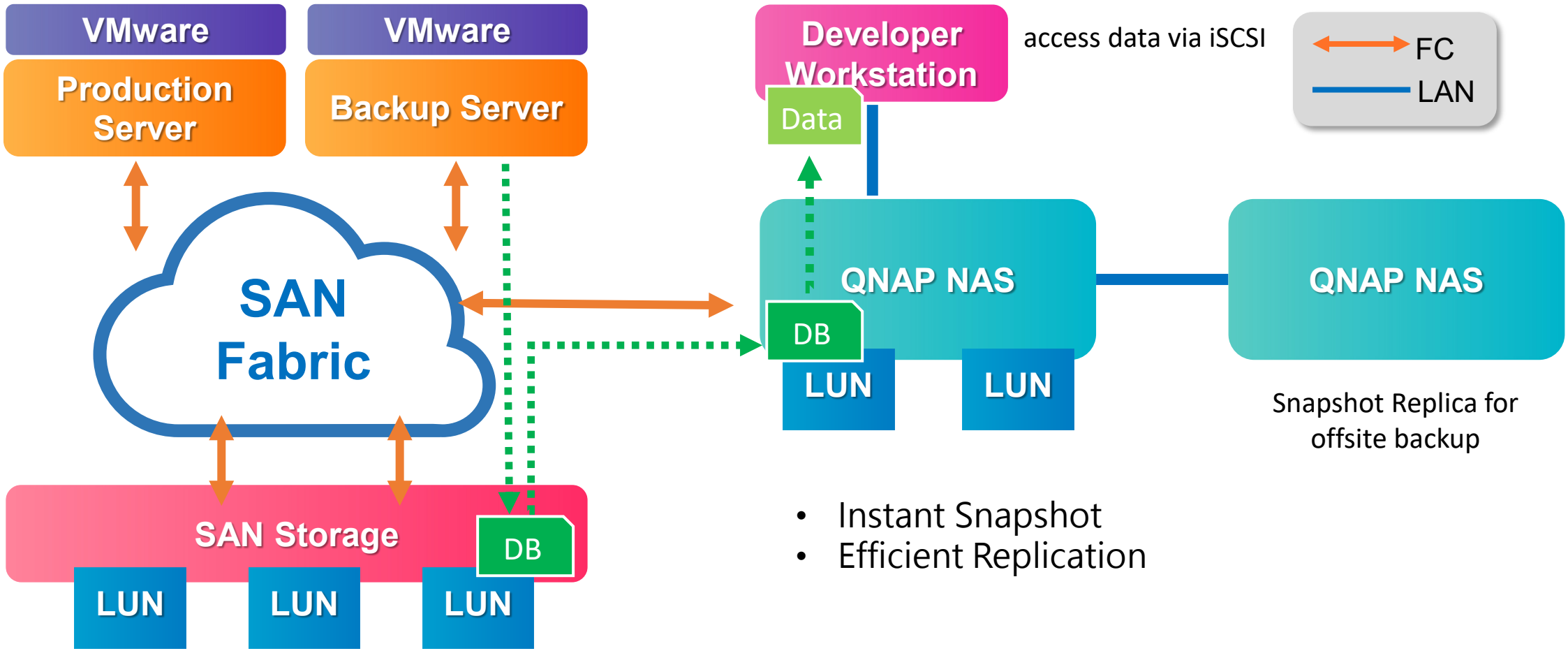
Data integrity and reliability

Efficent Snapshot

Snapshot manegemnet

Near-limitless, instant snapshots

Enterprise Fibre Channel SAN for CDM Application



- Instant Snapshot
- Efficient Replication

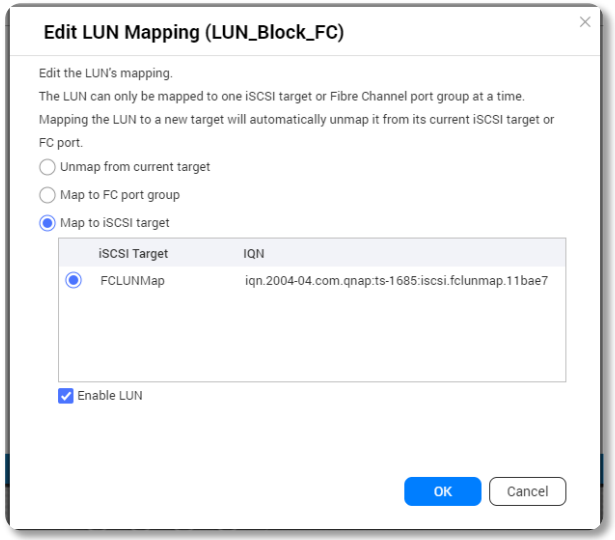
[CDM] Easily analyze LUN data risk-free

QNAP FC NAS

(1) Create a snapshot of an FC LUN on the QNAP NAS (e.g. a database)

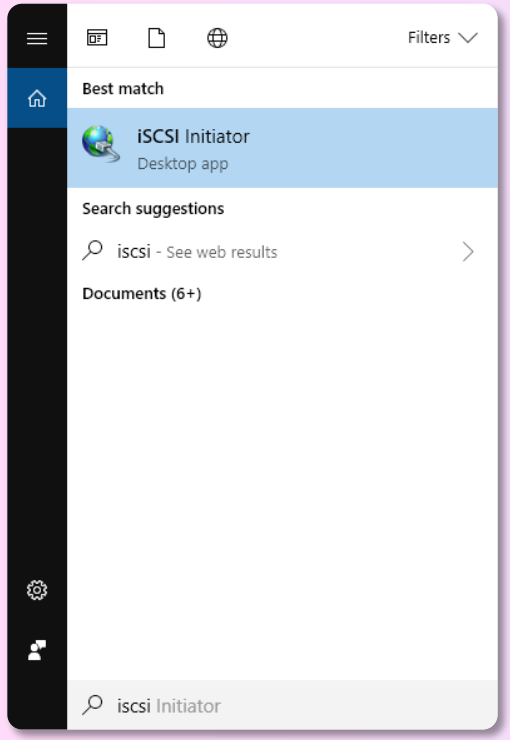
(2) Clone the snapshot

(3) Create the LUN copy and map this copy to iSCSI or FC while the original LUN remains online!

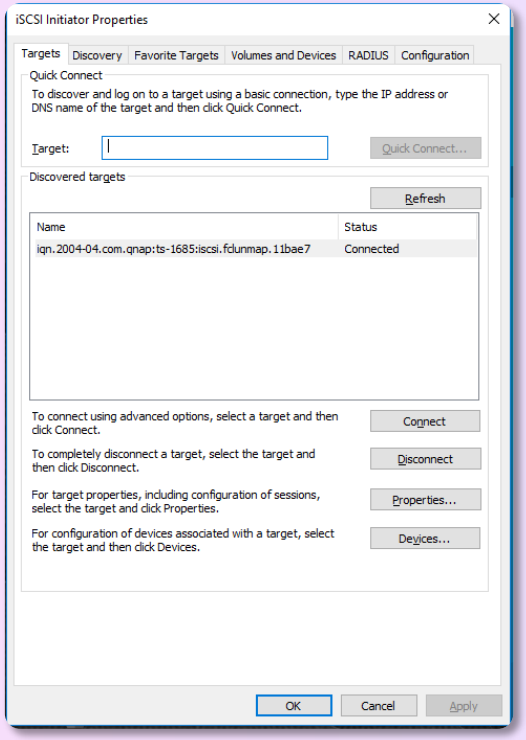


(4) Perform the necessary operations on this new LUN with no consequences on the original LUN

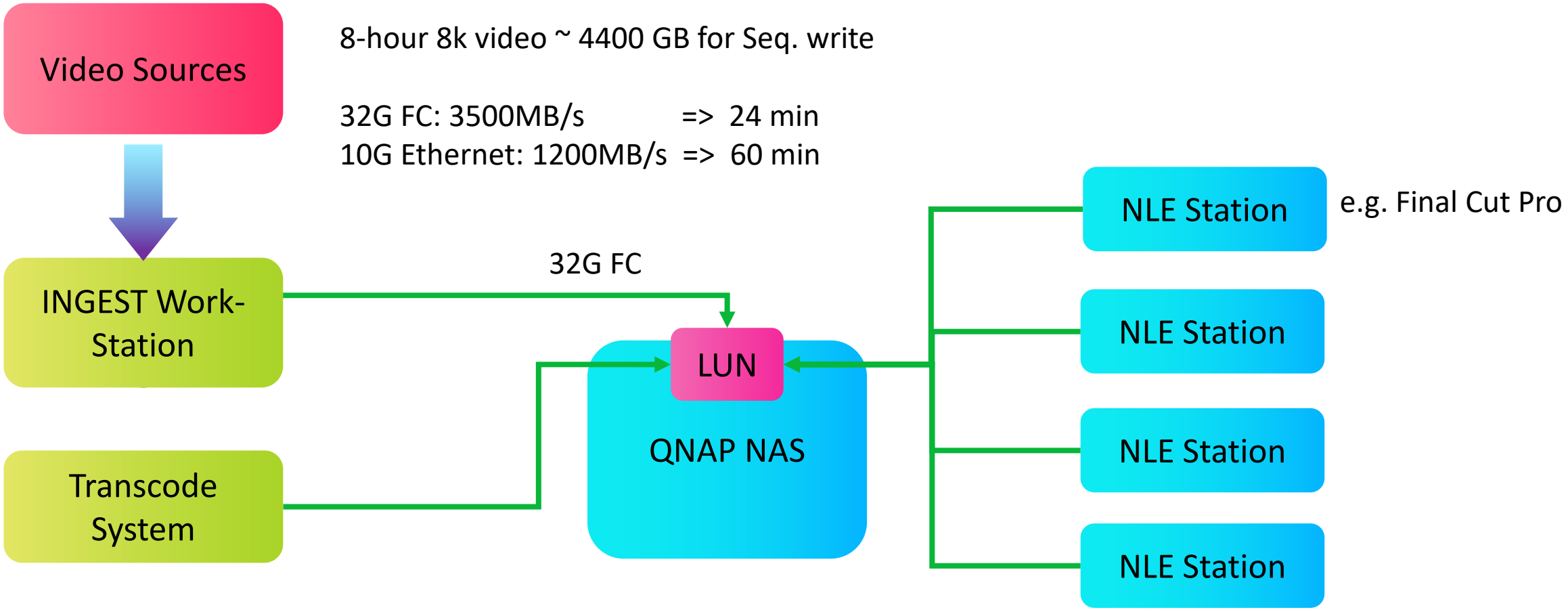
Open iSCSI Initiator on Windows



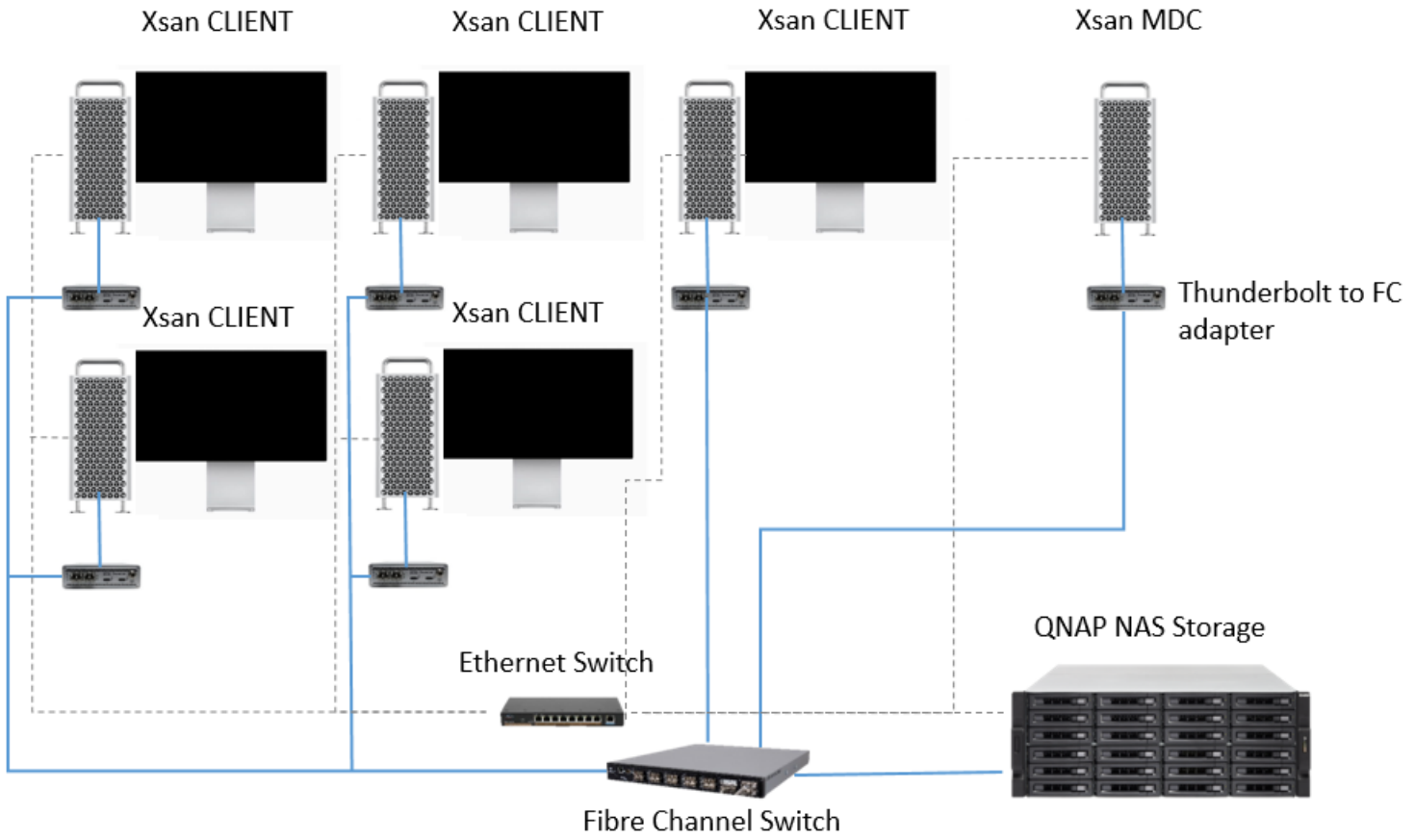
Connect to the iSCSI LUN



32G FC Realizes High Speed Ingest and Achieves Highly Efficient Video Editing Workflow

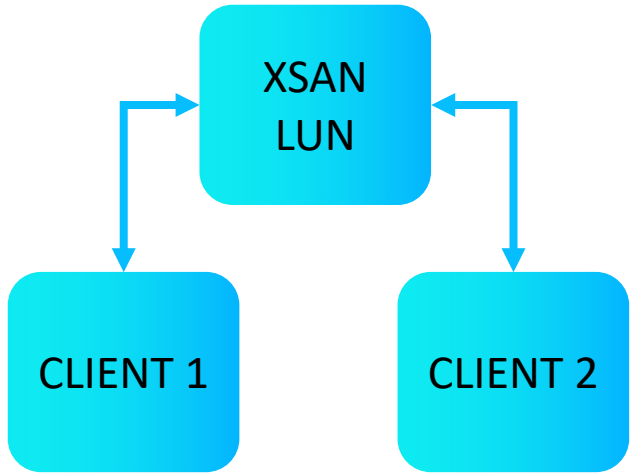


FC and QNAP NAS Enable the Same LUN Collaboration with XSAN



Search key words: “QNAP” “XSAN”

Setting up a Basic Xsan Environment with QNAP NAS Storage and Fibre Channel



Demo

QNAP Rackmount NAS with QTS can also support QXP fibre channel adapters

NAS Models with Intel processors

- TES-3085U (QTS), TES-1885U (QTS), TDS-16489U
- TS-2483XU, TS-1683XU-RP, TS-1283XU-RP, TS-983XU-RP, TS-983XU, TS-883XU-RP, TS-883XU
- TVS-EC2480U/1680U/1580MU/1280U, TS-EC880U
- TVS-2472XU-RP, TVS-1672XU-RP, TVS-1272XU-RP, TVS-972XU-RP, TVS-972XU, TVS-872XU-RP, TVS-872XU

NAS Models with AMD processors

- TS-2477XU-RP, TS-1677XU-RP, TS-1277XU-RP, TS-977XU-RP, TS-977XU, TS-877XU-RP, TS-877XU

QNAP desktop NAS with QTS can also support QXP fibre channel adapters

NAS Models with Intel processors

- TS-2888X
- TS-1685
- TVS-1282, TVS-882, TVS-682
- TVS-872XT, TVS-672XT, TVS-472XT
- TVS-872N, TVS-672N

NAS Models with AMD processors

- TS-1677X, TS-1277, TS-877, TS-677

Fibre channel for higher performance and lower CPU utilization

TS-2483XU-RP speed / CPU usage		Fibre channel RAID 0 performance			
		1 x 32GFC	NAS CPU	2 x 32GFC	NAS CPU
Throughput (MB/s)	SW-1M	3082	**13%**	3559	**20%**
	SR-1M	3125	**9%**	5253	**18%**
	SW-512K	3101	**12%**	4065	**18%**
	SR-512K	3130	**13%**	5233	**21%**
IOPS	RW-4K	129528	**19%**	165295	**27%**
	RR-4K	51590	**10%**	98389	**20%**

IOmeter Global Configuration: Maximum Disk Size: RAM*4/ Ramp Up Time: 30 seconds
Seq / Run Time: 3 Minutes / 2-workers/ 64-outstanding
Random / Run Time: 3 Minutes / 4-workers/ 32-outstanding

Test environment：TS-2483XU-RP

1. F/W: QTS 4.4.1
2. CPU: Intel(R) Xeon(R) E-2136 CPU @ 3.30GHz
3. SSD: 16 x ADATA SU900 + 8 x Intel SSDSC2BB240G4,RAID 0
4. RAM: 16GB
5. Thick volume; Block-based LUN; AIO enable; MPIO
6. FC32G: QNAP QXP-32G2FC

PC Environment

1. CPU: Intel(R) Xeon(R) CPU E5-2630 v3 @ 2.40GHz, 2401 Mhz, 8 Core(s), 16 Logical Processor(s)
2. OS: Windows Server 2016 Datacenter Build 14393
3. Memory: 128 GB.
4. FC32G: Marvell QLogic QLE2742-SR-CKFibre Channel Adapter

FC reduces CPU loading compared to iSCSI

Speed/CPU		iSCSI		FC	
		25GbEx1	CPU%	32G	CPU%
Throughput (MB/s)	SW-1M	2709	**56%**	2944	**39%**
	SR-1M	2755	**32%**	2772	**30%**
	SW-512K	2707	**61%**	2951	**37%**
	SR-512K	2825	**43%**	2872	**35%**
IOPS	RW-4K	154793	**81%**	155197	**77%**
	RR-4K	108263	**69%**	113162	**67%**

Test environment: TS-1283XU-RP

- F/W: 4.4.1
- CPU: Intel(R) Xeon(R) E-2124 CPU @ 3.30GHz
- Tested SSD: Samsung SSD 850 PRO 512GB SATA*12, RAID 0
- RAM: 8 GB (4GB x 2)
- Block-based LUN; AIO enable
- FC 32G: QLogic Fibre Channel Adapter-QLE2742-SR-CK
- 25GbE: QXG-25G2SF-CX4, MTU 9000

IOmeter Global Configuration:
Maximum Disk Size: RAM*4/ Ramp Up Time: 30 seconds Seq / Run Time: 3 Minutes / 2-workers/ 64-outstanding Random / Run Time: 3 Minutes / 4-workers/ 32-outstanding

PC Environment
- CPU: Intel(R) Xeon(R) CPU E5-2630 v3 @ 2.40GHz
- OS: Windows Server 2016 Database Evaluation.
- Version: 10.0.14393 Build 14393
- Memory: 128 GB.
- FC 32G: QLogic Fibre Channel Adapter-QLE2742-SR-CK
- 25GbE: QXG-25G2SF-CX4, MTU 9000

Fibre channel performance is good

Speed/CPU		FC	
		2 x 32GFC	CPU%
Throughput (MB/s)	SW-1M	3133	**30%**
	SR-1M	4797	**25%**
	SW-512K	3154	**29%**
	SR-512K	2772	**28%**
IOPS	RW-4K	92632	**40%**
	RR-4K	195360	**36%**

Note: the test environment is RAID 5.

IOmeter Global Configuration: Maximum Disk Size: RAM*4/ Ramp Up Time: 30 seconds
Seq / Run Time: 3 Minutes / 2-workers/ 64-outstanding
Random / Run Time: 3 Minutes / 4-workers/ 32-outstanding

Test environment: TS-2483XU-RP

1. F/W: 4.4.1.0955 build 20190603
2. CPU: Intel(R) Xeon(R) E-2136 CPU @ 3.30GHz
3. SSD: Samsung SSD 850 PRO 512GB SATA*24,RAID 5
4. RAM: 16GB, 8GB*2
5. Thick volume; Block-based LUN; AIO enable; MPIO
6. FC32G: QLogic Fibre Channel Adapter

PC Environment
1. CPU1: Intel(R) Xeon(R) CPU E5-2630 v3 @ 2.40GHz, 2401 Mhz, 8 Core(s), 16 Logical Processor(s)
2. OS: Windows Server 2016 Datacenter Evaluation Build 14393
3. Memory: 128 GB.
4. FC32G: QLogic Fibre Channel Adapter

Choose the right QuTS hero models based on your fibre channel environment

TS-h977XU-RP 16GFC

- 4 x 3.5” SATA + 5 x 2.5” SATA
- AMD Ryzen™ 7 3700X 8C/16T 3.6 GHz (up to 4.4 GHz)
- 32GB DDR4 RAM, expandable to 128GB
- 2 x 10GbE SFP+, 2 x 10GBASE-T, 2 x 1GbE

QuTS hero edition

TS-h1277XU-RP 16GFC

- 12 x 3.5” SATA
- AMD Ryzen™ 7 3700X 8C/16T 3.6 GHz (up to 4.4 GHz)
- 32GB & 128GB DDR4 RAM, expandable to 128GB
- 2 x 10GbE SFP+, 2 x 10GBASE-T, 2 x 1GbE

QuTS hero edition

TS-h1283XU-RP 32GFC

- 12 x 3.5” SATA
- Intel® Xeon® E-2236 6C/8T 3.4GHz (up to 4.8 GHz)
- 32GB & 128GB DDR4 **ECC** RAM, expandable to 128GB
- 2 x 10GbE SFP+, 2 x 10GBASE-T, 4 x 1GbE

QuTS hero edition

QXP-16G2FC & QXP-32G2FC FC adapters

Reliable, scalable, and budget-friendly QuTS hero NAS FC SAN solution

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