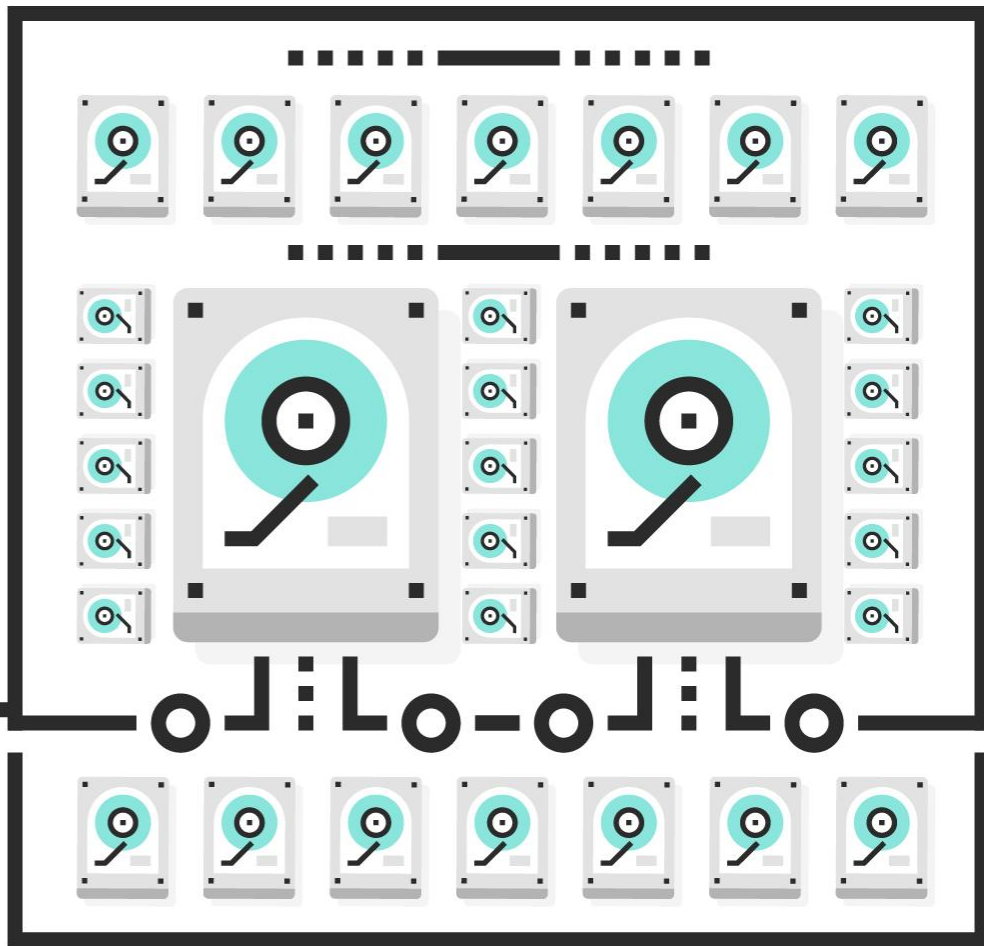


QNAP

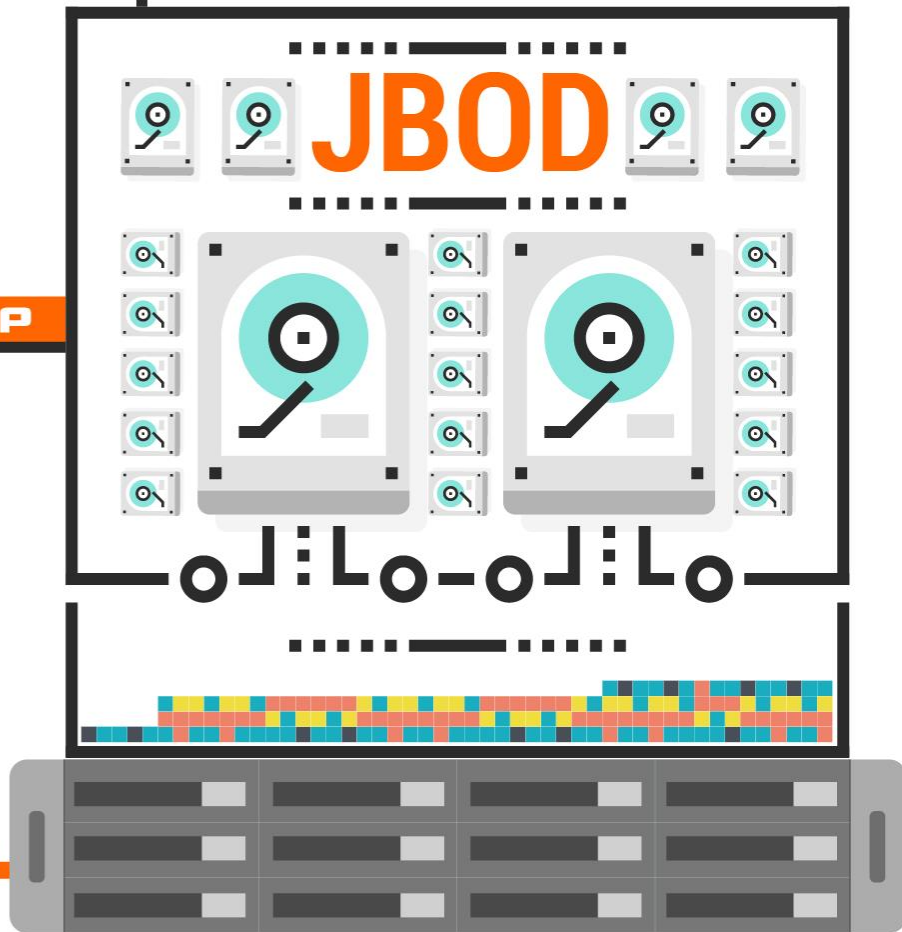
Improve
JBOD
performance
and **IOPS**
efficiency

with a **SAS**
storage expansion solution



The Explosion of Data

QNAP

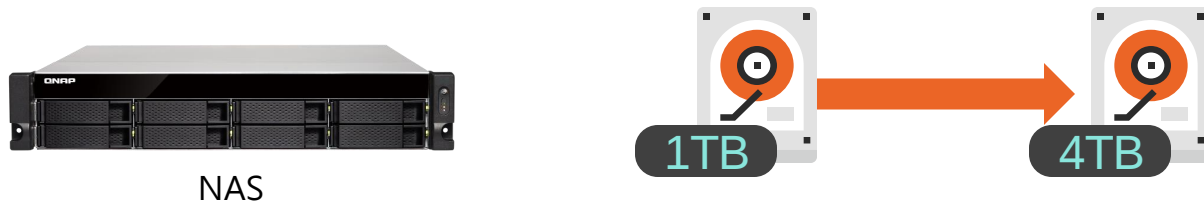


Three Ways to Expand Your QNAP NAS

QNAP

A. Online RAID Capacity Upgrade

- Replaces disk one by one
- Takes time in RAID rebuilding



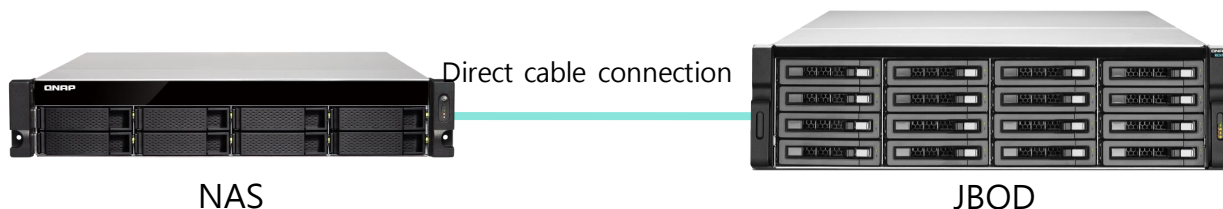
B. QNAP vJBOD

- High-speed network is required
- Need to purchase another NAS



C. Expand with JBOD

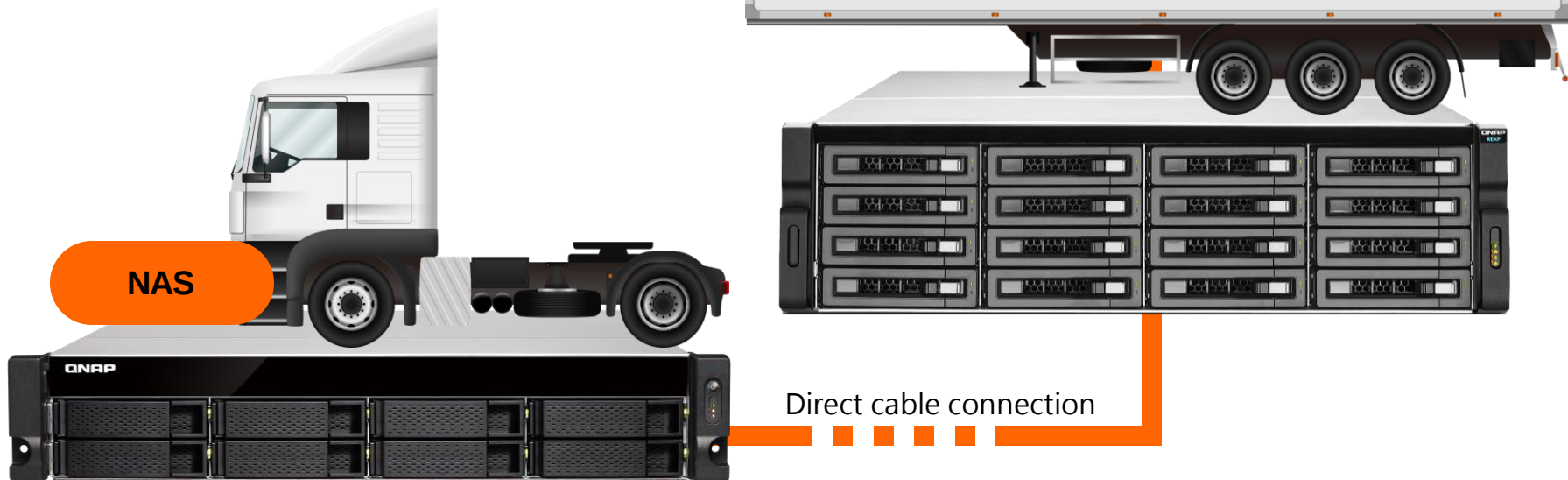
- Direct attached storage
- Need to purchase JBODs



JBOD Expansion is Straightforward

QNAP

- JBOD: Just a Bunch of Disks.
- Plug and use, ease of management



QNAP Expansion Solutions

QNAP

EJ series-SAS 12Gb/s dual controller JBOD



EJ1600 v2

TX series-Thunderbolt 2 JBOD



TX-800P



TX-500P

TR series- USB 3.1 RBOD



TR-004



TR-002

UX series-USB 3.0 JBOD



UX-1200U-RP



UX-800U-RP

REXP series-SAS 12Gb/s single controller JBOD



REXP-1620U-RP



REXP-1220U-RP

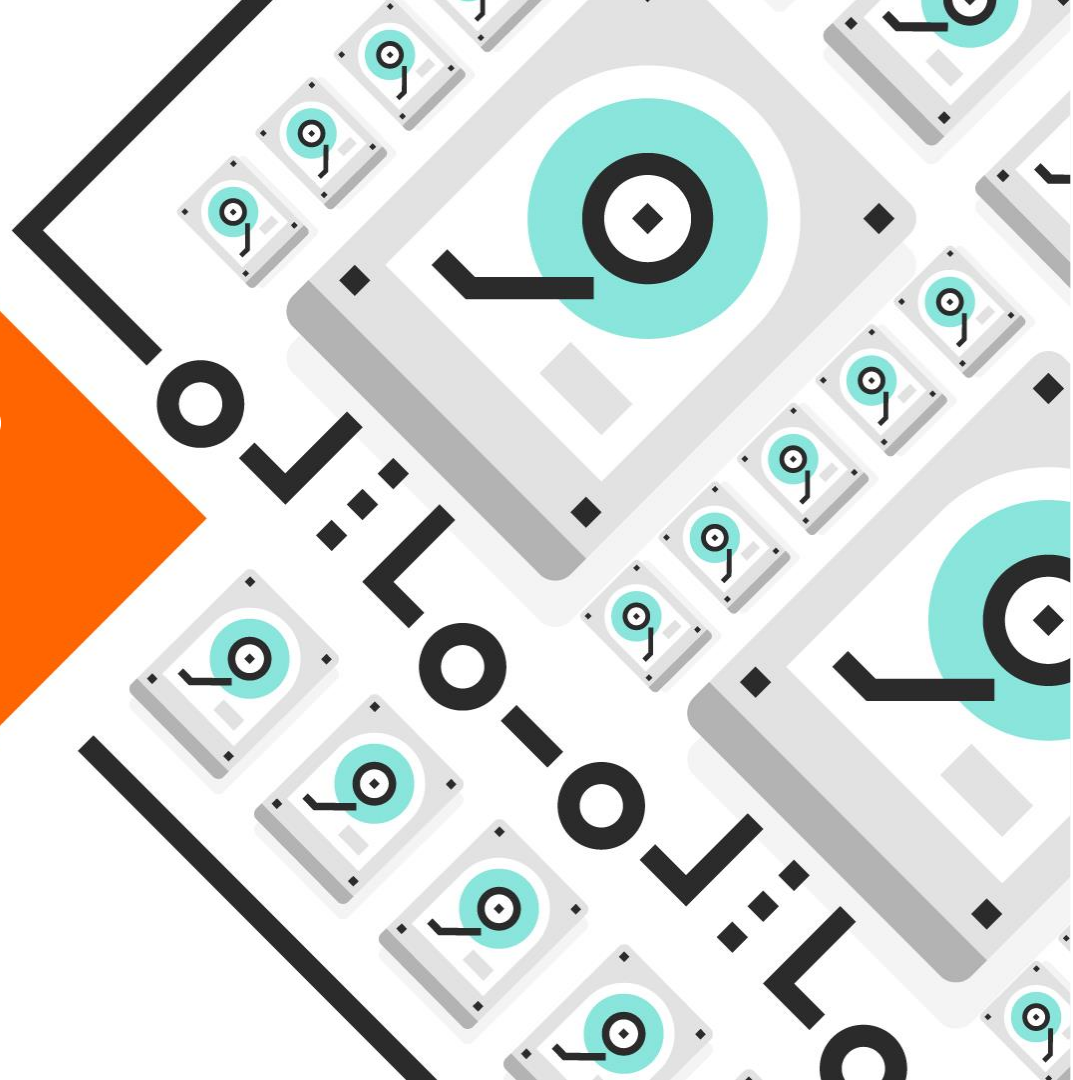
QNAP JBOD Comparison

QNAP

	EJ seires	REXP seires	TX seires	TR seires	UX seires
Protocol	SAS	SAS	Thunderbolt 2	USB 3.1	USB 3.0
Host connect interface	miniSAS HD (SFF-8644)	miniSAS HD (SFF-8644)	Thunderbolt 2 (miniDP)	USB Type-C	USB Type-A
Bandwidth	48Gbps	48Gbps	20Gbps	10Gbps	5Gbps
Supported HDD	SAS 12Gbps SATA 6Gbps	SAS 12Gbps SATA 6Gbps	SATA 6Gbps	SATA 6Gbps	SATA 6Gbps
Independent pool	Yes	Yes	Yes	Yes	Yes
Expand NAS pool	Ye	Yes	No	No	No



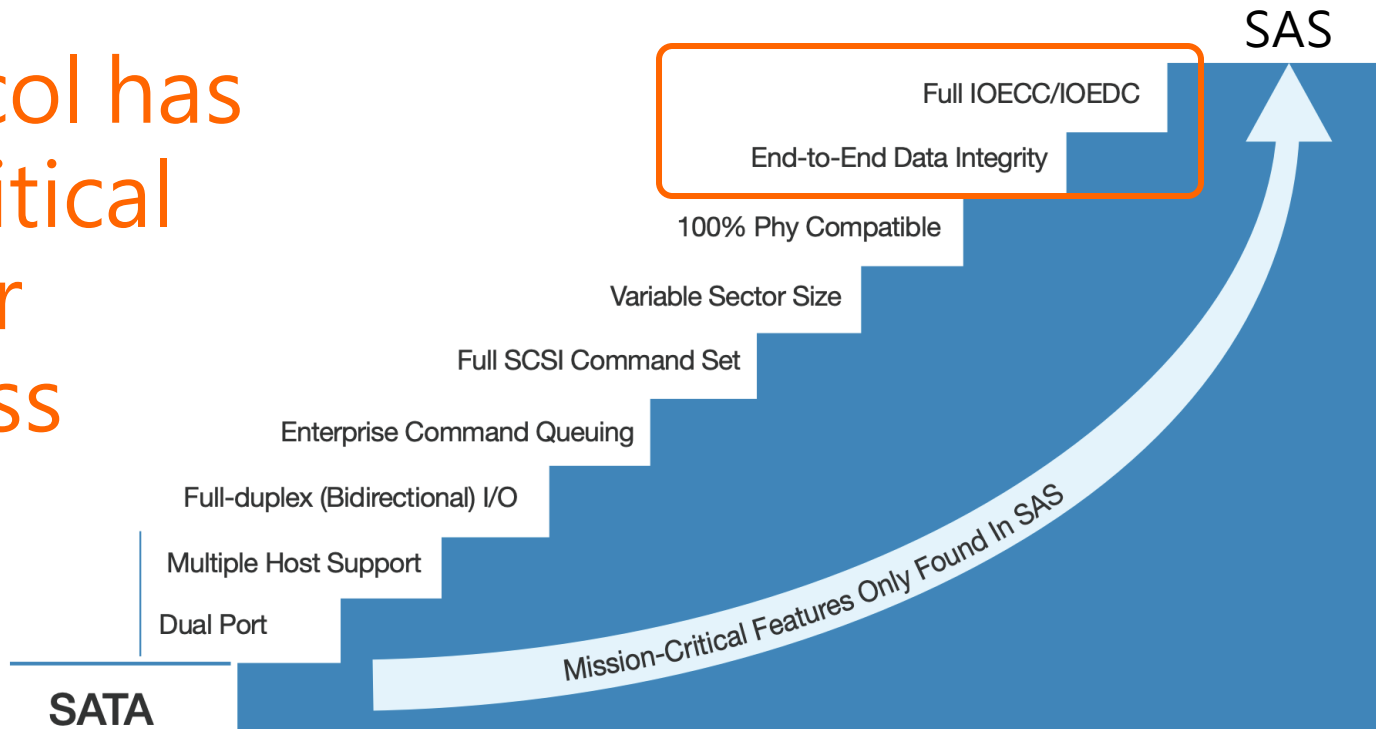
Advantages of SAS Protocol



SAS v.s. SATA

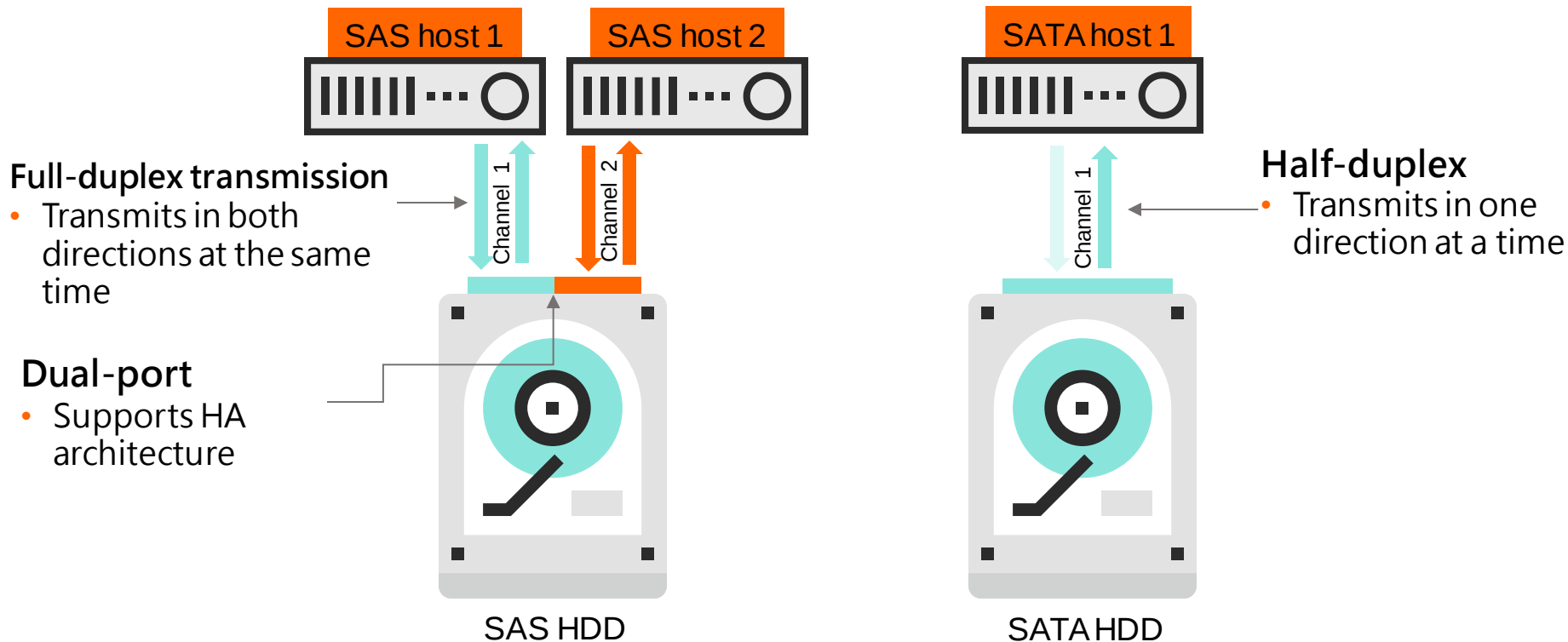
QNAP

SAS protocol has mission-critical features for the business



Full-Duplex and Dual-Pot

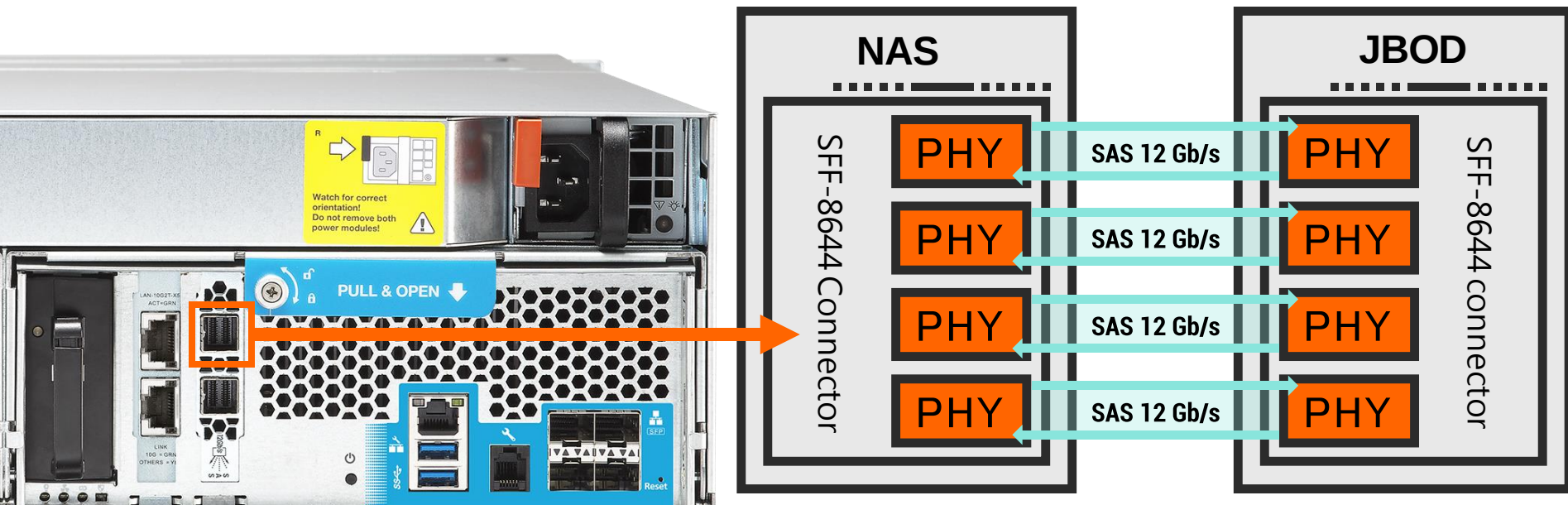
QNAP



SAS Wide Port and Bandwidth

QNAP

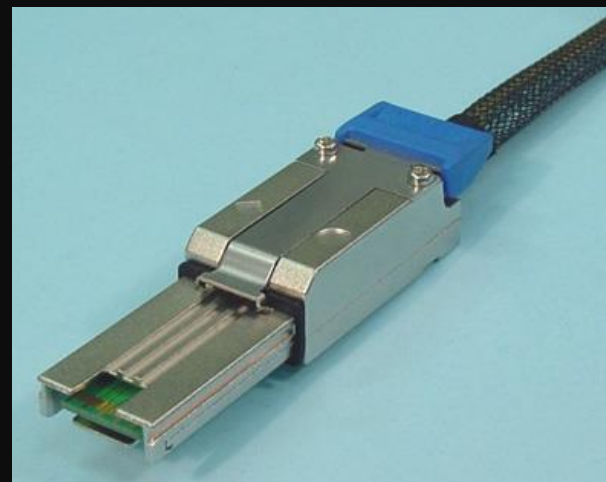
- SFF-8644 mini-SAS HD is wide port which includes 4 PHY
- Each PHY provides 12Gb/s bandwidth
- A wide port can provide up to 48 Gb/s bandwidth



SAS Connector



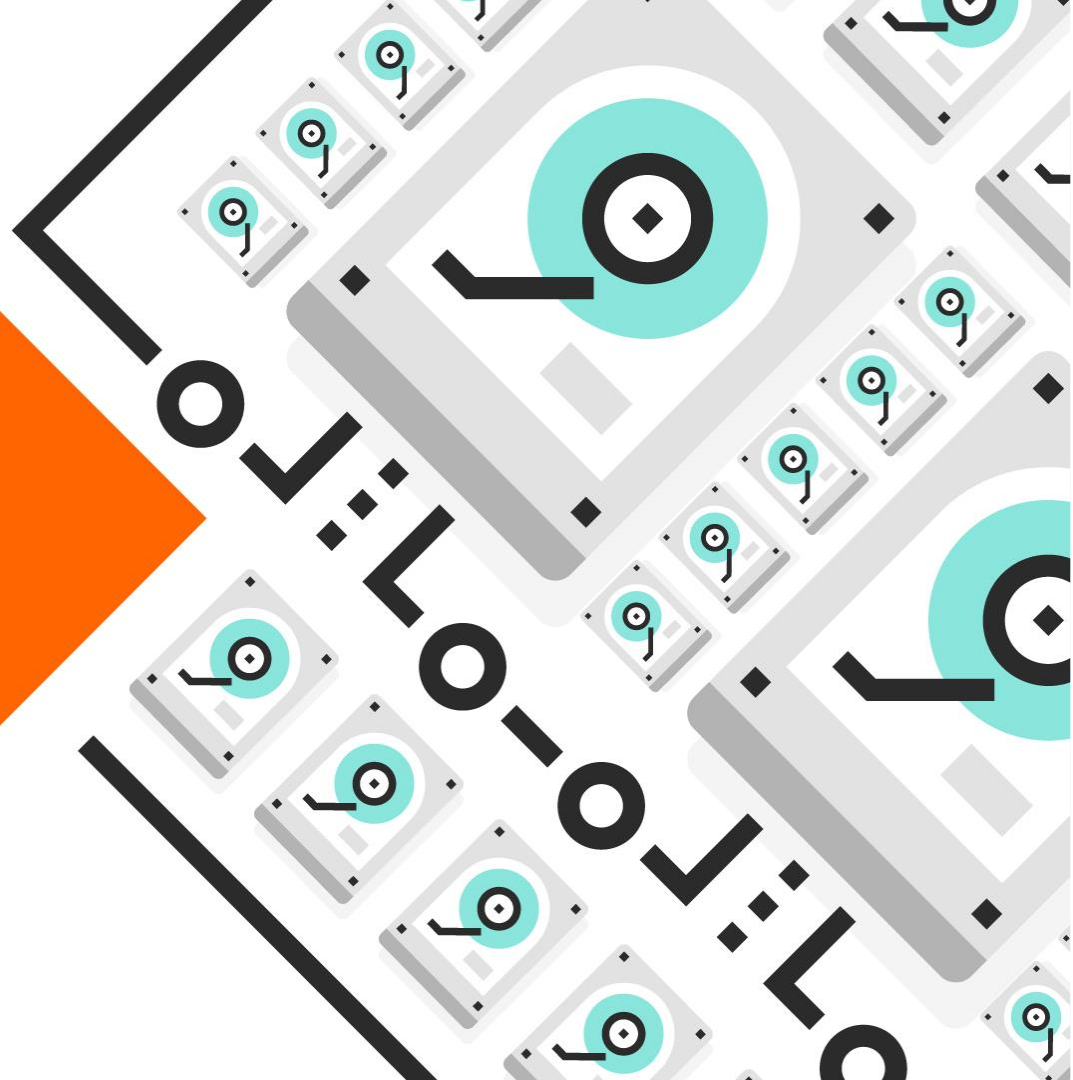
- SFF-8644 (mini-SAS HD)
- 48Gb/s data rate (12Gb/s x 4 lane)



- SFF-8088 (mini-SAS)
- 24Gb/s data rate (6Gb/s x 4 lane)

QNAP

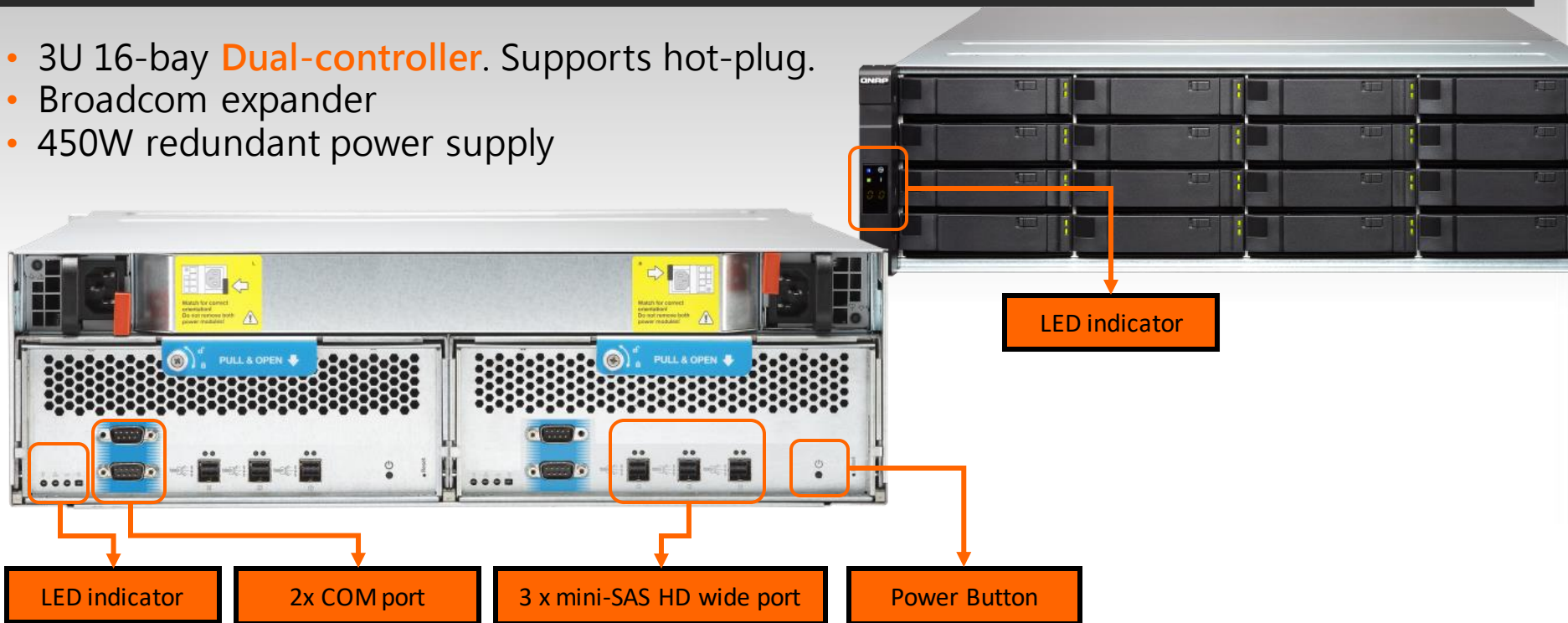
QNAP SAS JBOD Solutions



EJ1600 v2 Dual-controller JBOD

QNAP

- 3U 16-bay **Dual-controller**. Supports hot-plug.
- Broadcom expander
- 450W redundant power supply



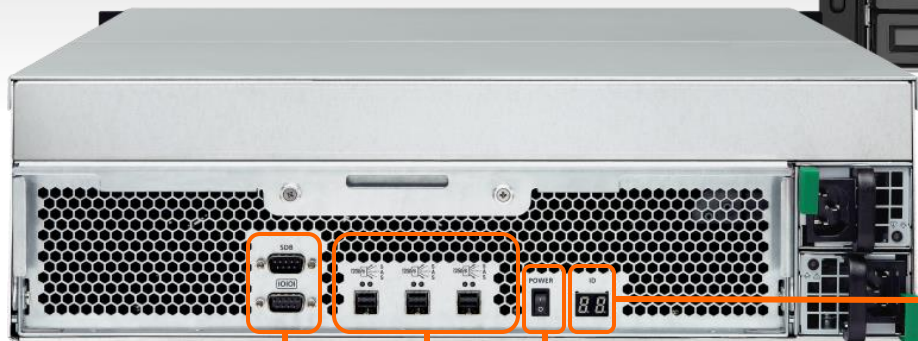
REXP-1620U-RP

QNAP

- 3U 16-bay single-controller
- Broadcom expander
- 450W redundant power supply



- Power button
- LED indicators



JBO ID

2x COM port

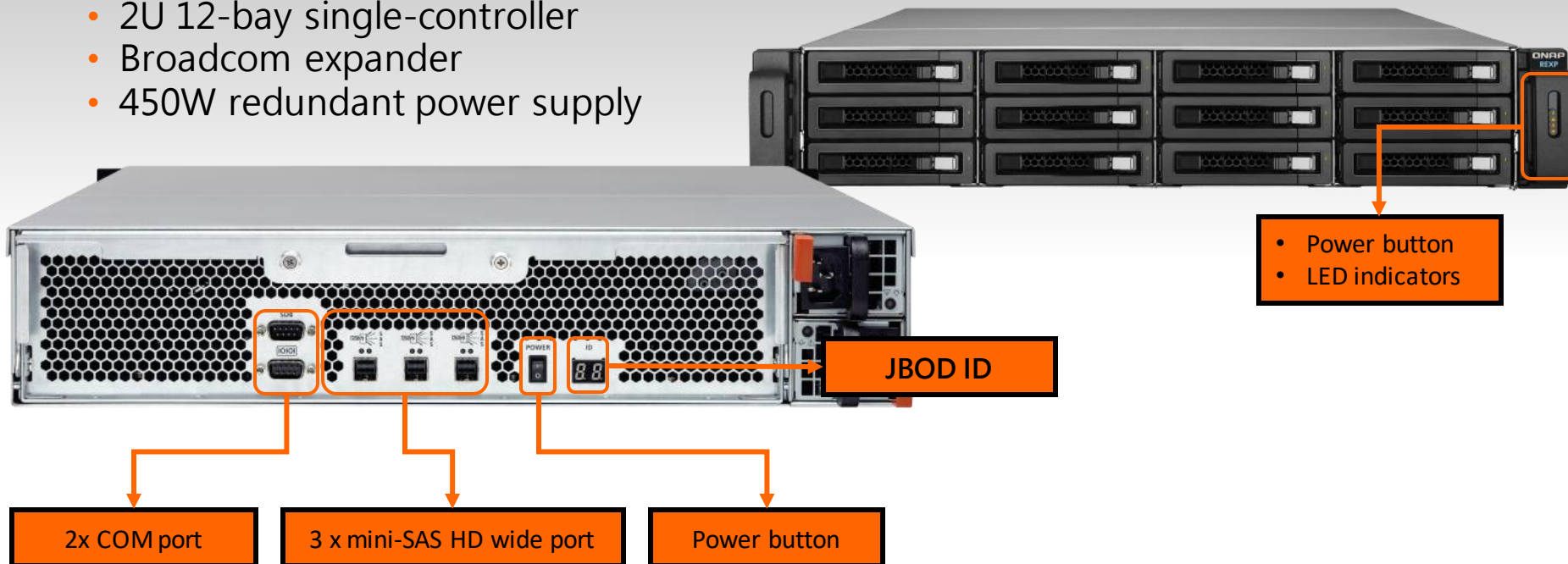
3 x mini-SAS HD wide port

Power button

REXP-1220U-RP

QNAP

- 2U 12-bay single-controller
- Broadcom expander
- 450W redundant power supply



QNAP SAS Adapter and Cables



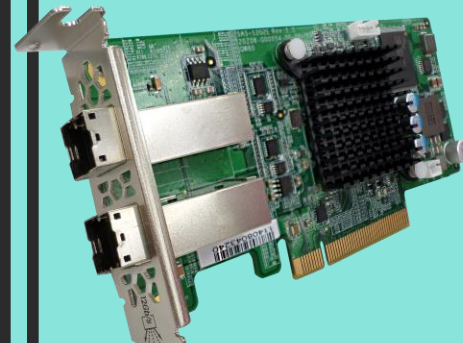
Mini-SAS HD cable (12Gb/s)

- CAB-SAS05M-8644
- CAB-SAS10M-8644
- CAB-SAS20M-8644
- CAB-SAS30M-8644



Mini-SAS to Mini-SAS HD cable

- CAB-SAS05M-8644-8088
- CAB-SAS10M-8644-8088
- CAB-SAS20M-8644-8088
- CAB-SAS30M-8644-8088



8 port SAS 12Gb/s card

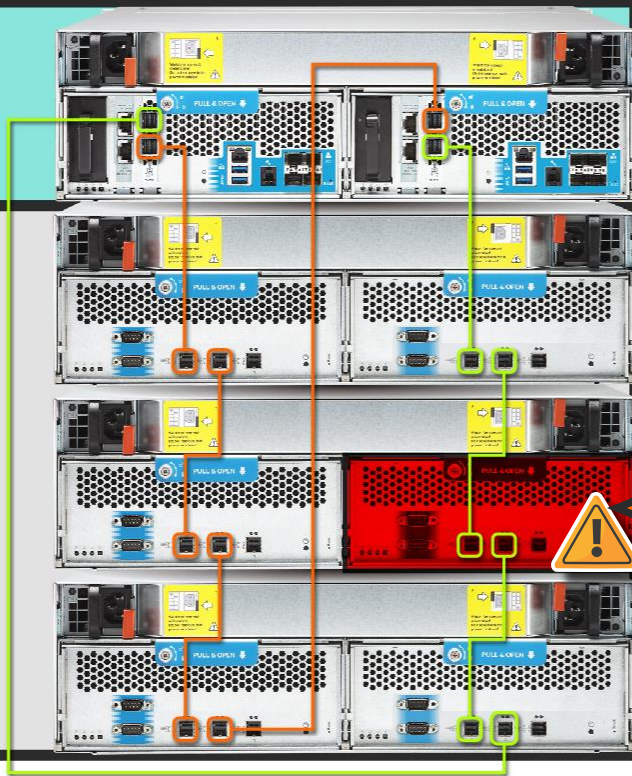
- SAS-12G2E

ES NAS High Availability Cabling Instruction

QNAP

Dual-controller
ES NAS

Dual-controller
EJ series JBOD



- Daisy-chain up to 7 EJ1600 v2
- Avoids single point of failure
 - ▶ System can operate when a cable or a controller has failed.

Multipath function allows to access data even when one controller has failed

Turbo NAS Cabling Instruction

Turbo NAS

REXP JBOD

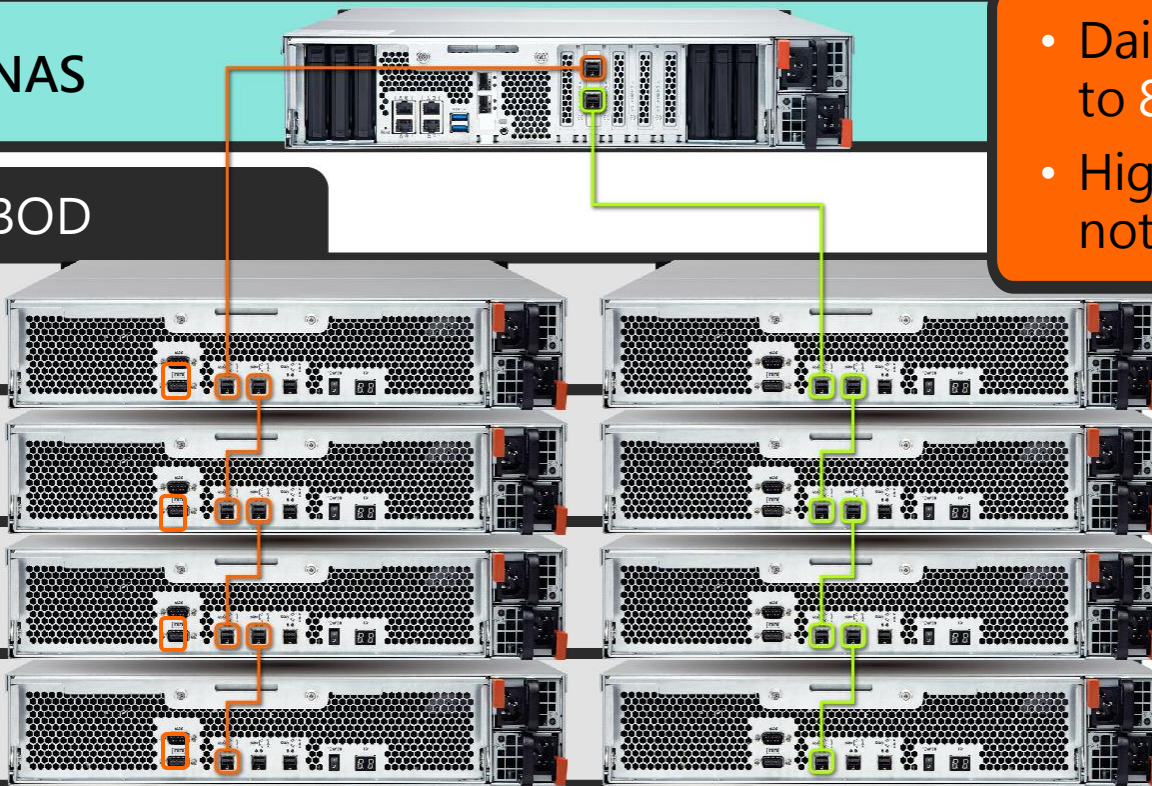
Tier 1

Tier 2

Tier 3

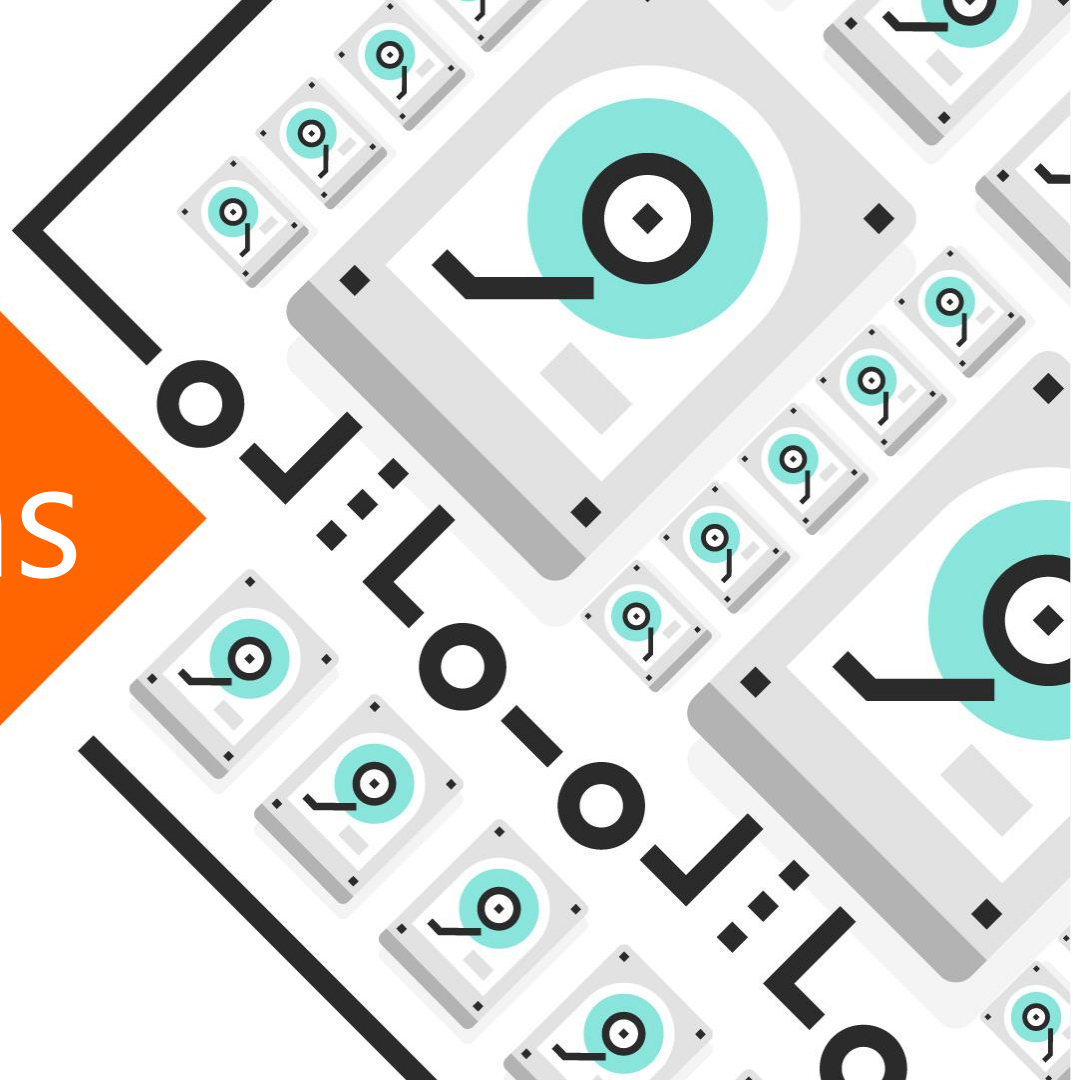
Tier 4

- Daisy chained up to 8 REXP or 4 tier
- High availability is not supported





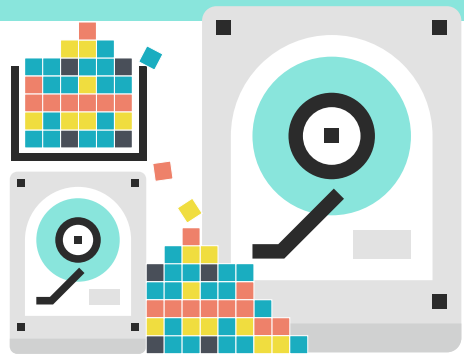
JBOD Applications



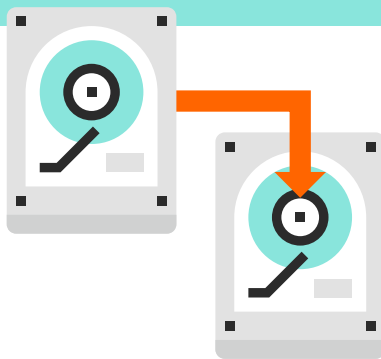
Three Key Applications

QNAP

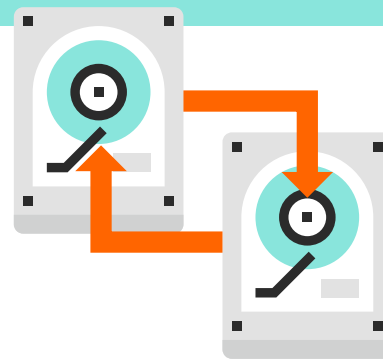
Capacity Expansion



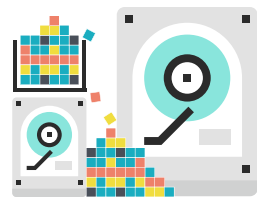
Data Migration



Local Data Backup

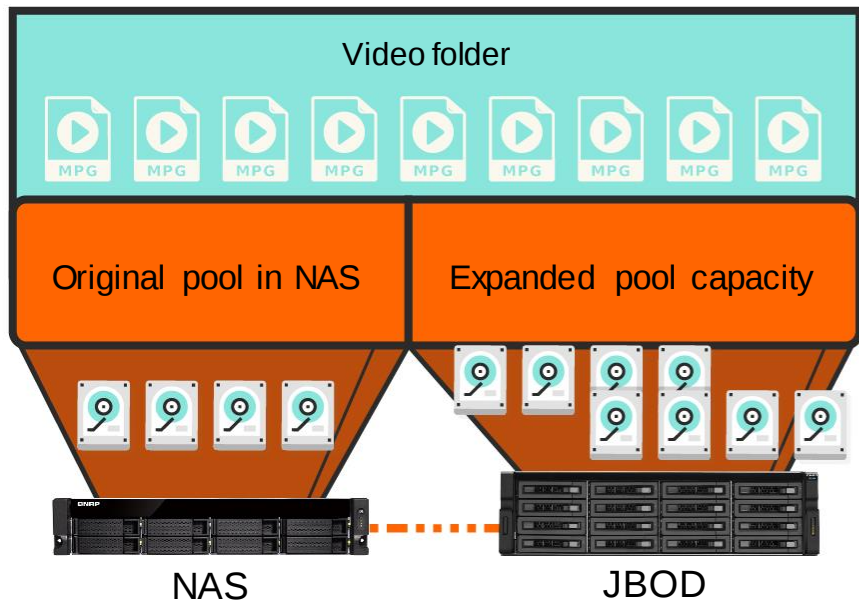


Capacity Expansion

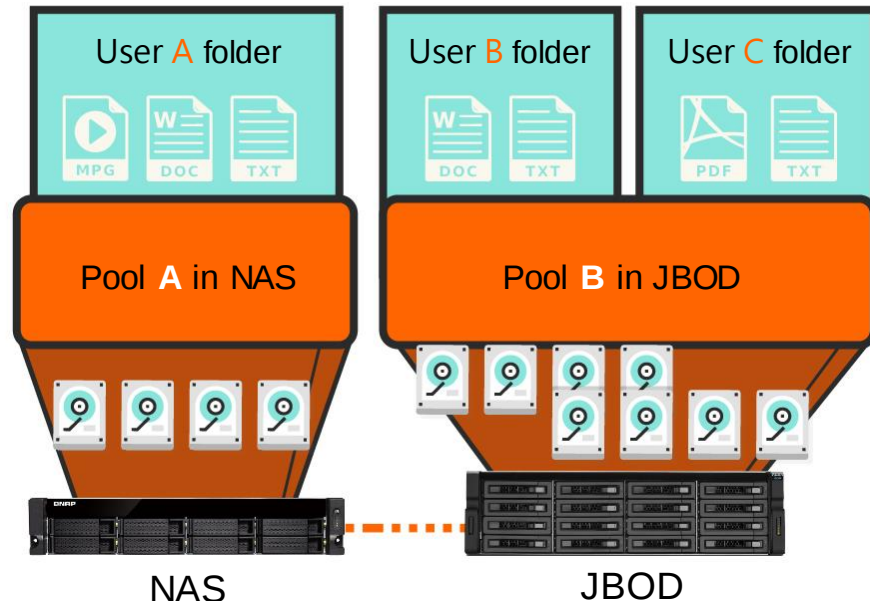


QNAP

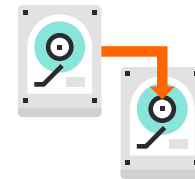
- Expand existing pool in NAS



- Independent pool in JBOD

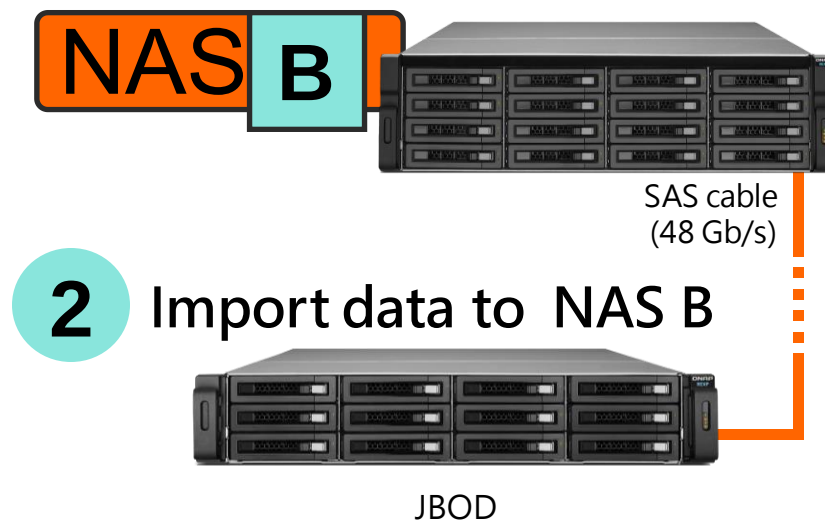
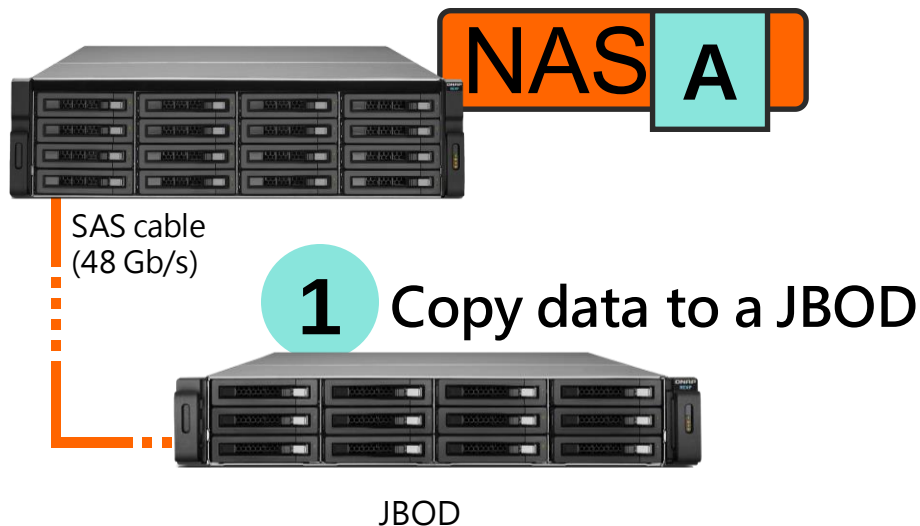


Data Migration

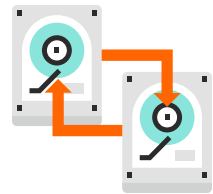


QNAP

- QJBOD Express for transferring huge amount of data
- 48 Gb/s high-speed to reduce time

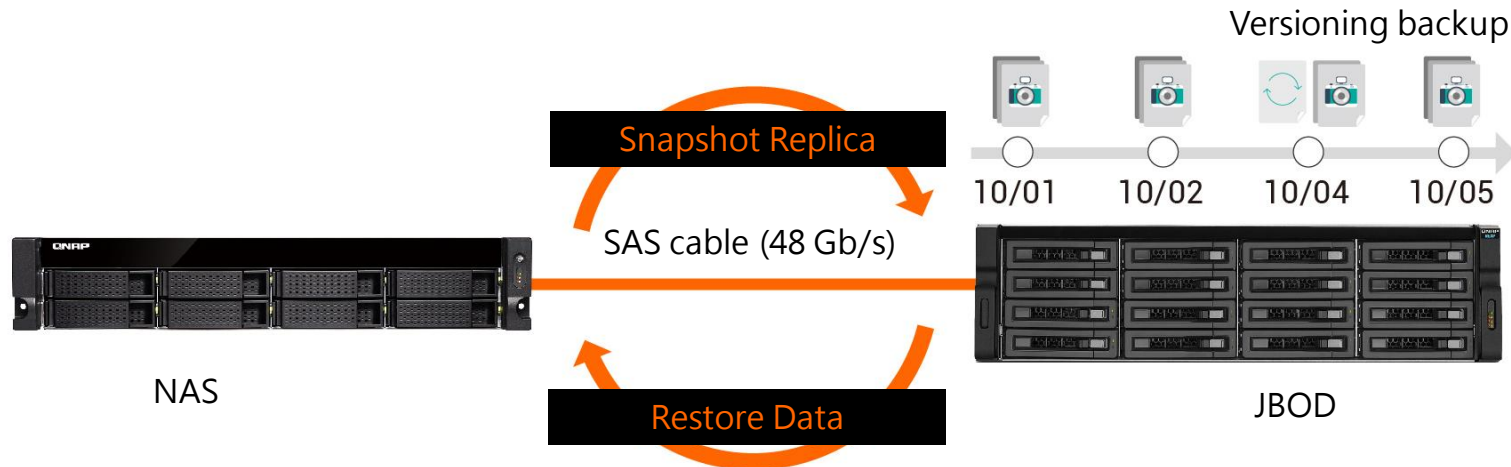


Back up Data at Local Site



QNAP

- Snapshot Replica supports incremental and versioning backup
 - Against Ransomware infection
 - Data recovery when multiple disks have failed in a RAID group
 - SAS 48 Gb/s high speed data transferring to shorten RTO (Recovery Time Objective)



QNAP

Best Expansion Solution with QNAP JBOD



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