

QTS 4.4.2

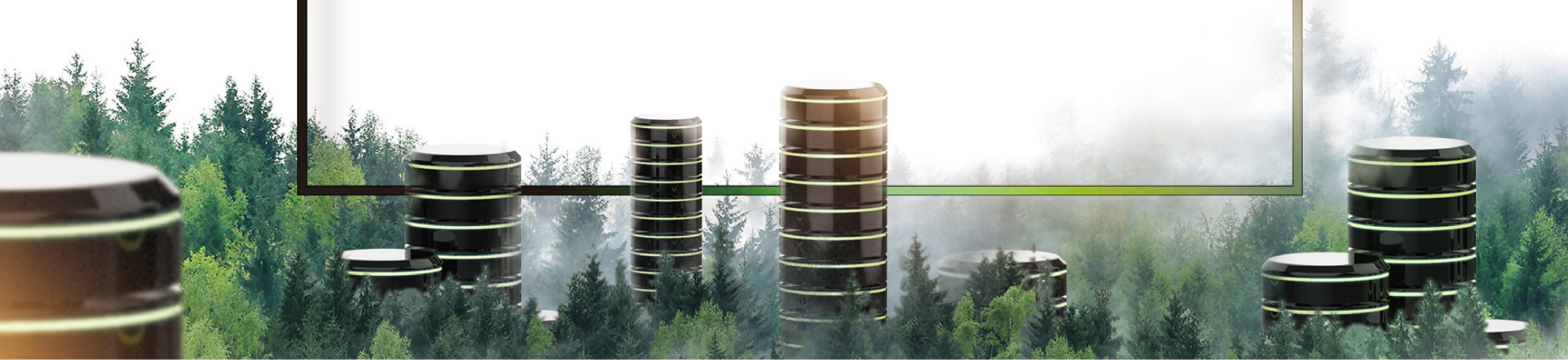


A guide to RAID, storage pool & volume settings,
and JBOD storage features



QTS 4.4.2

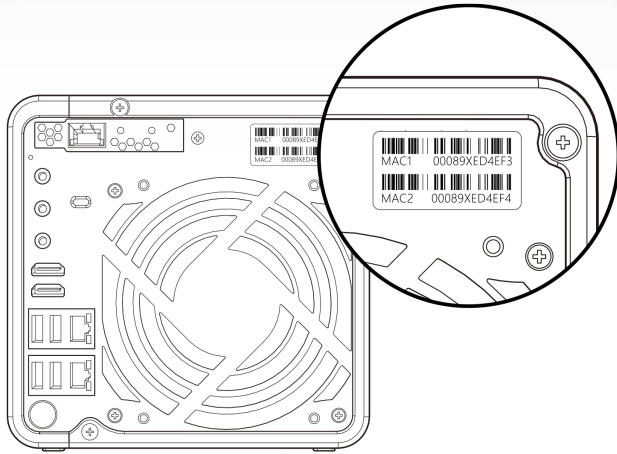
Launched:



QTS 4.4.2 Launched

QNAP product security improvements:

(A) The QTS default password is changed to the first MAC address (all caps).



Qfinder Pro 6.8.0

Qfinder ProConnectSettingsToolsRunHelp

QNAP

QfinderPRO



Login

Network Drives

Media Upload

Configuration

Details

Resource Monitor

Locate This Device

Bookmark the device

Bookmark	Name	IP Address	Type	myQNAPcloud	Device Name	Category	Device Type	Version	MAC Address	Status
☆	Sam882ST3	172.17.30.12	▼	Sam882ST3	NAS	TVS-882ST3	4.4.1.1216	24-5E-BE-0D-42-D9		
☆	Sam80P	172.17.30.182		EC1080Pro	NAS	TS-EC1080 Pro	4.3.4.0516	New 00-08-9B-DD-13-6A		
★	Sam472XT	172.17.30.142	▼	--	NAS	TVS-472XT	4.4.2.1239	24-5E-BE-2C-01-38		
☆	Sam431P2	172.17.30.57	--		NAS	TS-431P2	4.4.2.1239	24-5E-BE-19-9D-AE		
☆	Sam1685	172.17.30.101	--		NAS	TS-1685	4.4.1.1216	24-5E-BE-11-BA-E7		
☆	Qucpe	172.17.30.37	▼	--	uCPE	QuCPE-5010-DXE	1.0.2.q189 alpha	00-18-7D-FF-1E-CD		
☆	QtptTest	172.17.30.65		QTPTTEST	NAS	TS-1679U-RP	4.3.4.0597	New 00-08-9B-D7-B1-72		

On-line: 68

(B) TLS 1.2 & HTTP compression are now enabled by default.

QTS 4.4.2 Launched

Strong support for new expansion device : TL-JBOD

TL SATA JBOD



TL USB JBOD

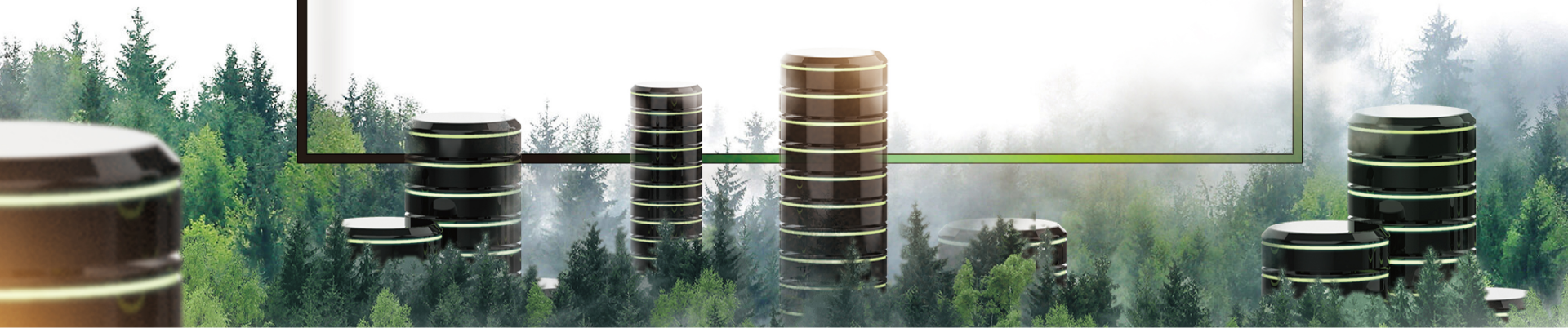




Storage Manager:

RAID / Pool / Volume

Practical Guide



Storage Manager - Address the practical needs of your storage configuration

Insufficient capacity?

How to use the external JBOD?

Buy a new NAS?

How to configure the storage space?

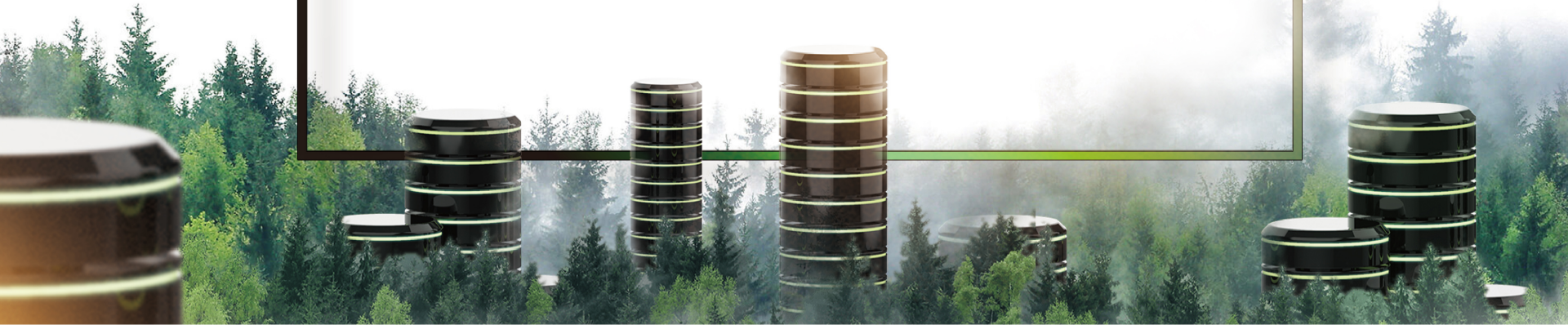
Re-configure your RAID due to reliability concerns?

How to configure your SSD?



Practical needs of storage configuration (1)

Insufficient capacity



When capacity is low (RAID expansion)

Replace Disk 1 by 1

- 1 Prepare new disks with the same number as the NAS's RAID group
- 2 Storage & Snapshot > Manage Storage Pool > Select a RAID Group > Manage > Select "Replace disk one by one"
- 3 Following wizard guide to unplug, plug in and sync disk one by one

Note: only supports RAID 1, 5, 6 & 10.

Online RAID expansion

- 1 Prepare one disk and plug into the free slot of NAS.
- 2 Storage & Snapshot > Manage Storage Pool > Expanding storage pool > Add new disk to existing RAID
- 3 Select the plugged disk and re-sync !

Note: only supports RAID 5, 6, 50 & 60

Also you can migrate to a new unit with more slots (next page), Or, use the TL JBOD external device. (final chapter)

1

TS-873 RAID 1 - Replace disk
one by one

2

Online RAID5 expansion

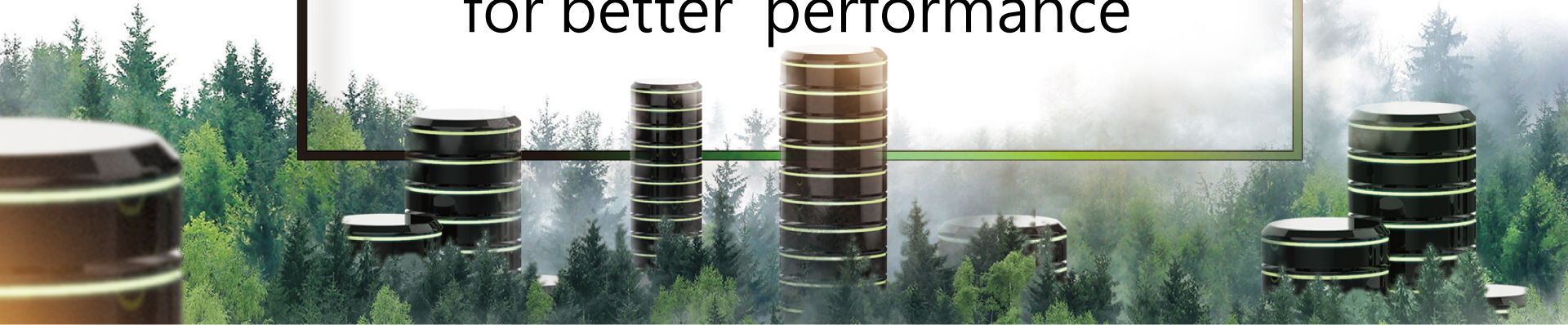
Live Demo

Q T S 4 . 4 . 2



Practical needs of storage configuration (2)

Buy a new NAS
for better performance



How to migrate existing disks to new NAS?

System Migration

- 1 Ensure 2 NAS have the same OS version (or update both to latest)
- 2 Shutdown both NAS and plug original disks into new NAS
- 3 Power on new NAS and reconfigure the network.



System migration may not support migrating NAS from an enterprise model back to an entry one.
For details please visit: <https://www.qnap.com/go/nas-migration>

How to migrate the non-system disk to new NAS?

Data pool migration

1 Storage & snapshot > Storage Pool manage > Action > Safely detach

2 Remove and plug in disks to the free slot of new NAS

3 Disk/VJBOD > Recover > Attach and Recover Storage Pool



1

System migrate from
TS-431P2 to TVS-472XT

2

Data pool migration from
TS-431P2 to TVS-472XT

Live Demo

Q T S 4 . 4 . 2



Practical needs of storage configuration (3)

When RAID type
migration is needed



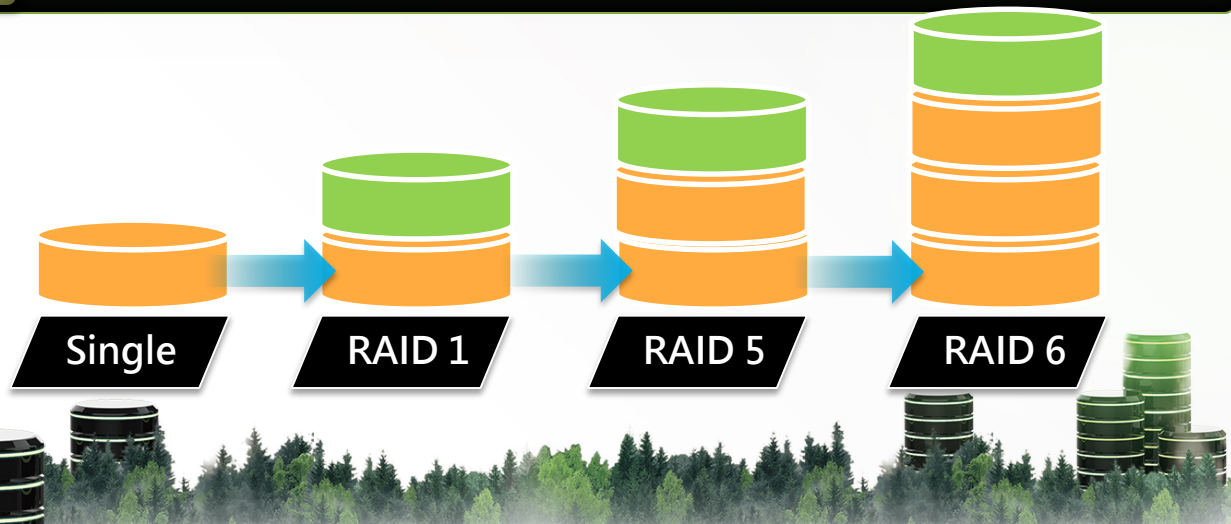
Re-configure and migrate the RAID type

RAID Migration

- 1 Plug in new disks into the NAS
- 2 Storage/Snapshot > Pool management > select RAID > Manage > Migrate
- 3 Follow the wizard to select new disk for migration

Note: only support migrating in this order.

The actual performance may differ based on NAS models. RAID 50 /60 do not support direct RAID migration



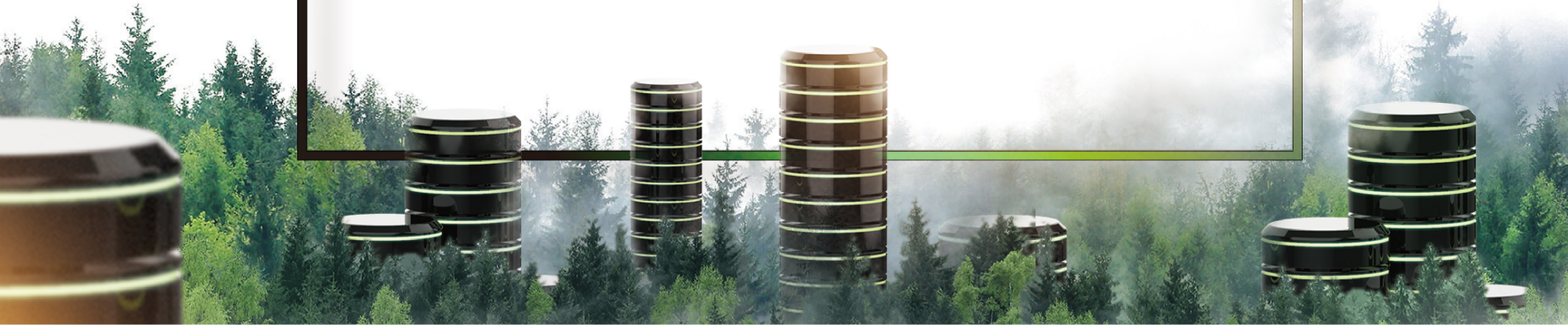
TS-873 RAID 5 migrate to RAID 6

Live Q T S 4 . 4 . 2 Demo



Practical needs of storage configuration (4)

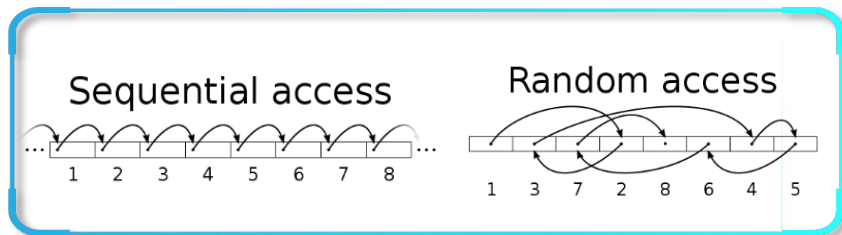
SSD Configuration



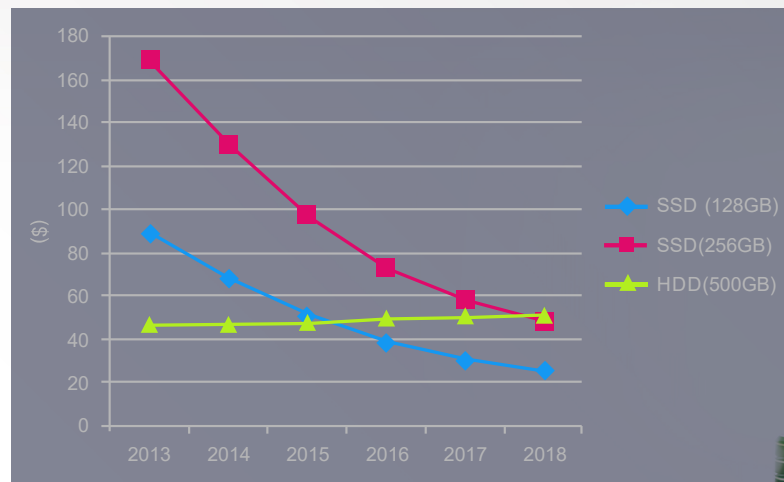
SSD Evolution Trend : Price

In storage devices, in addition to accelerating sequential file access, SSD even provides random performance (IOPS) that is far better than traditional mechanical disks.

Disk	Sequential (MB/s)	Random (IOPS)
HDD	200	350
SSD	550	60000



With modern applications it is required higher storage performance, SSD is becoming more popular and is being widely used.



What's Qtier tiered storage?

QNAP allows the combination of SSD and HDD RAID into the same pool and migrate data automatically based on accessing pattern.

Support SATA, SAS, M.2, QM2 and U.2 SSD.

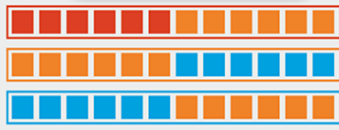
Provide higher capacity as SSD can be used to store data

- Hot data
- Warm data
- Cold data

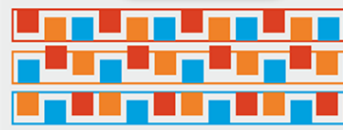
1 Before Tiering



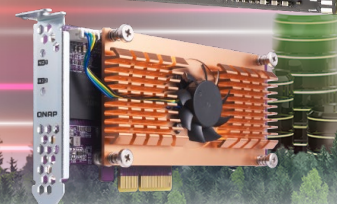
4 Data Access Pattern Changed



2 Start Tiering



3 After Tiering



Remove Qtier SSD tier on demand



Remove SSD Tier in 3 steps :



It is required that all RAID groups in Qtier Pool are normal and HDD tiers have enough capacity to store all data.

Ultra-High Speed Tier Removal Wizard

Check **Configure** Summary

Storage pool name: Storage Pool 1

This wizard will remove the ultra-high speed (SSD) tier by migrating all of its data to other tiers. The system will then remove the following SSD RAID groups:

	RAID Group	Enclosure Unit	Capacity	Disk member	Tier	Status
☒	RAID Group 1	NAS Host	206.07 GB	Disk 5, Disk 6	Ultra-High Speed	Ready
☐	RAID Group 2	NAS Host	865.79 GB	Disk 1, Disk 2, Dis...	Capacity	Ready

Available space: 869.13 GB

■ Allocated: 16.6 % (178.78 GB) ■ Ultra-High Speed Tier: 19.2 % (206.07 GB)

Cancel Next

1

Storage Pool Management >
Remove > Remove SSD Tier



2

Check if all the RAID Groups are
ready and have enough space.



3

User confirm to stop the pool's
service to start the operation.





Scenario of QNAP NAS with SSD Configuration

The SSD type will affect the workload, the best SSD configuration may only be measurable once it is configured. The SSD Cache and Qtier have different advantages, the IT manager can freely switch between the SSD Cache and Qtier to adapt to the best configuration :

Scenario	File Server	Web - Virtualized storage server	Editing Storage (raw cut, film cut...)	Editing Storage (Post production)	Log / high speed backup server	Enterprise Database
SSD usage	Qtier	Qtier	SSD RAID volume	SSD R/W cache	SSD write only cache	SSD RAID Pool
RAID type	RAID 6	RAID 10	RAID 5	RAID 5	RAID 10	RAID 10
SSD OP	10%	20%	20%	20%	30%	30%

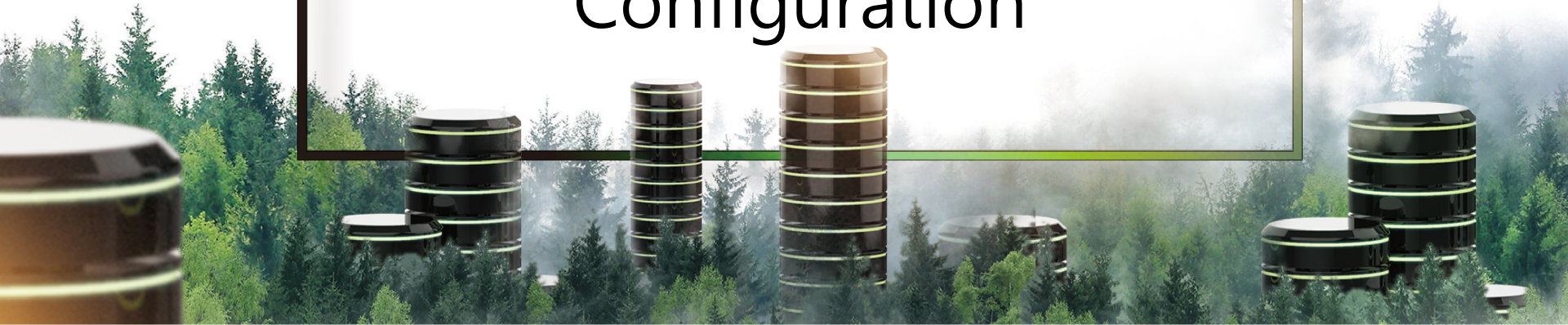


TS-1685 :
Re-configure between SSD cache
and Qtier



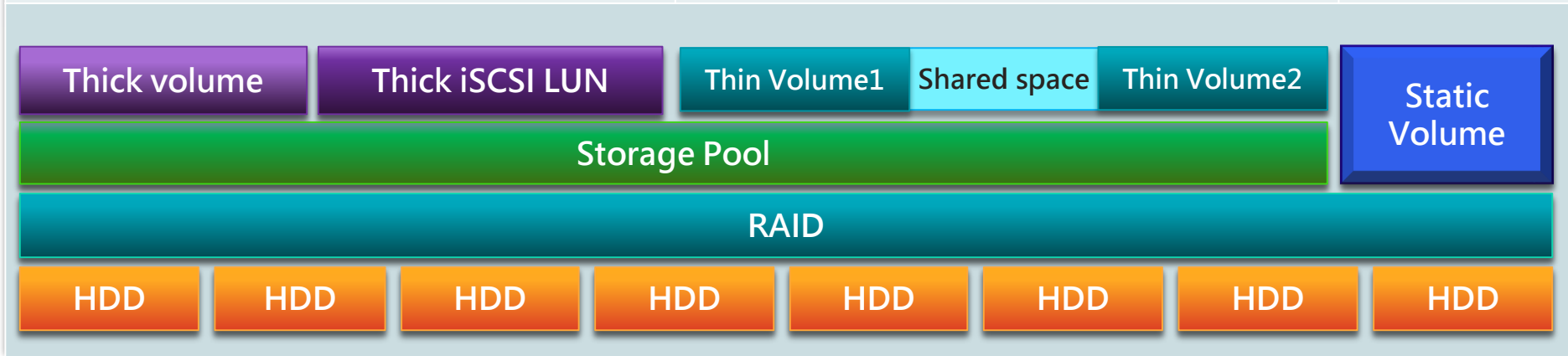
Practical needs of storage configuration (5)

Storage Space Configuration



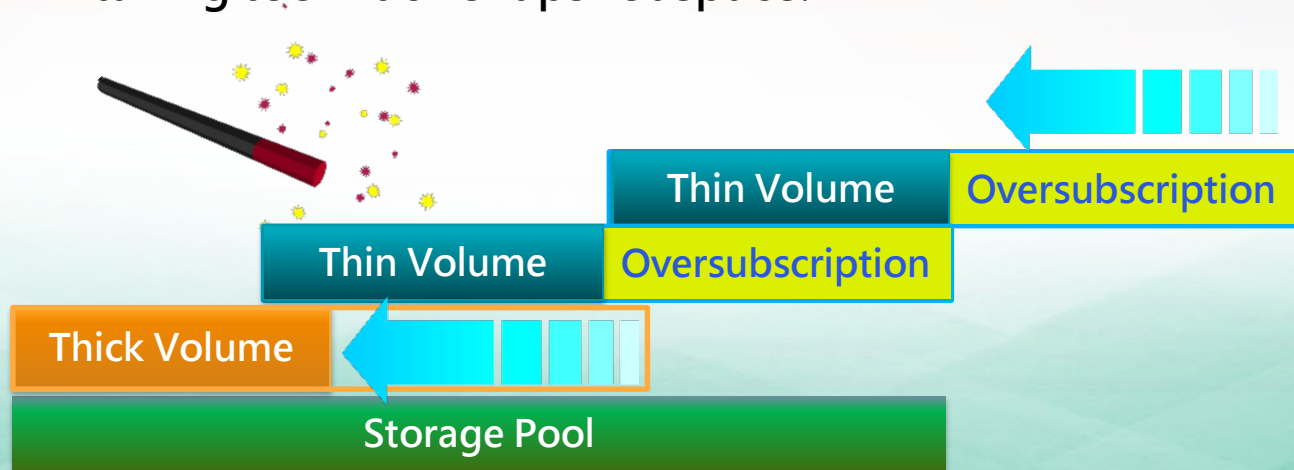
The difference of Static / Thin / Thick

Thick (under Pool)	Thin (under Pool)	Static
Guaranteed space	Dynamically distributed	Highest performance
free space cannot be utilized, waste too much space	volumes space will be limited and interrupt the important service if badly managed.	Without all advanced features (like snapshot...)



Flexibly allocate storage space - Pool / Volume resize

- Reduce the allocated thick volume space to free space for the storage pool, other volumes, LUN or Snapshot
- Reduce the planned thin volume space to avoid risk of "Oversubscription" or taking too much snapshot space.

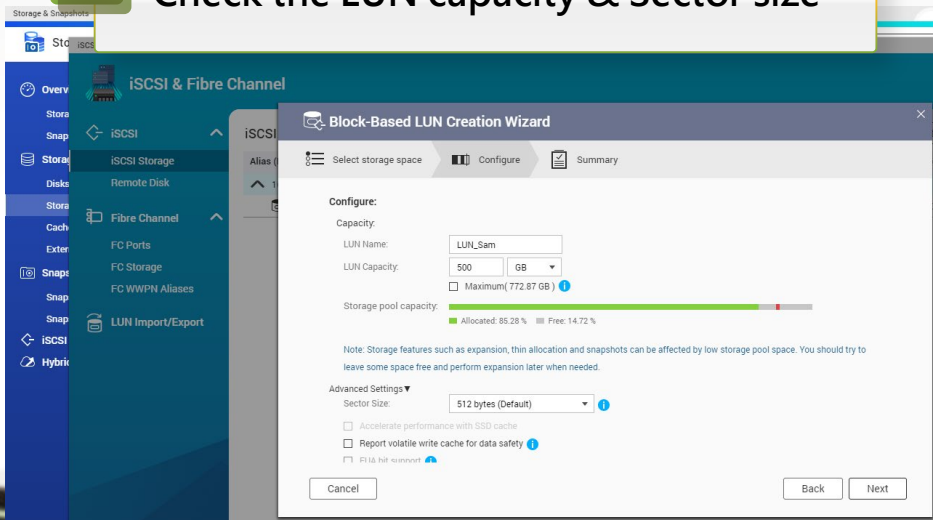


The space that thin volume has planned but its storage pool cannot currently provide.

LUN configuration for low latency SAN environment

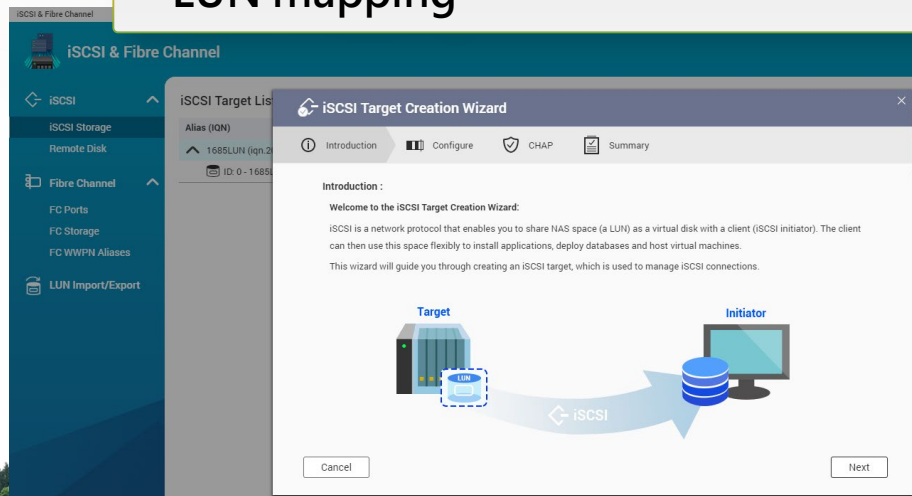
Create LUN

- 1 Storage/Snapshot > Create > New Block-Based LUN
- 2 Check the LUN capacity & Sector size



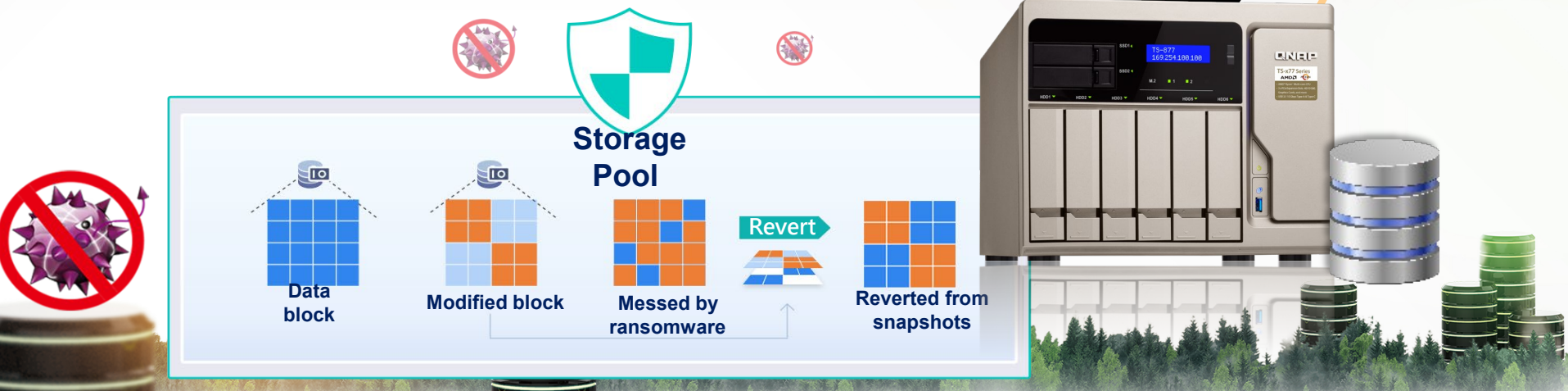
Create iSCSI target

- 1 iSCSI & FC > Create > New iSCSI Target
- 2 Right click on LUN space > Edit the LUN mapping



Snapshot - best for fighting against ransomware

- Both enterprises and consumer could be targets of ransomware
- Data needs to be backed up, while backups also need to be protected.
- Snapshots could help you avoid accidental modifications.
- **QNAP block-based snapshots protect your data from being damaged by ransomware.**



Ensure storage performance and health

Global - Storage

RAID Resync Priority:

Choose between sync speed or NAS performance (suggest to set at high speed)

RAID Scrubbing Schedule:

Scan and repair the failed sectors of RAID automatically. (suggest to enable it if use RAID 5 / 6)

Auto Reclaim:

Default on 2 am, then returns unused space of thin volume.

Check file system:

System will check the unclean file system in the volume.



Storage



Disk / Device



Snapshot

Global Settings

Configure these settings to ensure optimal RAID performance and health.

RAID Resync Priority (Rebuild, Migration, Scrub, Sync)

Storage Pool 3 

RAID Group	RAID 5	 Sync...	37.35 MB...	Default (Medium spe... 
----------------------------	--------	---	-------------	--

[Notice:](#)To ensure the priority settings are correctly applied according to the speed of your disks, please enable the [weekly disk performance test](#).

RAID Scrubbing Schedule  

Weekly  Day Sunday  Time: 00  : 00  (hh : mm)

Auto Reclaim and SSD Trim Schedule  

Daily  Time: 02  : 00  (hh : mm)

Scheduled File System Check  

2020/03/21  Time: 03  : 00  (hh : mm) [Set to Now](#)



Ensure storage performance and health

Global – Disk/Device

Predictive SMART Migration:

If a SMART error is detected, the system will migrate the data to spare disk immediately.

Disk Temperature Alarm:

The temperature of the M.2 SSD is extremely high, and it must be turned on if used. (And raise the temperature threshold to avoid false alarms)

Global Settings



Storage



Disk / Device



Snapshot

Configure these settings to ensure optimal disk performance and health.

Predictive S.M.A.R.T. Migration ☒

Use SSD estimated remaining life with S.M.A.R.T. disk migration ☐

S.M.A.R.T. polling time

Disk Temperature Alarm

Enable temperature alarm for hard disk drives: ☐ °C ▼

Enable temperature alarm for solid state drives: ☐ °C ▼

TLER/ERC Timer (seconds) ☐

Read: / Write:

Check for expansion unit firmware updates at login ☒

Share my disk analysis data with QNAP ☒

Check for expansion unit F/W update at login:

Suggest to enable

Share my disk analysis data with QNAP:

QNAP complies with GDPR requirements, will not collect any private info, and only obtains disk data for analysis and optimization of future OS version.



Ensure storage performance and health

Smart Snapshot Space Management options:

Recycle latest snapshot:
When disabled, last snapshot will not be recycled.

Recycle permanently snapshot:
When disabled, the snapshot that is set as permanent will not be recycled.

Enable all of this part to avoid interrupting storage service.

Global - Snapshot

Global Settings

Configure settings for all snapshots on the NAS.

Storage

Smart Snapshot Space Management ☒ ⓘ

Recycle oldest snapshots when free space is less than 32GB.

The latest snapshot of each volume/LUN can be recycled ☒

Snapshots marked as "Keep permanently" can be recycled. ☐

Enabling this option might result in all snapshots being recycled when storage pool space is very low. This is done to avoid storage spaces entering read/delete mode and becoming non-writable.

Disk / Device

Snapshot

Snapshot Directory ⓘ

Enable File Station Snapshot Directory for administrators ☒

Make snapshot directory (@Recently-Snapshot) visible in shared folder root ☒

When the number of snapshots reaches maximum ⓘ

☒ Overwrite the oldest snapshot when taking a new one

☐ Stop taking snapshots

Use timezone GMT+0 for all new snapshots ☐ ⓘ

Show hidden files in Snapshot Manager ☒ ⓘ

Enable Windows Previous Versions ☒ ⓘ

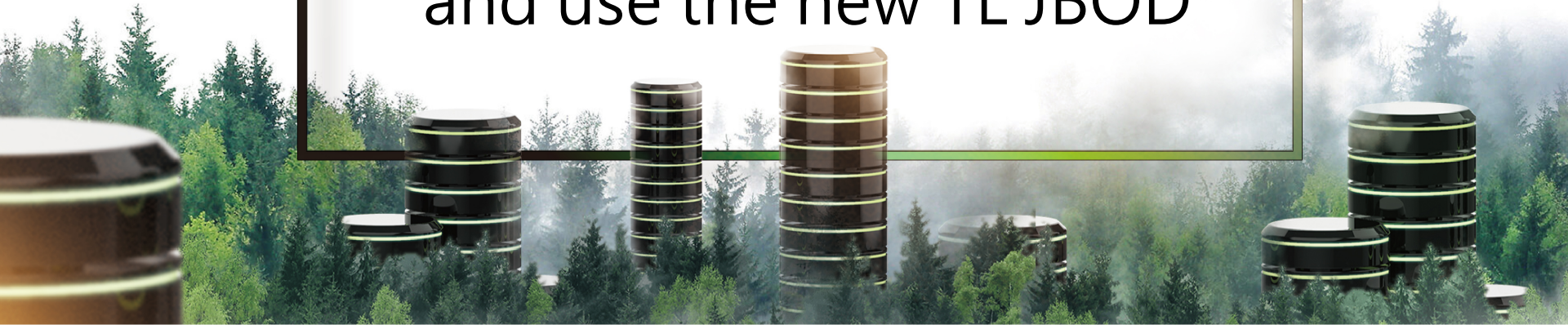
When number of snapshots reaches System Max:

- Replace oldest snapshot with new snapshot
- Stop taking new snapshot



Practical needs of storage configuration (6)

How to configure
and use the new TL JBOD



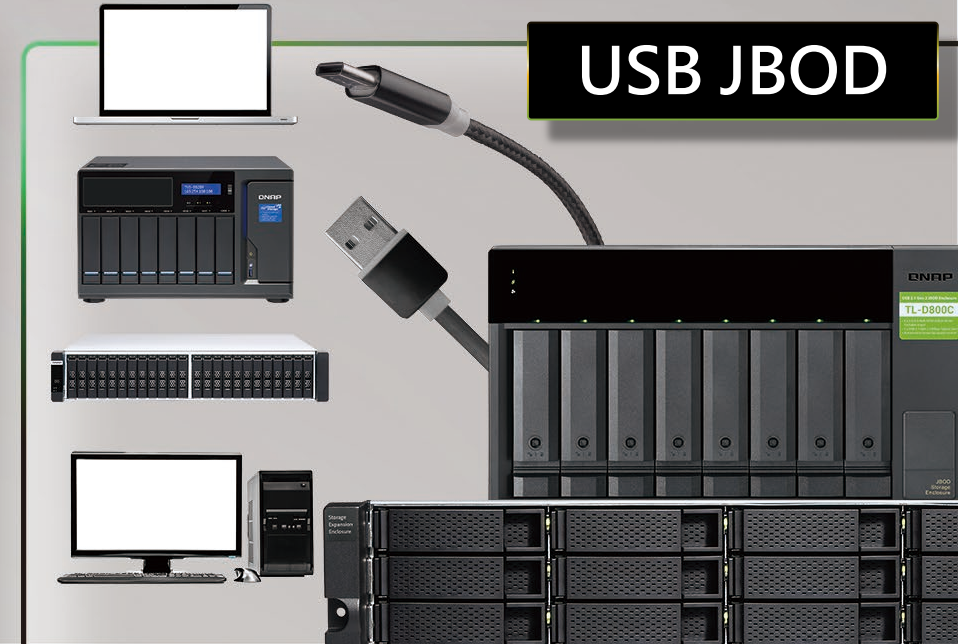
QTS 4.4.2 supports both USB & SATA JBOD units

SATA JBOD



Note: System supported USB endpoints has max limitation,
Follow the QNAP website of Expansion compatibility to
check the maximum number of supported JBOD units.

USB JBOD



Two different usages on NAS

NAS Expansion

Expand and provide more space
via a new storage pool



External Drive Enclosure

Cross-platform data can be easily
copied to NAS for sharing.

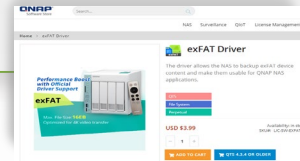


Note: Two modes cannot be used at the same time

High speed External Drive Enclosure



No matter the disk data stored in your dry cabinet is Linux (EXT4), exFAT for camera / memory card, Windows (NTFS), Mac (HFS +) format, you can easily use QNAP-JBOD as an External Drive Enclosure for data access, Then copy to NAS for protection and data sharing.



Soft Store
exFAT Driver

3.99
USD \$

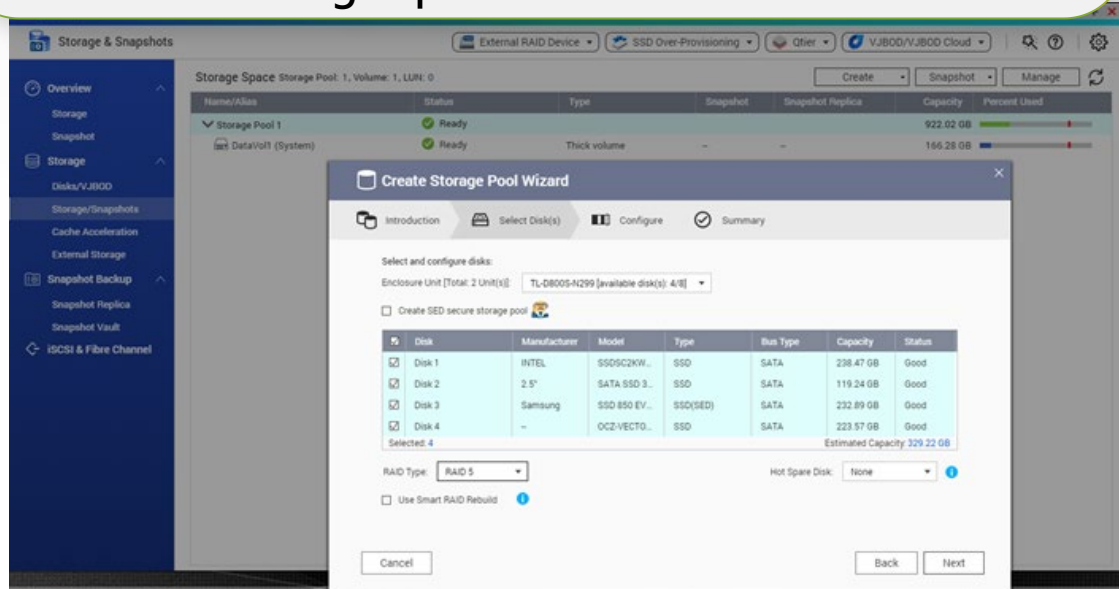


JBOD is your best expansion solution for NAS

The traditional RAID expansion method may result to NAS downtime.



TL-JBOD easily solves the problem of insufficient slots and storage space.



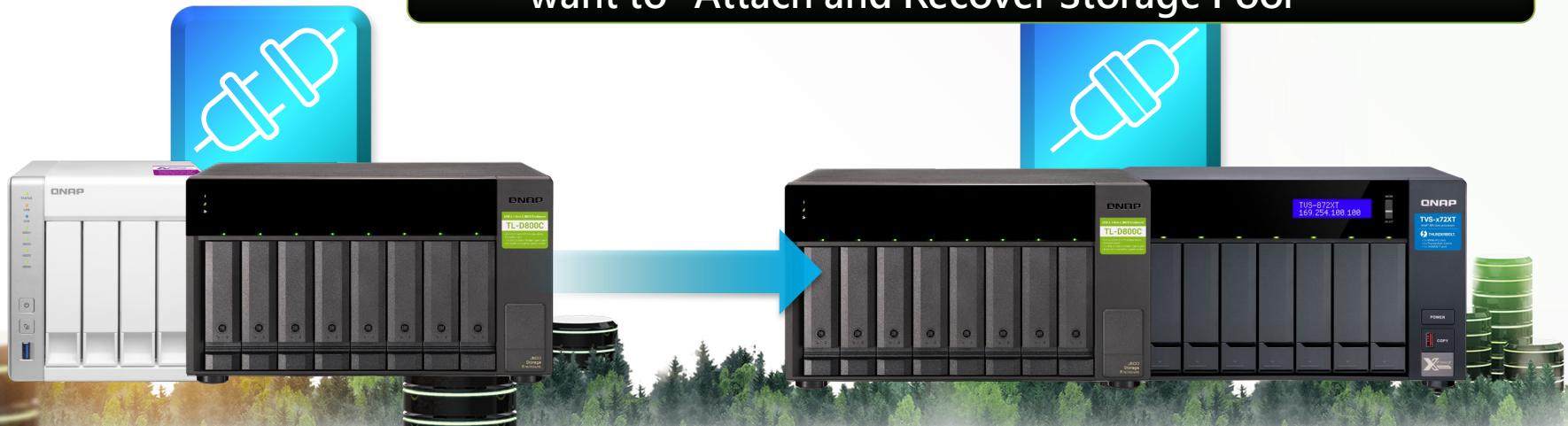
Note: (1) You have to configure the whole new storage pool for JBOD.

(2) When configuring the storage pool on JBOD, all disks of this JBOD will be erased for internal usage.

Easily migrate whole pool data of JBOD

JBOD Migration

- 1 Stop and Unmap the LUN if iSCSI service enabled
- 2 Disks/VJBOD > select JBOD device > Action> Safely detach
- 3 Shutdown the JBOD, connect to another NAS then startup.
- 4 NAS will detect automatically and confirm that do you want to "Attach and Recover Storage Pool"



1

TVS-472XT :
Use TL-D800C as the
External Drive Enclosure

2

TS-431P2 to TVS-472XT

TL JBOD migration



Live
Q T S 4 . 4 . 2
Demo

QNAP

QTS 4.4.2

is your best choice



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