QNAP

Qtier SSD

tier redefine:

Upgrade SSD capacity or types instantly

Coming soon! Will be released with QTS 4.4.1

Easily Recreate the Qtier SSD Tier

1. SSDs Need To Be Upgraded
2. Re-create Qtier SSD Tier

Demo

3. Remove Qtier SSD Tier
4. More Scenarios and Recap

QNAP

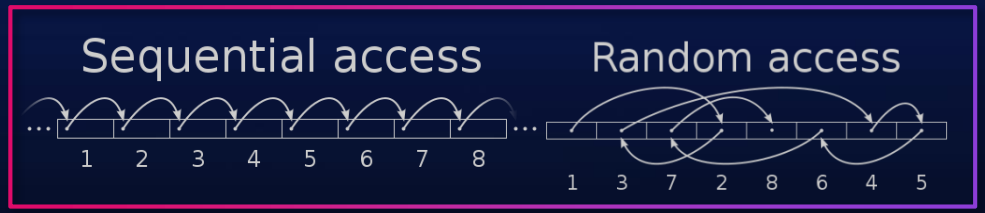
SSDs Need To Be Upgraded

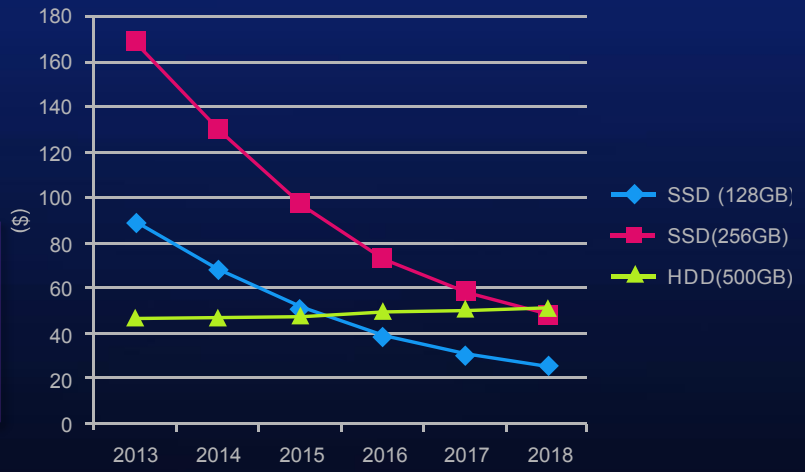
- SSD Evolution Trend
- Change Qtier SSD Tier

SSD EVOLUTION TREND

- With modern applications it is required higher storage performance, SSD is becoming more popular and is being widely used.
- As the SSD price keeps falling, smaller SSDs that have been purchased in the past can be replaced with larger SSD.

Disk Type	SW (MB/s)	RW (IOPS)
HDD	100	350
SSD	300	60000





https://www.sandisk.com/business/datacenter/resources/white-papers/the-ssd-enabled-pc-total-cost-of-ownership

SSD EVOLUTION TREND

- Since the SSD already has high performance, the SATA Port and AHCI Interface still post a limitation to the SSD.
- The NVMe Interface, PCIe, M.2, U.2 SSD, and latest technologies such as SSD Over-provisioning and Intel® Optane™ are all continuously contributing to the SSD evolution.

Bus Type	SATA 3	M.2	U.2	PCIe
Speed	6Gbps	10/32Gbps	32Gbps	20/32Gbps
IOPS	60,000	100,000	300,000	1,000,000
Interface Standard	AHCI	NVMe	NVMe	NVMe

2.5 inch	M.2	PCIe card
SATA	SATA	NMVe
NVMe (U.2)	NVMe	

IOPS performance is evaluated based on products spec existed on the market.
http://www.2cm.com.tw/2cm/zh-tw/magazine/-MarketTrend/F26FE52365E548DFB150B39173AED7D3
https://www.xfastest.com/thread-167519-1-1.html

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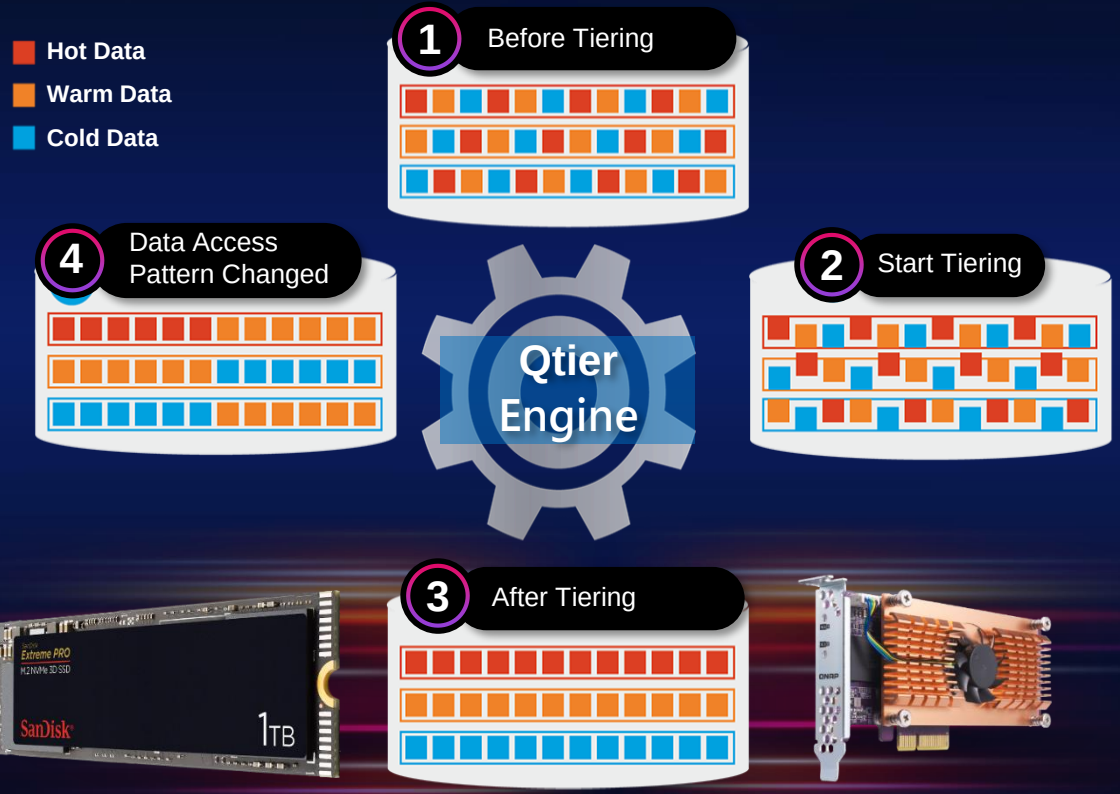
Change Qtier SSD Tier

- 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

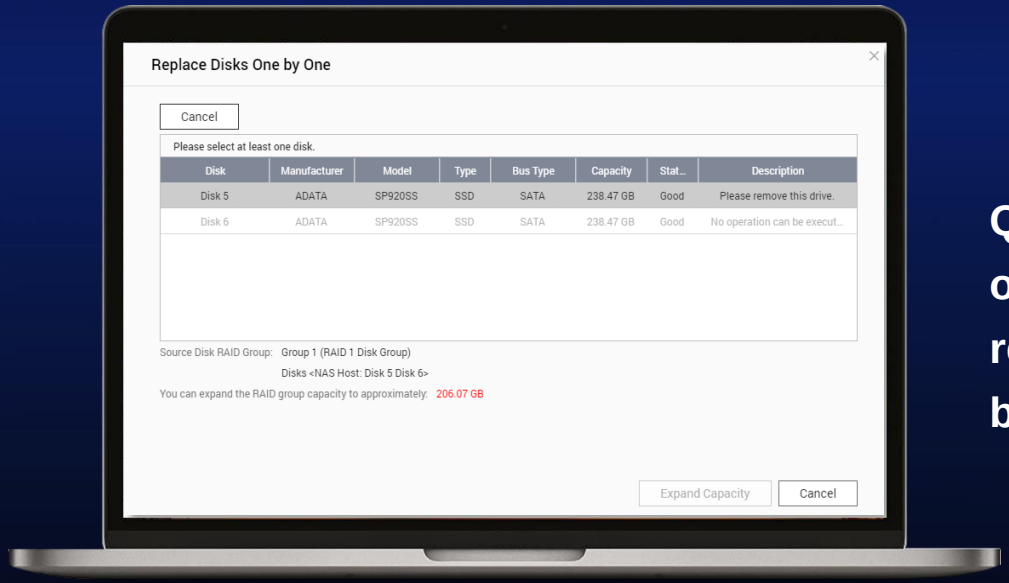


On QTS, PCIe NVMe SSD can only work as SSD Cache currently.

Change Qtier SSD Tier

Challenges

As SSD price continues to fall, larger SSDs can be purchased, but how to replace the SSD quickly?

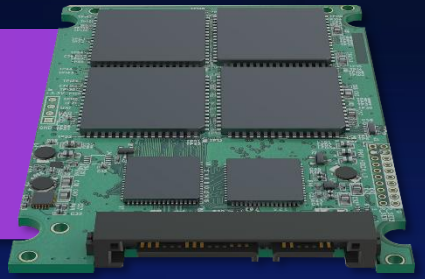


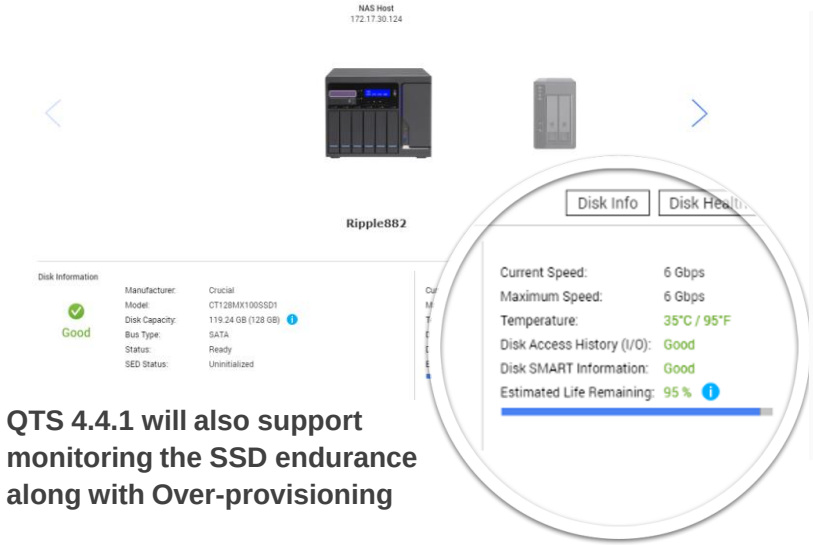
QTS system has "Replace disk one by one" but such operation requires multiple resync to be completed.

CHANGE QTIER SSD TIER

Challenges

After upgrading the QTS to 4.3.6, the new feature of SSD Over-provisioning cannot be applied on the existed Qtier SSD Tier?



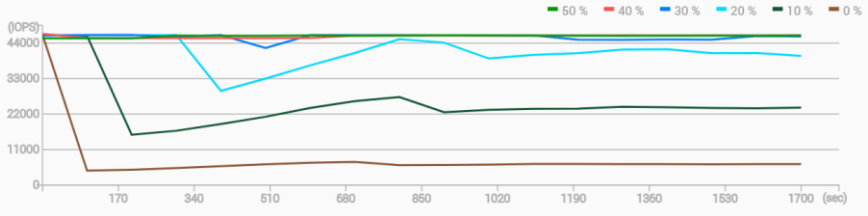


QTS 4.4.1 will also support monitoring the SSD endurance along with Over-provisioning

Test Information

NAS :	--	Test Status:	Completed
Disk Model:	Samsung 850 pro	Test range:	0 % ~ 50 %
RAID Type:	Single	Test interval:	10 %
		Test pattern:	Random Write

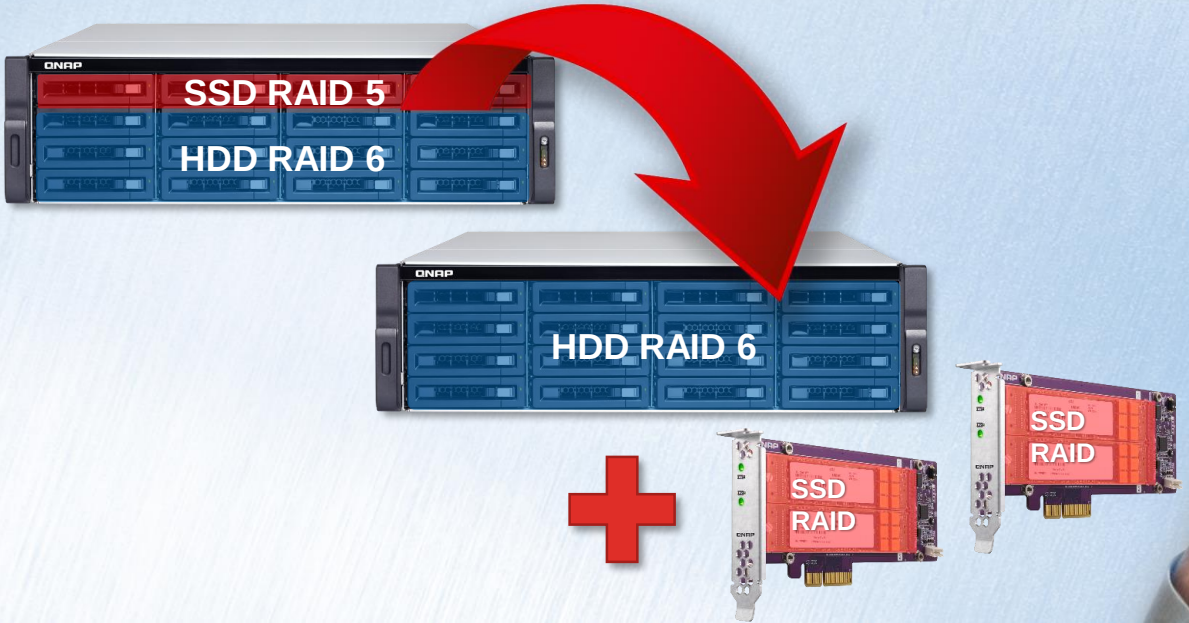
Test Result



Change Qtier SSD Tier

Challenges

While SSD Tier is already created with SATA Disk, how can I replace it with QM2 to expand the NAS while improving the SSD Tier performance?



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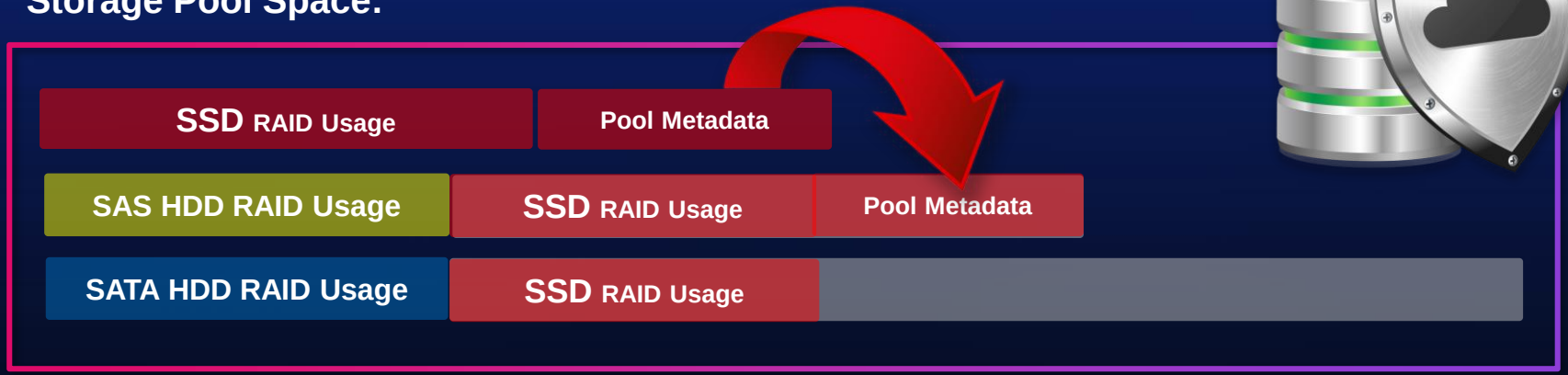
Re-create Qtier SSD Tier

- Remove Qtier SSD Tier
- Recreate Qtier SSD Tier

Remove Qtier SSD Tier

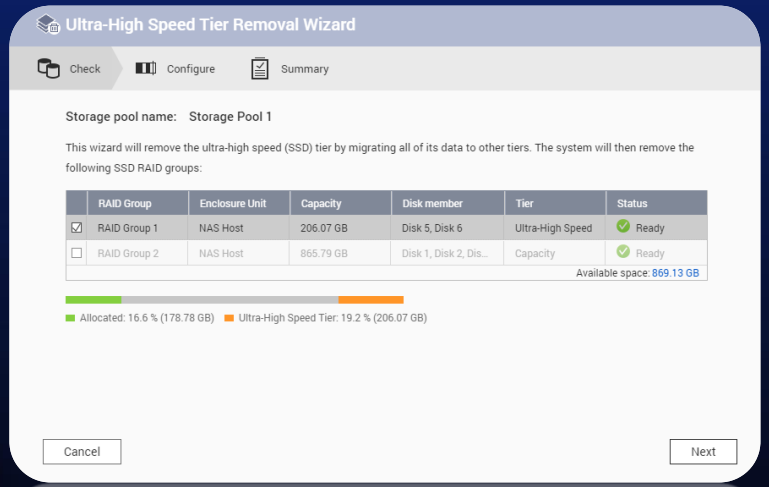
- QNAP QTS 4.4.1 supports remove Qtier SSD Tier, the users can remove then re-create SSD tier as required.
- When removing the SSD tier, all the storage pool data will be retained as data on SSD only to be moved to HDD.

Storage Pool Space:



Remove Qtier SSD Tier

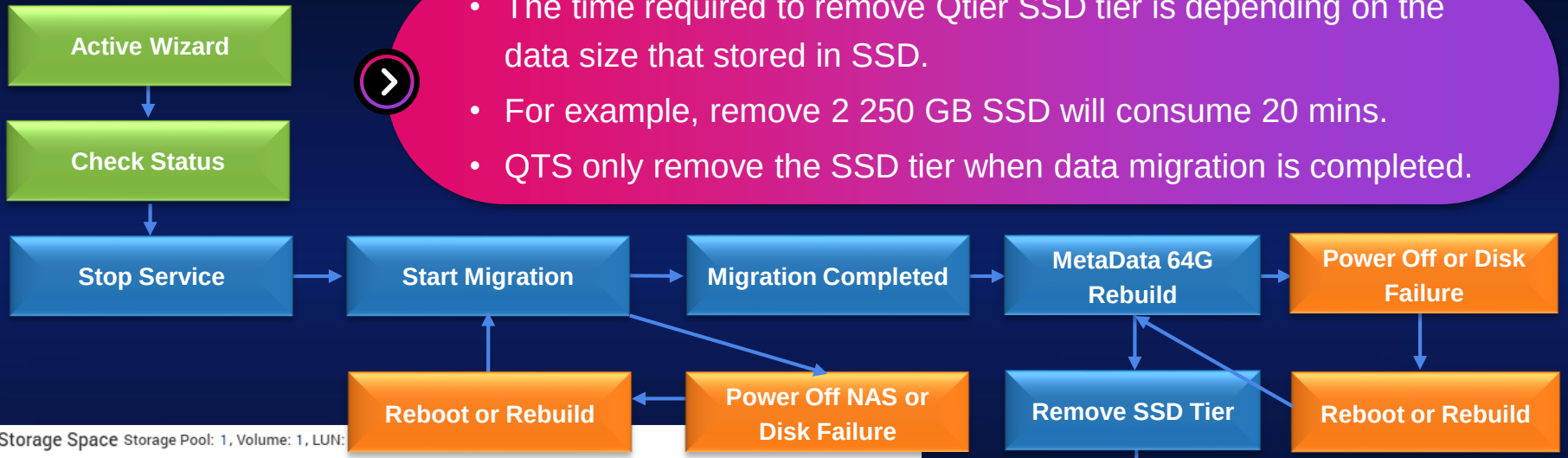
- Remove SSD Tier in 3 steps.
- It is required that all RAIDs in Qtier Pool are normal and HDD tiers have enough capacity to store all data.

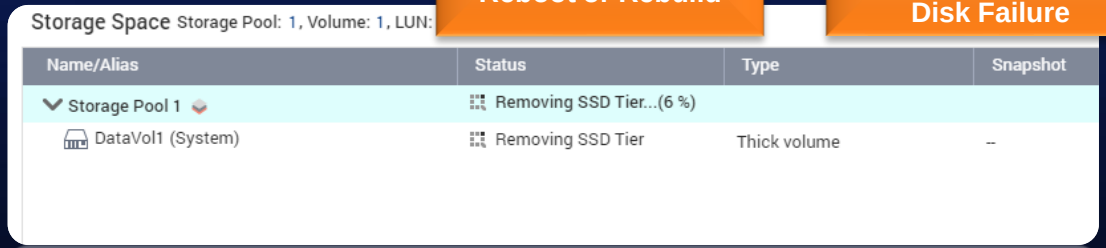


1. Storage Pool Management > Remove > Remove SSD Tier
2. Check if all the RAIDs Group are ready and have enough space.
3. User confirm to stop the pool's service to start the operation.

Remove Qtier SSD Tier

- The time required to remove Qtier SSD tier is depending on the data size that stored in SSD.
- For example, remove 2 250 GB SSD will consume 20 mins.
- QTS only remove the SSD tier when data migration is completed.





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DEMO

Re-create Qtier SSD Tier

Once Qtier SSD Tier is removed, the Storage Pool will become Normal Pool or remain to be Qtier Pool based on if second tier existed. User then can upgrade or expand the pool accordingly to add SSD.

Step 1

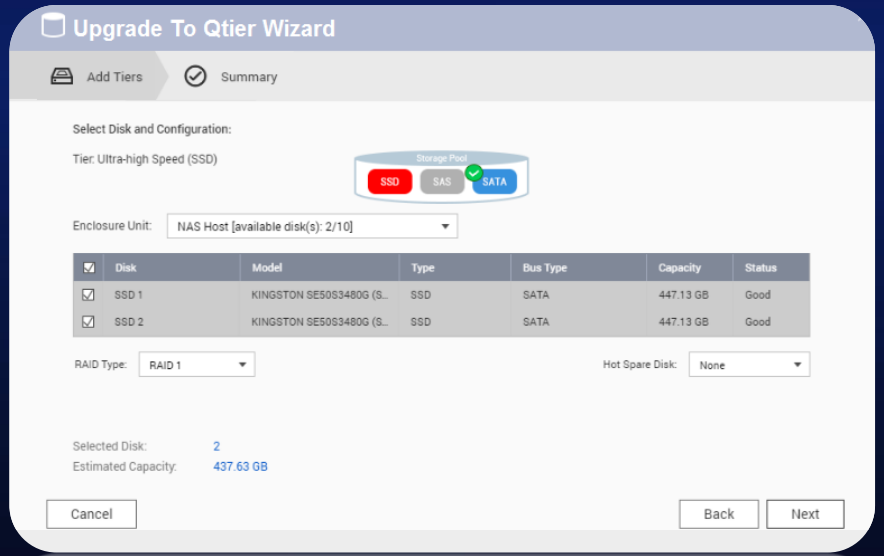
Insert new SSD and Open Storage & Snapshot.

Step 2

Choose “Upgrade” or “Expand” the Storage Pool.

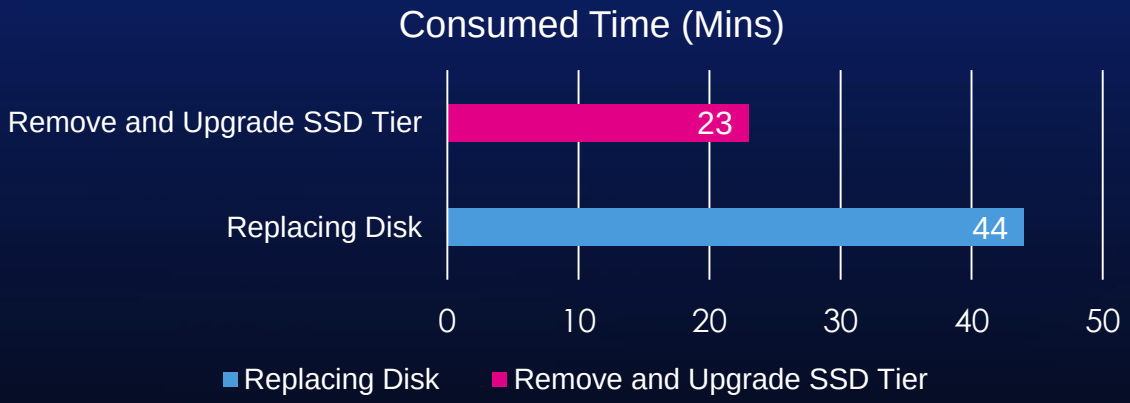
Step 3

Following the wizard to add new SSD back into the Storage Pool.



Re-create Qtier SSD Tier

- In QNAP Lab, 4 250 GB SSD need to be replaced with 500 GB SSD. The operation is conducted with both Replacing Disk & Remove SSD Tier
- The time for removing and re-creating the SSD tier is almost 2 times faster than replacing disk.



Using TVS-1282T with 4 enterprise HDD for testing.

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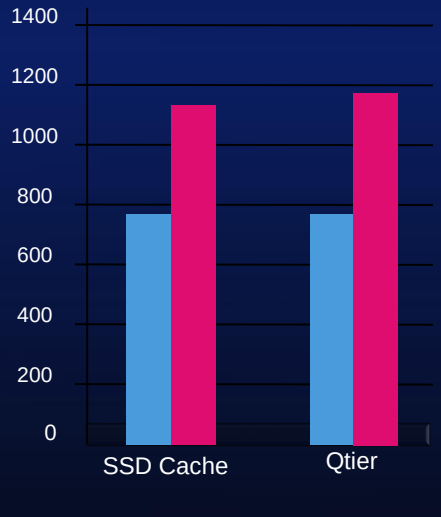
SUMMARY

- More Scenarios
- Function Summary

MORE SCENARIOS

The best SSD configuration may only be measurable once it is configured. The SSD Cache and Qtier have different advantages.

Sequential R/W (MB/s)



Random R/W (IOPS)

SSD Cache

Real Time Performacne Boost

1. For accessing with burst IO such as file syncing and video editing.
2. Can be changed to Read or Write only with bypass block size.

Qtier 2.0

Fully use SSD Capacity

1. For boosting IO with fixed pattern such as mail server.
2. With IO Aware Qtier can also support database operations.

TVS-871T-i7-16G pair with QM2 2P expansion card and ADATA SX8000NP 512GB as SSD Cache and Qtier

MORE SCENARIO

With Qtier remove SSD tier functions, the IT manager can freely switch between the SSD Cache and Qtier to adapt to the best configuration.

Scenarios	File Server	Web Server	Video Editing	Virtualization Storage	Backup	Database
SSD Usage	Read-write Cache	Qtier	Read-write Cache	Qtier	Write-only Cache	Qtier
RAID Type	RAID 10	RAID 10	RAID 5	RAID 10	RAID 5	RAID 10
SSD OP	10%	20%	20%	20%	10%	30%

SUMMARY

Upgrade SSD capacity or types in an instant

- SSD price is continuously falling, but performance is still increased with the new interface such as PCIe, M.2 and U.2.
- QNAP Qtier Pool support remove SSD tier, can replace SSD or change RAID type instantly.
- Data can be migrated to HDD tier automatically to prevent data loss.
- Afterward SSD can be re-added through using upgrading or migrating wizard.

QNAP

QNAP NAS

is your best choose in creating hybrid storage