Integrate Samsung Self-encrypting SSD ensuring data security and system performance

Coming soon! Will be released with QTS 4.4.1
QNAP x Samsung SSD

1. Why should we use Samsung SSD
2. Introduction of SED secure pool.
3. Step by step to show you how to use SED secure pool. Encrypt and protect data easily
4. Use SED secure pool to solve performance problem.
5. Demo of creating SED Secure Pool.
Why We Recommend Samsung SSD
1. Market share of Samsung SSD

The SSD market survey which is provided by TRENDFOCUS

Market share of Samsung SSD is near 40%!

資料來源：TRENDFOCUS, NAND/SSD Information Service CQ3 '18 Quarterly Update – November 15, 2018 Executive Summary
2. Samsung SSD Technology

Samsung SSD with security and performance!

Data Security
AES 256-bit hardware-based encryption
Compliant with TCG Opal and IEEE 1667.

Level up Performance
The latest V-NAND—which brings greater NAND performance and higher power efficiency

Enhanced performance
Reaches unrivalled sequential read/write speeds
3. Samsung SSD series support SED

We recommend the following SSDs for who pursues level up performance

<table>
<thead>
<tr>
<th>Model</th>
<th>860 QVO</th>
<th>860 EVO</th>
<th>860 DCT</th>
<th>970 EVO Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor form</td>
<td>2.5 inch</td>
<td>2.5 inch</td>
<td>2.5 inch</td>
<td>M.2</td>
</tr>
<tr>
<td>Interface</td>
<td>SATA 6Gb/s</td>
<td>mSATA, M.2</td>
<td>SATA 6.0 Gbps</td>
<td>PCIe Gen 3.0 x4, NVMe 1.3</td>
</tr>
<tr>
<td>Sequential Read Speed</td>
<td>1,000 GB, 2,000 GB, 4,000 GB</td>
<td>250 GB, 500 GB, 1,000 GB, 2,000 GB, 4,000 GB</td>
<td>960 GB, 1,920 GB, 3,840 GB</td>
<td>250 GB, 500 GB, 1,000 GB</td>
</tr>
<tr>
<td>Sequential Read Speed</td>
<td>Up to 550 MB/sec</td>
<td>Up to 550 MB/sec</td>
<td>Up to 550 MB/s</td>
<td>Up to 3,500 MB/sec</td>
</tr>
<tr>
<td>Sequential Write Speed</td>
<td>Up to 520 MB/sec</td>
<td>Up to 520 MB/sec</td>
<td>Up to 520 MB/sec</td>
<td>Max. 3,300 MB/sec</td>
</tr>
</tbody>
</table>
The Encryption Method in previous QTS version

While we store important files, we use following method:

1. Create Encrypted volume
2. Create encrypted shared folder

Both methods use software encryption so that usage of CPU will be increased.
Software Encryption Method Cause Following Disadvantage.

- **Reduce performance**
  
  Because both encryption and decryption are completed by CPU, the CPU resource will be occupied and reduce performance.

- **Vulnerable to Brute-force attack**
  
  Although the times of entering password could be limited, the counter could be reset to entering password continuously.
QNAP Adopts the Advantage of Hardware Encryption to Protect Data.

The advantage of hardware encryption

- Use AES 256
  Controller with AES-256 advanced encrypting engine, encryption will be completed automatically without using CPU resources.

- Prevent brute-force attack
  Such as bully attack and vicious code attack

- Erase data of the disks completely
  Use PSID of SED disk to erase to prevent data erased incompletely.
Integrate Samsung SSD, Encrypting File Without Degraded Read/Write Performance

Select the Samsung SSD which has largest market share, all series with SED. Use Samsung SSD and QNAP NAS to protect your data, The performance will maintain after system doing encryption.
Introduction of SED Secure Pool

Two Steps to Create SED Secure Pool
What is Self Encrypting Drive (SED)

- The SED encrypting engine is in the ASIC controller, and each disk is with dedicated encrypting engine.
- The management function is built in the disk, the encrypting key is in the disk all the time.
Why We need to Use QNAP SED Secure Pool

Because the chance of confidential data to be leaked and loss is increased.

The regulation of entire world such as GDPR makes some organization pay more attention on data security and need to use proficient way to keep data.

GDPR 25 MAY 2018

Risk fines of up to €20 million or 4% of your organisations global turnover
Use QNAP SED Secure Pool to Follow Regulation

Because of GDPR, the confidential data loss and leaked will cause loss of company. Managing personal data strictly is the trend now so the conscience of creating data protection is important.

QNAP meets the electronic requirements of HIPAA for storing PHI data by providing a base to protect the confidentiality and security of “individually identifiable health information”.

QNAP provides a full range and variety of storage models that can easily fit into different scales of deployment. Choose based upon capacity, performance, and price range to fit the need of any type of environment.
Easily Create SED Secure Pool by Two Steps

**STEP. 01**
Select Enable SED and choose SED disks
The SED disks of NAS will be filtered to let you select easily.

**STEP. 02**
Set password of SED pool
The password is used to decrypt the SED secure pool. The locked pool could protect data to prevent others know the data of the pool.

Completely creating SED secure Pool
Enable Qtier and Support SED Secure Pool

Enable Qtier to reach optimized performance and protect your data.

**STEP. 01**
Enable Qtier and select enable SED then Selecting SED disks

**STEP. 02**
Set password of SED Secure Pool

Completely creating SED secure Pool
The status of Locked SED Secure Pool is obvious.
Status of SED and SED Erase Information

Check the disk is SED disk or not and the status of SED disks.

Use PSID of SED disk to erase the data, you don't need to worry the data is not erased completely.
The Advantage of QNAP SED Secure Pool

- Hardware encryption won't slow down the performance.
- You can decide not to use password to protect the SED pool.
- PSID Erase make sure the data deleted completely.

Solve the problem caused by software encryption.
While the data is not important anymore, you can stop the password protection.
Solve the problem of high costs on deleting data.
The Difference Between Two Kind of Encryption Ways in QNAP NAS

QTS 4.4.1 Encryption method

Hardware encryption: Encrypt from Storage pool
Software encryption: You can also create encrypted Volume or shared folder

Before QTS 4.4.1 Encryption

Only Software encryption: Create encrypted Volume or shared folder

If you don't have SED disks, QNAP still help you to protect important data
Step by Step To Create SED Storage Pool
Performance Comparison
Use Samsung SSD 860 EVO to prove CPU usage decreased after using SED pool

<table>
<thead>
<tr>
<th>Encryption method</th>
<th>Software Encryption</th>
<th>Hardware Encryption</th>
<th>Without Encryption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encryption type</td>
<td>Volume</td>
<td>Storage pool</td>
<td></td>
</tr>
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</table>

**CPU usage**

<table>
<thead>
<tr>
<th>Sequential Write</th>
<th>96 %</th>
<th>94 %</th>
<th>93 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequential Read</td>
<td>65 %</td>
<td>36 %</td>
<td>38 %</td>
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Test environment: TVS-951X
- F/W: 4.4.1
- CPU: Intel(R) Celeron(R) CPU 3865U @ 1.80GHz (2 cores)
- Tested SSD: Samsung SSD 860 EVO 1TB *2 ; RAID 0
- RAM: 8 GB (4GB x 2)
- Thick volume; Block-based LUN
- 10GbE NIC: On-board 10GbE

IOmeter Global Configuration:
- Maximum Disk Size: 67108864(NAS RAM*4) / Ramp Up Time: 30 seconds / Run Time: 3 Minutes
- Seq-Write/Read: 2-workers / 64-outstanding

CPU usage decreased after using hardware encryption
Comparison: Performance

Use Samsung SSD 860 EVO to prove performance maintained after creating SED pool.

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**Performance**

<table>
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<tr>
<th>Sequential Write</th>
<th>726 MB/S</th>
<th>722 MB/S</th>
</tr>
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<tbody>
<tr>
<td>Sequential Read</td>
<td>820 MB/S</td>
<td>820 MB/S</td>
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Performance maintained after doing hardware encryption

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SED Secure Pool Performance Test
Use SED Storage Pool From Now

Advantage of QNAP SED secure pool

- Hardware encryption won't slow down the performance
- PSID Erase make data deleted completely
- Password protection

User scenario

- Use QNAP NAS to follow the regulation of security in the company. Enterprise use NAS to build data center and the SED disk is needed. Enterprise could boost productivity.
- Erase confidential data only need to use SED erase to delete data completely.
- User can use password to protect data to prevent data leak.
SED Secure Pool Integrate
Samsung SSD is
Your Best Choice