



# Qsan Document - White Paper

**Fast Rebuild**

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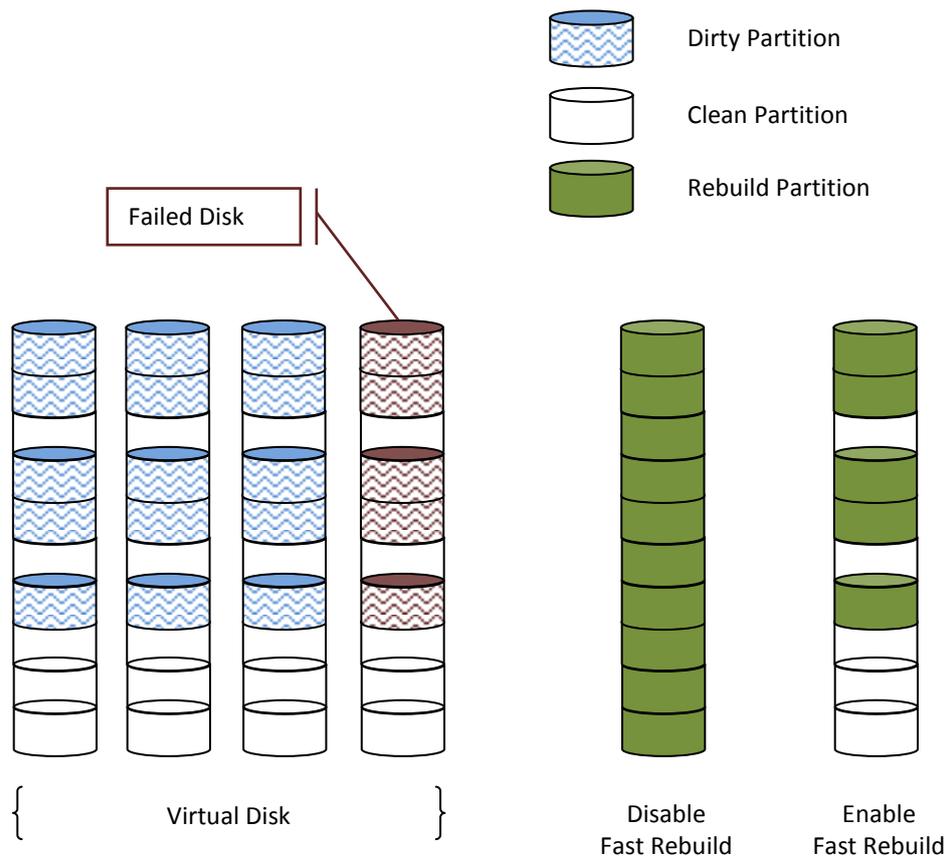
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## Introduction

When executing rebuild, the Fast Rebuild feature skips any partition of the virtual disk where no write changes have occurred, it will focus only on the parts that have changed. This mechanism may reduce the amount of time needed for the rebuild task. It also reduces the risk of RAID failure cause of reducing the time required for the RAID status from degraded mode to healthy. At the same time, it frees up CPU resources more quickly to be available for other I/O and demands.

## Solution

Without Fast Rebuild feature, rebuild will start from the beginning partition to the end. It may spend lots of time to complete the task. When enabling Fast Rebuild feature, it will rebuild the partition with the changed only.





**TIP:**  
 With less changed partition, the Fast Rebuild feature may go faster. If the virtual disk is full of changed partition. The rebuild may take the same time without Fast Rebuild feature.

## Configuration

When creating a virtual disk, enable the Fast Rebuild. The default is disabled.

The screenshot shows a 'Create a Virtual Disk' dialog box with the following settings:

- Virtual Disk Name:** [Empty text field]
- Data Storage:** Test1
- Size:** 1443 GB
- Stripe Size (KB):** 64
- Block Size (Bytes):** 512
- Cache Mode:** Write-back Cache (selected)
- Priority:** High Priority (selected)
- Bg Rate:** 4
- Read-Ahead:** Enabled
- AV-Media Mode:** Disabled
- Erase:** Do Not Erase
- Fast Rebuild:** Enabled (selected in the open dropdown menu)
- Disk Type:** RAID

## Constraint

Here are some constraints about Fast Rebuild.

- Only thick/fat RAID group supports this feature. Thin provision RAID group already has this feature implement.
- When rebuild happened in a fast rebuild virtual disk, clean partitions are not rebuilt since there are no data saved there. Though clean partitions are never rebuilt, their health status is good.
- If all partitions of the fast rebuild virtual disk are clean, then no rebuild would happen and no event would be sent.
- The RAID stacks could not use optimize algorithm to compute parities of a partition which is not rebuilt. Thus, the performance of random write in a clean partition would be worse.

**CAUTION:**

The fast rebuild should not be enabled for a virtual disk whose access pattern is random write.

## Test Result

Here is the configuration and test result.

- HDD: Seagate Constellation ES ST500NM0011 500GB SATA 6Gb/s (x4)
- RAID Group: RAID 5
- Virtual Disk: 1TB

Capacity	Usage	Disable Fast Rebuild	Enable Fast Rebuild	Improved
1TB	0GB	52 min. 13 sec.	5 sec.	62,660%
1TB	250GB	52 min. 20 sec.	13 min. 42 sec.	382 %
1TB	500GB	52 min. 18 sec.	25 min. 26 sec.	206%
1TB	750GB	52 min. 32 sec.	38 min. 36 sec.	135%

## Applies To

- AegisSAN Q500: FW 1.2.0
- AegisSAN LX: FW 3.3.0