



PROFESSIONAL SERVICES TECH NOTE #063

Data ONTAP data resiliency

The Concept

RAID-DP is the most touted data resiliency feature, but there are a number of background ONTAP functions just as important in protecting data against corruption and loss. For most systems, letting these functions run with their default settings is fine. However, systems managing more than a few hundred terabytes should have these settings tuned to maintain a consistent level of data resiliency.

RAID checksums. We are all familiar with how Data ONTAP computes checksums before data is written. What you may not know is when data is read from disk a checksum is calculated and compared with the checksum stored in the block's metadata. If the two checksums do not match, ONTAP generates a system error, recreates the data from parity, and then rewrites it to disk. This is self-healing function to prevent data corruption.

RAID scrubs. For data not accessed frequently, Data ONTAP performs a weekly RAID scrub on Sunday at 1 AM. For six hours it reads data blocks to trigger the RAID checksum process. This proactively heals old data blocks. For large storage environments, NetApp recommends changing these settings to schedule more frequent and longer RAID scrubs during non-peak hours.

```
fas1> options raid.scrub.schedule [minutes to run]@[day to run]@[hour to start]
fas1> options raid.scrub.duration [minutes to run]
Default is 360 minutes. Set to -1 to force scrubs to run to completion.
```

Background media scans. Similar to RAID scrubs, media scans run in the background anytime the system is idle and look for disk media errors. For large environments and/or environments primarily composed of large SATA drives (500GB +), NetApp recommends setting the following option to a higher value:

```
fas1> options raid.media_scrub.rate [300 - 3000]
Default is 600 and scrubs 1GB per hour (that's >400 hours for one 500GB disk drive!)
```

Lost write protection. On rare occasions, hardware malfunctions can result in write failures which are undetected by RAID and are reported as successful to client systems. NetApp addressed this with "write signatures" in WAFL to detect irregularities when data is read and then to recreate the lost data from parity.

What It Means To You

Tuning these functions may result in more overhead or longer processing times. However, your users will agree a small performance decrease is worth the protection against lost or corrupt data.

More Information

TR3437 – Best Practices Storage & Resiliency - <http://media.netapp.com/documents/tr-3437.pdf>
Data ONTAP System Management Guide -
<http://now.netapp.com/NOW/knowledge/docs/ontap/rel732/html/ontap/smg/frameset.html>

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