# SR Performance Updates In Release SR20071022

S. Hopkins
*Coraid, Inc.*

**Summary.** Coraid continually improves and enhances the SR Appliance through firmware updates available at the SR support page. Firmware release SR20071022 marks an important milestone in SR development, providing major performance enhancements enabling Coraid's High Performance SRxx61 product series. This release also includes additional features -- most notably, SMART error handling for SR disks. For a complete list of feature changes, please see the SR Changelog at the SR support page[1]. This paper compares the performance of the SR152x products using the SR20070924 and SR20071024 firmware releases.

## SR Local Rates

The following tables display disk rebuild and parity initialization rates for RAID5, RAID10, and RAID1. RAID10 and RAID1 both rebuild a disk mirror from a single disk; the rebuild effort is essentially the same, but both are presented for clarity.

The following numbers represent the total amount of processed data per second. These rates are sampled using the when command at the beginning of rebuild / initialization and are in units of KB/s. These rates are specifically relevant to the Samsung Spinpoint 500GB hard drives, model SAMSUNG HD512LJ; other disk models may exhibit higher or lower rates based on their capability. As the work proceeds further into the disk(s) the rate will decrease due to the slower disk zones internal to the disk(s). The amount of decrease varies with disk model.

The following tables show the new firmware to have a benefit for all RAID levels, but the greatest benefit is obtained by large RAID5 configurations on the SR1521, where the new firmware provides a 30.4% increase in the rebuild rate and a 19.8% increase in the parity initialization rate.

### Release SR20070924:

| Model | # Disks in RAID5 | RAID5 REBUILD | RAID5 PARITY INIT | RAID10 REBUILD | RAID1 REBUILD |
|---|---|---|---|---|---|
| SR1521 | 14 | 430,309 | 406,556 | 161,917 | 160,510 |
| SR1520 | 14 | 221,118 | 209,190 | 158,859 | 159,184 |

### Release SR20071022:

| Model | # Disks in RAID5 | RAID5 REBUILD | RAID5 PARITY INIT | RAID10 REBUILD | RAID1 REBUILD |
|---|---|---|---|---|---|
| SR1521 | 14 | 561,487 | 487,202 | 168,764 | 168,585 |
| SR1520 | 14 | 229,926 | 213,656 | 168,392 | 168,827 |

## SR AoE Throughput Rates

The throughput statistics detailed in the following tables were achieved by averaging the results of three independent runs of ddt for the given SR configuration. The system setup and testing approach is as described in the SR Performance Analysis paper available at the SR support page[1].

As shown in the following tables, release SR20071022 outperforms release SR20070924 in most configurations. The greatest improvement is for a 14 disk RAID5 on the SR1521, where the write throughput increases by 37.8%.

## Release SR20070924:

SR1521, two 1GbE links

| MTU | KiB / s | RAID0 15 DISK | RAID0 4 DISK | RAID10 14 DISK | RAID10 4 DISK | RAID5 14 DISK | RAID5 4 DISK | RAID1 2 DISK | JBOD 1 DISK |
|---|---|---|---|---|---|---|---|---|---|
| 9000 | WRITE: | 186,049.33 | 117,514.33 | 110,046.33 | 65,852.00 | 157,324.67 | 83,788.33 | 34,568.67 | 37,706.33 |
|  | READ: | 239,904.00 | 235,113.00 | 241,075.00 | 161,913.00 | 239,133.67 | 205,741.67 | 80,239.67 | 84,310.67 |
|  |  |  |  |  |  |  |  |  |  |
| 1500 | WRITE: | 77,847.67 | 68,047.67 | 62,323.67 | 48,648.33 | 64,160.33 | 54,891.00 | 34,361.33 | 34,360.00 |
|  | READ: | 73,386.67 | 74,711.33 | 73,295.33 | 75,113.67 | 73,138.67 | 68,574.33 | 62,600.67 | 74,965.67 |

SR1520, one 1GbE link[1]

| MTU | KiB / s | RAID0 15 DISK | RAID0 4 DISK | RAID10 14 DISK | RAID10 4 DISK | RAID5 14 DISK | RAID5 4 DISK | RAID1 2 DISK | JBOD 1 DISK |
|---|---|---|---|---|---|---|---|---|---|
| 4200 | WRITE: | 96,036.67 | 82,390.00 | 51,726.67 | 42,204.00 | 87,459.33 | 61,653.33 | 33,154.00 | 34,836.33 |
|  | READ: | 117,887.00 | 118,373.67 | 119,161.33 | 114,348.00 | 118,711.67 | 110,657.33 | 79,436.00 | 78,973.33 |
|  |  |  |  |  |  |  |  |  |  |
| 1500 | WRITE: | 50,069.67 | 48,702.67 | 41,735.67 | 36,773.67 | 45,179.33 | 40,088.33 | 32,056.33 | 34,218.67 |
|  | READ: | 54,841.33 | 55,225.67 | 54,912.00 | 55,234.33 | 54,483.67 | 52,300.67 | 47,186.67 | 56,502.33 |

## Release SR20071022:

SR1521, two 1GbE links

| MTU | KiB / s | RAID0 15 DISK | RAID0 4 DISK | RAID10 14 DISK | RAID10 4 DISK | RAID5 14 DISK | RAID5 4 DISK | RAID1 2 DISK | JBOD 1 DISK |
|---|---|---|---|---|---|---|---|---|---|
| 9000 | WRITE: | 239,333.33 | 106,840.33 | 162,068.67 | 71,196.67 | 216,853.67 | 92,672.33 | 36,525.00 | 38,057.67 |
|  | READ: | 240,682.33 | 240,891.33 | 235,480.33 | 161,025.00 | 236,099.00 | 212,946.67 | 80,943.00 | 84,789.67 |
|  |  |  |  |  |  |  |  |  |  |
| 1500 | WRITE: | 114,288.67 | 97,436.00 | 65,229.67 | 54,341.00 | 70,224.33 | 59,805.33 | 35,432.00 | 36,611.00 |
|  | READ: | 112,122.00 | 110,449.33 | 95,800.67 | 92,239.67 | 98,338.00 | 91,226.67 | 80,979.33 | 84,619.33 |

SR1520, one 1GbE link[1]

| MTU | KiB / s | RAID0 15 DISK | RAID0 4 DISK | RAID10 14 DISK | RAID10 4 DISK | RAID5 14 DISK | RAID5 4 DISK | RAID1 2 DISK | JBOD 1 DISK |
|---|---|---|---|---|---|---|---|---|---|
| 4200 | WRITE: | 104,253.00 | 100,832.00 | 52,251.67 | 49,750.33 | 96,317.00 | 72,052.00 | 34,966.00 | 36,765.67 |
|  | READ: | 119,956.33 | 120,094.00 | 119,336.33 | 117,316.67 | 119,962.33 | 117,551.33 | 77,844.00 | 82,833.67 |
|  |  |  |  |  |  |  |  |  |  |
| 1500 | WRITE: | 71,905.67 | 67,677.00 | 41,572.00 | 38,183.67 | 42,842.33 | 40,682.33 | 33,684.00 | 36,431.00 |
|  | READ: | 70,285.33 | 70,654.00 | 62,926.67 | 60,193.33 | 62,777.33 | 59,120.33 | 52,552.00 | 69,435.00 |

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1    *For an explanation of why the SR1520 performs best with one interface and an MTU of 4200, please see Application Note ANSR001 available at the SR support page (URL available in Appendix A).*

# Appendix A - References

The SR support page includes the SR firmware, user manual, and related docs:

`http://www.coraid.com/support/sr/`

Please e-mail `support@coraid.com` with any questions or comments.