

The Performance of 2 and 4 HyperDrive4 units in RAID0

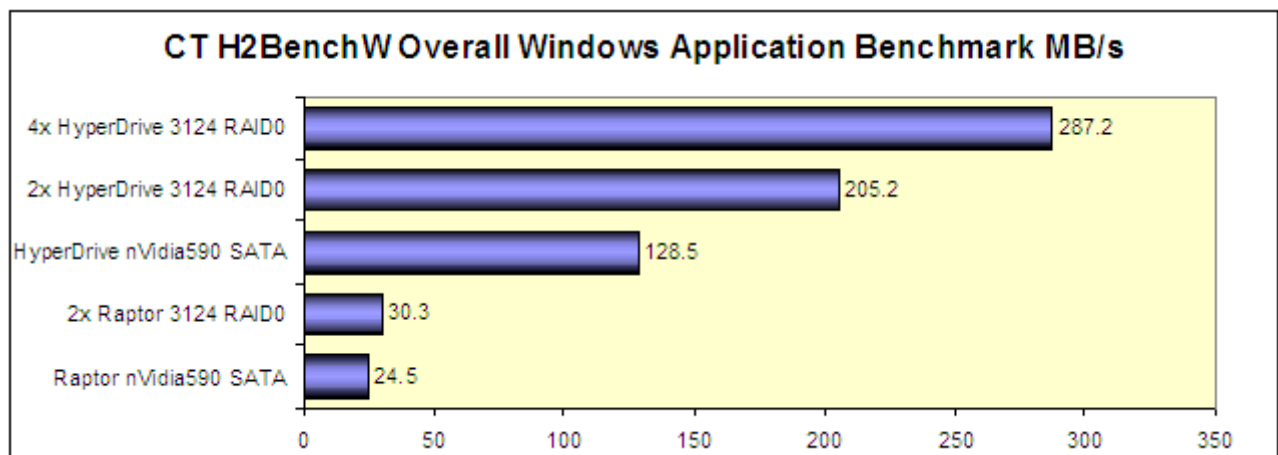
The DDR in a HyperDrive4 is only run at 100 MHz in order to save energy and prolong life and reliability. Even at this sedate pace, since it has a 64 bit bus (well 72 with the parity check, but 64 from a performance standpoint) it is effectively PC800. So it is capable of ATA800 performance. The HyperDrive does not achieve this performance of course since it has an ATA133 bus. But despite having an industry standard bus designed for mechanical hard disks, due to the fact that the HyperDrive4 has a seek time of 1.1 microseconds read and 250 nanoseconds write, the device is twice as fast as any number of WD740ADFD Raptors in RAID6 aged for defragmentation.

But we want to get closer to the full performance potential of DDR storage in order that all the time in our lives that is wasted by parasitic public sector bureaucrats can be saved by expensive private sector technology. So the obvious thing to do is try 2 and 4 HyperDrives in RAID0. One has to be careful when choosing a RAID card for 4 HyperDrives. Firstly since the STR of each unit is 120 MB per second, the total theoretical STR is 480 MB per second. So one needs a PCI-X card or a PCI express x4 card. Secondly the card itself must be able to do 500 MB per second STR. Thirdly since the seek time of the HyperDrive is so small we need a very fast RAID card which does not degrade the seek time much. Fourthly the card must be able to process ideally 100,000 IOPS. The fastest of the lot in this regard is nVidia590 Mobo SATA RAID. This does not degrade the seek time of the HyperDrive4 at all since it uses the main CPU as a RAID processor. All other RAID solutions do degrade the seek time. But it will only stripe two disks effectively. The best PCI express solution we found was the Areca 1220 and its superior models. And the best PCI-X solution was the Silicon Image 3124 chip RAID solution. We used the Datoptic 4 external SATA card for these tests. It was the fastest card for 4 HyperDrives. Do not bother using the Silicon Image 3132 chip cards or any Marvell RAID solutions or any HighPoint RocketRaid cards. They are all too slow.

We used an ASUS M2N32 WS Pro workstation board, a 2.61GHz dual core Athlon CPU, 1GB of 667MHz DDR2, a crummy GeForce 7100 Graphics card, Windows XP Service Pack2, the latest SATARAID5 driver for the 3124 chip from Silicon Image and the following Benchmarks...

IOmeter from Intel
 HDTach3 from Simpli Software (for the STR)
 H2BenchW from Computer Technik Magazine

The bottom line is as follows...



This Benchmark represents a typical day in a high end users life with a mixture of file copying, software installation, virus scan. Word, Photoshop and swap file operation. The net result is that one HyperDrive4 unit is 524% faster than one Raptor. 2 RAID0 HyperDrive4s are 677% faster than 2 RAID0 Raptors and 4 RAID0 HyperDrive4s are 675% faster than any number of RAID6 Raptors aged with a 10% performance hit for defragmentation (42.5 score). The HyperDrive, being a Random Access Device, does not suffer noticeably from fragmentation.

4 RAID0 HyperDrive4 units have an STR of 394.7 MB per second (as measured by HDTach) and 386.6 MB/s (as measured by CT H2BenchW - which is the most realistic) and 445 MB/s (as measured by IOMeter, which must actually occur in some sense but is not so realistic). It has a max IOPS of 75,000 and a seek time of around 10 microseconds. The extra 9 microseconds over the 1 microsecond seek time of one unit are due to the processing time of the 3124 chip. RAID5 or RAID6 are unnecessary and counter-productive with HyperDrives, since the time needed for the RAID algorithm is too long for the seek time of the device. You would need a mainframe just for the

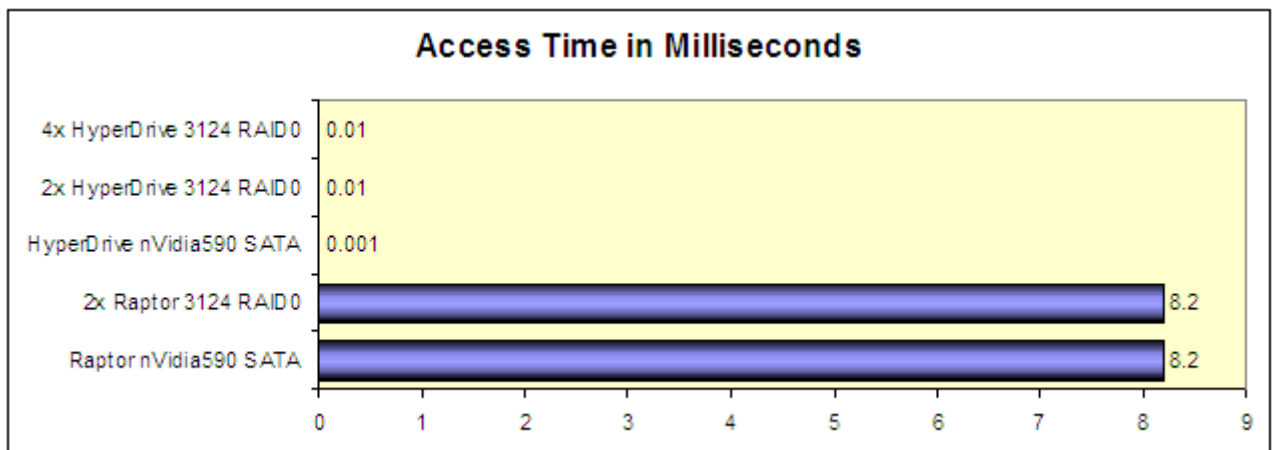
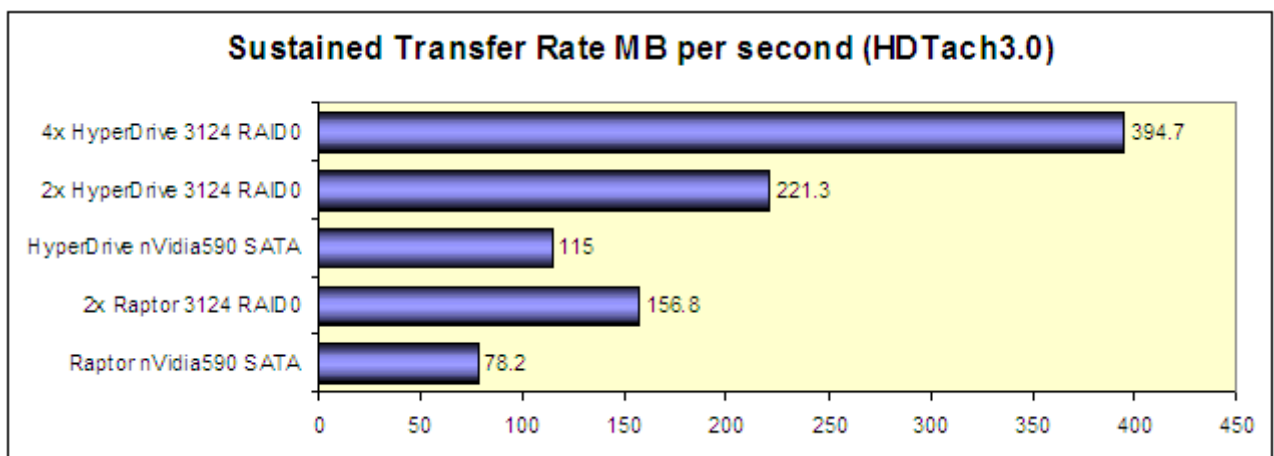
RAID algorithm! If you are concerned about memory stick failure which is a lot less likely than a mechanical failure in a hard disk, then use RAID10. Mirroring does not slow down the performance of the array.

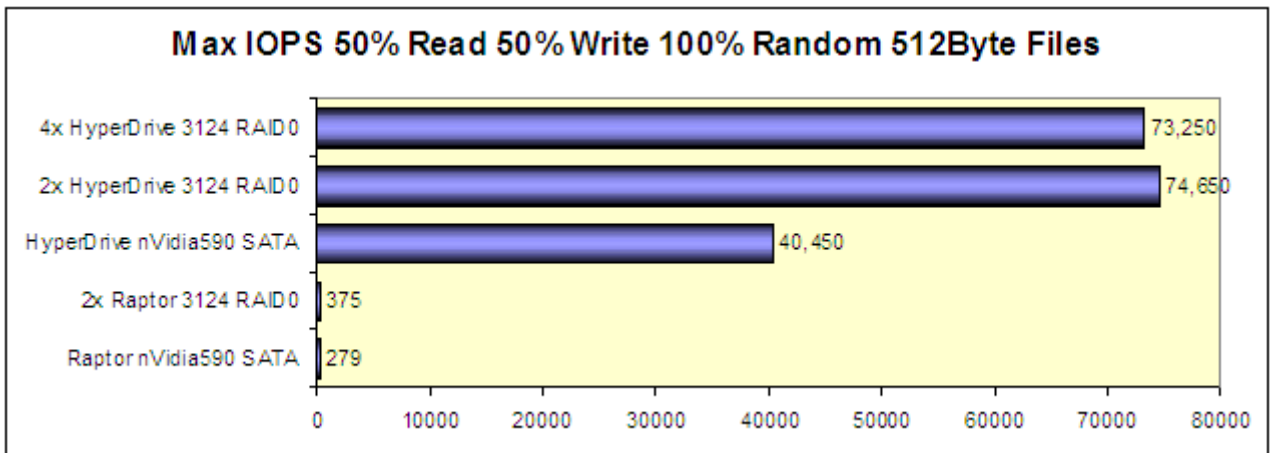
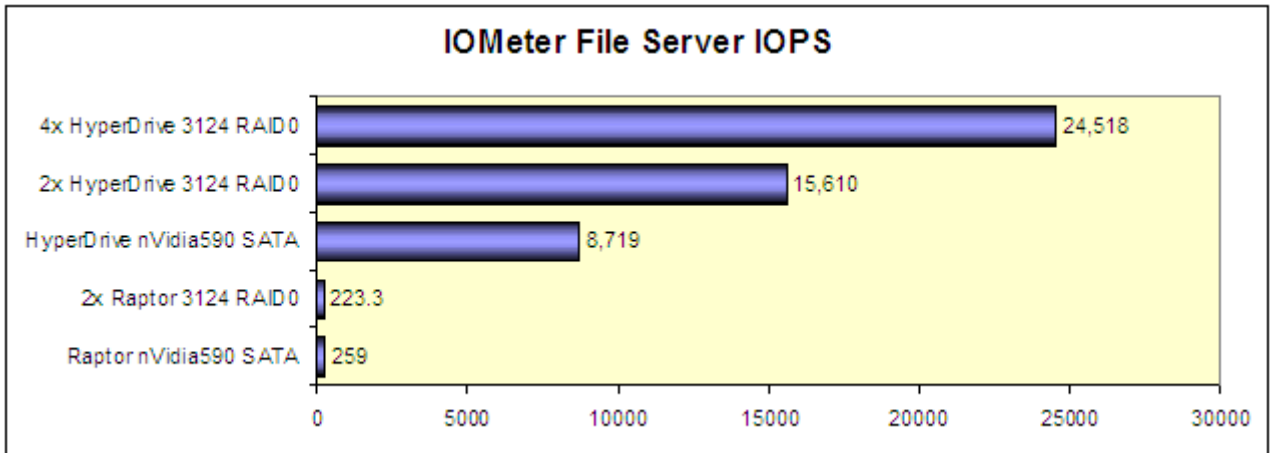
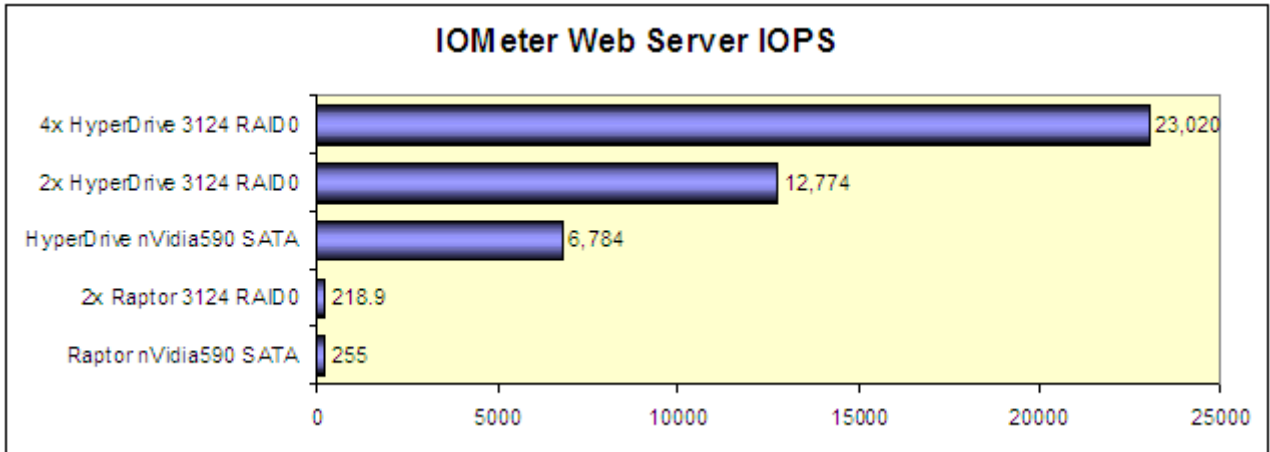
Let's state the conclusion one more time...

4 RAID0 HyperDrive4s are 675% faster than any number of WD740ADFD Raptors in RAID6 aged for defragmentation.

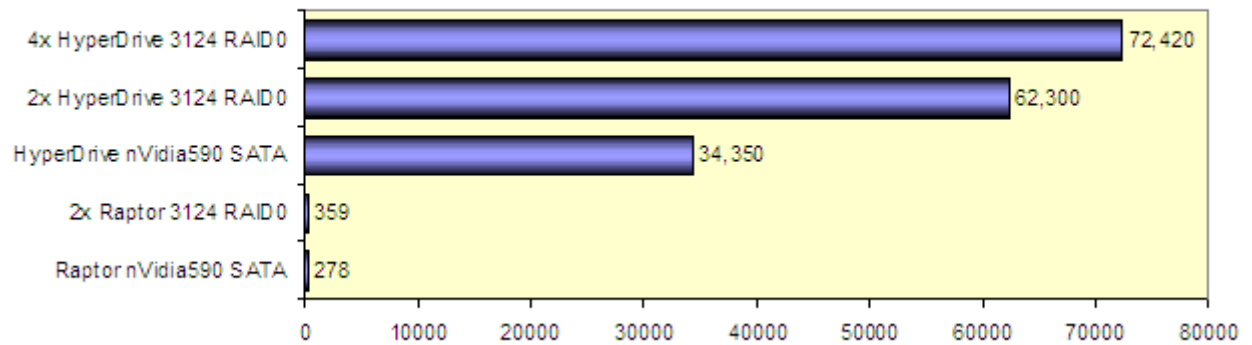
If one made a 10 drive RAID6 array from 15,000 rpm SAS Seagate Savvios using the fastest Areca RAID card (ARC 1280) or the fastest Adaptec RAID card (AAR 4800SA) one could at best do 33% better than the 10 RAID6 Raptors on the Areca 1220 card i.e. get a score of 56.5. Then the 4 RAID0 HyperDrive array would be 508% better than any number of RAID Savvios.

Here are the results of the tests we did in more detail for your perusal. These tests are really just stating the obvious in full technical detail...

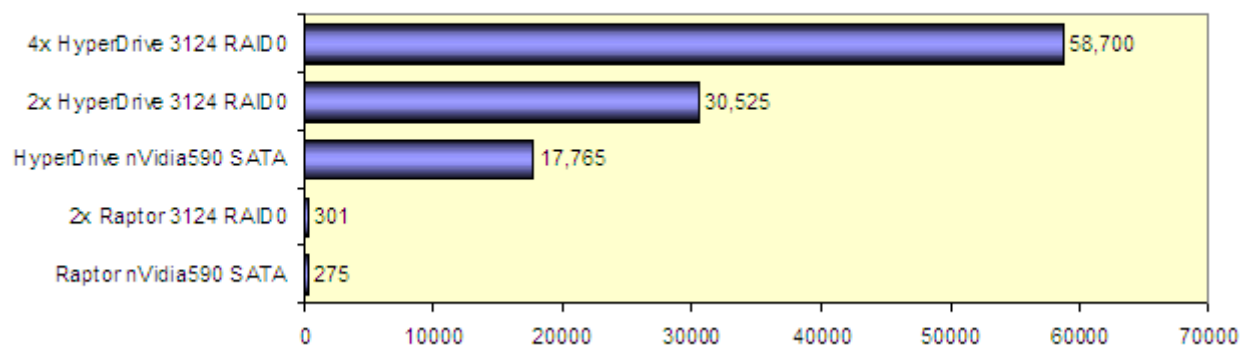




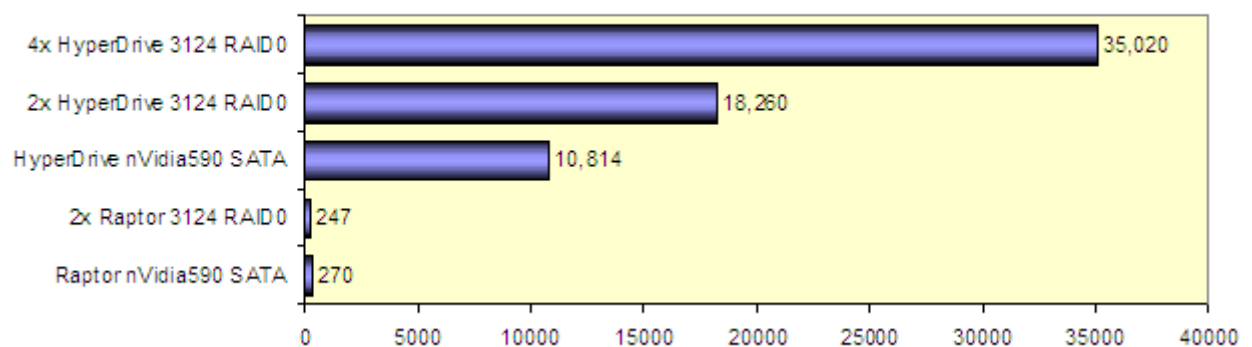
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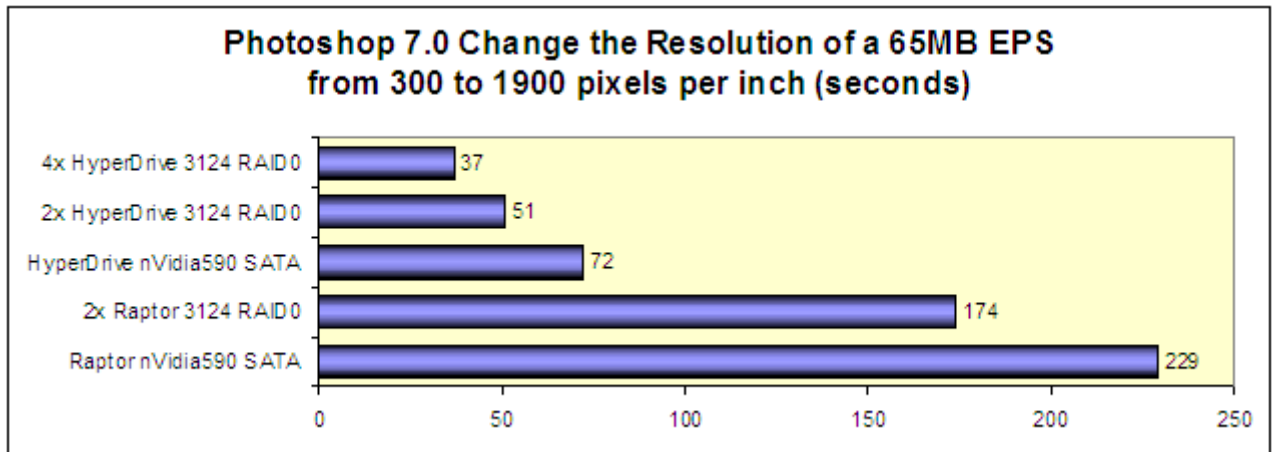


IOMeter IOPS 4K Files 50% Read 50% Write 100% Random



IOMeter IOPS 8K Files 50% Read 50% Write 100% Random





Conclusion

Instant computing is here. Any computer running on any number of hard disks is not a high performance machine. The bar has just been raised by 500% at a cost of £2000 (\$4000).

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