

Areca 1231ML Benchmarking Results HD4 vs Raptor

The latest WD Raptor, the WD740ADFD, is the fastest commercially available SATA Hard Disk at present (January 2007). And the Areca 1231ML and other 1280 series RAID cards (no sure what happend to their series numbering there) being full Hardware RAID, and using the Intel IO341 chip, are generally acknowledged to be the fastest or thereabouts of the server RAID cards. So the best the mankind can achieve in performance (given an acceptable level of data security) with hard disks is represented by around 10 of the latest WD Raptors in RAID6. We will compare HyperDrives against 8 Raptors in RAID0 which will be around 10-20% faster than 10 Raptors in RAID6.

Furthermore, with Hard Disks, the more you use, the more likely you are to have a mechanical failure. So the maintenance cost of very large arrays of Hard Disks means that striping more than 8 is really not worth it for the small percentage performance gain.

So now we can ask the 64 million dollar question...

Which would you say is faster: 1 HD4 all by itself or 8 WD740ADFD Raptors in RAID0 on the fastest RAID cards known to man?

The test system was an ASUS CrossHair Mobo with a dual core 3.0 GHz (6000 Intelahertz) Daul core Athlon 64 processor not overclocked and 1GB of 667 MHz DDR2 in dual channel configuration and a crummy Geforce6 Graphics card with no graphics drivers installed. We used the latest 9.35 nForce 590 Mobo drivers and the latest Areca 1231ML RAID driver. We ran Windows XP SP2. We used a Raptor as the boot disk.

The true Hardware seek time of the New HyperDrive4 (revision3) as measured by the wonderful Data Transit Bus Doctor (30,000 Euro Bus testing hardware) is 1100 nanoseconds read and 250 nanoseconds write. Hdtach3 gives a figure of 0.0 milliseconds. Computer Technical's H2BenchW gives a figure of 30 microseconds or occasionally of 20 microseconds, but these figures are just the minimum resolution of the Benchmark. Regrettably most RAID cards degrade this seek time by at least 10 microseconds.

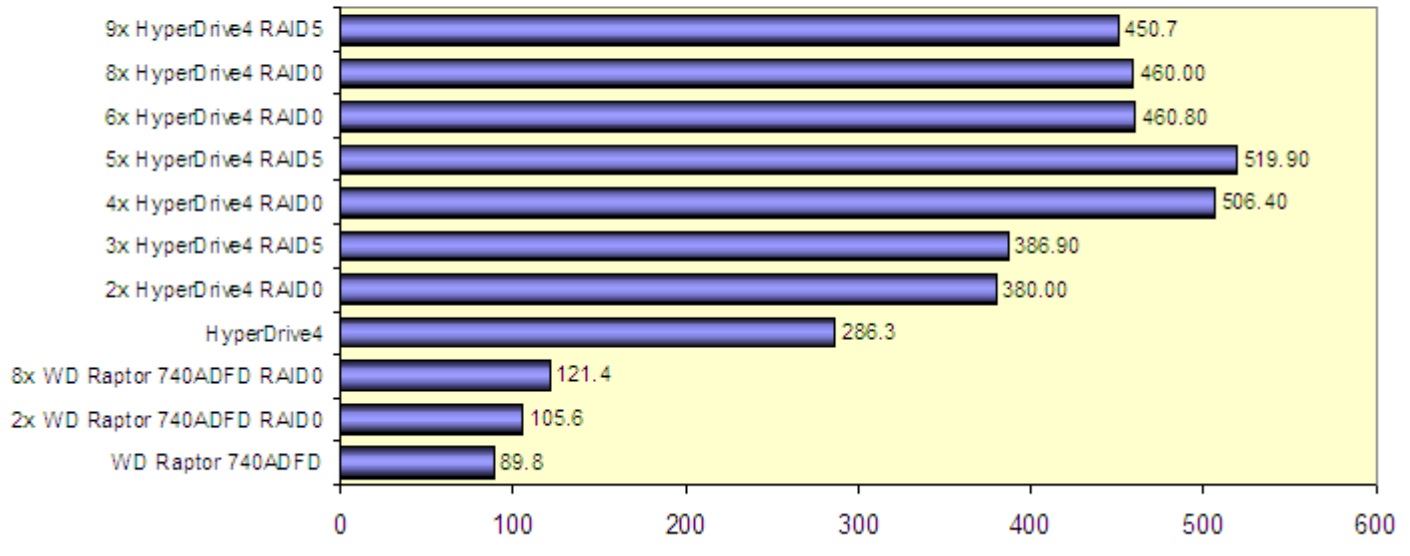
The Results

We used Simpli softwares HDTach3.0.1.0 for the STR figures and CT Magazine's H2BenchW for the seek time and base STR and Windows application figures and Intel's IOmeter for the IOPS figures. Here are all the results in table form.

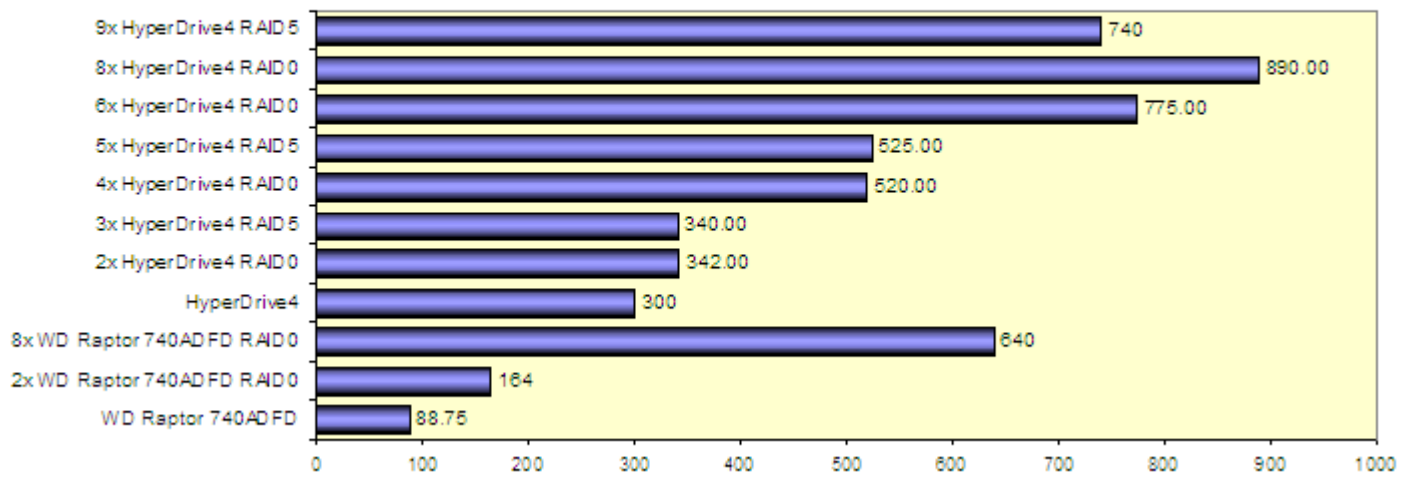
Capability	1 WD Raptor	2 WD Raptors	8 WD Raptors	1 HD4	2 HD4 RAID0	3 HD4 RAID5	4 HD4 RAID0	5 HD4 RAID5	6 HD4 RAID0	8 HD4 RAID0	9 HD4 RAID5
Base STR (H2BenchW) MB/s	77	150	590	140	244	243	486	486	729	877	728
Effective STR (HDTach) MB/s	88.75	164	640	300	342	340	520	525	775	890	740
Burst STR (HDTach) MB/s	1262	1246	1240	1240	1253	1238	1246	1251	1245	1245	1250
Seek Time ms	8300	8500	8500	1	10	10	10	20	20	20	20
Swap File MB/s	86	103	120	207	280	280	348	351	269	267	269
Install MB/s	43	37.8	33	224	288	314	402	430	366	359	347
Word MB/s	270	214	158	719	773	711	738	751	673	655	620
Photoshop MB/s	150	233	316	285	437	437	765	786	750	745	740
Copying MB/s	234	437	800	643	983	1005	1300	1295	1229	1240	1260
Virus Scan MB/s	17	18.7	20.5	104	130	140	189	197	181	188	179
Combined Index MB/s	89.8	105.6	121.4	286.3	380.0	386.9	506.4	519.9	460.8	460.0	450.7
Max IOPS	365	630	2,000	51,500	55,500	39,250	55,600	37,000	54,250	55,000	36,250
1K file IOPS	365	600	1,890	42,000	55,500	37,750	55,000	36,000	53,500	54,200	35,500
2K file IOPS	350	570	1,880	30,500	51,500	33,750	53,250	32,250	52,750	52,250	34,000
4K file IOPS	340	550	1,870	20,000	36,750	23,000	51,000	27,000	50,250	50,500	30,750
8K file IOPS	330	540	1,860	11,500	21,750	13,500	40,000	17,000	45,000	44,750	24,250
16K file IOPS	320	530	1,850	6,500	9,000	7,500	22,000	9,000	30,000	32,500	14,750
32K file IOPS	310	520	1,800	3,500	4,500	4,150	11,400	4,500	15,900	15,900	8,500

All of the figures in the table are cache assisted other than the base STR figures. Here are some bar charts of the most relevant figures.

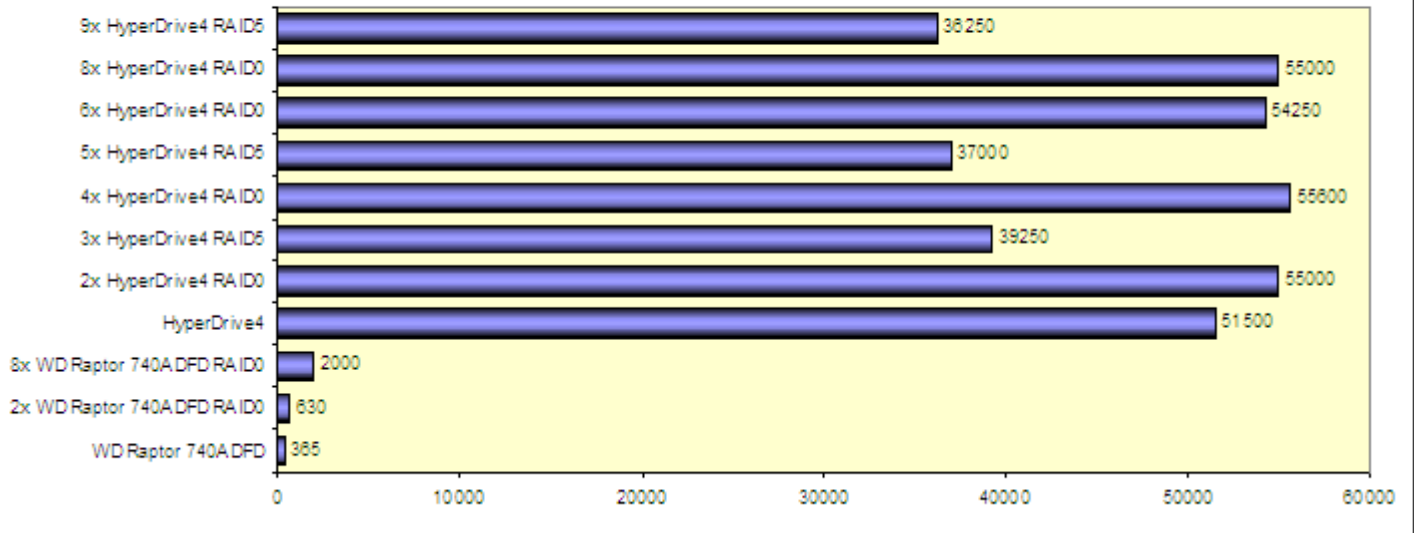
Combined H2BenchW Real World Windows Application Index for Raptors and HyperDrives on Areca 1231ML with 1GB Cache (Swap file, Installing, Word, Photoshop, Copying and Virus Scanning)



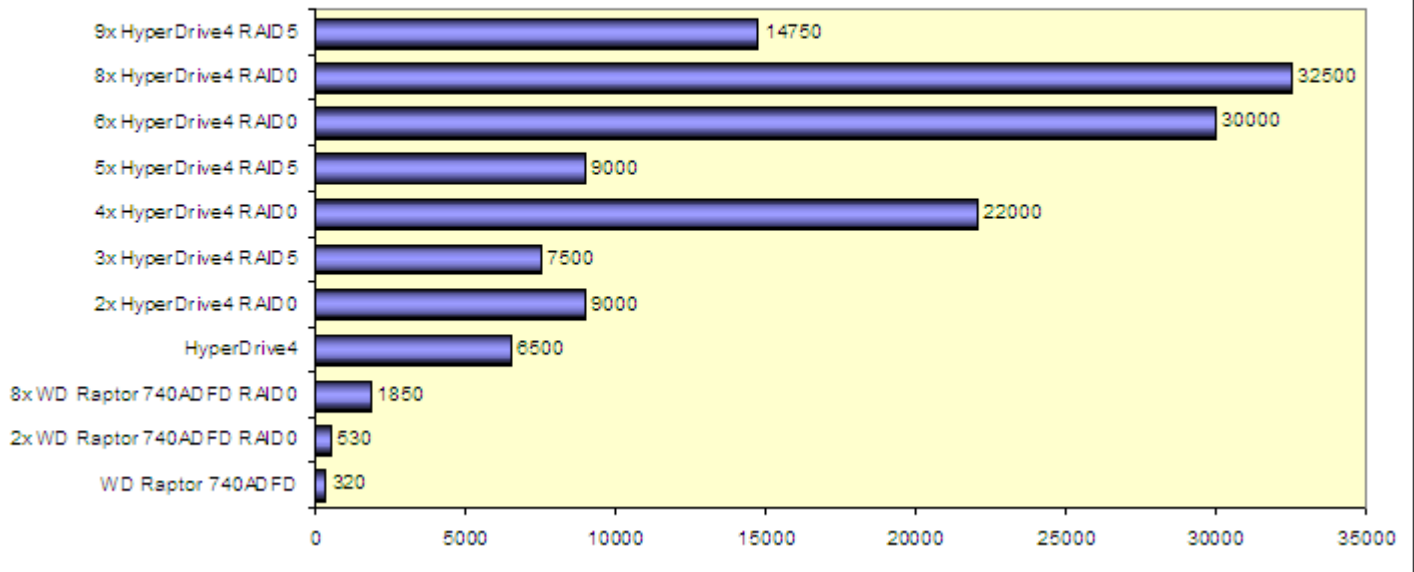
Effective Sustained Transfer Rate, taking account of RAID card cache (HD Tach) for Raptors and HyperDrives on Areca 1231ML with 1GB Cache



Max IOPS (0.5KB files) IOMETER for Raptors and HyperDrives on Areca 1231ML with 1GB Cache



16KB file size IOPS IOMETER for Raptors and HyperDrives on Areca 1231ML with 1GB Cache



Summary

One HyperDrive is 235% faster at running your basic real world Windows apps than any number of RAID0 raptors on the fastest RAID cards known to man. So your office productivity will more than double even if you are presently using a huge hard disk array!!!

In fact given, the IOPS differential of more than 100x, we have seen speed advantages of 40x and more in the real world for SQL database apps and Multi user web servers and network servers etc.

5 HyperDrives in RAID5 are 428% faster than anything that can be done with hard disks and RAID cards.

So The HD4 has the capability to solve most IO problems!