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Pro/E 2004

Wildfire Benchmark Update

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Pro/E Community's 2004 Wildfire Benchmark Update

By Jay Sussman, P.E.

Welcome to the summer update to the Wildfire Benchmark 2004. You may recall that back in January in the Pro/E Community's Wildfire Benchmark 2004, we tested three workstations running Pro/ENGINEER Wildfire software. For this update, we are excited to announce that IBM submitted its M Pro Intel Pentium 4, 3.4GHz Workstation and also the IBM A Pro AMD Opteron 2.2GHz Workstation.

All benchmark results are compiled after running systems three times and averaging the results. These test files are available for download and private testing on The Pro/E Community's website. The benchmark test compares total points, CPU performance, and graphics performance. For a breakdown of the points for each category, see Table 1.

As always, this article's goal is to help the Pro/ENGINEER user and the corporate IT decision maker reach informed, knowledgeable decisions about purchasing hardware for use with Pro/ENGINEER. As hardware certifications and updates change almost weekly, it is also a good idea for readers to visit the PTC website at www.ptc.com to check updated lists of "PTC Certified" hardware and system configurations before making the final decision to purchase. For previous benchmark results, and for an explanation of how scores were calculated, see the Wildfire Benchmark 2004 on the Pro/E Community site at www.proe.com (under the "Features" pull down menu).

This benchmark update uses the same Wildfire Benchmark test that was performed and published on the Pro/E Community site in January, with the additions of these two new hardware submissions. Again, for a complete list of test parameters and details, please refer to that publication; however, just to recap, we performed a typical installation of Pro/Engineer Wildfire Build Code #2003170 using the default installation wizard and default installation directories and installation options for Wildfire 1.0 right out of the box. No errors were generated on any of the machines through these installations, and we used Internet Explorer 6.0 as the default web browser installed on each machine. As many of you will notice when you download the benchmark files, our team used one standard config.pro file to set all Pro/E settings for each machine. This configuration file contains specific settings for graphics performance, edge quality, accuracy, auto regeneration, shading quality, and the IGES input and output settings that are used by most companies in the industry. (For more information on this file, please refer to "config.pro" packaged with the benchmark files.)

Highlights as Configured for Benchmark Testing

The operating systems for both the IBM M Pro Intel Pentium 4, 3.4GHz and the A Pro AMD Opteron 2.2GHz Workstations included Windows XP Service Pack 1. The M Pro's processor was the new Intel Pentium 4 running at 3.4GHz and a 512 L2 Cache with 1GB of main memory and an 80GB SATA Hard Drive running at 7200 rpm. The A Pro system comes equipped with an AMD Opteron processor running at 2.2GHz and a 1MB cache with 2GB of main memory and a 36GB SCSI Hard drive running 10,000 rpm. Both systems featured the same nVidia Quadro FX1100 graphics card, which includes 128MB of RAM and rich graphics output in both analog and digital formats. The Intellistation M Pro workstation preloaded with Windows XP with Intel Pentium 4 processors and nVidia FX1100 graphics card offers great graphics performance, performs intense functions well, and is reliable. The workstation is ergonomically designed with a handle slot at the top that makes picking it up and moving it around virtually hassle free.

Highlights of the M Pro

The M Pro uses Pentium 4 processors up to 3.4GHz and up to 4GB of dual-channel DDR memory. Both ATA-100 and Serial ATA hard disk controllers are integrated with a 1GB DDR400 ECC memory (expandable up to 4GB), 80GB hard disk, a CD-RW drive, and a zip disk drive. Also, the hard disk was partitioned into a 6GB system partition and an 8GB test partition on which Wildfire was installed.

The price as configured for testing was $3,358. IBM backs the IntelliStation M Pro with vigilant service via the Worldwide IBM Help Center. It offers support for IntelliStation workstations running Microsoft Windows XP Professional, Windows 2000 Professional and Red Hat Enterprise Linux.

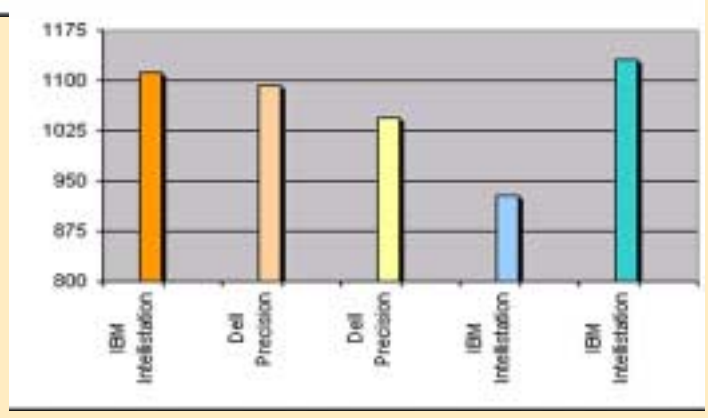
Highlights of the A PRO

The revolutionary IBM Intellistation A Pro, powered by the AMD Opteron 200 series processor, delivers the scalability of 64 bit computing without sacrificing 32 bit compatibility or performance. This machine will go a long way to alleviate the misery of CAD engineers, who are usually grounded by meager memory units and untold quantities of data that must be gathered, managed, processed, and finally visualized. Featuring an nVIDIA Quadro FX 1100 accelerator for sophisticated OpenGL 3D graphics, the A Pro either stands alone or takes its place as the front-end visualization station of a High Performance Computing (HPC) grid.

Powered by AMD Opteron 200 Series processors up to 2.2GHz, the all-new IntelliStation A Pro worksta-

CPU Performance	
IBM Intellistation M Pro 6230U	1113
Dell Precision 630 Config1	1092
Dell Precision 630 Config2	1045
IBM Intellistation M Pro	928
IBM Intellistation A Pro	1131 WINNER

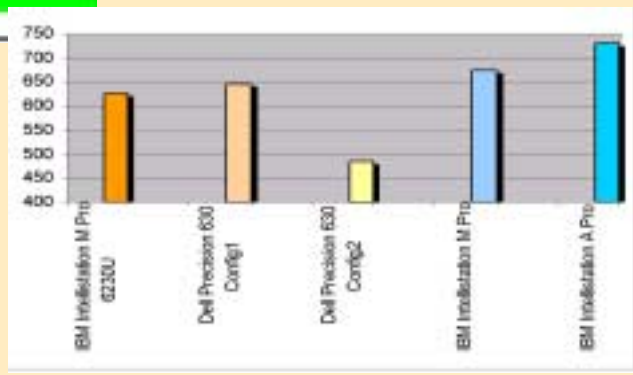
Chart 1



Graph 1

Graphics Performance	
IBM Intellistation M Pro 6230U	625
Dell Precision 630 Config1	645
Dell Precision 630 Config2	485
IBM Intellistation M Pro	673
IBM Intellistation A Pro	730 WINNER

Chart 2



Graph 2

tion doubles the data pathway with its AMD64 architecture, accessing up to 16GB of DDR PC3200 memory to process massive datasets in 64 bit chunks.

Please note that at the time of testing for this article Pro/Engineer 64 BIT versions of Wildfire were not fully debugged and available for all hardware manufacturer platforms in our Wildfire Benchmark; so to remain unbiased, we opted just to test the configurations shown here. As future 64 BIT versions become available (and integrated with Intralink 3.4 as scheduled by PTC for July 2004), we will be excited to test 64 BIT applications at a later date. For more information on 64 BIT applications from PTC, please visit http://www.ptc.com/products/proe/64bit_faq.htm.

For reader interest, however, the following information is provided. Applications that thrive on 64-bit memory addressability include:

- Mechanical Computer-Aided Design: load and manipulate complete assemblies of large, complex 3D models, e.g. automotive and aerospace;

- Computer Aided Engineering: solve large problems of finite element and computational fluid dynamics;

- Electronic Design Automation: simulate the complexity of integrated circuits comprising hundreds of millions of devices.

So now there's a compelling alternative to proprietary UNIX workstations in the standards-based IntelliStation A Pro, combining exceptional price/performance with the open-source advantages of Linux, the strategic platform for IBM's eBusiness On Demand initiative.

The benchmark A Pro preloaded with windows XP uses an AMD Opteron 2.2GHz processor. It has a main memory of 2GB and an Ultra 320 SCSI hard disk capacity of 36GB. The hard disk was partitioned into a 6GB system partition and an 8GB test partition on which Pro/Engineer wildfire build code 2003170 was installed.

The price as configured for testing was $4,558. The breakthrough price/performance ratio, simultaneous 32- and 64-bit computing, huge memory scalability and highly tuned graphics, on-site service and on-line access to the IBM Performance, makes the A Pro the platform of choice for high-end CAD applications. Please see Table 2 for additional details on system configurations.

The M Pro and A Pro machines performed very well in the Graphics

Performance tests, finishing with 5% and 12% faster times respectively then the next closest Dell Machine (See Chart 2 and Graph 2). The M Pro was sluggish in the CPU performance test, with the slowest score (Only 928 Points) in this category; however it did tie the Dell 630 (Configuration 2) in the overall seconds to complete the benchmark at 135 seconds. The A Pro was the fastest machine in the benchmark with a CPU performance rating of approximately 2% better then the original IBM M Pro 6230 we tested; however, the A Pro did outperform the Dell configurations by nearly 4% and 8% respectively. The A Pro therefore was the winner in both CPU and Graphics Performance categories but did not finish with the fastest overall time to complete the benchmark. This was due to the unusually slow performance of both the IBM machines in Test #12. The times for the M Pro and the A Pro were 26 and 30 seconds for test #12, which is twice as slow as the other machines tested. We are still investigating the reason for these numbers; however they are correct, and our feeling is they are possibly a result of the OS differences of these machines running XP rather than Windows 2000. The Dell (Configuration 1) still holds the fastest time to complete the benchmark test at 114 seconds.

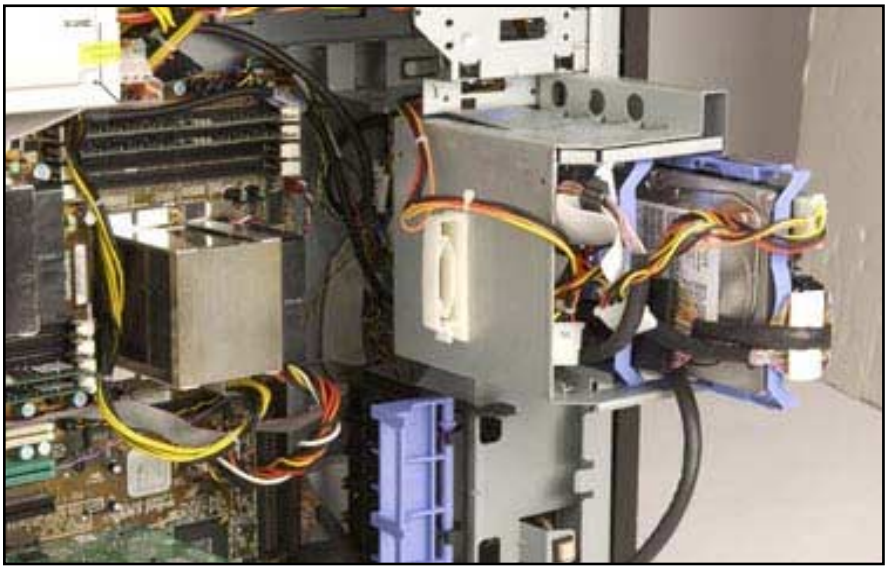
The Quadro FX 1100 graphics card from nVidia does show some nice im provement (on average two seconds faster than previous nVidia cards tested), particularly in the changes display tests #8, #9, and #10. This despite the fact that all the cards tested do have the same 128MB of RAM on board. Overall, the nVidia Cards are very good performers and provide rich graphical images even in Photo Rendered applications in Wildfire. These cards are economically priced, and we are glad to see all the manufactures in this benchmark choosing nVidia graphics cards in their workstation configurations.

As mentioned, the A Pro was the overall winner in both CPU and Graphics tests and receives Performance rating of 5 Stars plus a shooting star for being the winner of the CPU performance test. The A Pro is priced $765 higher than the high-end Dell (Configuration 1) and $1,200 more that the M Pro tested here and therefore only receives a Price Performance rating of 4 Stars. The A Pro, with its Benchmark point score of 26.23 does, however, receive an overall rating of 5 Stars. The M Pro (at 25.40 Star Points) attains an overall rating of 4 Stars as well as 4 Star ratings for Performance and Price/Performance respectively. (Please see Charts for details).

Conclusion

As you can see, all of these machines performed exceptionally well in our Benchmark to date, and we look forward to more vendor submissions for our next Benchmark update as well as our 64 Bit Benchmark tests. Many of you have e-mailed me regarding Wildfire 2.0 Benchmark tests and files and their availability. We are currently modifying the Wildfire Benchmark to work with version 2.0 and once tested and debugged, we hope to have those files available to you through the www.proe.com and www.torgon.com websites sometime in July 2004.

The Torgon Industries Benchmark team includes CIP's Nikesh Gnanasekaran (Official tester), Glenn Reid (file procurement), and Jay Sussman (interpretation and author). ▲



Inside the A PRO

Jay Sussman is president and CEO of Torgon Industries Inc., a product development and engineering design firm and PTC reseller specializing in Pro/ENGINEER software sales and PTC Product training services for over eight years. Torgon has offices and training centers in Oakville,Ontario, Canada; San Diego, CA; Mountain View, CA; and Ft. Lauderdale, FL. Sussman, a PTC Certified Professional and Certified Instructor Provider (CIP), has taught PTC classes for eight years. He can be reached at jay@torgon.com. For information about Torgon, visit www.torgon.com.

Benchmark 2004 Test Work Sheet (Averaged), all time is in seconds. (Table 1)

Vendor Name	Test #1	Test #2	Test #3	Test #4	Test #5	Test #6	Test #7	Test #8	Test #9	Test #10	Test #11	Test #12	Test #13	Test #14	Test #15	Test #16		Totals
IBM Intellistation M Pro 623046U	7.33	7.33	7.67	0.33	7.67	0.1	1	14	12	11	1	12.67	5.33	23	4.67	6	121.1	2.018
Benchmark Points =	99	98	94	182	91	146	100	92	94	98	73	152	133	95	93	98		1738
Dell Precision 360-Configuration 1	7	6.33	6.33	0.67	6.33	0.1	1	13	11	11	1	12.67	6	22	4.33	5	113.76	1.896
Benchmark Points =	104	114	114	90	111	146	100	99	102	98	73	152	118	100	100	117		1737
Dell Precision 360-Configuration 2	8	7.67	8	1	7.67	0.33	1	15.33	13.33	12.67	0.33	14.33	8.67	25.33	4.67	6.67	135	2.250
Benchmark Points =	91	94	90	60	91	44	100	84	85	85	222	134	82	87	93	88		1529
IBM MPRO	7	7.666667	7.333333	0.666667	7.333333	0.1	1	11	11	10.33333	0.666667	30.33333	8.333333	21.33333	4.333333	6.666667	135.1	2.252
Benchmark Points =	104	94	98	90	95	146	100	117	102	105	110	64	85	103	100	88		1600
IBM APRO	7	7	6.666667	0.333333	6	0.1	1	11	9	9	0.666667	26.33333	7	18	3.666667	5	117.7667	1.963
Benchmark Points =	104	103	108	180	117	146	100	117	125	120	110	73	101	122	118	117		1861
Benchmark Average for each Item	7.27	7.20	7.20	0.60	7.00	0.15	1.00	12.87	11.27	10.80	0.73	19.27	7.07	21.93	4.33	5.87	123.29	
	Open Large Assembly file, Wireframe, Low	Open Large Assembly file, Wireframe, Very High	Open Large Assembly file, Shaded, Very High	Erase / Current - Time To Clear Memory	Open Large Assembly file, Shaded, Low	Change Graphics Display to Wireframe, Low	Change Graphics Display to Wireframe, Very High	Change Graphics Display to Shaded, Very High	Change Graphics Display to Hidden Line, Very High	Change Graphics Display to No Hidden, Very High	Erase / Not Displayed - Time to Clear memory	Feature Regeneration - After Clip Suppress, Resume All	Export IGES for motor.asm	Spin | Pan | Zoom - Check for Graphics Display	Import IGES fan.igs	Feature Hole Creation and Fill Pattern of Holes		Final Time is in Total Minutes

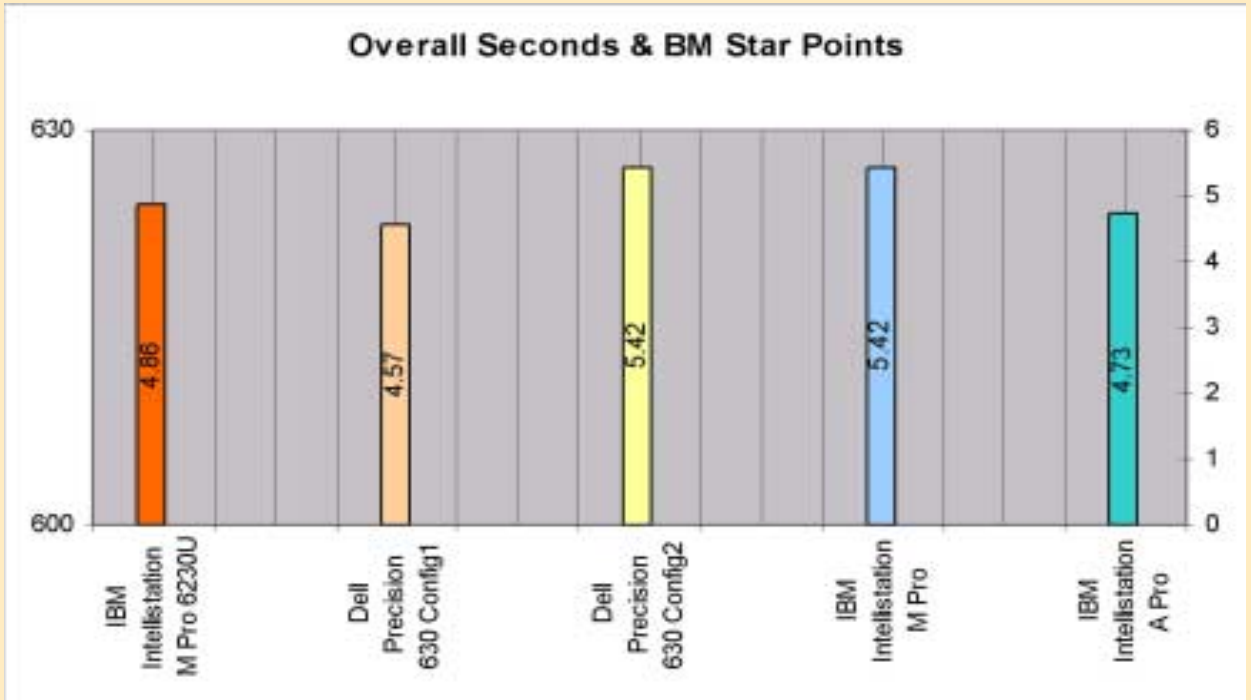
"=" Total Benchmark Points

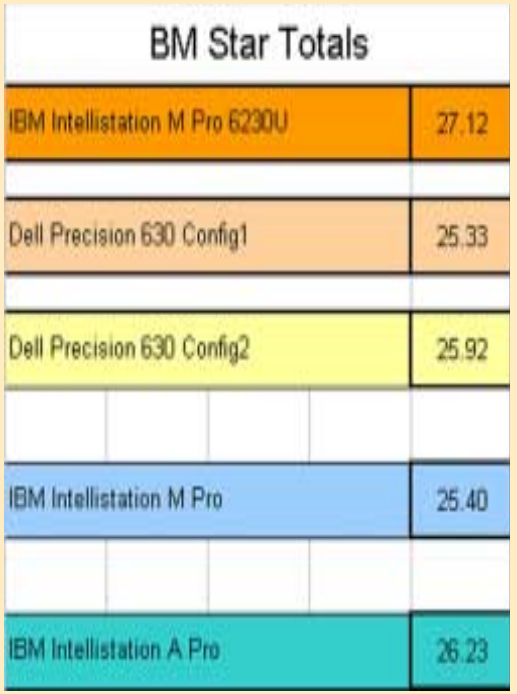
"=" CPU Performance Winner

"=" Graphics Perf. Winner

Vendor Submission Worksheet - Table 2	IBM	Dell 1	Dell 2	IBM (MPRO)	IBM (APRO)
Vendor Name and Contact Information	IBM (PR Contact: Cory Stockum, 919 543 3506 or Mike Redd, 919254 4069 mikeredd@us.ibm.com)	Dell (PR Contact: Tom Roberts, 512-728-3563 troberts@dell.com)	Dell (PR Contact: Tom Roberts, 512-728-3563 troberts@dell.com)	IBM (PR Contact: Fred Baritell,Ph. (919) 486-1434 / Tie 526-1434 or Mike Redd, 919254 4069 mikeredd@us.ibm.com)	IBM (PR Contact: Fred Baritell,Ph. (919) 486-1434 / Tie 526-1434 or Mike Redd, 919254 4069 mikeredd@us.ibm.com)
Vendor Web address	www.ibm.com	www.dell.com	www.dell.com	www.ibm.com	www.ibm.com
Operating System, including service pack loaded	Windows XP, version 2002, SP1	Windows 2000 Professional, SP 4	Windows 2000 SP4	Windows XP, Service pack1	Windows XP, Service pack1
Model Name & Number	INTELLISTATION M PRO 623046U	Dell Precision Workstation 360	Dell Precision Workstation 360	INTELLISTATION, Mpro	INTELLISTATION, Apro
Processor and Quantity	Intel Pentium 4 3.2 GHz	(Single) Intel Pentium 4 Extreme Edition 3.20GHz	(Single) Intel Pentium 4 2.80GHz	Intel Pentium 4 3.4 GHz	AMD Opteron 2.2GHz / one tested / 2 max
Graphics Option	nVidia Quadro FX 1000	nVidia Quadro FX 1000	nVidia Quadro FX 500	nVidia Quadro FX 1100	nVidia Quadro FX 1100
Graphics Memory	128 MB	128MB	128MB	128 MB	128 MB
Secondary Processor Cache	512K L2	512K L2, 2MB L3	512K L2	512K L2	1MB
Cache Speed	3.20GHz	3.20GHz	2.80GHz	3.40GHz	2.2GHz
Main Memory	1 GB	1GB	1GB	1 GB	2GB
Memory Type & Speed	DDR400	DDR400	DDR400	DDR400	PC3200
ECC Memory	yes	yes	yes	yes	Yes
Maximum Memory Capacity	4GB	4GB	4GB	4GB	16GB
Hard Disk Capacity	80GB	120GB	40GB	80GB	36GB
Hard Disk Type	SATA	SATA	PATA	SATA	Ultra 320 SCSI
Hard Disk Rpm	7200	7200	7200	7200	10K rpm
Disk Controller	Integrated	Integrated	Integrated	Integrated	Integrated
Disk Controller Bandwidth	100MB/s	150MB/s	100MB/s	100MB/s	320MB's
Network Card Speed	Gigabit	Gigabit	Gigabit	1GB 10/100/1000	1GB 10/100/1000
10BaseT Supported?	yes	yes	yes	Yes	Yes
Maximum Supported Resolution	3840 x 2400	1600x1200	1600x1200	Analog - 2048x1536, Digital - 3840x2400	Analog - 2048x1536, Digital - 3840x2400
Color Depth at Maximum	24bit (true color)	24bit (true color)	24bit (true color)	32bit (true color)	32bit (true color)
Maximum Refresh Rate at Max.	75 Hertz	75 Hertz	75 Hertz	75 Hertz	75 Hertz
Technical support Number	**800-IBM-7255**	**888 560 8324**	**888 560 8324**	**800-IBM-7255**	**800-IBM-7255**

Price as configured for testing	$2,799	$3,793	$2,345	$3,358	$4,558
Benchmark Price Points =	**62**	**46**	**65**	**48**	**41**





PTC Certification BM Star Point	
IBM Intellistation M Pro 6230U	1
Dell Precision 630 Config1	1
Dell Precision 630 Config2	1
IBM Intellistation M Pro	1
IBM Intellistation A Pro	1

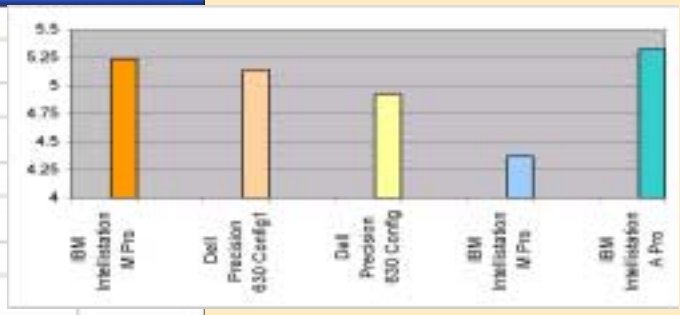
Chart 3

Overall Seconds To Complete Benchmark & BM Stars			
IBM Intellistation M Pro 6230U	121		4.86
Dell Precision 630 Config1	114		4.57
Dell Precision 630 Config2	135		5.42
IBM Intellistation M Pro	135		5.42
IBM Intellistation A Pro	118		4.73
Benchmark Average			124.55

Overall Average of Benchmark points			
IBM Intellistation M Pro 6230U	1738		5.13
Dell Precision 630 Config1	1737		5.13
Dell Precision 630 Config2	1529		4.52
IBM Intellistation M Pro	1600		4.73
IBM Intellistation A Pro	1861		5.50
Benchmark Average			1693

Chart 4

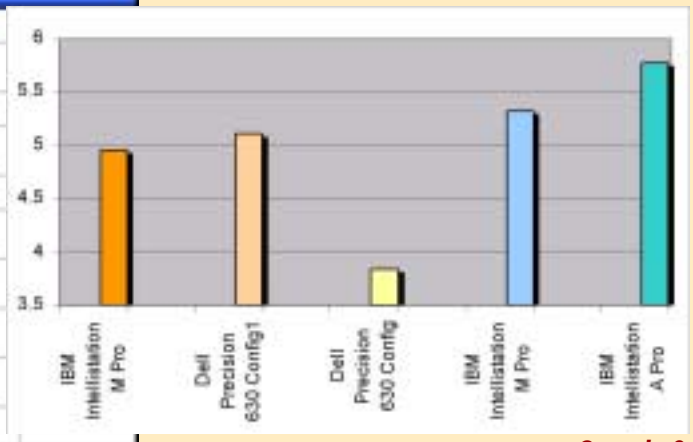
CPU Performance Star Points	
IBM Intellistation M Pro 6230U	5.24
Dell Precision 630 Config1	5.14
Dell Precision 630 Config 2	4.92
IBM Intellistation M Pro	4.37
IBM Intellistation A Pro	5.33
Benchmark Average	1061.60



Graph 5

Chart 5

Graphics Performance Star Points	
IBM Intellistation M Pro 6230U	4.95
Dell Precision 630 Config1	5.11
Dell Precision 630 Config 2	3.84
IBM Intellistation M Pro	5.33
IBM Intellistation A Pro	5.78
Benchmark Average	631.57



Graph 6

Chart 6

BM Price / Performance Points				
IBM Intellistation M Pro 6230U	$2,799.00		62	5.93
Dell Precision 630 Config1	$3,793.00		46	4.38
Dell Precision 630 Config 2	$2,345.00		65	6.23
IBM Intellistation M Pro	$3,358.00		48	4.55
IBM Intellistation A Pro	$4,558.00		41	3.90
Benchmark Average		52		

Chart 7