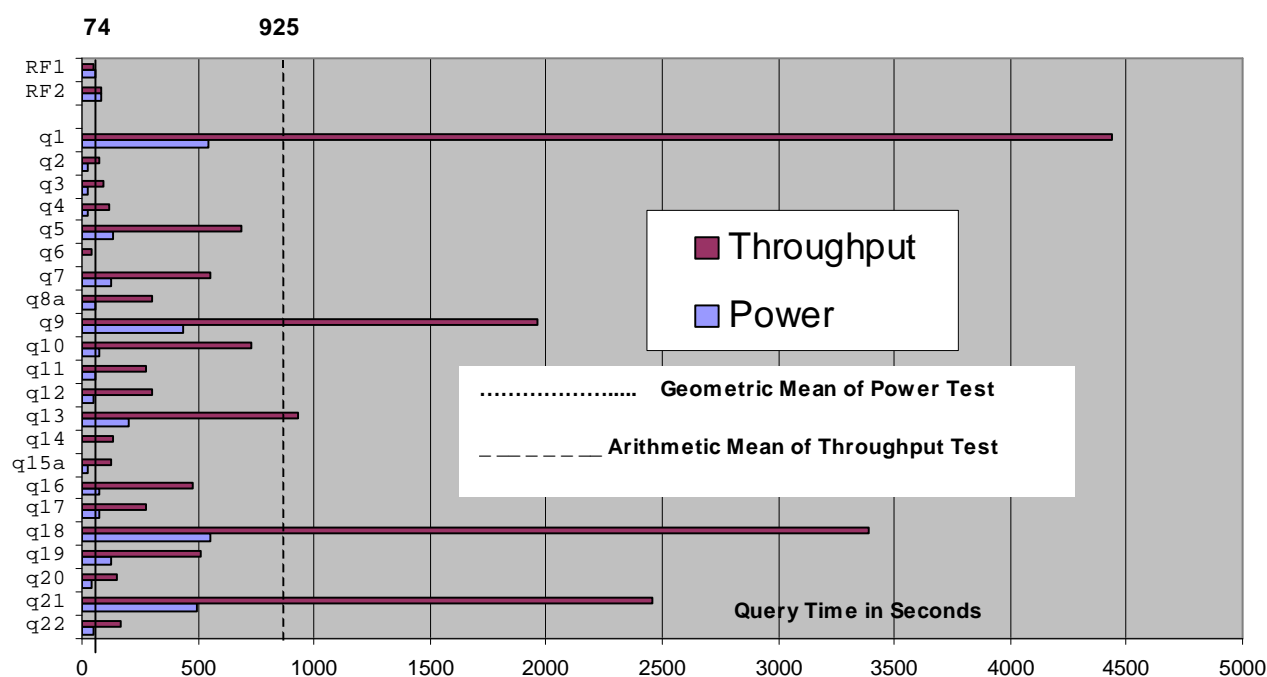
	Bull Novascale 6320		TPC-H Rev. 2.3.0		
			Report Date February 2, 2006		
Total System Cost		Composite Query per Hour Rating		Price Performance	
\$1,343,811		34,987.5 QphH @ 1000GB		\$38.41 / QphH @ 1000GB	
Database size	Database Manager	Operating System	Other Software	Availability Date	
1000 GB*	Oracle Database 10g Release 2 with Automatic Storage Management	Linux Suse sles9 sp2 for 64-bit Itanium-based Systems	gcc-c++-3.3.3-43-28	February 2, 2006	



Database Load Time = 5:52:50		Load included backup: N		Total Data Storage / Database Size = 16.73	
RAID (Base tables): Y		RAID (Base tables and Auxiliary Data Structures): Y		RAID (All): N	
System Configuration					
Processors	32 x 1.6 GHz Intel® Itanium2™ with 6MB Level 3 Cache (each processor is 1 chip, 1 core, 1 thread)				
Memory	128 GB Main Memory				
Disk Controllers	30 LSI 7202XP -LC				
Disk Drives	2	73GB FB 10K			
	244	73GB FB 15K (1GB = 10 ⁹ byte)			
Total Disk Storage		16728 GB (1GB=2 ³⁰ bytes)			
* Database size includes only raw data (eg, no temp, index, redundant storage space, etc.)					



Bull Novascale 6320 (32SMP/128GB)

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Description	Part Number	Brand	Pricing	Unit Price	Qty	Extended Price	3 yr. Maint. Price
Server Hardware							
NovaScale 6320 System Octo Itanium 2 1.6GHz/9MB - 4 I/O boxes - 40U rack	CPXU703-1609	Bull	1	474 320	1	474 320	149 885
CPU Kit: 4x Itanium 2 1.6GHz/6MB L3, 1 CPU/M Box	CPKU307-1606	Bull	1	29 108	6	174 649	55 315
16GB (16x1024MB DIMMS, SDRAM DDR) kit for one CPU/Memory box	CMMU303-0000	Bull	1	18 767	8	150 137	0
PCI fibre optical 2 Gb/s host connection kit, w/o cable - Windows and HPC Linux (LP9802)	CKTU213-0000	Bull	1	1 817	1	1 817	0
Bull FDA 1400-2 Redundant 15-slot Fibre to Fibre disk rack drawer 3U (1 GB cache and 2 host ports and 1 disk port / controller)	DSSH102-14F1	Bull	1	9 213	1	9 213	2 503
Manager Workgroup for FDA1400 up to 2 hosts connected	EXSH401-WG14	Bull	1	1 538	1	1 538	486
73GB Raid 2G Fibre Disk (10Krpm) for FDA	MSUH044-FDA2	Bull	1	517	2	1 034	327
Dummy disk canister	DSKH103-FDA2	Bull	1	24	13	315	
Additional Power Distribution Unit	PSSU200-0000	Bull	1	924	1	924	0
Subtotal						813 946	208 517
Storage Hardware							
Rack 1100H 40U/19" w/o Power Distribution Unit	RCKU209-1140	Bull	1	3 682	2	7 363	0
7-outlet Power Distribution Unit (7x C13)	PSSU211-00M7	Bull	1	266	8	2 130	0
Dual Channel HBA PCI-X to fiber (*)	LSI 7202	LSI	3	1 237	33	40 821	Spares
16-slot fiber JBOD disk rack drawer (*)	NS39-S05A134	Bull	1	4 025	33	132 825	Spares
SFP for disk drawer (*)	NS39-S05A136	Bull	1	92	66	6 072	Spares
FC multimode optical LC to LC 2 Gb SAN cable - 5 m	CBLH008-0500	Bull	1	200	60	12 012	
73GB/15k Fiber disk (*)	NS39-S05A135	Bull	1	640	269	172 160	Spares
Subtotal						373 383	0
Server Software							
Novascale Master	Included	Bull	1				
SLES 9 for IPF, up to 16-CPU lic., M&D, 1 year Supp.	EXSU282-LA0H	Bull	1	1 693	1	1 693	2 765
SLES 9 for IPF, add'l 8-CPU lic., 1 year Supp.	EXSU283-LA0H	Bull	1	1 060	2	2 120	1 728
Oracle Database 10g Enterprise Edition Release 2, Named User Plus for 3 years		Oracle	2	10 000	32	320 000	Inc. Below
Partitioning, Named User Plus for 3 years		Oracle	2	2 500	32	80 000	Inc. Below
Database Server Support Package for 3 years		Oracle	2	2 000	3		6 000
Subtotal						403 813	10 493
Discounts						391 787	74 553
TOTAL						1 199 355	144 456

Notes:
Pricing : 1-Bull, 2-Oracle, 3-LSI
Discount: 27% on Bull catalog, 35% on Maintenance, \$ 81 200 on Oracle (Oracle Mandatory E-Business Discount)
 (*) **Spares** = 10% spare disks, drawers, SFP and PCI-X HBA added in place of onsite service
 Used 30 HBA, 60 SFP, 30 disk drawers, 244x73Gb disks - Spares are 3 HBA, 6 SFP, 3 drawers, 25x73Gb disks

Three-Year Cost of Ownership : \$1 343 811

QpH @ 1000GB : 34 987

\$/ QpH@1000GB : 38,41

Result and methodology audited by François Raab of InfoSizing Inc. (www.sizing.com)

Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the stated components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchases are not permitted. All discounts reflects standard pricing policies for the listed components. For complete details, see the pricing sections of the TPC benchmark specifications. If you find that the stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank you.



Bull Novascale 6320

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Numerical Quantities Summary

Measurement Results

Scale Factor	1,000
Total Data Storage / Database Size	16.73
Start of Database Load	01/14/06 00:58:15
End of Database Load	01/14/06 06:51:05
Database Load Time	05:52:50
Query Streams for Throughput Test	7
TPC-H Power	48,631.6
TPC-H Throughput	25,171.4
Composite Query per Hour Rating (QphH@1000GB)	34,987.5
Total System Price Over 3 Years	\$1,343,811
TPC-H Price Performance Metric	\$38.41

Measurement Intervals

Measurement Interval in Throughput Test (Ts) 22,025.3 seconds (06:07:15)

Duration of Stream Execution:

	Seed	Query Start Date/Time	RF1 Start Date/Time	RF2 Start Date/Time	Duration
		Query End Date/Time	RF1 End Date/Time	RF2 End Date/Time	
Stream 00	114065105	Sat Jan 14 8:11:25 2006	Sat Jan 14 8:10:28 2006	Sat Jan 14 9:5:4 2006	0:53:39
		Sat Jan 14 9:5:4 2006	Sat Jan 14 8:11:25 2006	Sat Jan 14 9:6:30 2006	
Stream 01	114065106	Sat Jan 14 9:6:30 2006	Sat Jan 14 14:58:2 2006	Sat Jan 14 14:58:54 2006	5:21:08
		Sat Jan 14 14:27:38 2006	Sat Jan 14 14:58:54 2006	Sat Jan 14 15:0:16 2006	
Stream 02	114065107	Sat Jan 14 9:6:35 2006	Sat Jan 14 15:0:16 2006	Sat Jan 14 15:1:7 2006	5:50:18
		Sat Jan 14 14:56:53 2006	Sat Jan 14 15:1:7 2006	Sat Jan 14 15:2:29 2006	
Stream 03	114065108	Sat Jan 14 9:6:40 2006	Sat Jan 14 15:2:29 2006	Sat Jan 14 15:3:21 2006	5:21:20
		Sat Jan 14 14:28:0 2006	Sat Jan 14 15:3:21 2006	Sat Jan 14 15:4:43 2006	
Stream 04	114065109	Sat Jan 14 9:6:47 2006	Sat Jan 14 15:4:43 2006	Sat Jan 14 15:5:34 2006	5:51:15
		Sat Jan 14 14:58:2 2006	Sat Jan 14 15:5:34 2006	Sat Jan 14 15:6:56 2006	
Stream 05	114065110	Sat Jan 14 9:6:53 2006	Sat Jan 14 15:6:56 2006	Sat Jan 14 15:7:47 2006	5:49:13
		Sat Jan 14 14:56:6 2006	Sat Jan 14 15:7:47 2006	Sat Jan 14 15:9:9 2006	
Stream 06	114065111	Sat Jan 14 9:6:59 2006	Sat Jan 14 15:9:9 2006	Sat Jan 14 15:10:0 2006	5:48:14
		Sat Jan 14 14:55:13 2006	Sat Jan 14 15:10:0 2006	Sat Jan 14 15:11:22 2006	
Stream 07	114065112	Sat Jan 14 9:7:5 2006	Sat Jan 14 15:11:22 2006	Sat Jan 14 15:12:13 2006	5:32:44
		Sat Jan 14 14:39:49 2006	Sat Jan 14 15:12:13 2006	Sat Jan 14 15:13:35 2006	



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TPC-H Timing Intervals (in seconds)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8a
Stream 00	544.2	23.1	28.8	22.2	138.3	9.7	127.6	57.7
Stream 01	5,674.1	176.2	103.7	139.9	685.7	39.6	693.6	394.1
Stream 02	4,799.9	90.9	91.6	126.6	821.3	36.6	646.7	258.7
Stream 03	5,655.0	56.3	24.0	135.8	983.1	48.9	652.2	319.6
Stream 04	4,692.0	65.0	22.5	121.6	1,068.0	69.2	432.9	275.0
Stream 05	4,383.2	59.7	113.2	118.2	649.9	39.0	604.2	260.9
Stream 06	4,408.1	77.3	144.2	157.7	572.1	70.1	706.4	434.2
Stream 07	5,330.0	71	103.6	131.5	618.2	34.3	565.5	411.1
Min Qi	4,383.2	56.3	22.5	118.2	572.1	34.3	432.9	258.7
Avg Qi	4,991.8	85.2	100.4	133.1	771.2	48.2	614.5	336.2
Max Qi	5,674.1	176.2	144.2	157.7	1,068.0	70.1	706.4	434.2
	Q9	Q10	Q11	Q12	Q13	Q14	Q15a	Q16
Stream 00	438.4	75.5	55.6	46.3	204.7	12.3	26.9	72.4
Stream 01	2,176.5	558.7	368.3	227.0	1,252.8	223.8	90.1	434.2
Stream 02	2,952.2	961.0	281.3	235.4	1,146.5	249.2	159.5	781.7
Stream 03	2,170.6	479.6	220.2	289.4	777.4	93.2	192.5	573.1
Stream 04	2,782.0	782.8	496.5	364.5	763.2	119.3	160.3	459.1
Stream 05	1,315.9	670.1	207.0	608.5	1,284.5	139.4	169.0	524.4
Stream 06	2,258.2	1,632.4	277.8	369.9	1,214.0	142.3	116.9	441.4
Stream 07	1,608.3	686.8	287.5	304.0	827.6	81.6	84.7	508.6
Min Qi	1,315.9	479.6	207.0	227.0	763.2	81.6	84.7	434.2
Avg Qi	2,180.5	730.9	305.5	342.7	1,038.0	149.8	139.0	531.8
Max Qi	2,952.2	1,632.4	496.5	608.5	1,284.5	249.2	192.5	781.7
	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 00	74.1	557.0	121.9	39.0	496.8	46.7	57.4	85.9
Stream 01	283.6	3,480.6	550.4	204.0	1,220.2	291.1	51.8	82.1
Stream 02	346.3	3,956.8	687.3	166.7	2,044.4	177.4	50.9	82.3
Stream 03	344.4	2,853.3	507.6	97.6	2,484.2	221.6	51.8	82.0
Stream 04	334.4	3,766.6	594.5	39.0	3,582.9	83.9	51.2	81.9
Stream 05	239.7	4,412.9	657.6	129.7	4,190.7	175.3	51.4	81.5
Stream 06	277.2	4,239.3	515.4	348.6	2,325.5	166.0	50.9	81.9
Stream 07	285.2	3,864.8	430.2	197.8	3,326.3	205.1	51.3	81.8
Min Qi	239.7	2,853.3	430.2	39.0	1,220.2	83.9	50.9	81.5
Avg Qi	301.5	3,796.3	563.3	169.0	2,739.2	188.6	51.3	81.9
Max Qi	346.2	4,412.9	687.3	348.6	4,190.7	291.1	51.8	82.3