

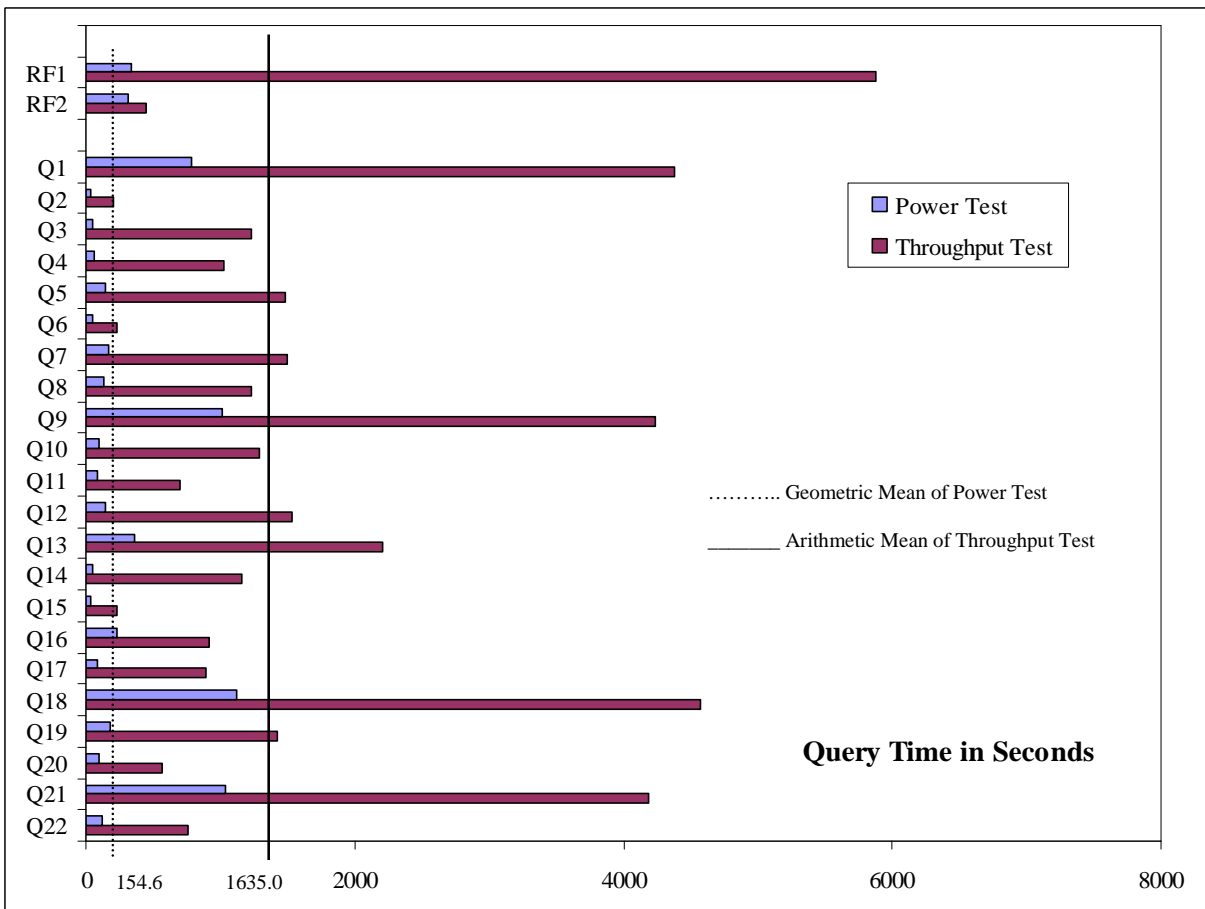


# Bull Novascale 5160

TPC-H Rev. 2.1.0

Report Date: November 7, 2005

<b>Total System Cost</b>		<b>Composite Query per Hour Rating</b>		<b>Price Performance</b>	
<b>\$ 434,553</b>		<b>17,059.8 QphH @ 1000GB</b>		<b>\$25.48 / QphH @ 1000GB</b>	
<b>Database size</b>	<b>Database Manager</b>	<b>Operating System</b>	<b>Other Software</b>	<b>Availability Date</b>	
<b>1000 GB *</b>	Microsoft SQL Server 2005 Enterprise Edition 64-bit (SP1)	Microsoft Windows Server 2003, Datacenter Edition for 64-bit	Microsoft Visual C++ MS Visual Studio Pro.	<b>May 05, 2006</b>	



<b>Database Load Time = 19:09:48</b>		<b>Load included backup: Y</b>		<b>Total Data Storage / Database Size = 9.27</b>	
<b>RAID (Base tables): N</b>		<b>RAID (Base tables and Auxiliary Data Structures): N</b>		<b>RAID (All): N</b>	
<b>System Configuration</b>					
Processors	16 x 1.6 GHz Intel® Itanium2™ with 6MB Level 3 Cache				
Memory	64 GB Main Memory				
Disk Controllers	15 PCI-X SCSI 320 Dual Channel				
Disk Drives	217	36GB SCSI (34.18 GB useable)			
	19	73GB SCSI (68.36 GB useable)			
	2	300GB SCSI (279.39 GB useable)			
Total Disk Storage	9274.68 GB				

\* Database size includes only raw data (eg, no temp, index, redundant storage space, etc.)



# Bull NovaScale 5160

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Description	Part Number	Brand	Pricing	Unit Price	Quantity	Extended Price	3-year Maint. Price
<b>Server Hardware</b>							
French system localisation	LOCU200-00FF	Bull	1	0	1	0	0
Power Supply Type (Voltage, Plug) - Europe	PSKU004-0002	Bull	1	0	1	0	0
Indicator System NovaScale 5160 Package	PKHU205-0000	Bull	1	0	1	0	0
NovaScale 5160 System Quad Itanium 2 1.6GHz/6MB -	CPXU405-1606	Bull	1	100 139	1	100 139	31 628
CPU Kit: 4x Itanium 2 1.6GHz/6MB L3, 1 CPU/M Box	CPKU307-1606	Bull	1	29 108	3	87 324	27 658
16GB (16x1024MB DIMMS, SDRAM DDR) kit for one CPU/Memory box	CMMU303-0000	Bull	1	18 767	4	75 068	0
PCI Ultra320 SCSI Dual Channel Host connection kit	CKTU217-0000	Bull	1	473	1	473	0
SR-1422 - 14-slot redundant SCSI RAID disk rack drawer, RnR	DSSH007-RR00	Bull	1	8 862	1	8 862	4 163
36GB Ultra 320 SCSI 15Krpm HDD (1") *	MSUH041-2S30	Bull	1	355	16	5 685	0
One additionnal I/O Box including 11 add'l PCI slots	DRWU300-0000	Bull	1	15 400	1	15 400	3 603
<b>Subtotal</b>						292 950	67 052
<b>Storage Hardware</b>							
Rack 1100H 40U/19" (without PDU)	RCKU209-1140	Bull	1	3 681	2	7 362	0
7-outlet Power Distribution Unit (7x C13)	PSSU211-00M7	Bull	1	266	5	1 331	0
HBA SCSI U320 ADAPTEC 39320	DCCH007-0000	Bull	1	478	15	7 174	0
PCI Ultra320 SCSI Dual Channel Host connection kit	CKTU217-0000	Bull	1	473	3	1 418	0
SJ-0812 RAID extention 8 *1" slots, rackmountable in RnR, 1PS, 2SCSI w/ cable	DSSH001-EROC	Bull	1	2 277	2	4 554	2 224
73GB Ultra 320 SCSI 10Krpm HDD (1") *	MSUH038-1S30	Bull	1	355	21	7 461	0
300GB Ultra 320 SCSI 10Krpm HDD (1") *	MSUH040-1S30	Bull	1	1 279	3	3 837	0
Data cable 68pin VHD TO VHD SCSI U320, 1m for SJ-0812 and SR-1422	CBLH011-0100	Bull	1	128	6	766	0
SJ-1422- 14 slots SCSI multi initiator JBOD - rack drawer - RnR w/ 2 cables VHD-VHD 1m	DSSH019-RR0C	Bull	1	3 219	15	48 279	24 435
36GB Ultra 320 SCSI 15Krpm HDD (1") *	MSUH041-2S30	Bull	1	355	224	79 587	0
Data cable 68pin VHD TO VHD SCSI U320, 3m for SJ-0812 and SR-1422	CBLH011-0300	Bull	1	156	30	4 686	0
<b>Subtotal</b>						166 455	26 659
<b>Server Software</b>							
Windows Server 2003 DTC Ed. (up to 16-CPU) & 5CAL	EXSU264-NA0H	Microsoft	1	29 543	1	29 543	3 445
SQL Server 2005 Enterprise Edition	810-04793	Microsoft	2	8 487	1	8 487	0
SQL Server 2005 Client License	359-01911	Microsoft	2	156	45	7 020	0
Visual Studio .Net 2003 Professional	659-00390	Microsoft	2	799	1	799	0
Microsoft Problem Resolution Services (1 incident)		Microsoft	2	245	1	245	245
<b>Subtotal</b>						46 094	3 690
<b>Discounts</b>						-134 342	-34 004
<b>TOTAL</b>						371 157	63 396

**Notes:**

**Pricing: 1-Bull 2-Microsoft**

\* = 10% spare disks added in place of onsite service, rounded up for bundled pricing.

Used (14+203)x36GB disks + 19x73GB disks + 3x300Gb disks

Spares are (2+21)x36GB disks + 2x73GB disks + 2x300GB disk

**Audited by Francois Raab of InfoSizing (www.sizing.com)**

**Three-Year Cost of Ownership: \$434 553**

**QpH @ 1000GB: 17 059,8**

**\$ / QpH@1000GB: 25,48**

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.



Numerical Quantities Summary

Measurement Results

Scale Factor	1000 GB
Total Data Storage / Database Size	9.27
Start of Database Load	31/10/2005 23:50:06
End of Database Load	01/11/2005 19:56:51
Database Load Time	19:09:48
Query Streams for Throughput Test	7
TPC-H Power	23278.7
TPC-H Throughput	12502.3
Composite Query per Hour Rating (QphH@1000GB)	17059.8
Total System Price Over 3 Years	\$434,553
TPC-H Price Performance Metric	\$25.48

Measurement Intervals

Measurement Interval in Throughput Test (Ts) 44344 seconds

Duration of Stream Execution

	Seed	Query Start Date/Time	RF1 Start Date/Time	RF2 Start Date/Time	
		Query End Date/Time	RF1 End Date/Time	RF2 End Date/Time	Duration
Stream 0	1101195651	2005-11-02 18:32:49 2005-11-02 20:13:58	2005-11-02 18:27:11 2005-11-02 18:32:48	2005-11-02 20:14:00 2005-11-02 20:19:12	1:52:01
Stream 1	1101195652	2005-11-02 20:19:15 2005-11-03 06:27:24	2005-11-02 20:19:15 2005-11-03 06:51:55	2005-11-03 06:51:57 2005-11-03 06:58:12	10:08:09
Stream 2	1101195653	2005-11-02 20:19:16 2005-11-03 06:39:01	2005-11-03 06:58:17 2005-11-03 07:05:44	2005-11-03 07:05:47 2005-11-03 07:12:20	10:19:45
Stream 3	1101195654	2005-11-02 20:19:16 2005-11-03 05:21:15	2005-11-03 07:12:34 2005-11-03 07:20:56	2005-11-03 07:20:59 2005-11-03 07:27:54	09:01:59
Stream 4	1101195655	2005-11-02 20:19:17 2005-11-03 06:45:37	2005-11-03 07:28:06 2005-11-03 07:36:41	2005-11-03 07:36:44 2005-11-03 07:44:16	10:26:20
Stream 5	1101195656	2005-11-02 20:19:17 2005-11-03 06:10:23	2005-11-03 07:44:34 2005-11-03 07:53:40	2005-11-03 07:53:44 2005-11-03 08:01:31	09:51:06
Stream 6	1101195657	2005-11-02 20:19:18 2005-11-03 06:22:50	2005-11-03 08:01:52 2005-11-03 08:11:17	2005-11-03 08:11:21 2005-11-03 08:19:40	10:03:32
Stream 7	1101195658	2005-11-02 20:19:19 2005-11-03 06:24:54	2005-11-03 08:20:09 2005-11-03 08:29:56	2005-11-03 08:30:03 2005-11-03 08:38:19	10:05:35



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## TPC-H Timing Intervals (in seconds):

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Stream 0	787.3	35.9	46.4	56.9	145.4	43.0	172.9	132.3
Stream 1	4768.9	121.0	1460.4	650.9	1364.9	191.2	2056.9	565.2
Stream 2	3812.8	195.5	1379.0	551.7	1425.0	237.2	2875.4	2033.2
Stream 3	3650.4	114.3	496.6	1059.4	3313.6	212.9	1388.5	484.0
Stream 4	4959.4	114.1	44.1	1728.6	442.1	284.4	246.1	2713.6
Stream 5	4884.5	577.5	1152.1	1080.0	566.2	249.9	1310.2	961.5
Stream 6	4429.3	146.0	3557.8	570.6	931.3	203.3	1605.9	1012.0
Stream 7	4147.7	188.4	490.9	1557.5	2327.2	230.6	1029.5	818.6
Min Qi	3650.4	114.1	44.1	551.7	442.1	191.2	246.1	484.0
Max Qi	4959.4	577.5	3557.8	1728.6	3313.6	284.4	2875.4	2713.6
Avg Qi	4379.0	208.1	1225.8	1028.4	1481.5	229.9	1501.8	1226.9
Query	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Stream 0	1018.7	94.1	81.4	149.8	363.6	45.5	36.1	224.7
Stream 1	3515.4	1211.1	851.1	765.3	3179.6	3394.6	230.4	949.7
Stream 2	3798.7	1392.3	352.0	1223.7	1972.8	2402.9	227.2	768.0
Stream 3	3783.8	646.2	747.2	923.4	2597.5	412.1	198.4	1204.8
Stream 4	4151.5	3928.1	801.9	1486.8	1568.1	344.3	211.4	769.7
Stream 5	3927.1	657.8	808.5	2682.5	2560.0	215.0	430.2	999.0
Stream 6	5261.7	734.7	455.6	1184.1	1749.3	1169.9	175.7	809.2
Stream 7	5241.9	433.5	905.6	2497.2	1864.4	194.8	159.4	892.0
Min Qi	3515.4	433.5	352.0	765.3	1568.1	194.8	159.4	768.0
Max Qi	5261.7	3928.1	905.6	2682.5	3179.6	3394.6	430.2	1204.8
Avg Qi	4240.0	1286.2	703.1	1537.6	2213.1	1161.9	233.2	913.2
Query	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 0	84.5	1119.6	183.7	92.8	1036.5	118.9	336.2	313.0
Stream 1	573.2	4872.3	1108.9	612.6	3298.7	746.1	37960.3	374.9
Stream 2	799.5	5245.5	1196.4	927.1	3402.4	967.4	447.0	393.2
Stream 3	717.1	4344.2	1029.0	301.6	4286.8	607.3	502.3	414.8
Stream 4	2524.9	4502.2	837.0	186.3	5619.2	115.7	514.5	451.2
Stream 5	526.5	4390.0	2791.3	471.7	3491.8	732.2	546.0	467.2
Stream 6	443.7	3951.4	2374.7	314.5	4347.3	784.5	565.7	499.5
Stream 7	683.2	4674.0	643.9	1170.9	4858.3	1326.1	587.0	495.7
Min Qi	443.7	3951.4	643.9	186.3	3298.7	115.7	447.0	374.9
Max Qi	2524.9	5245.5	2791.3	1170.9	5619.2	1326.1	37960.3	499.5
Avg Qi	895.4	4568.5	1425.9	569.2	4186.4	754.2	5874.7	442.4