

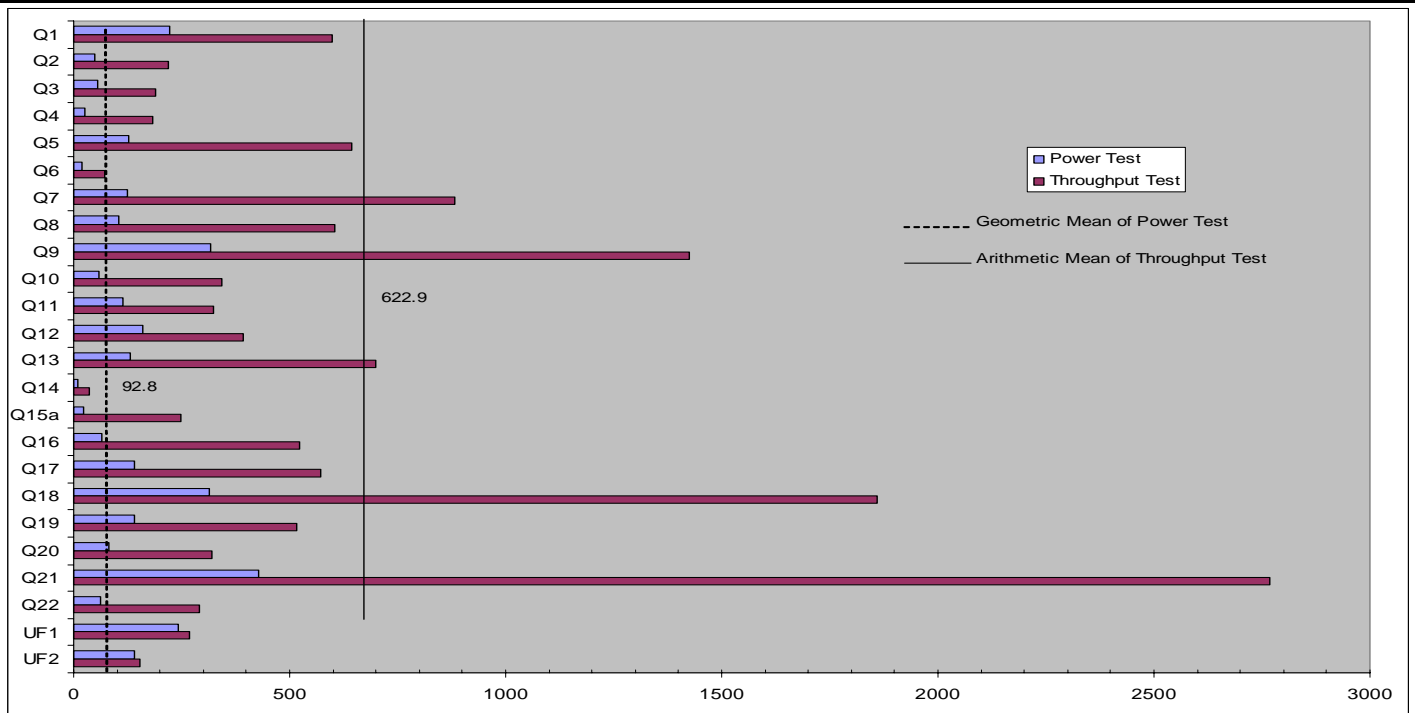


# HP BladeSystem 64P

TPC-H Rev. 2.3.0

Report Date:  
**June 8, 2006**

Total System Cost		Composite Query per Hour Metric	Price / Performance	
<b>\$4,179,238 USD</b>		<b>110,576.5</b> QphH@3000GB	<b>\$37.80 USD</b> \$ / QphH@3000GB	
Database Size	Database Manager	Operating System	Other Software	Availability Date
<b>3000GB</b>	<b>Oracle Database 10g Release 2, Enterprise Edition with Oracle Real Application Clusters and Partitioning</b>	<b>Red Hat Enterprise Linux 4</b>		<b>June 8, 2006</b>



Database Load Time = 05:51:14	Load Included Backup: N	Total Data Storage / Database Size = 23.21
RAID (Base tables only): N	RAID (Base tables and auxiliary data structures): N	RAID (All): Y

### 64 ProLiant server blade BL25p :

Processors (per blade):	1 x Dual-Core AMD Opteron™ processor Model 285 (2.6GHz/1MB L2 cache per core for 2MB total/1 GHz HyperTransport)
Cores (per blade) :	2
Threads (per blade) :	2
Memory (per blade) :	12 GB
OS Disk Drives (per blade) :	2 x 36GB 15krpm HDD Ultra320
Network (per blade) :	2 x on-board GigE (one of them as cluster interconnect)
Host Bus Adapter (per blade) :	2 x on-board
Storage Area Network :	2 x hp 4/256 SAN Director Switch 129 x hp StorageWorks MSA1000 1806 x 36GB 15krpm HDD Ultra320
Total Storage :	69624 GB



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8-Jun-06

Description	Part Number	Brand	Pricing	Unit Price	Qty	Extended Price	3 yr. Maint. Price
<b>Server Hardware</b>							
HP ProLiant BL25p CTO Blade	382731-405		1	1,493.00	64	95,552	
HP BL25p O285 2.6GHZ DC Kit	406426-B21		1	1,449.00	64	92,736	
HP 8GB REG PC2700 2X4GB Memory	395409-B21		1	7,299.00	64	467,136	
HP 4GB REG PC2700 2 x 2GB Memory	371049-B21		1	1,499.00	64	95,936	
36GB 15Krpm U320 UNI HDD	286776-B22		1	269	128	34,432	
HP BL25/45p Fiber Channel Adapter	381881-B21		1	599	64	38,336	
HP 3y 4h 24x7 ProLiant Svr Blade HW Supp	UD188E		1	295	64		18,880
HP 5642 Unassembled Rack	358254-B21		1	689	16	11,024	
HP BladeSystem p-Class Server Blade Enclosure	243564-B22		1	1,499	8	11,992	
HP BLp-Class Pair RJ-45 Patch Panel	230766-B21		1	1,172.00	8	9,376	
HP BladeSystem Enclosure/Pwr Bundle	390738-B21		1	3,099.00	8	24,792	
HP 3y 4h 24x7 BladeSystem Encl HW Supp	HC032E		1	737	8		5,896
HP T2200 XR High Voltage US UPS	204451-002		1	749	8	5,992	
HP CAT5 KVM USB 1 Pack Interface Adapter	336047-B21		1	99	1	99	
HP s7540 17in. CRT Monitor	PF997AA#ABA		1	149	1	149	
USB Optical Mouse cbt/slvr USB 2-Button Optical Scroll Mouse	PT951AV		1	5	1	5	
Standard Keyboard USB	DX752AV#ABA		1	12	1	12	
HP ProCurve Switch 5308xl-48G, 3 16 port copper Gigabit modules (3+2 spares)	J8167A#ABA		1a	7,499	5	37,495	Included
HP ProCurve Switch xl 16 10/100/1000 modules (4+2 spares)	J4907A		1a	2,499	6	14,994	Included
					<b>Subtotal</b>	<b>940,058</b>	<b>24,776</b>
<b>Storage</b>							
HP Storageworks Modular SAN Array 1000 (129+13 spares)	201723-B22		1	6,995	142	993,290	Included
36GB, 15krpm HDD Ultra320 HP (1806 + 181 spares)	286776-B22		1	269	1987	534,395	Included
5m SW LC/LC FC cable kit	221692-B22		1	82	128	10,496	
15m SW LC/LC FC cable kit	221692-B23		1	103	128	13,184	
2Gb SFF-SW Trmcvr Kit ALL 2GB Small Form Pluggable Adapter Kit	221470-B21		1	199	128	25,472	
HP 3y 4h 24x7 StorWrks MSA 1000 HWSupp	U6357E		1	3,222	0		0
HP 4/256 SAN Director Switch	A7988A		1a	62,999	2	125,998	
HP 4/256 SAN Director 32 port 4G Blade	A7991A		1a	50,999	16	815,984	
HP CPe 3Y 4H 24x7 HW Director2	341444-001		1a	29,164	2		58,328
					<b>Subtotal</b>	<b>2,518,819</b>	<b>58,328</b>
<b>Software</b>							
Oracle Database 10g Enterprise Edition Release 2, Named User Plus for 3 Years	run-time	Oracle	2	10,000	64 **	640,000	
Oracle Real Application Clusters, Named User Plus for 3 Years	run-time	Oracle	2	5,000	64 **	320,000	
Partitioning, Named User Plus for 3 Years	run-time	Oracle	2	2,500	64 **	160,000	
Database Server Support Package for 3 Years	run-time	Oracle	2	128,000	3		384,000
Red Hat Ent Linux 4 AS Prm 24X7	384956-B21		1	699	192	134,208	Included
					<b>Subtotal</b>	<b>1,254,208</b>	<b>384,000</b>
HP Large Purchase and Net30 discount			1			(610,825)	(14,128)
Oracle Mandatory E-Business Discount			2			(376,000)	
					<b>Total</b>	<b>3,726,261</b>	<b>452,976</b>

3-Year Cost of Ownership in USD: **\$4,179,238 USD**

QpH Rating: **110,576.5**

USD\$ / QpH@3000GB: **\$37.80 USD**

Pricing: 1-HP Direct at 17% discount 800-203-7648, 1a-HP Direct at 17% discount. 800-203-7648

Pricing: 2-Oracle at 15% discount, Oracle Pricing Contact: MaryBeth Pierantoni, mary.beth.pierantoni@oracle.com, 916-315-5081

\*\* 64 = 128 \* 0.50. Explanation: For the purposes of counting the number of processors which require licensing, an AMD multicore chip with "n" cores shall be determined by multiplying "n" cores by a factor of 0.50.

All discounts are based on US list prices and for similar quantities and configurations.

Oracle Price quote is in Appendix G



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## Numerical Quantities

### Measurement Results:

Database Scale Factor = 3000  
 Total Data Storage / Database Size = 23.21  
 Start of Database Load = 05/30/2006 16:26:23  
 End of Database Load = 05/30/2006 22:17:37  
 Database Load Time = 05:51:14

Query Streams for Throughput Test = 8  
 TPC-H Power = 116,379.3  
 TPC-H Throughput = 105,063.0  
 TPC-H Composite Query-per-Hour Metric (QpH@3000GB) = 110,576.5  
 Total System Price Over 3 Years = \$4,179,238 USD  
 TPC-H Price/ Performance Metric (\$/QpH@3000GB) = \$37.80 USD

### Measurement Intervals:

Measurement Interval in Throughput Test (Ts) = 18092.0 seconds

### Duration of Stream Execution:

	Seed	Query Start Time Query End Time	RF1 Start Time RF1 End Time	RF2 Start Time RF2 End Time	Duration
Stream 0	530221737	05/31/2006 7:43:31 05/31/2006 8:29:45	05/31/2006 7:39:27 05/31/2006 7:43:31	05/31/2006 8:29:45 05/31/2006 8:32:05	0:52:38
Stream 1	530221738	05/31/2006 8:32:10 05/31/2006 12:20:49	05/31/2006 12:37:41 05/31/2006 12:42:38	05/31/2006 12:42:38 05/31/2006 12:45:21	4:13:11
Stream 2	530221739	05/31/2006 8:32:10 05/31/2006 12:14:12	05/31/2006 12:45:21 05/31/2006 12:49:49	05/31/2006 12:49:49 05/31/2006 12:52:23	4:20:13
Stream 3	530221740	05/31/2006 8:32:10 05/31/2006 11:54:56	05/31/2006 12:52:23 05/31/2006 12:56:54	05/31/2006 12:56:54 05/31/2006 12:59:33	4:27:23
Stream 4	530221741	05/31/2006 8:32:11 05/31/2006 11:54:52	05/31/2006 12:59:33 05/31/2006 13:04:02	05/31/2006 13:04:02 05/31/2006 13:06:53	4:34:42
Stream 5	530221742	05/31/2006 8:32:10 05/31/2006 12:37:41	05/31/2006 13:06:53 05/31/2006 13:11:31	05/31/2006 13:11:31 05/31/2006 13:14:08	4:41:58
Stream 6	530221743	05/31/2006 8:32:11 05/31/2006 12:34:12	05/31/2006 13:14:08 05/31/2006 13:18:20	05/31/2006 13:18:20 05/31/2006 13:20:38	4:48:27
Stream 7	530221744	05/31/2006 8:32:11 05/31/2006 12:34:49	05/31/2006 13:20:38 05/31/2006 13:24:50	05/31/2006 13:24:50 05/31/2006 13:27:02	4:54:51
Stream 8	530221745	05/31/2006 8:32:10 05/31/2006 12:33:11	05/31/2006 13:27:02 05/31/2006 13:31:17	05/31/2006 13:31:17 05/31/2006 13:33:42	5:01:32



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

Query	Stream 0	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5	Stream 6	Stream 7	Stream 8	Min Qi	Max Qi	Avg Qi
Q1	221.4	369.5	398.8	362.9	506.2	463.8	896.5	1056.1	743	362.9	1056.1	599.6
Q2	48.7	357.1	367.4	143.5	217.9	146.9	140.2	153.1	236.1	140.2	367.4	220.3
Q3	55.7	205.4	184.3	216	177.8	84.3	274.8	150.7	229.3	84.3	274.8	190.3
Q4	26.1	64.3	295.1	200.6	204.6	153.5	189.9	198.5	160.7	64.3	295.1	183.4
Q5	127.3	865.2	895.4	688	580.8	407.8	409.9	822.1	471.6	407.8	895.4	642.6
Q6	18.7	51	27.6	68.2	156	104.5	69.6	39.1	54.4	27.6	156.0	71.3
Q7	124.5	994.4	591.4	510.7	627.9	1354.9	961.6	986.2	1028	510.7	1354.9	881.9
Q8	106	696.1	651.8	299.9	586.1	418.1	527.7	1024.9	644.2	299.9	1024.9	606.1
Q9	316	881.9	2068.4	878.5	846	435.9	2668.9	2681	938.6	435.9	2681.0	1424.9
Q10	59	253.6	1169.2	332.9	275.7	96.3	208	144.6	263.6	96.3	1169.2	343.0
Q11	113.1	475.1	283.3	267.1	268.2	409.1	272.5	379.6	224	224.0	475.1	322.4
Q12	161.6	432.8	241.3	373.8	375.8	174.7	698.3	242.2	595.4	174.7	698.3	391.8
Q13	130.5	1089.4	408.8	543.5	993.4	1091.2	373.7	369.3	713.3	369.3	1091.2	697.8
Q14	10.7	33.5	56.5	21.7	35.1	44.1	31.5	24.3	34.1	21.7	56.5	35.1
Q15a	23.8	237.5	112.6	125.5	380.8	511.1	331.9	119.3	170.9	112.6	511.1	248.7
Q16	66.4	453	1127.2	301.7	631.7	435.8	579.1	250.4	402	250.4	1127.2	522.6
Q17	139.2	312.2	461.9	1124.3	647.8	216.6	808.2	292	705.2	216.6	1124.3	571.0
Q18	312.1	1424.8	1468.4	1318.4	1681.5	3617.2	1185.8	1559.2	2609.5	1185.8	3617.2	1858.1
Q19	141.8	744.6	790.6	380.4	399	734.2	349.5	398	321.6	321.6	790.6	514.7
Q20	82.1	229.7	223.3	197.8	351	142.9	384	272.5	747.9	142.9	747.9	318.6
Q21	429.3	3280.7	1239.7	3602.9	1963.9	3108.4	2931.5	3151.6	2877.6	1239.7	3602.9	2769.5
Q22	60.5	266.7	258.9	207.2	254.7	579.1	228.7	243.7	289.6	207.2	579.1	291.1
UF1	243.3	297	267.6	271.4	268.4	277.7	251.6	252.3	254.7	251.6	297.0	267.6
UF2	139.5	163.2	154.1	159.2	171.5	157.4	137.5	131.9	145.8	131.9	171.5	152.6