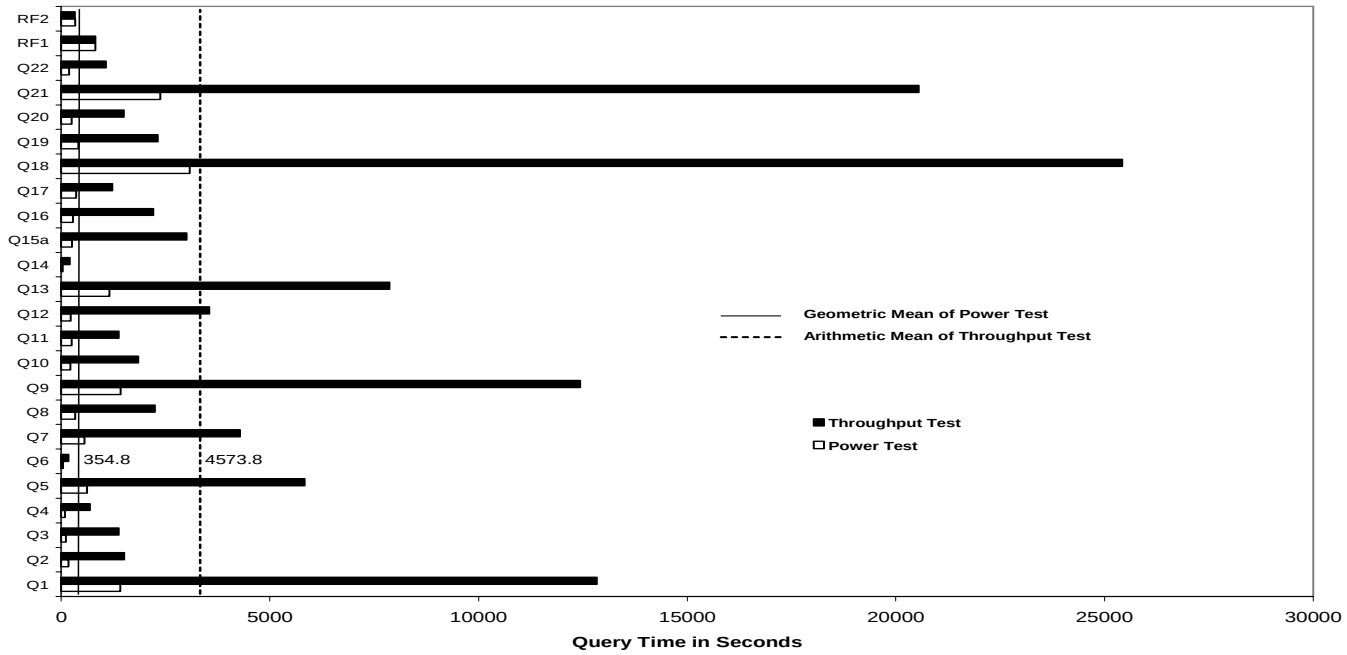
	HP ProLiant DL740 Cluster 32P	TPC-H Rev. 2.1.0 Report Date: **March 2, 2004**

Total System Cost	Composite Query per Hour Metric	Price / Performance
$2,076,265	**22387.9** QphH@3000GB	**$93** $ / QphH@3000GB

Database Size	Database Manager	Operating System	Other Software	Availability Date
3000GB	**Oracle Database 10g Enterprise Edition with Real Application Cluster and Partitioning**	**Red Hat Enterprise Linux AS 3**		**March 2, 2004**



Database Load Time = 18:52:00	Load Included Backup: N	Total Data Storage / Database Size = 10.75
RAID (Base tables only): Y	RAID (Base tables and auxiliary data structures): Y	RAID (All): Y

System Configuration :	8 nodes
Processors (per node) :	4 x 3.0GHz Intel Xeon Processor MP w/ 4MB cache
Memory (per node) :	8 GB
OS Disk Drives (per node) :	2 x 36GB 15krpm HDD Ultra320
NICs (per node) :	2 x on-board, 1 x hp NC7770 PCI-x Gigabit server adapter
Disk Controllers (per node) :	3 x hp StorageWorks fca 2214DC, 2 x hp StorageWorks fca 2214
Storage Area Network :	8 x hp StorageWorks SAN Switch 2/16 64 x hp StorageWorks MSA1000 896 x 36GB 15krpm HDD Ultra320
Total Storage :	32256GB
Cluster Interconnect :	2 x hp ProCurve Switch 4148gl

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					Report Date:		2-Mar-04
Description	**Part Number**	**Third Party**		**Unit Price**	**Qty**	**Extended Price**	**3 yr. Maint. Price**
Server Hardware		**Brand**	**Pricing**				
DL740 X3.0-4M 4P 4G ALL	348445-B21		1	40,088	8	320,704	
512MB 133MHz ECC SDRAM Memory Option Kit (1x512MB)	236853-B21		1	309	64	19,776	
36GB, 15krpm HDD Ultra320 HP	286776-B22		1	429	16	6,864	
S5500 15" Monitor	261602-001		1	129	8	1,032	
Scroll Mouse-Carbon	231947-B21		1	5	8	40	
PS/2 Easy Access Internet Keyboard	265977-001		1	12	8	96	
hp NC7770 PCI-X Gigabit server adapter	244948-B21		1	221	8	1,768	
hp StorageWorks fca 2214 2Gb, 64-bit/133Mhz PCI-X FC HBA	281541-B21		1	1,590	16	25,440	
hp StorageWorks fca 2214DC 2Gb, 64-bit/133Mhz PCI-X FC HBA	321835-B21		1	2,500	24	60,000	
Servers 500 Series CarePaq, 3yr 7x24, 4hr resp.	401782-002		1	1,795	8		14,360
Rack Model 9142 (42U - Opal) - Flat Pallet	120663-B21		1	1,321	8	10,568	
Rack Sidewall Kit	120670-B21		1	207	1	207	
UPS T1500 XR	204155-002		1	621	8	4,968	
hp ProCurve Switch 4148gl	J4888A		1	1,934	3	5,802	
hp ProCurve Switch gl 100/1000-T module	J4863A		1	812	12	9,744	
hp ProCurve Switch gl 100/1000-T module Support 3YR 24X7 4HR	U2856E		1	1,080	3		3,240
					Subtotal	**467,009**	**17,600**
Storage							
hp Storageworks Modular SAN Array 1000	201723-B22		1	9,995	64	639,680	
hp StorageWorks Modular SAN Array 1000 Support 3YR 24x7 4HR	402164-002		1	3,538	64		226,432
hp StorageWorks SAN switch 2/16-EL	322120-B21		1	6,400	8	51,200	
hp SAN Switch 2/32 Support 3YR 24X7 4HR	161299-002		1	3,399	8	27,192	
5m LC to LC Cable Kit	221692-B22		1	82	32	2,624	
15m LC to LC Cable Kit	221692-B23		1	103	32	3,296	
2Gb SFF-SW Trncvr Kit	221470-B21		1	199	64	12,736	
2Gb SFF-SW Trncvr Kit (10% spares)	221470-B21		1	199	7	1,393	
36GB, 15krpm HDD Ultra320 HP	286776-B22		1	429	896	384,384	
36GB, 15krpm HDD Ultra320 HP (10% spares)	286776-B22		1	429	90	38,610	
					Subtotal	**1,161,115**	**226,432**
Software							
Oracle Database 10g Enterprise Edition for 3 years, Named User Plus	run-time		2	10,000	32	320,000	
Real Application Clusters for 3 years, Named User Plus	run-time		2	5,000	32	160,000	
Partitioning for 3 years, Named User Plus	run-time		2	2,500	32	80,000	
Database Server Support Package (8 servers, 3 years)	run-time		2	16,000	3		48,000
Red Hat Enterprise Linux AS (Ver. 3 Std. Edi. For x86)	SVC0022		3	1,499	8	11,992	
2 Addi. Yrs Subs. to Red Hat Enterprise Linux AS (Ver. 3 Std. Edi. For x86)	SVC0022		3	1,499	16		23,984
					Subtotal	**571,992**	**71,984**
*hp Large Purchase discount			1			(276,781)	(41,485)
Oracle Mandatory E-Business Discount			2			(121,600)	
					Total	**1,801,735**	**274,531**
					3-Year Cost of Ownership:		**$2,076,265**
					QphH Rating:		**22387.9**
Price Key: 1-HP at 17% discount, 2-Oracle, 3-Red Hat. Oracle pricing contact: Mary Beth Pierantoni, mary.beth.pierantoni@oracle.com, 916-315-5081. *All discounts are based on US list prices and for similar quantities and configurations.					**$ / QphH@3000GB:**		**$93**

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 reflect 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. Results independently audited by Lorna Livingtree of Performance Metrics Inc. Thank you.

Numerical Quantities

Measurement Results:

Database Scale Factor	= 3000
Total Data Storage / Database Size	= 10.75
Start of Database Load	= 1/16/2004 19:39:12
End of Database Load	= 1/17/2004 14:31:12
Database Load Time	= 18:52:00
Query Streams for Throughput Test	= 8
TPC-H Power	= 30430.7
TPC-H Throughput	= 16470.8
TPC-H Composite Query-per-Hour Metric (QphH@3000GB)	= 22387.9
Total System Price Over 5 Years	= $2,070,568
TPC-H Price/ Performance Metric ($/QphH@3000GB)	= $93

Measurement Intervals:

Measurement Interval in Throughput Test (Ts)	= 115404 seconds

Duration of Stream Execution:

Stream ID	Seed	Start Date	Start Time	Stop Date	Stop Time	Duration
Stream00	117143112	17-Jan-04	15:49:56	17-Jan-04	20:01:34	4:11:38
Stream01	117143113	17-Jan-04	20:01:48	19-Jan-04	01:21:52	29:20:04
Stream02	117143114	17-Jan-04	20:01:48	19-Jan-04	00:17:30	28:15:42
Stream03	117143115	17-Jan-04	20:01:48	18-Jan-04	23:57:11	27:55:23
Stream04	117143116	17-Jan-04	20:01:48	19-Jan-04	00:44:15	28:42:27
Stream05	117143117	17-Jan-04	20:01:48	19-Jan-04	01:32:12	29:30:24
Stream06	117143118	17-Jan-04	20:01:48	18-Jan-04	23:35:24	27:33:36
Stream07	117143119	17-Jan-04	20:01:48	18-Jan-04	19:30:19	23:28:31
Stream08	117143120	17-Jan-04	20:01:48	19-Jan-04	00:52:09	28:50:21
Refresh		19-Jan-04	01:32:12	19-Jan-04	04:05:12	2:33:00

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TPC-H Timing Intervals (in seconds)

Query	1	2	3	4	5	6	7	8
Stream 00	1417.4	180.4	114.2	95.8	622.6	49.1	559.8	343.4
Stream 01	4985.1	1365.2	883.9	166	4440.1	179.2	3572	1599
Stream 02	8868.8	1389.3	651.1	565.2	4392.7	114.7	4285.5	2004.4
Stream 03	7281.5	961.5	517.9	592.3	5831.2	72	2740.2	2248.7
Stream 04	7207.4	1099.5	247.1	696.2	3882.1	171	1690.2	1467.4
Stream 05	12834.9	1515	980.7	468.7	4382.1	70.5	4154.8	1522
Stream 06	10173.4	944.3	1383.1	551	4278.2	72.8	2791.9	1795.1
Stream 07	9303.7	1208.1	740.9	695.1	4642.1	165.7	3309.3	1699.2
Stream 08	12119	1079.4	640.4	487.3	4194.8	164.7	2997.7	1395.4
Min Qi	4985.1	944.3	247.1	166	3882.1	70.5	1690.2	1395.4
Max Qi	12834.9	1515	1383.1	696.2	5831.2	179.2	4285.5	2248.7
Avg Qi	9096.7	1195.3	755.6	527.7	4505.4	126.3	3192.7	1716.4
Query	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Stream 00	1431.5	221.9	250.6	225.3	1157.4	42.1	266.0	281.1
Stream 01	8742.5	1488.2	1114.7	2285.5	8571.4	114.4	3,430.4	2515.5
Stream 02	8466.2	1103.4	1130.7	1679.8	7808.9	250.2	3,036.2	3274.4
Stream 03	10914.4	1205.2	1329.5	2711.7	6963.7	219.3	2,221.5	1681
Stream 04	11233.8	1583.1	1178.5	2421.7	5983.3	236.8	3,116.1	1822.8
Stream 05	2223.4	814.2	1383.9	1400.2	9026.5	211.7	2,163.9	2389.9
Stream 06	9909.6	1218.4	1235.7	3552.3	8101.2	192.1	4,368.7	2052.1
Stream 07	9144	1846.7	1145.6	3272.8	8314.5	186.9	3,028.6	2238.8
Stream 08	12434.8	1298.2	492.7	3100.9	8148.4	207.3	2,710.9	1705.5
Min Qi	2223.4	814.2	492.7	1400.2	5983.3	114.4	2163.9	1681
Max Qi	12434.8	1846.7	1383.9	3552.3	9026.5	250.2	4368.7	3274.4
Avg Qi	9133.6	1319.7	1126.4	2553.1	7864.7	202.3	3009.5	2210.0
Query	**17**	**18**	**19**	**20**	**21**	**22**	**RF1**	**RF2**
Stream 00	361.9	3083.2	411.4	250.1	2376.2	194.2	821.0	341.3
Stream 01	1364.1	27957.9	1083.9	1216.1	27820.7	708.6	777.59	329.67
Stream 02	3376.6	27334.1	3559.9	1010.1	16168.4	1272.3	787.02	311.23
Stream 03	696	31019.4	872	850.7	18203.8	1390.3	793.74	327.62
Stream 04	804	28910.9	2715.3	291.7	26150.8	438.4	761.11	342.06
Stream 05	742.9	27961	2964.3	2528.6	25172.5	1313.4	805.21	322.76
Stream 06	1448.7	25067.9	1755.1	994.6	16260.2	1070.3	924.33	327.7
Stream 07	678.5	8446.9	1868	4334.3	16882.6	1358.5	842.69	346.81
Stream 08	709.8	26699.6	3709	789.6	17739.2	996.6	855.81	324.1
Min Qi	678.5	8446.9	872	291.7	16168.4	438.4	761.11	311.23
Max Qi	3376.6	31019.4	3709	4334.3	27820.7	1390.3	924.33	346.81
Avg Qi	1227.6	25424.7	2315.9	1502.0	20549.8	1068.6	818.4	329.0