

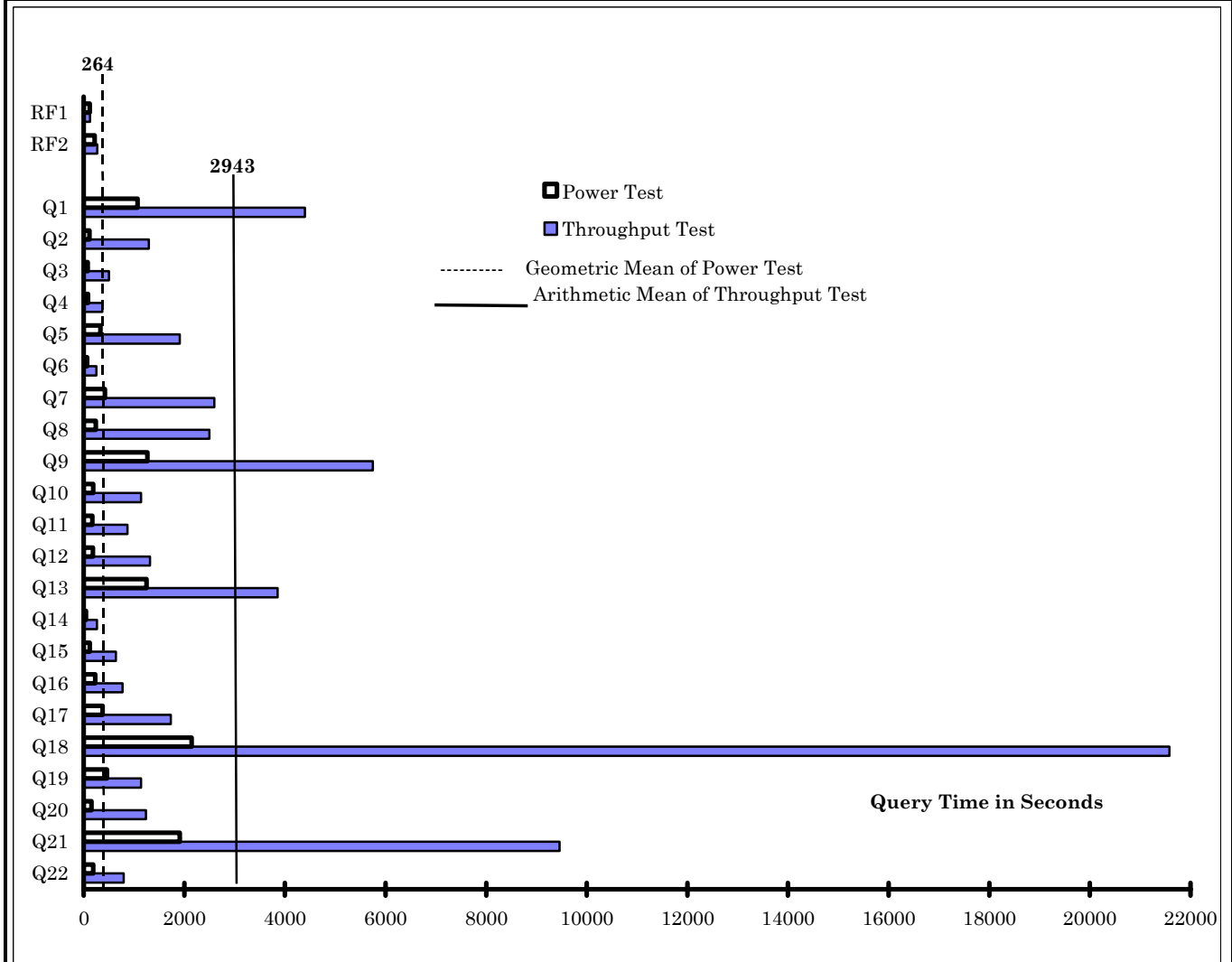


ES7000 Aries 420 Enterprise Server

TPC-H Rev. 2.1.0

Report Date
August 13, 2004

Total System Cost		Composite Query per Hour Rating		Price Performance	
\$669,239		9,853.3 QphH @ 1000GB		\$68 / QphH @ 1000GB	
Database size	Database Manager	Operating System	Other Software	Availability Date	
1000 GB	Oracle Database 10g Enterprise Edition 64-bit with Automatic Storage Management	Microsoft Windows Server 2003, Datacenter Edition for 64-bit Itanium-based Systems	MKS Toolkit for Developers 8.6	November 30, 2004 *	



Database Load Time = 5:25:43		Load included backup: N		Total Data Storage / Database Size = 5.67	
RAID (Base tables): Y		RAID (Base tables and Auxiliary Data Structures): Y		RAID (All): N	
System Configuration					
Processors	16 x 1.5 GHz Intel® Itanium2™ with 6MB Level 3 Cache				
Memory	64 GB Main Memory				
Disk Controllers	26	PCI Fibre Channel			
Disk Drives	164	36GB FC (34.17 GB useable)			
	2	36GB SCSI (33.47 GB useable)			
Total Disk Storage	5670.82 GB				
* All hardware is available now					



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	Part No.	Third Party		Unit Price	Qty.	Extended Price	3 yr.Maint. Price
		Brand	Price				
SVR: ES7000-420, 16x 1.5GHz/6MB, 32GB Mem. 1x RAID Controller, 2x 36GB Disk (boot media) Sentinel System Management S/W and Media 36Ux19"x34" cabinet and skins	ES7420166-100 Included Included Included		1	\$260,300	1	\$260,300	\$12,936
MEM: 32GB, 1 GB DIMMs	MEM321-32G		1	\$22,800	1	\$22,800	
I/F:4-Slot I/O Mod, 100M	MOD3000-PCI		1	\$1,805	4	\$7,220	
CTRL: Ethernet, 1000Mb, 1-Port Opt., PCI	ETH33311-PCX		1	\$499	1	\$499	
I/F: Monitor, 15-inch Color, Kybrd, Mse & Cable	ES70003-UIF		1	\$570	1	\$570	
Server Subtotal						\$291,389	\$12,936
CTRL: PCIX, Fiber Channel, 2Gb, 1-Port	FCH742313-P64		1	\$1,330	26	\$34,580	
DISK: 3.0TB Pkg, 84x 36GB, 15Krpm, + 10% spares *	JBD203615-P84		1	\$36,086	2	\$72,172	Spared
DISK: 0.5 TB Pkg, 14x 36GB, 15Krpm, + 10% spares *	JBD203615-P14		1	\$8,772	1	\$8,772	Spared
RCK: FC 2Gb Storage, Optical/Optical I/F	JBD2020-SA		1	\$3,958	13	\$51,454	\$8,112
RCK: Rack Mount Kit, Disk Enclosure	JBD2001-RMK		1	\$190	13	\$2,470	
CBL: FC, Optical, LC Conn's, 10m + 10% Spares *	GCFAZLL10	3	3	\$36	26	\$936	Spared
PWR: Distribution Strip, 9-Plug w/ Line Cord	SFR91-PWR		1	\$238	3	\$714	
CAB: 36U x 19" x 41" Open Front Cabinet	HRT361941-OFT		1	\$1,425	1	\$1,425	
Storage Subtotal						\$172,523	\$8,112
O/S: Windows 2003 Svr, DataCenter Ed, 16P, 1yr Lsub.	WND2316-TSP		1	\$35,112	1	\$35,112	
O/S: Windows 2003 Server, DC Lmtd Sbscrptn, 1yr.	DUS200316-TSP		1	\$3,173	2	\$6,346	
O/S: Windows 2003 Server DC Support, 24x7x4, 1yr.	GTS7412316-SSA		1	\$12,574	3		\$37,722
Oracle Database 10g Enterprise Edtn, Named User Plus for 3 yrs		4	4	\$10,000	16	\$160,000	Inc. below
Oracle Partitioning, Named User Plus for 3 years		4	4	\$2,500	16	\$40,000	Inc. below
Oracle Database Server Support Package for 3 years		4	4	\$6,000	1	\$6,000	\$6,000
MKS Toolkit for Developers		2	2	\$479	1	\$479	Inc. above
Software Subtotal						\$241,937	\$43,722
Total						\$705,849	\$64,770
Oracle Mandatory E-Business Discount (license and support)						(\$30,900)	
Computer Resolutions Inc. 13% Large Volume Discount						(\$70,480)	

Notes: 1. * = 10% or minimum 2 spares added in place of onsite service.
 2. HW & SW maintenance at 24 x 7 w/ 4 hr. max. response time for spares.
 3. 3rd Party Brand & Pricing: 1 = CRI Product Price, Unisys Maintenance Price
 2 = Microsoft 3 = GoCables 4 = Oracle; pricing contact: MaryBeth Pierantoni, mary.beth.pierantoni@oracle.com, 650-506-2118

Three Year Cost of Ownership: \$669,239
QphH @ 1TB: 9,853.3
\$ / QphH@1TB: \$67.93

Benchmark results and test methodology audited by Lorna Livingtree of Performance Metrics, Inc.

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 assumption 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 benchmarks 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	5.67
Start of Database Load	7/17/2004 10:40:37
End of Database Load	7/17/2004 16:05:20
Database Load Time	5:24:43
Query Streams for Throughput Test	7
TPC-H Power	13614.2
TPC-H Throughput	7131.3
Composite Query per Hour Rating (QphH@1000GB)	9853.3
Total System Price Over 3 Years	\$669,239
TPC-H Price Performance Metric	\$67.93

Measurement Intervals

Measurement Interval in Throughput Test (Ts) 77742 seconds

Duration of Stream Execution:

		Query Start Date/Time	RF1 Start Date/Time	RF2 Start Date/Time	
	Seed	Query End Date/Time	RF1 End Date/Time	RF2 End Date/Time	Duration
Stream 0	717160520	7/18/04 20:56:33 7/19/04 0:01:42	7/18/2004 20:54:30 7/18/2004 20:56:32	7/19/04 0:01:42 7/19/04 0:05:21	3:10:51
Stream 1	717160521	7/19/04 0:05:40 7/19/04 16:52:32	7/19/04 20:54:58 7/19/04 20:56:58	7/19/04 20:56:58 7/19/04 21:00:38	20:54:58
Stream 2	717160522	7/19/04 0:05:40 7/19/04 18:51:11	7/19/04 21:00:38 7/19/04 21:02:45	7/19/04 21:02:45 7/19/04 21:08:21	21:02:41
Stream 3	717160523	7/19/04 0:05:41 7/19/04 18:36:27	7/19/04 21:08:21 7/19/04 21:10:32	7/19/04 21:10:32 7/19/04 21:14:23	21:08:42
Stream 4	717160524	7/19/04 0:05:41 7/19/04 18:13:52	7/19/04 21:14:02 7/19/04 21:16:30	7/19/04 21:16:30 7/19/04 21:20:01	21:14:20
Stream 5	717160525	7/19/04 0:05:41 7/19/04 14:29:14	7/19/04 21:20:14 7/19/04 21:22:24	7/19/04 21:22:24 7/19/04 21:27:50	21:22:09
Stream 6	717160526	7/19/04 0:05:41 7/19/04 17:48:04	7/19/04 21:27:50 7/19/04 21:30:03	7/19/04 21:30:03 7/19/04 21:33:46	21:28:05
Stream 7	717160527	7/19/04 0:05:41 7/19/04 20:54:45	7/19/04 21:33:46 7/19/04 21:35:58	7/19/04 21:35:58 7/19/04 21:41:15	21:35:34

TPC-H Timing Intervals (in seconds):

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Stream 0	1067.9	117.5	79.2	84.0	334.4	67.0	420.7	242.3
Stream 1	4579.8	1595.1	591.6	502.6	2254.8	108.6	3410.0	1238.8
Stream 2	5455.5	1540.0	480.0	359.6	2155.6	1032.7	3234.4	1112.0
Stream 3	4804.2	1733.3	168.1	562.3	2392.2	166.7	3569.9	8689.4
Stream 4	5192.1	1347.1	242.7	425.1	2284.0	139.0	3149.4	863.7
Stream 5	4372.0	1484.7	327.4	165.2	2395.9	135.7	1130.1	1375.7
Stream 6	5286.4	1246.6	1609.2	467.5	1533.9	120.9	3241.5	1547.6
Stream 7	1064.2	110.3	87.8	83.0	347.3	64.1	424.3	2646.5
Min Qi	1064.2	110.3	87.8	83.0	347.3	64.1	424.3	863.7
Max Qi	5455.5	1733.3	1609.2	562.3	2395.9	1032.7	3569.9	8689.4
Avg Qi	4393.5	1293.9	501.0	366.5	1909.1	252.5	2594.2	2496.2
Query	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Stream 0	1268.3	189.6	172.8	182.8	1250.9	48.5	122.9	227.9
Stream 1	6075.4	1257.8	1021.4	985.7	4319.1	362.5	622.2	1142.3
Stream 2	8217.5	1698.4	1294.6	1394.1	2780.5	203.0	530.3	1092.1
Stream 3	7158.1	804.9	841.0	310.3	3515.8	230.3	757.6	458.6
Stream 4	7167.2	1243.8	973.9	1599.8	5384.1	278.3	400.6	732.3
Stream 5	5094.1	895.4	942.2	2601.1	3983.6	432.4	183.9	538.8
Stream 6	5455.0	1883.8	816.8	2040.3	5761.3	281.7	1860.3	1199.0
Stream 7	1065.5	172.0	174.5	272.8	1251.8	47.9	121.7	231.3
Min Qi	1065.5	172.0	174.5	272.8	1251.8	47.9	121.7	231.3
Max Qi	8217.5	1883.8	1294.6	2601.1	5761.3	432.4	1860.3	1199.0
Avg Qi	5747.5	1136.6	866.3	1314.9	3856.6	262.3	639.5	770.6
Query	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 0	372.7	2146.1	460.1	156.3	1908.1	189.2	122.5	218.5
Stream 1	929.1	19441.8	1027.6	2927.9	5193.7	824.0	120.0	220.1
Stream 2	7314.4	14830.0	1342.9	881.7	9368.2	1212.6	126.7	335.8
Stream 3	952.7	15024.5	1461.4	921.1	11375.4	748.7	131.3	230.7
Stream 4	733.8	14056.8	985.9	429.8	17198.2	463.6	127.1	224.1
Stream 5	740.4	16434.2	1045.5	1155.5	5235.5	1144.4	129.5	326.4
Stream 6	1077.8	14981.6	1650.6	917.6	9805.6	958.0	132.3	223.0
Stream 7	384.9	56289.5	464.7	1415.3	8035.8	189.4	132.1	316.6
Min Qi	384.9	14056.8	464.7	429.8	5193.7	189.4	120.0	220.1
Max Qi	7314.4	56289.5	1650.6	2927.9	17198.2	1212.6	132.3	335.8
Avg Qi	1733.3	21579.8	1139.8	1235.6	9458.9	791.5	128.4	268.1