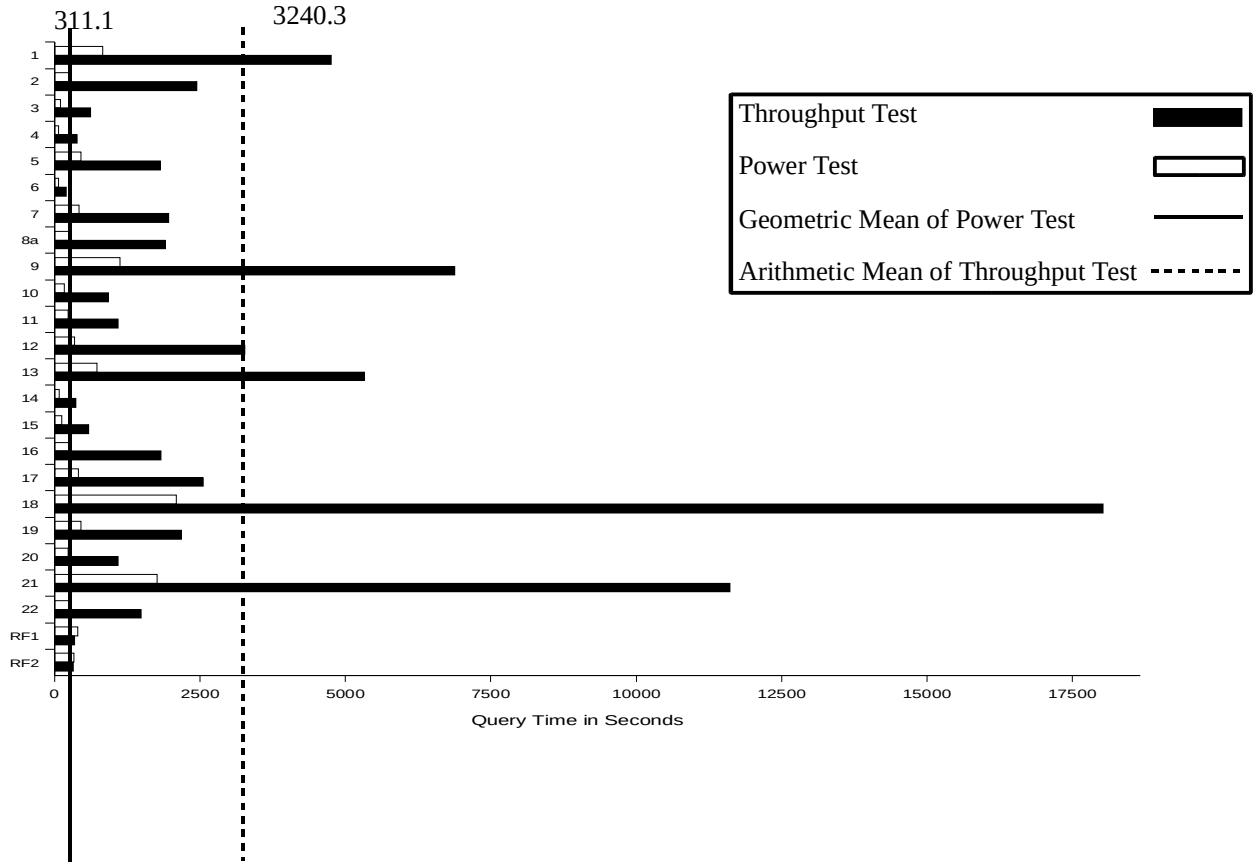
Sun microsystems / ORACLE	**Sun Fire™ 15K Server with Oracle9i R2**	**TPC-H Rev. 2.0** **April 7, 2003**

Total System Cost	Composite Query per Hour Metric	Price/Performance
$5,335,742	**28,948.1** QphH@3000GB	**$184** $/QphH@3000GB

Database Size	Database Manager	Operating System	Other Software	Availability Date
3000GB	Oracle 9i R2 Enterprise Edition	Solaris 9	Veritas Volume Mgr. 3.5.0	April 30, 2003



Database Load Time = 8:19	Load Includes Backup: N	Total Data Storage/Database Size=9.25
RAID (Base tables): Y	RAID (Base tables and auxiliary data structures): Y	RAID (All): N

System Configuration: Sun Fire™ 15K Server
Processors: 72 UltraSPARC™ III Cu 1200 MHz processors
Memory: 288GB memory
Disks: 33 A5200 (12x73.4GB), 2 T3 (9x36.4GB),1 S1 (2x36.4GB)
Total Storage: 27,748.2 GB (in this calculation one GB is defined as 1024*1024*1024 bytes)

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Description	Part Number	Source	Unit Price	Qty	Ext. Price	3 Yr. maint.
Server Hardware						
Sun Fire 15K Server Base	F15K-CAB3	1	706,000	1	706,000	180,144
CPU/MEM BD BNDL-4CPU@1200/16GMEM	CPUBD-482-1200	1	128,600	18	2,314,800	251,442
Opt QFE PCI card w/SW	1034A	1	1,795	1	1,795	
PCI dual Ultra-3 SCSI	X6758A	1	800	1	800	
Cable,SCSI,SCSI-3/SCSI-3, 2.0m	X1139A	1	95	1	95	
PCI I/O Assy for F15K	4575A	1	15,000	18	270,000	
Opt Pwr Cord For Enterpr.(US)	3800A	1	0	12	0	
2GB PCI Dual FC Network Adapter	X6768A	1	4,900	67	328,300	
15M Fibre Channel Cable	X9724A	1	190	134	25,460	
North American Country Kit	3508A	1	0	1	0	
Server Hardware Subtotal					3,647,250	431,586
Storage						
1601 GB StorEdge A5200 cabinet	SG-ARY563A-1601G	1	152,650	6	915,900	70,632
1606-GB Sun StorEdge A5200 array	SG-ARY571A-1606GR5		115,000	5	575,000	58,860
511-GB Sun StorEdge A5200 Array	SG-XARY570A-511G		53,000	22	1,166,000	258,984
A5000 Exp Cab Mount Kit	X9655A		250	22	5,500	
FCAL GBIC Module 100 MB/s	X6731A	1	600	66	39,600	
StorEdge S1, 2x36GB	NS-DSKS1-236GAC	1	3,195	1	3,195	2,232
655 GB StorEdge T3ES	T3BES-RK-22-655	1	88,400	1	88,400	8,460
Power Cord for StorEdge	X3858A	1	0	14	0	
Storage Subtotal					2,793,595	399,168
Server Software						
Solaris 9 Std Media	SOLZS-00AC9AYS	1	50	1	50	
SPARC Compiler C/C++	FDEIS-700-T999	1	2,995	1	2,995	3,096
Sun StorEdge Comp Mgr	SCMMS-210-R99R	1	0	1	0	
Veritas VM 3.5 for A5x00, Solaris 9	VVMGS-350-9999	1	0	1	0	
Oracle 9i Database Enterprise Edition Release 2, Named User Plus for 3 years		2	10,000	72	720,000	
Partitioning, Named User Plus for 3 years		2	2,500	72	180,000	
Oracle Database Server Support Package for 3 years		2	6,000	1		6,000
Oracle Mandatory E-Business Discount (license and support)					-181,200	
Server Software Subtotal					721,845	9,096
Volume Discounts and Support Prepayment					-2,577,076	-89,722
			Total		4,585,614	750,128
Service for all Sun products is from Sun Microsystems, Inc.			**3 Yr. Cost**		5,335,742	
Service for Oracle products is from Oracle Corp.			**QphH@3000GB**		28,948.10	
			$/QphH@3000GB		$184.32	

Notes (Source):

1. Sun Microsystems, Inc.
2. Oracle Corp. contact MaryBeth Pierantoni (see Appendix G)

Audited by: François Raab, 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 standard components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchase 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. Thank you.

Numerical Quantities

Measurement Results:

Database Scale Factor	= 3000GB
Total Data Storage / Database Size	= 9.25
Start of database load time	= 03-26-2003 15:38:55
End of database load time	= 03-26-2003 23:57:46
Database Load Time	= 8:19
Query Streams for Throughput Test	= 8
TPC-H Power	= 34,714.4
TPC-H Throughput	= 24,139.6
TPC-H Composite Query-per-Hour Rating (QphH@3000GB)	= 28,948.1
Total System Price Over 3 Years	= $5,335,742
TPC-H Price/Performance Metric ($/QphH@3000GB)	= $184

Measurement Intervals:

Measurement Interval in Throughput Test (Ts)	= 78,742 seconds

Duration of Stream Execution:

Stream ID	Seed	Start Date	Start Time	End Date	End Time	Duration
Stream 00	326235746	3/28/03	13:20:43	3/28/03	16:31:54	03:11:11
Stream 01	326235747	3/28/03	16:32:13	3/29/03	11:28:16	18:56:03
Stream 02	326235748	3/28/03	16:32:13	3/29/03	12:57:12	20:24:59
Stream 03	326235749	3/28/03	16:32:13	3/29/03	11:47:13	19:15:00
Stream 04	326235750	3/28/03	16:32:13	3/29/03	12:12:25	19:40:12
Stream 05	326235751	3/28/03	16:32:13	3/29/03	12:37:33	20:05:20
Stream 06	326235752	3/28/03	16:32:13	3/29/03	12:23:39	19:51:26
Stream 07	326235753	3/28/03	16:32:13	3/29/03	12:40:19	20:08:06
Stream 08	326235754	3/28/03	16:32:13	3/29/03	12:35:57	20:03:44
Refresh		03/29/03	12:57:12	3/29/03	14:24:35	01:27:23

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TPC-H Timing Intervals (in seconds)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8a	Q9	Q10	Q11	Q12
Stream 00	828.0	254.3	95.1	65.5	455.2	62.6	423.2	277.1	1126.4	165.5	227.9	344.3
Stream 01	4006.2	2626.4	778.6	392.7	1491.9	281.4	1840.1	1733.5	8043.6	1065.1	1107.5	2076.9
Stream 02	4807.4	2591.1	634.0	396.2	1776.8	97.1	2017.7	2063.0	8058.7	1054.8	1181.2	2938.1
Stream 03	4714.0	2010.7	520.4	433.6	2295.6	193.8	2163.2	2608.3	5229.7	966.4	1253.6	3400.3
Stream 04	4784.2	2164.8	359.4	353.8	1214.1	271.1	2044.7	1968.2	6449.9	1002.4	1066.4	3792.8
Stream 05	4662.9	2870.2	697.4	362.9	2024.2	200.6	1977.5	1711.5	6555.6	1136.4	1215.2	3958.5
Stream 06	4861.1	2748.0	789.6	431.2	1772.2	317.2	1831.7	2106.9	7413.5	380.4	1159.6	4270.2
Stream 07	5213.9	2114.6	663.4	368.8	1985.3	69.6	2022.6	1643.7	7044.6	814.0	1286.1	1220.5
Stream 08	5034.8	2383.2	483.6	356.3	1939.5	202.0	1771.4	1387.0	6193.5	951.1	499.4	4471.1
Minimum	4006.2	2010.7	359.4	353.8	1214.1	69.6	1771.4	1387.0	5229.7	380.4	499.4	1220.5
Average	4760.6	2438.6	615.8	386.9	1812.4	204.1	1958.6	1902.8	6873.6	921.3	1096.1	3266.0
Maximum	5213.9	2870.2	789.6	433.6	2295.6	317.2	2163.2	2608.3	8058.7	1136.4	1286.1	4471.1

	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 00	725.1	76.2	125.3	273.4	408.0	2090.3	458.5	231.9	1762.2	261.6	402.4	330.8
Stream 01	4930.9	255.5	505.3	1824.1	1388.1	17974.8	2218.7	887.5	11034.4	1700.3	368.9	316.5
Stream 02	5518.3	570.4	725.2	2283.7	3304.1	18512.3	3250.9	1220.9	8940.0	1557.4	328.3	299.3
Stream 03	5817.7	404.3	504.3	1814.2	1979.7	16894.7	2167.9	1266.7	11328.9	1331.8	341.9	314.3
Stream 04	5396.5	396.8	733.5	2194.9	1691.6	18167.5	1587.3	718.7	13265.2	1188.4	352.1	324.1
Stream 05	5534.0	302.3	657.6	1901.5	1892.5	17099.7	1404.5	1345.0	13301.4	1508.4	338.8	308.6
Stream 06	5544.8	353.7	739.0	1607.9	2944.9	16350.2	1570.4	1055.3	11800.3	1438.1	325.3	316.7
Stream 07	5921.8	163.6	205.5	1134.1	3558.5	20822.9	2143.1	1175.7	11400.7	1512.9	323.5	329.5
Stream 08	4003.1	477.5	580.1	1827.5	3692.8	18367.6	3076.4	1056.8	11815.1	1653.5	320.0	334.2
Minimum	4003.1	163.6	205.5	1134.1	1388.1	16350.2	1404.5	718.7	8940.0	1188.4	320.0	299.3
Average	5333.4	365.5	581.3	1823.5	2556.5	18023.7	2177.4	1090.8	11610.8	1486.4	337.4	317.9
Maximum	5921.8	570.4	739.0	2283.7	3692.8	20822.9	3250.9	1345.0	13301.4	1700.3	368.9	334.2