

Sun SPARC Enterprise M9000 with Oracle Database 11g

TPC-H Rev. 2.6.2

May 2, 2008
Revised July 16, 2008

Total System Cost

Composite Query per Hour Metric

Price/Performance

\$2,859,795

118,573.3
QphH@1000GB

\$24.12
\$/QphH@1000GB

Database Size

Database Manager

Operating System

Other Software

Availability Date

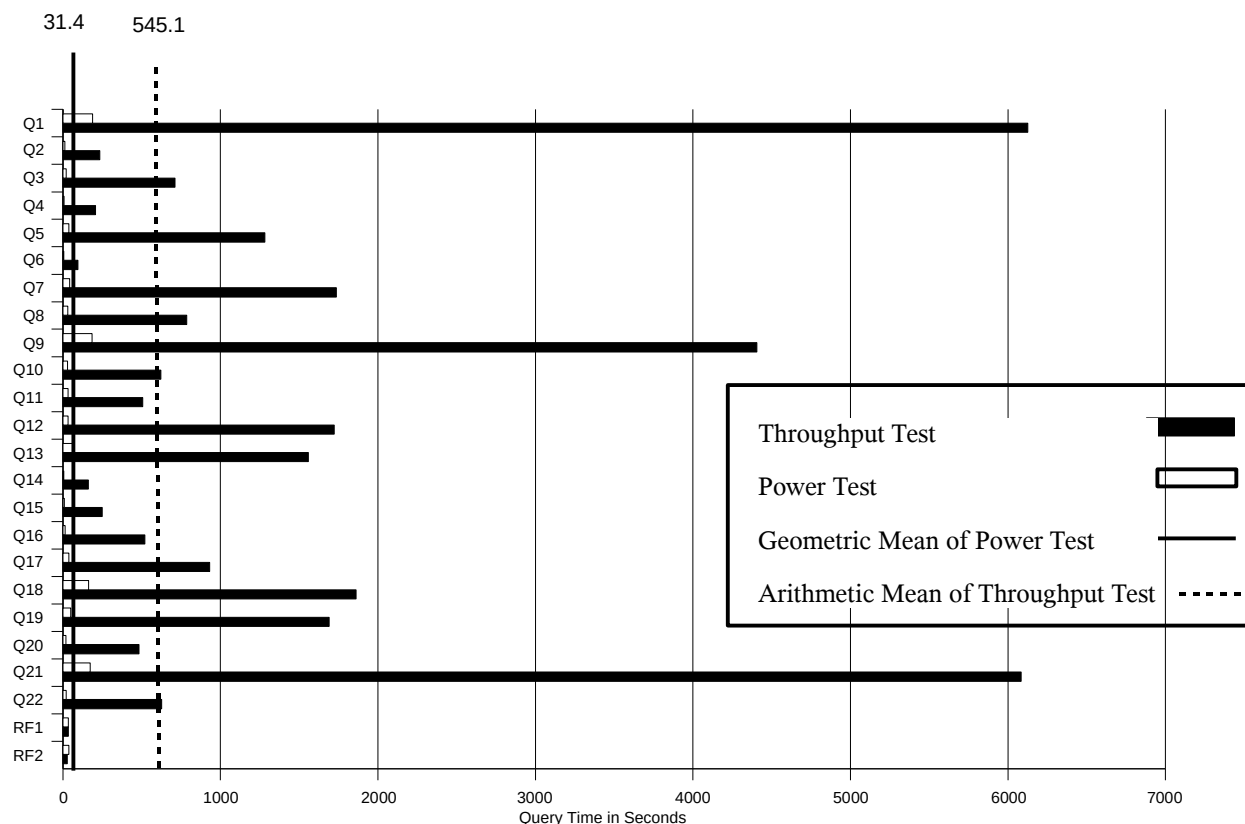
1000GB

Oracle Database 11g Enterprise
Edition with Partitioning and
Automatic Storage Management

Solaris 10

None

September 10, 2008



Database Load Time = 1:35:27

Load Includes Backup: N

Total Data Storage/Database Size=35.6

RAID (Base tables): N

RAID (Base tables and auxiliary data structures): N

RAID (All): Y

System Configuration: Sun SPARC Enterprise M9000 Server

Processors: 32 SPARC64 VI 2400 MHz processors on 32 chips, 64 cores, 128 threads

Memory: 512GB memory

Disks: 20 Sun StorageTek 2540 Arrays (20x12x146GB), 8 internal SAS disks (8x73GB)

Total Storage: 35,624GB (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.	Unit 3 Yr Maint.
Server Hardware							
Sun SE M9000-32 Base 1ph	SEHASY11Z	1	275,000	1	275,000	147,654	147,654.48
SE_CMU:4*SPARC64VI@2.4GHz w/64GB	SEMY4DE1Z	1	404,000	8	3,232,000	172,775	21,596.89
SE_PCI_E IO Unit: 8*slots	SEMY61Z	1	18,000	8	144,000		
PWR Cord 1PHs M8000-9000 USA (included)	SEMX9P31Z	1	0	5	0		
PCI-E Base IO Card	SEMY7BS1Z	1	1,995	4	7,980		
4GB PCIe Dual Host Bus Adapter, Emulex	SG-XPCIE2FC-EM4	1	1,995	20	39,900		
15M Fibre Channel Cable	X9724A	1	190	40	7,600		
Server Hardware Subtotal					3,706,480	320,430	
Storage							
2540-1752G-12x146/15-2RAIDACRR	XTA2540R01A2E1752	1	14,320	20	286,400	102,010	5,100
SE_73GB 10K RPM 2.5" SAS	SEMY3A11Z	1	450	8	3600		
72" StorEdge Expansion Rack	RSG-SG-XARY030A	1	6,500	2	13,000		
Exp Cab 2U Universal Rack Mount Kit	TA-3000-2URK-19U	1	350	40	14,000		
Power Cord for StorEdge	X3858A	1	0	4	0		
Storage Subtotal					317,000	102,010	
Server Software							
Solaris 10		3	0	1	0		
Sun Studio 12		4	10	1	10	2,376	2,376
Sun StorageTek Common Array Manager		1	0	1	0		
Oracle Database 11g Enterprise Edition, Named User Plus for 3 years		2	11,875	48 ‡	570,000		
Partitioning, Named User Plus for 3 years		2	2,875	48 ‡	138,000		
Oracle Database Server Support Package for 3 years		2	6,900	1		6,900	
Server Software Subtotal					708,010	9,276	
Sun Volume Discounts (50%) and Support Prepayment discount (35%)		1			-2,011,745	-148,685	
Oracle Mandatory E-Business Discount (20%)		2			-142,980		
Total					2,576,765	283,030	
Service for all Sun products is from Sun Microsystems, Inc. and is based on SunSpectrum Instant Upgrade Gold 7x24					3 Yr. Cost	2,859,795	
Service for Oracle products is from Oracle Corp.					QphH @1000GB	118,573.30	
					\$/QphH @1000GB	\$24.12	

Notes (Source):

1. Sun Microsystems, Inc. (see Appendix G)
2. Oracle Corp. (see Appendix G)
3. Download from SunSolve
4. Order media kit from sun.com

‡ 48 = 0.75 * 64. Explanation: For purposes of counting the number of processors which require licensing, a multicore chip with "n" cores shall be determined by multiplying "n" cores by a factor of 0.75

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.



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Numerical Quantities

Measurement Results:

Database Scale Factor	= 1000GB
Total Data Storage / Database Size	= 35.6
Start of database load time	= 04-11-2008 20:53:31
End of database load time	= 04-11-2008 22:28:58
Database Load Time	= 1:35:27
Query Streams for Throughput Test	= 64
TPC-H Power	= 114,725.4
TPC-H Throughput	= 122,550.2
TPC-H Composite Query-per-Hour Rating (QphH@1000GB)	= 118,573.3
Total System Price Over 3 Years	= \$2,859,795
TPC-H Price/Performance Metric (\$/QphH@1000GB)	= \$24.12

Measurement Intervals:

Measurement Interval in Throughput Test (Ts)	= 41,361 seconds
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Duration of Stream Execution:

Stream ID	Seed	Start Date	Start Time	End Date	End Time	Duration
Stream 0	411222858	04/11/08	22:30:20	04/11/08	22:51:26	00:21:06
Stream 1	411222859	04/11/08	22:51:30	04/12/08	06:06:42	07:15:12
Stream 2	411222860	04/11/08	22:51:30	04/12/08	04:49:59	05:58:29
Stream 3	411222861	04/11/08	22:51:30	04/12/08	07:28:01	08:36:31
Stream 4	411222862	04/11/08	22:51:30	04/12/08	08:50:00	09:58:30
Stream 5	411222863	04/11/08	22:51:31	04/12/08	07:50:06	08:58:35
Stream 6	411222864	04/11/08	22:51:31	04/12/08	08:16:33	09:25:02
Stream 7	411222865	04/11/08	22:51:31	04/12/08	08:58:51	10:07:20
Stream 8	411222866	04/11/08	22:51:31	04/12/08	07:04:53	08:13:22
Stream 9	411222867	04/11/08	22:51:31	04/12/08	09:00:07	10:08:36
Stream 10	411222868	04/11/08	22:51:31	04/12/08	08:51:53	10:00:22
Stream 11	411222869	04/11/08	22:51:31	04/12/08	08:51:32	10:00:01
Stream 12	411222870	04/11/08	22:51:31	04/12/08	04:45:10	05:53:39
Stream 13	411222871	04/11/08	22:51:31	04/12/08	07:43:04	08:51:33
Stream 14	411222872	04/11/08	22:51:31	04/12/08	08:42:38	09:51:07
Stream 15	411222873	04/11/08	22:51:31	04/12/08	06:51:52	08:00:21
Stream 16	411222874	04/11/08	22:51:31	04/12/08	07:15:35	08:24:04
Stream 17	411222875	04/11/08	22:51:31	04/12/08	07:33:56	08:42:25
Stream 18	411222876	04/11/08	22:51:31	04/12/08	08:39:56	09:48:25
Stream 19	411222877	04/11/08	22:51:31	04/12/08	08:48:33	09:57:02
Stream 20	411222878	04/11/08	22:51:31	04/12/08	07:29:13	08:37:42
Stream 21	411222879	04/11/08	22:51:32	04/12/08	07:50:45	08:59:13
Stream 22	411222880	04/11/08	22:51:32	04/12/08	08:54:39	10:03:07
Stream 23	411222881	04/11/08	22:51:32	04/12/08	06:28:31	07:36:59
Stream 24	411222882	04/11/08	22:51:32	04/12/08	08:36:19	09:44:47
Stream 25	411222883	04/11/08	22:51:32	04/12/08	07:39:08	08:47:36
Stream 26	411222884	04/11/08	22:51:32	04/12/08	08:00:07	09:08:35
Stream 27	411222885	04/11/08	22:51:32	04/12/08	08:27:36	09:36:04
Stream 28	411222886	04/11/08	22:51:32	04/12/08	08:09:58	09:18:26
Stream 29	411222887	04/11/08	22:51:32	04/12/08	09:13:13	10:21:41
Stream 30	411222888	04/11/08	22:51:32	04/12/08	08:45:55	09:54:23
Stream 31	411222889	04/11/08	22:51:32	04/12/08	08:28:55	09:37:23
Stream 32	411222890	04/11/08	22:51:32	04/12/08	09:12:35	10:21:03



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Duration of Stream Execution (continued):

Stream ID	Seed	Start Date	Start Time	End Date	End Time	Duration
Stream 33	411222891	04/11/08	22:51:32	04/12/08	08:57:46	10:06:14
Stream 34	411222892	04/11/08	22:51:32	04/12/08	07:21:45	08:30:13
Stream 35	411222893	04/11/08	22:51:32	04/12/08	08:18:27	09:26:55
Stream 36	411222894	04/11/08	22:51:32	04/12/08	08:19:57	09:28:25
Stream 37	411222895	04/11/08	22:51:32	04/12/08	09:08:24	10:16:52
Stream 38	411222896	04/11/08	22:51:33	04/12/08	08:58:27	10:06:54
Stream 39	411222897	04/11/08	22:51:33	04/12/08	08:46:00	09:54:27
Stream 40	411222898	04/11/08	22:51:33	04/12/08	06:54:22	08:02:49
Stream 41	411222899	04/11/08	22:51:33	04/12/08	08:53:28	10:01:55
Stream 42	411222900	04/11/08	22:51:33	04/12/08	08:28:40	09:37:07
Stream 43	411222901	04/11/08	22:51:33	04/12/08	08:28:00	09:36:27
Stream 44	411222902	04/11/08	22:51:33	04/12/08	07:18:46	08:27:13
Stream 45	411222903	04/11/08	22:51:33	04/12/08	08:00:50	09:09:17
Stream 46	411222904	04/11/08	22:51:33	04/12/08	07:12:37	08:21:04
Stream 47	411222905	04/11/08	22:51:33	04/12/08	09:07:38	10:16:05
Stream 48	411222906	04/11/08	22:51:34	04/12/08	08:06:57	09:15:23
Stream 49	411222907	04/11/08	22:51:34	04/12/08	09:02:26	10:10:52
Stream 50	411222908	04/11/08	22:51:34	04/12/08	09:00:07	10:08:33
Stream 51	411222909	04/11/08	22:51:34	04/12/08	08:52:04	10:00:30
Stream 52	411222910	04/11/08	22:51:34	04/12/08	06:20:06	07:28:32
Stream 53	411222911	04/11/08	22:51:34	04/12/08	06:19:57	07:28:23
Stream 54	411222912	04/11/08	22:51:34	04/12/08	06:55:36	08:04:02
Stream 55	411222913	04/11/08	22:51:34	04/12/08	09:05:24	10:13:50
Stream 56	411222914	04/11/08	22:51:34	04/12/08	06:26:23	07:34:49
Stream 57	411222915	04/11/08	22:51:34	04/12/08	08:16:33	09:24:59
Stream 58	411222916	04/11/08	22:51:34	04/12/08	06:23:04	07:31:30
Stream 59	411222917	04/11/08	22:51:35	04/12/08	07:49:06	08:57:31
Stream 60	411222918	04/11/08	22:51:35	04/12/08	06:10:04	07:18:29
Stream 61	411222919	04/11/08	22:51:35	04/12/08	05:16:11	06:24:36
Stream 62	411222920	04/11/08	22:51:35	04/12/08	08:42:29	09:50:54
Stream 63	411222921	04/11/08	22:51:35	04/12/08	08:26:03	09:34:28
Stream 64	411222922	04/11/08	22:51:35	04/12/08	08:10:37	09:19:02
Refresh		04/12/08	9:13:13	04/12/08	10:20:51	01:07:38



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TPC-H Timing Intervals (in seconds):

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Stream 0	188.0	12.7	20.4	7.8	38.1	5.5	42.7	31.8	185.1	29.9	32.3	33.3
Stream 1	1,314.1	350.3	931.3	0.1	2,737.0	137.7	0.1	938.4	0.1	1,477.2	588.7	1,914.3
Stream 2	0.1	213.1	834.7	365.9	2,763.4	6.7	2,040.4	905.0	5,113.1	0.1	606.3	2,022.1
Stream 3	9,013.3	245.8	702.2	0.1	4,103.4	120.0	2,130.3	894.4	1,258.5	0.1	710.1	1,786.5
Stream 4	6,364.0	222.7	228.5	0.1	1,324.2	141.6	919.9	801.4	5,421.5	1,238.1	518.4	2,214.4
Stream 5	8,579.8	245.8	807.5	0.1	0.1	0.1	2,210.7	823.7	4,187.4	316.0	527.7	2,615.0
Stream 6	0.1	234.5	1,620.5	292.0	2,892.3	118.2	1,972.5	800.3	5,583.7	1,224.9	492.0	1,975.1
Stream 7	8,943.4	198.9	277.6	271.5	97.5	7.6	89.2	786.6	4,269.8	51.3	401.0	38.4
Stream 8	9,819.1	181.3	0.1	325.2	1,810.0	0.1	2,193.7	783.2	5,649.2	983.0	465.3	2,583.5
Stream 9	4,452.8	221.8	1,046.8	371.5	430.1	0.1	1,742.7	1,511.8	3,191.5	0.1	705.3	1,565.2
Stream 10	8,290.2	245.8	541.1	134.2	756.4	693.5	2,290.0	371.0	5,487.1	0.1	274.4	2,969.1
Stream 11	0.1	102.0	845.3	0.1	0.1	56.4	719.9	829.5	0.1	0.1	617.0	2,461.4
Stream 12	4,500.8	226.6	917.5	304.3	0.1	134.6	2,354.5	827.1	1,199.7	1,111.7	558.1	2,375.5
Stream 13	6,275.3	174.1	910.0	0.1	0.1	106.9	2,613.8	685.2	6,341.8	0.1	479.0	2,765.8
Stream 14	8,254.4	43.6	347.5	386.5	1,972.8	0.1	2,474.2	476.4	396.1	0.1	243.3	576.8
Stream 15	8,514.6	195.9	0.1	268.8	0.1	110.2	2,108.0	898.0	384.0	0.1	743.2	1,135.9
Stream 16	5,647.7	259.6	834.3	308.9	1,250.9	109.5	2,170.5	776.6	4,539.8	0.1	499.2	1,762.4
Stream 17	9,930.2	237.9	1,565.8	0.1	2,749.3	111.0	2,079.1	780.0	5,198.2	0.1	560.0	1,282.9
Stream 18	3,601.1	235.2	1,043.2	327.3	95.7	122.2	1,077.0	714.8	4,202.4	1,291.1	542.4	1,209.2
Stream 19	4,598.5	254.0	728.3	1,192.9	2,109.4	90.5	2,114.9	989.5	5,494.3	0.1	388.5	2,894.9
Stream 20	8,274.2	198.5	901.7	306.8	0.1	95.4	2,530.8	578.1	5,006.8	0.1	448.2	2,135.5
Stream 21	2,366.1	158.5	641.5	0.1	0.1	82.2	2,253.3	777.5	4,770.8	0.1	609.1	2,047.0
Stream 22	8,620.5	209.1	0.1	318.2	1,598.8	77.5	1,520.2	546.1	2,742.6	0.1	545.2	2,191.4
Stream 23	0.1	223.1	1,014.0	0.1	0.1	153.1	2,219.0	769.4	5,824.6	1,306.0	555.4	1,980.2
Stream 24	2,580.1	200.6	968.0	0.1	1,073.3	0.1	2,541.1	819.9	6,562.0	1,530.8	248.6	1,553.5
Stream 25	8,138.3	234.2	0.1	0.1	0.1	119.8	2,063.4	866.2	4,693.6	588.0	665.7	2,504.9
Stream 26	8,764.7	213.5	1,035.0	381.3	453.2	0.1	2,578.2	673.0	6,307.5	0.1	524.2	1,727.3
Stream 27	8,237.2	252.8	0.1	0.1	2,066.7	107.1	2,561.9	948.0	5,865.6	827.3	373.3	1,464.6
Stream 28	8,747.3	203.1	897.7	356.2	2,375.5	107.7	2,374.6	677.2	5,030.4	1,930.6	312.5	2,291.0
Stream 29	8,539.1	132.0	0.1	7.7	0.1	142.5	52.9	991.8	6,992.7	1,953.8	396.7	2,800.2
Stream 30	8,154.9	87.8	824.8	0.1	2,584.2	0.1	2,532.6	345.1	6,249.0	0.1	259.1	1,134.4
Stream 31	8,834.8	1,075.0	828.0	0.1	1,934.1	0.1	2,099.4	570.4	8,357.1	0.1	808.4	1,292.0
Stream 32	7,789.5	19.4	1,151.5	327.8	2,448.1	138.6	2,540.5	800.3	2,950.0	29.2	204.5	1,949.4



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TPC-H Timing Intervals (continued):

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Stream 33	3,447.0	289.7	0.1	366.0	2,282.1	89.0	2,402.5	676.5	5,743.2	1,443.3	581.9	1,027.5
Stream 34	5,526.7	192.8	1,031.3	341.7	0.1	0.1	2,248.2	689.3	5,276.6	0.1	972.4	1,038.0
Stream 35	8,986.1	227.1	564.6	0.1	2,511.3	0.1	0.1	804.4	4,178.6	1,306.6	307.3	1,589.5
Stream 36	8,434.3	175.5	930.7	349.9	0.1	0.1	2,076.9	525.2	4,833.6	0.1	623.7	1,202.7
Stream 37	7,765.2	128.1	888.0	0.1	2,152.1	0.1	2,259.0	1,037.1	5,856.3	0.1	640.6	1,122.5
Stream 38	8,210.0	285.2	1,037.2	363.4	3,882.0	0.1	2,177.8	765.7	2,176.3	766.1	545.5	1,790.5
Stream 39	9,038.8	87.2	1,524.5	276.7	2,708.0	137.2	3,003.0	460.3	4,399.3	0.1	258.2	701.5
Stream 40	7,996.3	231.9	834.4	294.1	0.1	115.9	2,135.2	814.1	5,556.1	0.1	494.5	2,060.7
Stream 41	7,614.4	314.0	0.1	345.7	0.1	137.9	781.6	878.8	7,237.4	762.3	516.4	79.4
Stream 42	251.8	225.2	944.0	158.4	0.1	123.5	2,595.0	786.4	4,754.2	0.1	759.6	2,327.4
Stream 43	0.1	249.5	861.6	0.1	1,965.7	340.9	2,125.8	817.3	6,198.8	1,389.1	538.1	2,184.5
Stream 44	8,022.3	225.8	783.8	0.1	3,435.3	124.7	2,192.3	1,559.5	6,605.6	0.1	565.2	1,831.8
Stream 45	0.1	174.5	509.2	0.1	1,316.2	147.7	1,649.8	700.7	7,485.2	938.0	472.0	2,350.7
Stream 46	0.1	212.9	829.3	354.4	2,164.4	148.8	2,530.4	780.9	5,684.1	1,163.0	521.3	2,758.0
Stream 47	9,719.0	158.6	1,022.1	0.1	1,792.3	0.1	2,024.3	880.1	5,487.0	1,952.2	503.8	2,509.3
Stream 48	0.1	248.4	866.9	0.1	0.1	83.3	0.1	968.8	0.1	1,101.8	573.5	1,634.8
Stream 49	9,856.7	221.5	921.1	0.1	2,024.7	0.1	2,277.7	796.1	5,080.6	0.1	39.6	2,918.3
Stream 50	7,927.5	238.4	919.1	342.5	229.5	121.1	1,461.7	782.2	2,117.6	0.1	607.6	951.0
Stream 51	8,088.8	223.3	544.0	107.4	681.6	373.2	0.1	382.9	1,946.3	0.1	260.9	2,240.0
Stream 52	8,349.5	235.8	886.7	324.5	0.1	133.4	0.1	916.9	0.1	1,391.0	613.8	1,108.2
Stream 53	5,893.8	260.5	887.8	313.3	2,913.6	124.6	2,140.8	835.6	5,147.0	1,385.7	468.4	1,059.7
Stream 54	9,329.5	217.6	0.1	352.0	0.1	121.9	2,481.4	815.5	0.1	1,296.9	531.8	1,663.4
Stream 55	9,212.1	945.1	27.7	369.0	0.1	0.1	1,667.7	74.9	10,853.0	0.1	35.2	43.1
Stream 56	8,308.6	196.2	784.4	0.1	0.1	0.1	0.1	928.7	8,574.4	1,135.8	562.0	944.6
Stream 57	5,437.2	258.8	979.3	351.7	1,314.0	108.7	2,293.2	956.6	5,768.1	1,279.5	643.8	0.1
Stream 58	0.1	223.1	738.3	349.8	3,227.8	140.2	0.1	975.8	6,304.3	1,138.3	576.1	2,607.2
Stream 59	8,568.5	215.6	1,080.4	264.2	2,639.2	146.0	1,683.7	942.2	3,317.6	0.1	602.1	1,731.8
Stream 60	0.1	224.7	940.7	402.1	2,610.0	0.1	2,270.9	787.7	0.1	1,308.9	581.5	2,052.1
Stream 61	8,188.7	236.8	0.1	341.5	0.1	126.0	0.1	877.5	0.1	1,414.6	586.4	0.1
Stream 62	8,517.9	97.4	332.4	274.6	0.1	0.1	0.1	580.0	3,327.9	1,500.0	590.4	1,985.1
Stream 63	0.1	238.5	744.2	437.6	2,127.2	106.2	2,122.6	655.1	3,567.9	1,236.8	558.8	2,293.0
Stream 64	8,113.4	215.8	0.1	262.1	0.1	0.1	1,389.0	771.4	5,336.1	0.1	478.0	2,202.7
Minimum	0.1	19.35	0.1	0.1	0.1	0.1	0.1	74.94	0.1	0.1	35.21	0.1
Average	6126.4	234.2	711.5	207.9	1281.9	95.7	1736.3	786.3	4406.1	621.5	507.2	1721.5
Maximum	9930.2	1075.0	1620.5	1192.9	4103.4	693.5	3003.0	1559.5	10853.0	1953.8	972.4	2969.1



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TPC-H Timing Intervals (continued):

	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 0	73.2	5.4	8.4	14.0	37.2	163.5	49.9	19.0	173.6	21.7	34.4	37.1
Stream 1	3,613.4	0.1	0.1	496.1	985.5	0.1	2,127.1	477.7	7,278.1	745.4	34.5	28.4
Stream 2	2,896.3	20.5	290.8	207.1	75.8	0.1	1,915.8	542.5	0.1	689.4	35.1	29.9
Stream 3	0.1	0.1	0.1	459.2	1,037.2	1,110.5	1,975.0	441.7	4,052.1	950.3	34.2	27.9
Stream 4	0.1	133.5	324.7	517.5	941.6	0.1	1,842.1	43.0	12,465.2	247.4	34.8	29.9
Stream 5	0.1	0.1	0.1	612.5	870.4	0.1	2,306.5	474.2	7,044.4	693.9	33.4	28.0
Stream 6	3,512.7	0.1	347.9	557.8	916.4	0.1	2,036.4	602.0	8,091.1	632.5	35.4	29.9
Stream 7	1,092.7	7.4	0.1	23.7	1,184.7	6,629.1	986.2	445.0	9,911.6	726.7	34.2	28.9
Stream 8	0.1	147.1	312.2	520.2	1,094.5	0.1	1,705.0	441.7	0.1	587.7	34.2	28.4
Stream 9	5,061.3	15.6	360.0	31.9	1,018.1	0.1	2,358.9	472.9	11,261.8	695.8	33.8	28.5
Stream 10	2,877.9	148.7	611.7	360.4	1,119.2	6,666.8	1,169.5	333.0	0.1	682.4	34.6	28.6
Stream 11	0.1	254.2	698.7	576.3	1,203.0	17,455.9	161.4	587.1	8,720.5	713.1	34.1	29.9
Stream 12	0.1	180.4	0.1	516.3	1,048.3	0.1	2,156.0	446.9	1,592.0	768.6	34.9	28.1
Stream 13	0.1	110.3	260.3	448.0	1,013.9	0.1	1,386.7	433.7	7,135.3	753.0	33.5	29.8
Stream 14	0.1	106.3	296.6	535.8	983.0	5,124.4	1,357.1	529.8	11,007.0	354.9	32.9	30.1
Stream 15	0.1	248.5	0.1	57.9	91.7	0.1	1,925.6	525.1	10,930.0	683.7	34.2	29.4
Stream 16	4,004.1	175.2	267.0	647.4	1,131.4	0.1	2,185.2	513.2	2,430.3	730.5	34.9	27.6
Stream 17	0.1	175.4	323.0	702.9	940.6	0.1	2,052.4	453.5	1,699.0	503.6	34.1	28.4
Stream 18	6,033.1	561.9	169.4	243.0	1,163.0	0.1	1,973.5	537.3	9,885.4	277.0	33.6	28.5
Stream 19	0.1	149.8	306.1	529.1	1,125.4	0.1	1,440.8	393.6	10,354.5	666.6	35.0	28.5
Stream 20	4,404.5	188.0	867.7	973.9	1,056.7	0.1	1,948.4	474.1	0.1	672.3	34.7	28.7
Stream 21	0.1	318.7	0.1	594.0	968.1	0.1	2,092.1	1,246.2	12,763.8	664.9	35.0	28.2
Stream 22	2,748.5	234.0	225.9	694.7	85.0	0.1	1,729.9	332.5	11,020.7	746.4	34.4	28.0
Stream 23	0.1	155.3	0.1	570.4	1,156.8	7,971.2	2,354.3	503.0	0.1	664.1	34.5	27.8
Stream 24	0.1	152.6	276.1	214.1	490.7	2,428.9	1,250.1	737.6	10,786.4	673.0	32.9	29.3
Stream 25	0.1	154.9	0.1	545.8	1,017.3	6,628.0	2,191.8	495.3	49.1	700.3	32.9	28.7
Stream 26	3,677.1	150.5	256.2	375.8	667.0	0.1	2,090.5	487.5	1,899.9	652.5	34.4	28.3
Stream 27	0.1	554.9	0.1	446.4	110.2	0.1	981.3	265.9	8,666.1	834.9	34.3	28.6
Stream 28	0.1	137.1	0.1	489.1	1,026.1	0.1	2,058.5	608.2	2,977.2	906.3	34.4	28.8
Stream 29	2,094.7	10.8	0.1	386.7	728.8	8,469.2	96.2	492.2	2,554.6	458.5	33.9	29.1
Stream 30	4,048.3	144.7	360.1	316.2	1,030.6	0.1	1,320.9	196.7	5,452.1	622.0	34.6	28.8
Stream 31	0.1	69.4	152.0	476.7	678.8	0.1	1,568.9	400.8	5,166.4	330.9	35.1	28.7
Stream 32	4,680.5	0.1	1,098.3	621.4	1,157.2	7,126.6	91.8	26.7	1,466.3	645.9	34.2	28.3



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TPC-H Timing Intervals (continued):

	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 33	2,494.3	172.8	1,125.8	1,134.9	981.0	0.1	1,325.0	547.7	9,788.3	455.7	35.9	28.0
Stream 34	4,056.9	148.3	0.1	522.5	849.7	0.1	1,662.2	420.6	4,973.4	662.3	36.2	28.4
Stream 35	0.1	425.4	56.1	539.7	1,119.4	0.1	1,252.7	549.3	8,671.4	924.7	36.1	28.8
Stream 36	0.1	102.1	0.1	451.1	1,070.4	0.1	1,074.1	344.7	11,166.3	743.9	35.0	27.7
Stream 37	3,625.1	135.7	493.4	549.1	1,017.3	3,475.9	1,879.0	24.9	3,320.2	642.3	35.8	27.8
Stream 38	0.1	154.0	160.9	514.5	656.0	0.1	1,334.5	1,237.8	9,716.9	640.5	35.9	29.2
Stream 39	2,901.1	167.9	300.5	504.9	518.6	0.1	2,064.2	438.1	5,946.1	230.9	36.3	28.7
Stream 40	3,624.8	123.4	313.5	550.0	1,001.6	0.1	1,742.7	457.5	0.1	622.9	35.8	28.1
Stream 41	3,357.7	397.6	0.1	559.1	1,129.9	0.1	781.2	616.9	9,880.0	725.2	35.2	29.5
Stream 42	0.1	129.7	0.1	536.1	1,022.7	10,043.2	1,700.9	490.9	7,419.5	358.4	34.9	28.2
Stream 43	4,048.4	240.7	0.1	770.6	1,059.4	0.1	1,926.8	466.8	8,767.4	635.5	35.4	29.2
Stream 44	0.1	149.4	366.9	466.0	1,085.0	0.1	1,998.8	430.9	0.1	589.0	35.2	31.7
Stream 45	0.1	144.5	0.1	449.9	952.1	0.1	1,807.0	366.8	13,022.1	470.0	34.8	28.4
Stream 46	0.1	133.3	321.0	536.7	1,019.9	0.1	2,132.9	539.0	7,577.1	656.5	35.1	28.8
Stream 47	4,466.2	96.9	346.2	349.4	548.3	0.1	1,331.3	273.7	2,878.1	626.4	34.4	28.4
Stream 48	3,749.3	97.3	207.1	381.2	1,008.0	7,920.9	2,081.7	465.9	11,159.7	774.6	34.8	28.2
Stream 49	1,414.3	144.6	0.1	474.0	1,110.7	0.1	1,745.7	459.4	6,574.1	593.4	34.3	28.3
Stream 50	6,116.9	16.7	364.4	32.5	1,076.8	0.1	2,222.7	568.3	9,690.6	726.3	33.8	28.3
Stream 51	0.1	124.6	271.8	345.0	991.0	5,980.9	1,063.7	333.2	11,327.6	744.3	34.3	28.6
Stream 52	0.1	407.7	1,072.2	613.0	1,116.0	6,488.8	1,996.9	551.2	0.1	706.9	33.9	28.6
Stream 53	0.1	149.6	330.7	653.5	1,117.4	0.1	2,082.2	445.6	0.1	693.1	34.5	28.4
Stream 54	0.1	140.8	0.1	598.4	1,059.4	0.1	1,716.2	473.1	7,540.9	703.3	34.2	28.7
Stream 55	0.1	6.8	251.5	459.4	826.9	6,238.2	71.1	391.4	5,329.9	26.4	35.1	28.1
Stream 56	0.1	155.8	0.1	1,299.1	1,128.6	0.1	2,233.0	405.2	0.1	632.7	36.5	28.8
Stream 57	0.1	170.9	0.1	655.2	1,044.2	0.1	2,230.1	493.9	9,138.0	775.9	35.9	28.5
Stream 58	0.1	150.8	272.9	1,051.8	1,065.2	3,048.7	2,274.7	462.6	1,823.6	658.4	35.3	27.8
Stream 59	3,752.0	359.4	248.2	371.6	992.3	0.1	2,079.2	532.9	2,313.6	410.8	33.7	28.3
Stream 60	0.1	143.8	281.7	479.8	1,127.6	0.1	2,228.9	461.2	9,704.9	702.6	35.3	28.1
Stream 61	2,305.8	181.6	656.9	1,231.2	1,061.0	2,575.2	2,046.1	619.8	0.1	627.6	35.7	27.9
Stream 62	0.1	350.6	280.0	429.4	897.2	0.1	1,910.3	1,175.4	12,772.7	433.0	36.1	27.6
Stream 63	5,139.5	316.2	0.1	1,246.1	496.9	0.1	2,101.1	384.6	9,909.2	786.9	34.4	28.0
Stream 64	0.1	134.3	0.1	585.1	797.0	7,919.5	1,548.7	333.4	2,785.7	670.5	35.4	28.1
Minimum	0.1	0.1	0.1	23.67	75.84	0.1	71.11	24.86	0.1	26.41	32.85	27.61
Average	1559.1	161.7	250.5	520.3	931.8	1861.1	1690.8	484.0	6083.3	626.9	34.7	28.6
Maximum	6116.9	561.9	1125.8	1299.1	1203.0	17455.9	2358.9	1246.2	13022.1	950.3	36.5	31.7