

UNISYS	ES7000 Orion 440 Enterprise Server		TPC-H Rev. 2.1.0	
			Report Date June 27, 2005	
Total System Cost		Composite Query per Hour Rating		Price Performance
\$901,528 USD		21,505.7 / QphH @ 1000GB		\$41.93 / QphH @ 1000GB
Database Size	Database Manager	Operating System	Other Software	Availability Date
1000 GB*	Microsoft SQL Server 2005 Enterprise Edition 64-bit	Microsoft Windows Server 2003, Datacenter Edition (64-bit) SP1	Microsoft Visual C++	Dec 07, 2005 **

Query Time in Seconds

Legend:
 ■ Power Test
 ■ Throughput Test
 - - - - - Geometric Mean of Power Test
 ——— Arithmetic Mean of Throughput Test

Database Load Time = 19:17:03		Load included backup: Y	Total Data Storage / Database Size = 16.82
RAID (Base tables): N		RAID (Base tables and Auxiliary Data Structures): N	RAID (All): N
System Configuration			
Processors	32 x 1.6 GHz Intel® Itanium2™ with 6MB Level 3 Cache		
Memory	128 GB Main Memory		
Disk Controllers	30 PCI Fibre Channel 2 PCI SCSI		
Disk Drives	91 18GB FC (16.97 GB useable) 231 36GB FC (34.8 GB useable) 98 73GB FC (68.24 GB useable) 8 72GB SCSI (68.36 GB useable)		
Total Disk Storage	16,817 GB		

* Database size includes only raw data (eg, no temp, index, redundant storage space, etc.)

** All hardware available now

UNISYS	ES7000 Orion 440 Enterprise Server		TPC-H Rev. 2.1.0				
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Description	Part No.	Third Party		Unit Price	Qty.	Extended Price	3 yr.Maint. Price
		Brand	Price				
Server Hardware:							
SYS: ES7000-440, 32x 1.6GHz/6MB, 32GB Mem.	ES7440327-100	1		\$361,362	1	\$361,362	\$13,968
1x RAID Controller, 2x 36GB Disk (boot media)	Included						
Sentinel System Management S/W and Media	Included						
36Ux19"x34" cabinet and skins	Included						
MEM: 32GB Memory Package	MEM321-32G	1		\$22,800	3	\$68,400	
MOD: I/F, 2-Slot IO Module, 133MHz	MOD3133-PCI	1		\$1,805	12	\$21,660	
CTRL: Fibre Channel HBA, 2-Port, 64-bit PCI	FCH752323-PCX	1		\$2,138	11	\$23,518	
CTRL: Fibre Channel HBA, 2-Port, 64-bit PCI	FC76222-P64	1		\$2,850	19	\$54,150	
CTRL: SCSI RAID HBA, 2-Channel, u320, PCI-X	RAD754323-P64	1		\$1,520	1	\$1,520	
CTRL: Ethernet, 1000Mb, 1-Port Cu, PCI	ETH33312-PCX	1		\$152	1	\$152	
I/F: Monitor, 17-inch LCD, Kybrd, Mse & Cable	ES70004-UIF	1		\$665	1	\$665	
				Server Subtotal		\$531,427	\$13,968
Storage Hardware:							
DISK: 1.5TB Pkg, 84x 18GB, 15Krpm, + 10% spares *	JBD201815-P84	1		\$28,220	1	\$28,220	Spared
DISK: 0.2 TB Pkg, 14x 18GB, 15Krpm, + 10% spares *	JBD201815-P14	1		\$7,342	1	\$7,342	Spared
DISK: 18GB Drive, 15Krpm, 2Gb FC, SCA	JBD201815-2F	1		\$546	3	\$1,638	Spared
DISK: 3.0TB Pkg, 84x 36GB, 15Krpm, + 10% spares *	JBD203615-P84	1		\$36,086	3	\$108,258	Spared
DISK: DISK: 36GB Drive, 15Krpm, FC, + 10% spares *	JBD203615-2F	1		\$646	3	\$1,938	Spared
DISK: 6.0TB Pkg, 84x 73GB, 15Krpm, + 10% spares *	JBD207315-P84	1		\$63,503	1	\$63,503	Spared
DISK: 1.0TB Pkg, 14x 73GB, 15Krpm, + 10% spares *	JBD207315-P14	1		\$14,772	1	\$14,772	Spared
DISK: 73GB Drive, 15Krpm, FC, + 10% spares *	JBD207315-2F	1		\$1,088	10	\$10,880	Spared
RCK: FC 2Gb Storage, Standard, Optical/Optical I/F	JBD2020-SA	1		\$3,958	30	\$118,740	\$18,720
DISK: 72GB, 15Krpm, U320 SCSI	HDF1072150-X35	1		\$694	8	\$5,552	
RCK: ES7K U320 SCSI 4-Disk, 1 Channel	EPD3141-DSK	1		\$1,615	2	\$3,230	
CBL: 10FT LVD SCSI VHDD	CBL2210-OSM	1		\$124	2	\$248	
CBL: Ethernet, Cat5e, RJ45 Conn's, 4m	DSH600004-TBT	1		\$19	1	\$19	
CBL: FC, Optical, LC->LC Conn's, 10m + 10% Spares *	GCFAZLL10	3	3	\$29	60	\$1,740	Spared
RCK: Rack Mount Kit, Disk Enclosure	JBD2001-RMK	1		\$190	30	\$5,700	
PWR: Distribution Strip, 9-Plug, 220V	SFR9-PWR	1		\$162	9	\$1,458	
CBL: Power, U.S. (Domestic), C20 - L6-20P	USE1936-LC6	1		\$86	9	\$774	
CAB: 36U x 19" x 41" Open Front Cabinet	HRT361941-OFT	1		\$1,425	3	\$4,275	
				Storage Subtotal		\$378,287	\$18,720
Server Software:							
O/S: Windows Srvr 2003, Datacenter Edtn,32P, 1yr Lsub.	WND6432-TSP	2	1	\$70,224	1	\$70,224	\$31,644
O/S: Windows Server 2003, DC Lmtd Sbscrptn, 1yr.	DUS200332-TSP	2	1	\$6,346	2	\$12,692	
ACC: Sentinel System Management Sbscrptn, 1yr.	SEN20000-SUB	1		\$3,420	2	\$6,840	
APP: Microsoft SQL Server 2005 Enterprise Edtn (64-bit)	810-00652	2	2	\$7,233	1	\$7,233	** Inc. below
APP: Microsoft SQL Server 2005 Client Licenses	359-00532	2	2	\$139	70	\$9,730	** Inc. below
ACC: Microsoft Visual C++ Standard Edition	254-00170	2	2	\$109	1	\$109	** Inc. below
SRVC: Microsoft Problem Resolution Services **		2	2	\$245	1	\$245	\$245
				Software Subtotal		\$106,828	\$31,889
Note: All prices are effective as of the date of publication Computer Resolutions Inc. 18% Large Volume Discount						Total USD	\$1,016,542 (\$179,591)
Notes:							
1. 3rd Party Brand & Pricing: 1 = CRI Product Price, Unisys Maintenance Price 2 = Microsoft 3 = GoCables					Three Year Cost of Ownership: \$901,528 USD		
2. HW & SW maintenance figured at 24 x 7 w/ 4 hr. max. response time for spares.					QpH @ 1TB: 21,505.7		
3. * = 10% spares added in place of onsite service.					\$/ QpH@1TB: \$41.93		
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	16.82
Start of Database Load	6/19/2005 0:14:19
End of Database Load	6/19/2005 19:31:22
Database Load Time	19:17:03
Query Streams for Throughput Test	7
TPC-H Power	27494.5
TPC-H Throughput	16821.3
Composite Query per Hour Rating (QphH@1000GB)	21505.7
Total System Price Over 3 Years	\$901,528 USD
TPC-H Price Performance Metric	\$41.93 USD

Measurement Intervals

Measurement Interval in Throughput Test (Ts)	32958.2 seconds
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Duration of Stream Execution:

	Seed	Query Start Date/Time	RF1 Start Date/Time	RF2 Start Date/Time	Duration
		Query End Date/Time	RF1 End Date/Time	RF2 End Date/Time	
Stream 0	619193122	6/20/05 9:06:55	6/20/05 9:00:45	6/20/05 10:28:22	01:32:05
		6/20/05 10:28:21	6/20/05 9:06:54	6/20/05 10:32:50	
Stream 1	619193123	6/20/05 10:32:53	6/20/05 10:32:53	6/20/05 18:19:02	7:51:42
		6/20/05 17:36:57	6/20/05 18:19:00	6/20/05 18:24:35	
Stream 2	619193124	6/20/05 10:32:54	6/20/05 18:24:40	6/20/05 18:30:39	8:03:27
		6/20/05 17:54:24	6/20/05 18:30:37	6/20/05 18:36:21	
Stream 3	619193125	6/20/05 10:32:54	6/20/05 18:36:27	6/20/05 18:42:18	8:15:11
		6/20/05 18:06:31	6/20/05 18:42:15	6/20/05 18:48:06	
Stream 4	619193126	6/20/05 10:32:55	6/20/05 18:48:14	6/20/05 18:54:35	8:28:09
		6/20/05 18:12:40	6/20/05 18:54:31	6/20/05 19:01:04	
Stream 5	619193127	6/20/05 10:32:56	6/20/05 19:01:12	6/20/05 19:07:47	8:41:27
		6/20/05 18:13:56	6/20/05 19:07:36	6/20/05 19:14:23	
Stream 6	619193128	6/20/05 10:32:56	6/20/05 19:14:35	6/20/05 19:21:38	8:55:23
		6/20/05 18:03:10	6/20/05 19:21:32	6/20/05 19:28:19	
Stream 7	619193129	6/20/05 10:32:57	6/20/05 19:28:30	6/20/05 19:35:53	9:09:14
		6/20/05 17:25:24	6/20/05 19:35:49	6/20/05 19:42:11	

TPC-H Timing Intervals (in seconds):

Query	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Stream 0	515.0	27.5	90.6	53.3	134.4	26.7	138.5	103.5
Stream 1	4124.3	73.8	945.3	917.8	1692.4	88.9	780.4	557.8
Stream 2	3680.1	182.6	690.2	328.6	1654.9	198.2	1439.4	1470.6
Stream 3	1985.8	60.7	503.6	642.3	2514.0	133.8	1293.8	484.8
Stream 4	3877.2	112.8	160.5	751.2	369.8	72.0	940.8	1059.5
Stream 5	2975.5	162.2	1774.5	823.5	2377.0	134.3	1171.7	732.7
Stream 6	2596.0	108.5	2095.0	656.5	2156.4	93.5	1673.2	1072.9
Stream 7	2075.5	199.4	357.1	489.5	1855.5	127.9	476.4	1151.3
Min Qi	1985.8	60.7	160.5	328.6	369.8	72.0	476.4	484.8
Max Qi	4124.3	199.4	2095.0	917.8	2514.0	198.2	1673.2	1470.6
Avg Qi	3044.9	128.6	932.3	658.5	1802.9	121.2	1110.8	932.8
Query	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Stream 0	668.4	65.3	62.1	179.5	194.3	48.0	38.5	130.1
Stream 1	1741.9	851.2	1484.2	1852.6	1604.4	162.7	182.1	608.2
Stream 2	1395.8	1022.1	334.8	1077.1	912.7	1848.7	214.8	583.7
Stream 3	2082.0	825.0	601.9	1392.1	743.4	390.4	133.3	1031.0
Stream 4	2069.1	752.7	1478.2	1925.0	1006.8	300.5	187.4	261.2
Stream 5	2075.3	1049.3	1267.7	1144.0	1201.1	273.7	209.5	451.8
Stream 6	2730.2	630.0	644.5	964.2	1171.1	449.3	352.8	589.7
Stream 7	3166.9	263.7	983.0	560.7	2098.4	324.0	140.9	417.6
Min Qi	1395.8	263.7	334.8	560.7	743.4	162.7	133.3	261.2
Max Qi	3166.9	1049.3	1484.2	1925.0	2098.4	1848.7	352.8	1031.0
Avg Qi	2180.2	770.6	970.6	1273.7	1248.3	535.6	203.0	563.3
Query	Q17	Q18	Q19	Q20	Q21	Q22	RF1	RF2
Stream 0	62.4	1110.6	117.4	60.0	867.3	192.8	368.3	268.2
Stream 1	331.7	3528.4	544.0	324.4	2537.4	509.6	27967.0	333.3
Stream 2	633.5	4350.3	818.4	365.8	2861.4	426.9	357.0	342.0
Stream 3	684.0	4820.5	626.9	1008.4	4742.2	516.8	348.6	347.5
Stream 4	1417.8	4158.3	1460.3	117.9	4821.7	283.9	377.0	389.4
Stream 5	605.9	5398.5	568.1	323.2	2606.6	333.9	384.4	395.9
Stream 6	243.6	4157.7	527.0	351.2	3328.8	421.1	416.2	401.0
Stream 7	688.1	4591.4	565.2	922.2	2951.8	340.1	439.0	378.2
Min Qi	243.6	3528.4	527.0	117.9	2537.4	283.9	348.6	333.3
Max Qi	1417.8	5398.5	1460.3	1008.4	4821.7	516.8	27967.0	401.0
Avg Qi	657.8	4429.3	730.0	487.6	3407.1	404.6	4327.0	369.6