

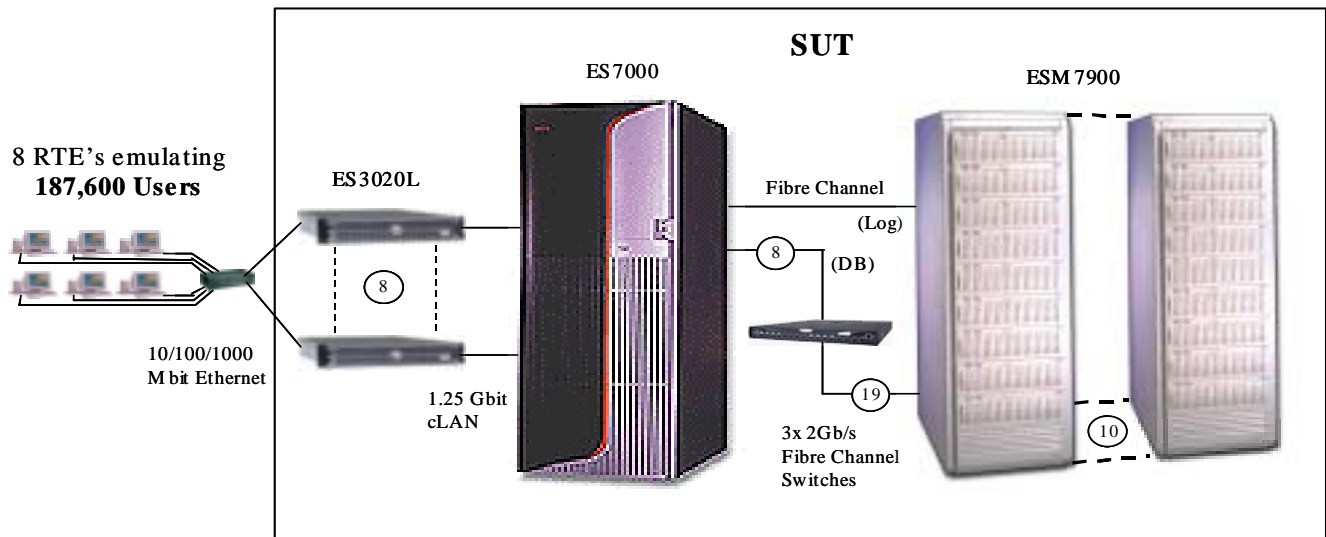


ES7000 Orion 230 Enterprise Server

TPC-C Rev. 5.0

Report Date: Dec. 9, 2002
Updated: Mar. 28, 2003

Total System Cost	TPC-C Throughput	Price Performance	Availability Date
\$2,715,310	234,325.10 tpmC	\$11.59 / tpmC	May 2, 2003
Processors	Database Manager	Operating System	Other Software
32 - Database 16 - Clients	Microsoft SQL Server 2000 Enterprise Edition	Microsoft Windows Server 2003, Datacenter Edition	Windows 2000 Server w/ IIS 5.0 and COM+ Microsoft Visual C++
Number of Users			
18,760			



Clients (each of 8)
ES3020L Server
2 x 2.4GHz Intel® Xeon™
w/ 512KB L2 cache,
1 GB memory,
1 x 18GB internal disk,
2 Inbuilt 10/100/1000Mb
Ethernet (1 used),
1 x PCI cLAN controller

**ES7000 Orion 230
Enterprise Server**
32 x 2.0GHz Intel® Xeon™ MP
w/ 2MB L3 cache,
64 GB memory,
1 PCI SCSI controller,
2 x 36GB internal SCSI disks,
9 x PCI Fibre Channel controllers,
8 x PCI cLAN controllers

**Storage
ESM7900**
814 x 18GB + 34 x 36GB
Hot-Pluggable
External Fibre Channel disks
20 x FC RAID controllers

System Components	Enterprise Server		Clients (each of 8)	
	Quantity	Type	Quantity	Type
Processors	32	2.0GHz Intel® Xeon™ MP with 2MB Level 3 Cache	2	2.4GHz Intel® Xeon™ with 512KB Level 2 Cache
Memory	4	16 GB	2	512 MB
Disk Controllers	9	PCI Fibre Channel	1	Inbuilt SCSI
	1	PCI SCSI (boot media)		
Disk Drives	814	18GB FC (16.4 GB useable)	1	18GB SCSI (16.9 GB useable)
	34	36GB FC (32.7 GB useable)		
	2	36GB SCSI (32.7 GB useable)		
Total Storage		13.8 TB		16.9 GB
Tape / CD-ROM	1	SCSI CD-ROM	1	IDE CD-ROM
Terminals	2	Console Monitor	1	Console Monitor



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Description	Part No.	Third Party		Unit Price	Qty.	Extended Price	3 yr.Maint. Price
		Brand	Price				
Server Hardware:							
SYS: ES7000 Orion 230,32x 2.0GHz Procs, 16 GB Mem. 1x RAID Controller, 2x 36GB Disk (boot media) Sentinel System Management S/W and Media	ES7321831-GD			\$489,600	1	\$489,600	\$67,824
MEM: 16GB, 1 GB DIMMs	RAM7-16G			\$23,573	3	\$70,719	
CTRL: Fibre Channel HBA, 2-Port, 64-bit PCI	FC76222-P64			\$2,720	9	\$24,480	
CTRL: cLAN, PCI Host Adapter & Cable	PCI10001-CXG			\$721	8	\$5,768	
CTRL: 2Ch SCSI, U160, PCI	PCI7602-P64			\$544	1	\$544	
I/F: Monitor, 15-inch Color, Kybrd, Mse & Cable	ES70003-UIF			\$544	2	\$1,088	
Server Software:							
O/S: Microsoft Windows .NET Datacenter & SQL Package	WNQ323232-LIT	2	1	\$476,907	1	\$476,907	\$43,200
SRVC: Microsoft Database Server Support Package*	PRO-PRORS-16U-01	2	2	\$1,950	3	\$5,850	\$5,850
Server Subtotal						\$1,069,106	\$116,874
Storage Hardware:							
DISK: 18GB Drive, 15K FC, SCA	ESM18304-F94			\$728	814	\$592,592	Spared
DISK: 18GB Drive, 15K FC, SCA 10% spares**	ESM18304-F94			\$728	82	\$59,696	\$59,696
DISK: 36GB Drive, 10K FC, SCA	ESM36202-F94			\$928	34	\$31,552	Spared
DISK: 36GB Drive, 10K FC, SCA 10% spares**	ESM36202-F94			\$928	4	\$3,712	\$3,712
DAE: Expansion Enclsr, w/ 0 Disk	ESM7200-DAE			\$4,087	79	\$322,873	\$71,100
DPE: 2 RAID Cntrl, 1GB Cache ea., 0 Disk	ESM7900-DPE			\$44,200	10	\$442,000	\$96,480
SYS MGT: Storage Agent, Monitor, Call Home & ATF	ESM1710-W2K			\$1,661	1	\$1,661	\$1,044
SWTCH: Switch & Software, 16-port FC, 2Gbit/s	HSC30438-S16			\$18,936	3	\$56,808	\$17,820
ACC: SFP, 2Gb/s Shortwave	HSC50400-SFS			\$218	39	\$8,502	\$2,808
CBL: FC, 50um Dupx, LC->SC Conn's, 10m	CBL170-10			\$277	20	\$5,540	
CBL: FC, 50um Dupx, LC->LC Conn's, 10m	CBL171-10			\$279	14	\$3,906	
PWR: Distribution Strip, 9-Plug, 220V	SFR9-PWR			\$295	20	\$5,900	
CBL: Power, U.S. (Domestic), C20 - L6-20P	USE1936-LC6			\$126	20	\$2,520	
CAB: 36U x 19" x 34" Open Front Cabinet	HRT361934-OFT			\$1,473	10	\$14,730	
DOOR: 36U x 19", Rear	HRT3619-RDR			\$368	10	\$3,680	
PNL: 36U x 34" Side Skins, L&R HRT	HRT3634-SDS			\$589	10	\$5,890	
INSTL: Stabilizer Foot	RM1936-FOT			\$126	10	\$1,260	
Storage Subtotal						\$1,499,414	\$252,660
Client Hardware:							
SYS: ES3020L w/ 1x 2.4GHz Proc., 0MB Mem	ESL30201-240			\$1,413	8	\$11,304	\$10,464
PROC: 1x 2.4GHz Intel Xeon/512KB Cache	CPL3020241-512			\$722	8	\$5,776	
MEM: 1GB, 2x512MB DDR DRAM PC133ECC	DIM3000022-1GB			\$723	8	\$5,784	
RCK: ESL2026 Disk Backpanel, 1x4	HBP3020101-51			\$205	8	\$1,640	
DISK: 18GB 10Krpm 3.5 Internal	HDM18110-DC4			\$258	8	\$2,064	
CTRL: cLAN, PCI Host Adapter & Cable	PCI10001-CXG			\$721	8	\$5,768	
RCK: ES3020L Universal Rack Kit	ESL3020-VRL			\$258	8	\$2,064	
SWTCH: Switch, 8-port KVM	SWC81-SXR			\$1,179	1	\$1,179	\$1,116
CBL: Cable, KVM, 12 foot	CBL121-SWC			\$111	8	\$888	
KBD: Keyboard & Drawer, Rackmount	KBR28301-SXR			\$258	1	\$258	
MON: Display, Rackmount LCD	MON2145-LCD			\$1,989	1	\$1,989	
PWR: Distribution Strip, 9-Plug, 220V	SFR9-PWR			\$295	2	\$590	
CBL: Power, U.S. (Domestic), C20 - L6-20P	USE1936-LC6			\$126	2	\$252	
CAB: 36U x 19" x 34" Open Front Cabinet	HRT361934-OFT			\$1,473	1	\$1,473	
DOOR: 36U x 19", Rear	HRT3619-RDR			\$368	1	\$368	
PNL: 36U x 34" Side Skins, L&R HRT	HRT3634-SDS			\$589	1	\$589	
INSTL: Stabilizer Foot	RM1936-FOT			\$126	1	\$126	
Client Software:							
O/S: Microsoft Windows 2000 Server	C11-00821	2	2	\$738	8	\$5,904	* Inc. above
ACC: Microsoft Visual C++ .NET Standard	254-00170	2	2	\$109	1	\$109	* Inc. above
Client Subtotal						\$48,125	\$11,580
Total						\$2,616,645	\$381,114
						(\$267,404)	(\$15,045)

Notes:

1. 3rd Party Brand & Pricing: 1 = Comark Product Price, Unisys Maintenance Price
2 = Microsoft
2. HW & SW maintenance figured at 24 x 7 w/ 4 hr. max. response time for spares.
3. ** = 10% spare disks added in place of onsite service.

Three Year Cost of Ownership: \$2,715,310
tpmC Rating: 234,325.10
\$/ tpmC: \$11.59

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

MQTh, Computed Maximum Qualified Throughput: 234,325.10 tpmC

Response Times, in seconds

Transaction	90th %ile	Average	Maximum
New-Order	0.50	0.35	10.91
Payment	0.43	0.30	5.48
Order-Status	0.48	0.33	15.56
Delivery (interactive portion)	0.29	0.20	2.75
Delivery (deferred portion)	0.38	0.26	2.83
Stock-Level	1.40	1.00	6.08
Menu	0.29	0.20	3.34

Response time delay added for emulated components, in seconds

RT Response time	0.1
Menu Response time	0.1

Transaction Mix, in percent of total transactions

New Order	44.88%
Payment	43.05%
Order-Status	4.01%
Delivery (interactive portion)	4.01%
Stock-Level	4.02%

Keying / Think Time Times, in seconds

Transaction	Minimum	Average	Maximum
New Order	18.01 / 0.00	18.01 / 12.03	18.03 / 120.31
Payment	3.01 / 0.00	3.01 / 12.03	3.03 / 120.33
Order-Status	2.01 / 0.00	2.01 / 10.07	2.03 / 100.70
Delivery (interactive portion)	2.01 / 0.00	2.01 / 5.06	2.03 / 50.61
Stock-Level	2.01 / 0.00	2.01 / 5.06	2.03 / 50.61

Test Duration

Ramp up time	39 minutes
Measurement interval (M)	120 minutes
Transactions (all types) completed during measurement interval	62,647,652
Ramp-down time	66 minutes

Checkpointing:

Number of checkpoints	4
Checkpoint interval	30 minutes