Data General

TPC Benchmark™ C
Full Disclosure Report

Data General AViiON® 6600 Server
Using Microsoft SQL Server v. 6.5, Enterprise Edition®
and Microsoft Windows NT Server v. 4.0, Enterprise Edition®

First Edition

December 1997

Data General FDR Order No. 012-004977-00
Data General Executive Summary Order No. 012-004978-00

TPC Benchmark™ C Full Disclosure Report,
Data General AV 6600 Server Using Microsoft SQL Server v. 6.5, Enterprise Edition and Windows NT Server v. 4.0, Enterprise Edition
Edition 1

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Document Number: 012-004977-00

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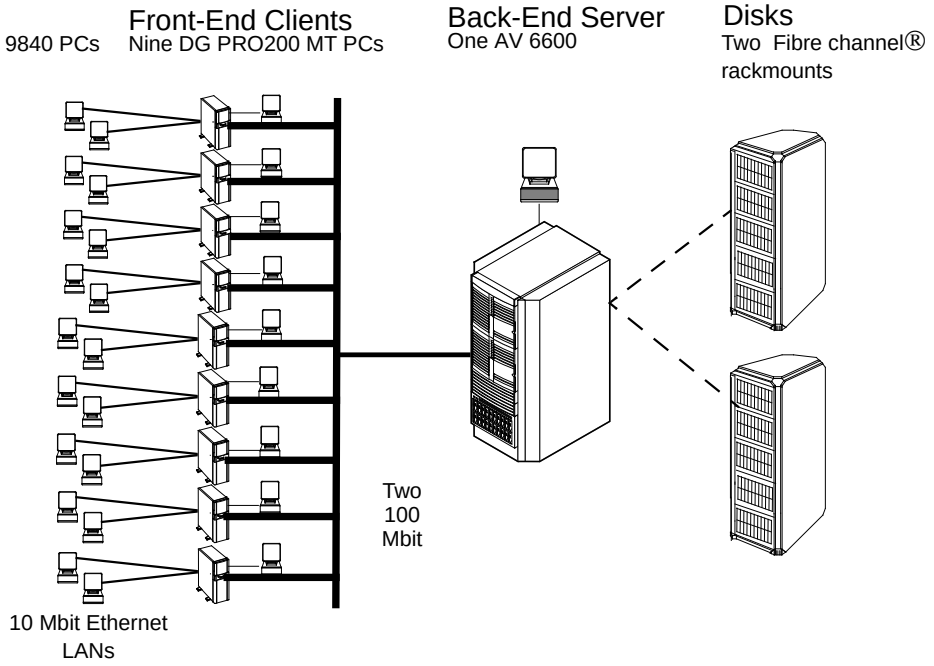
Executive Summary

The following pages list key results from the benchmark, including tpmC (transactions per minute) and price per tpmC (five-year capital cost per measured tpmC). The remainder of the report provides details about the hardware, software, and test methodology, as required by the Transaction Processing Performance Council.

Data General Corporation	AViiON 6600 Client/Server	TPC-C Rev. 3.3 Report Date: December 4, 1997

Total System Cost	TPC-C Throughput	Price / Performance	Availability Date
$864,485	**12,030.47 tpmC**	**$71.86 per tpmC**	**February 1998**

Processors	Database Manager	Operating System	Other Software	Number of Users
Back-End 1 x 6-way Intel Pentium Pro @ 200 MHz	**Microsoft SQL Server v. 6.5, Enterprise Edition**	**Windows NT Server v. 4.0, Enterprise Edition**	**Microsoft Internet Connector License, Microsoft Visual C++ MS SQL Server Programmers Toolkit, NCR TopEnd v.2.04.01**	**9840**



Components		Front-End Clients: Data General Pentium Pro 200 MT		Back-End Server: AV 6600
	Qty	**Type**	**Qty**	**Type**
Processors	9 clients	each with 1 Intel Pentium Pro @ 200 MHz	1	6-way Intel Pentium Pro @ 200 MHz with 1 MG L2 cache
Memory	9 clients	each with 192 MB memory	1	4 GB memory
Disk Controllers	9 clients	each with 1 integrated EIDE adapter	1	Integrated SE SCSI adapter,
			4	QLogic Fibre Controllers
Network Hardware	9 clients	each with 2 10-Mbit Ethernet PCI controllers, and 1 100-Mbit controller	2	100 Mbit Ethernet PCI controller
CD-ROM	9 clients	each with 1 CD-ROM	1	CD-ROM
Disk Drives	9	each with a 2.5 GB disk	139 2	9 GB disks 4 GB internal drives
Total GB of Storage	22.5	GB total storage	1259	GB total storage
Terminals	9840	PCs used as ASCII terminals, plus one DG console	1	DG console terminal

Data General Corporation

AViiON 6600 Client/Server

TPC-C Rev. 3.3
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Description	Model	Third Party* Brand	Pricing	Unit Price	Qty	Ext. Price	5-Yr. Maint.
Server Hardware							
"AV6600,3 CPU/512KB, 256MB, LAN, SCSI, CD"	70708-AE			$28,436	1	$28,436	$5,697
ADD-ON 1GB MEM (4X256MB DIMM)	7106			$26,246	3	$78,739	$2,650
REPL 256MB WITH 1GB (4X256MB DIMM)	R7375			$22,496	1	$22,496	$1,104
4GB 1'' HOT SWAP DISK FOR AV3600R/6600	61024-SJC			$1,356	2	$2,712	$883
REPL TRI-CPU BOARD (200MHZ/512KB) W(200MHZ/1MB)	R7100			$13,676	1	$13,676	$1,104
ADD-ON TRI-CPU BOARD (200MHZ/1MB)	7200			$24,476	1	$24,476	$1,104
ETHERExpress PRO 100 LAN Card	PILA8480	Software House Internationa	4	$457	4	$1828	$0
"D1600I 14'' TERMINAL, WHITE, ERGONOMIC"	6945W			$306	1	$306	$221
"D1200I/D1600I 101-KEYBOARD, PWR CORD"	G6001A-A			$58	1	$58	$66
60'' DEEPRACK CABINET	14001-G7			$2,725	1	$2,725	$0
P-F-Rack/Rack Cabinet	9470157			$5,000	2	$10,000	$0
DAE Rackmount Kit	C7680G-A			$75	14	$1,050	$0
Rackmount 10-slot DAE	C5001R-ASC			$3,206	14	$44,888	$18,184
DAE to DAE Rackmount Cable	15495 E001			$45	10	$450	$0
9GB 7200 RPM Disk	C0972FG-A			$1,988	139	$276,263	$82,066
Host to DAE FC Cable	15496 E010			$75	4	$300	$0
Other PCI Fibre Channel Host	118025373			$750	4	$3,000	$1,102
Subtotal						**$511,403**	**$114,181**
Server Software							
Microsoft Windows NT Server, Enterprise Ed 4.0 incl 25 CALs		Microsoft	1	$3,999	1	$3,999	$0
Microsoft SQL Server, Enterprise Edition, 6.5 plus User License		Microsoft	1	$28,999	1	$28,999	$10,475
Subtotal						**$32,998**	**$10,475**
Client Hardware							
"DG/V Pro200MT, 64MB, FDD, No HD"	92632N-A			$3,826	9	$34,431	$9,936
64MB SIMM Upgrade (2x32MB)	22100			$662	18	$11,922	$0
2.5GB High Perf Enhanced ID	26088			$456	9	$4,100	$3,180
12x Atapi CD-ROM	26098			$187	9	$1,683	$1,192
"3C905-TX, 10/100Base-T Nic"	24037			$144	27	$3,892	$3,577
14" SVGA Monitor	26105GD			$238	9	$2,142	$1,192
Subtotal						**$58,171**	**$19,077**
Client Software							
Microsoft Windows NT Server 4.0 incl 5 CALs		Microsoft	1	$809	9	$7,281	$0
Microsoft SQL Workstation (incl Programmers Toolkit)		Microsoft	1	$499	1	$499	$0
Microsoft Visual C++ 32-bit edition		Microsoft	1	$499	1	$499	$0
TopEnd	ESC-TESERV-001	Entersoft	2	$2,700	9	$24,300	$0
TopEnd RTQ	ESC-TERTQ-001	Entersoft	2	$675	1	$675	$0
TopEnd Global Admir	ESC-TEADM-000	Entersoft	2	$500	1	$500	$0
TopEnd - ISD	ESC-TEISD-000	Entersoft	2	$1,000	1	$1,000	$0
TopEnd Support	ESC-TESUP-000	Entersoft	2	$0	1	$0	$19,860
Subtotal						**$34,754**	**$19,860**
User Connectivity							
Ethernet Hub, 8-port 100TX + 10% spares	NX-H8TX	NETLUX	3	$299	4	$1,196	$0
Ethernet Hub, 16-port 10 Base-T + 10% spares	NX-H16EZ	NETLUX	3	$90	693	$62,370	$0
Subtotal						**$63,566**	**$0**
Totals:						**$700,892**	**$163,593**
5-year cost of ownership:						**$864,485**	
tpmC Rating:						**12,030.47**	
$/tpmC:						**$71.86**	

Notes:
***. 10% spares or 2 spares minimum were included for hardware from third-party vendors in place of on-site service; these products include 5 year return-to-vendor warranty**
1. Microsoft
2. Entersoft
3. NETLUX
4. Software House International

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 assumptions 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 benchmark specifications. If you find that the stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org.

Audited by Francois Raab and Larry Fontana, Information Paradigm, Inc.

TPC-C Rev. 3.3 Numerical Quantities Summary for Data General AViiON 6600

Computed Maximum Qualified Throughput (MQTh) 12,030.47 tpmC

Percent Throughput Difference In Reported and Reproducibility Runs .61%

Transaction Response Times

	90th Percentile	Average	Maximum
New Order	1.59	0.87	7.75
Payment	0.58	0.41	3.31
Order-Status	1.18	0.78	4.24
Delivery (interactive portion)	0.40	0.37	2.60
Delivery (deferred portion)	18.99	11.48	
Stock-Level	2.81	1.68	8.00
Menu	0.31	0.22	2.85

Response Time Delay (in seconds)

RT Response Time	0.1
Menu Response Time	0.1

Transaction Mix (in percent of total transactions)

New Order	44.73
Payment	43.11
Order-Status	4.04
Delivery	4.07
Stock-Level	4.04

Keying / Think Times (in seconds)

	Minimum	Average	Maximum
New Order	18.00 / 0.00	18.01 / 12.08	18.07 / 120.51
Payment	3.01 / 0.00	3.01 / 12.10	3.06 / 120.50
Order-Status	2.01 / 0.00	2.01 / 10.24	2.06 / 84.39
Delivery	2.00 / 0.00	2.01 / 5.05	2.06 / 45.30
Stock-Level	2.01 / 0.00	2.01 / 5.06	2.06 / 43.78

Test Duration (in minutes)

Ramp-up Time	17 min
Measurement Interval	30 min
Transactions (all types) completed during measurement interval	806,785
Ramp down time	10 min

Checkpointing

Number of checkpoints	1
Checkpoint interval	30 min

The TPC-C Benchmark C Overview

The TPC-C benchmark was developed by the Transaction Processing Performance Council (TPC), a consortium of system vendors, software suppliers, and computer users. The TPC was founded to define transaction benchmarks and to disseminate objective, verifiable, performance data to the industry. Data General is an active participant in the TPC.

The TPC-C benchmark is defined in the document, *TPC Benchmark™C Standard Specification*, Version 3.3. Clause 0.1 from that document provides the following overview.

0.1 TPC Benchmark™ C (TPC-C) is an OLTP work load. It is a mixture of read-only and update intensive transactions that simulate the activities found in complex OLTP application environments. It does so by exercising a breadth of system components associated with such environments, which are characterized by:

- *The simultaneous execution of multiple transaction types that span a breadth of complexity*
- *On-line and deferred transaction execution modes*
- *Multiple on-line terminal sessions*
- *Moderate system and application execution time*
- *Significant disk input/output*
- *Transaction integrity (ACID properties)*
- *Non-uniform distribution of data access through primary and secondary keys*
- *Databases consisting of many tables and a wide variety of sizes, attributes, and relationships*
- *Contention on data access and update*

The performance metric reported by the TPC-C is a "business throughput" measuring the number of orders processed per minute. Multiple transactions are used to simulate the business activity of processing an order, and each transaction is subject to a response time constraint. The performance metric for this benchmark is expressed in transactions-per-minute-C (tpmC). To be compliant with the TPC-C standard, all references to tpmC results must include the tpmC rate, the associated price-per-tpmC, and the availability date of the priced configuration.

Despite the fact that this benchmark offers a rich environment that emulates many OLTP environments, this benchmark does not reflect the entire range of OLTP requirements. In addition, the extent to which a customer can achieve the results reported by a vendor is highly dependent on how closely TPC-C approximates the customer application. The relative performance of systems derived from this benchmark does not necessarily hold for other workloads or environments. Extrapoliations to any other environment are not recommended.

Structure of This Report

This report follows the structure defined by the *TPC Benchmark™C Standard Specification*, Version 3.3. When clauses from that document are quoted, the clause number appears in bold type, text from the clause appears in italics, and Data General's response to the clause follows in standard type.