

MS SQL Server 6.5 Enterprise Edition Versus Oracle8 Enterprise Edition



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Oracle8 is a registered trademark of Oracle.



December 12, 1997

GartnerGroup Evaluation Requested

We are requesting from GartnerGroup a recommendation for a back end database for Washington State Social Services Payment System (SSPS). At this time we are not addressing the SSPS production system. We are, instead, working on a year 2000 based SSPS contingency project, an alternate project to be used in case of date fix problems. The consideration of a relational DBMS is for research and development. Although the date replacement in the Unisys based SSPS program is highly successful in its progress and estimated for early completion, we are commissioned to continue the contingency project. Work completed in this project could be used for future system enhancement.

A Utah based contractor, Data Systems International (DSI), has designed an application for the contingency project using the company's own native database. The software is written in a combination of C++ and Niakwa Programming Language (NPL). The front end application is promising, but we have reservations in terms of a proprietary database from a small company and the fact that DSI is not even at the level of a 2-tier client server architecture.

Our plans from this time forward are as follows: We plan to have DSI put their application into Microsoft Transaction Server and port the back end from their DSI native database to either MS SQL Server or Oracle for a prototype. The relational DBMS will be set up with the appropriate combination of 2nd and 3rd normal form. In this way we can make good use of work completed by DSI; overcome the architecture issues; and also take over the coding from DSI, incrementally converting to Visual Basic 5 as updates are required. Updates would be made in manageable pieces, rather than as a big project. If successful, eventually we could run the two versions of SSPS parallel and discontinue the mainframe when feasible.

A summary of basic SSPS statistics are included here, followed by our initial efforts at documenting the features of Oracle and MS SQL Server. We do not plan to add case management to our payment program, but rather create simply a better payment program for our customers. We want to create a true OLTP system and an operational data store (ODS) expecting to be 15-20 GB in the next 3 years.

Shirley Stirling
SSPS Contingency Project Manager

State of Washington, Department of Social and Health Services
Administrative Services Division
Phone: (360) 902-8302 E-mail: STIRLSA@DSHS.WA.GOV
FAX: (360) 586-1049

SSPS Statistical Overview

Information, unless otherwise noted, is from Oct 1997

Clients and Providers

104,000 Clients (client base grows at about 20% annually)

50,169 Providers (a combination of individual providers/vendors and agencies)

SSPS Users

1,540 SSPS data input operators (operator numbers) as of July 1997

We don't know the concurrent usage rate at the mainframe. If the operator count is really about 1,000 (assuming many user numbers not closed should be) and if we use the traditional 30% concurrency rate during absolute peak periods, then it could be as high as a maximum of 300 concurrent users. (The only online processing in the current system is a few online edit checks and queuing for a night batch of significant processing.)

3,413 SSPS social service authorizers (worker ID numbers) - social workers and nurses

Payments \$

564,000 invoices printed annually

684,000 warrants printed annually with \$1.4 billion per biennium dispersed.

The monthly dollar output has increased from \$26.5 million in January, 1993 to \$62 million in October 1997, an increase of 18% annually.

Technical Description

SSPS operates on a Unisys 2200 mainframe computer in 74 TIP COBOL accessing 1.65 GB of DMS-1100* databases and data files. In addition to the exclusive use of COBOL 74, SSPS also uses Compool** and MCB TIP. SSPS has a few on-line edits. Data is processed in a nightly batch. SSPS is composed of 294 computer programs with 340,000 lines of code. About half of these programs deal with reports. SSPS programs are interrelated/integrated in that they rely on the actions of many other programs to function. The various programs are tightly related in chains of batch processes that loop back on themselves to allow for error corrections, etc. It is this multiple batch loop issue that makes the mainframe system hard to deal with. SSPS directly interfaces with other mission-critical department systems (e.g. divisional case management systems, W2 form generation, check writer). The system also has 300 external sort routines.

Data Storage

The online SSPS databases are small, consuming 1.65 GB of space. SSPS authorization with all service lines closed for paid services are archived off of the mainframe after 6 months. Payment data, even for open cases, stays in the system only for the past 6 months. Non-payment services are archived after the end of the month in which they are terminated.

Since SSPS is an older style batch system, the flat files, tables, and temporary files it uses take up about 5 times as much space as online databases, for a grand total of 10 GB of mainframe storage.

Transaction Volume

Currently, the average transaction load is about 20 transactions per minute, and the absolute peak load is 60 transactions per minute. Growth is expected at almost 40% over the next 2 years due to welfare reform and after that, 10% per year. Some growth will occur related to year 2,000 expansion issues.

Staff

684,000 telephone calls are received annually on the statewide SSPS hot line.

16.6 staff at SSPS central operations, including 7 programmers (mostly COBOL with some Pascal and Visual Basic).

SSPS is part of a larger unit with an established base of MS-SQL server and Visual Basic 5.

*DMS-1100 is a network database, a more complex version of traditional hierarchical data storage techniques.

**Compool TIP is an obsolete style of Unisys on-line transaction monitor no longer supported by the vendor.

Comparison of DSI Client Track Database Options

Microsoft SQL Server 6.5 Enterprise Edition

Cost:	\$24,665 for Unlimited Users License (Select Agreement)
System Requirements:	Intel Processor Alpha Processor 64 MB RAM 80 MB HD CD-ROM Runs on Windows NT server 4.0 Enterprise Edition
Training & Education:	Minimal learning curve due to established base. Easier programming language to learn Requires 200 hours to complete Developer Administrator classes. <Estimated \$8,000>
Developer's Tools:	C++ <\$939> Visual Basic <\$939> Visual Studio <\$1167>
Current Capabilities:	5.4 GB growth per year Unlimited Concurrent users * Gartner Group's review stated functionally 100-150 concurrent users. 4 CPU Processors without lost performance
Projected Capabilities: By Year 2000	1000 Concurrent users 6 or more CPU Processors 300 GB by year 2000
Technical Support:	Priority Plus Support (base of 100 incidents) Annual Fee <\$20,000> Better technical support availability (more hours)
Other:	Requires several OS updates to compete with other Enterprise Editions. Script Programming is compiled. Compatibility with existing systems Less Scaleable Delayed releases of WindowsNT Less able to manage very large databases

Comparison of DSI Client Track Database Options

Oracle8 Enterprise Edition

Cost:	\$24,000 for 100 Concurrent Devices/User Licenses
System Requirements:	Intel Processor Power PC Sparc Processor Sun Processor Alpha Processor R4XXX Processor 32 MB Free RAM 65 MB Free HD 275 MB Free HD on UNIX Windows NT server 3.51 or later UNIX
Training & Education:	Steep learning curve New programming language PL/SQL, more complicated Requires 168 hours to complete training for developers. <Estimated \$7,000 per person>
Developer's Tools:	PL/SQL - Powerful Development Language Advanced object-oriented features Slow to get tools & applications to exploit new features ➤ Financial Analyzer <\$10,000> ➤ Designer/2000 <\$5,995> ➤ Developer/2000 <\$5,995> ➤ Discoverer 1.1 <\$995>
Current Capabilities:	40 GB growth per year 1000 Concurrent Users Geographic Queries Bitmap indexing 16 CPU Processors without lost performance (due to hardware limit)
Projected Capabilities: By Year 2000	3000 Concurrent Users 32 CPUs 500 GB by year 2000
Technical Support:	1 Year Bronze Annual <\$9,600>
Other:	Slow and expensive Technical Support Good longevity and maturity of Oracle Prices excludes Support and Training Script Programming is compiled Able to manage very large data base

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Cost

Microsoft SQL Server 6.5 Enterprise Edition:

- Microsoft SQL Server 6.5 Enterprise Edition Unlimited Clients \$ 24,665 (Select Agreement)
- or
- Microsoft SQL Server 6.5 Enterprise Edition \$ 2,335
- Microsoft SQL Client 6.5 for Windows NT (per user) \$ 77

- Developer's Tools to accommodate Microsoft SQL Server:
 - Visual C++ Enterprise Edition \$ 939
 - Visual Basic 5.0 Enterprise Edition \$ 939
 - Visual Studio Enterprise Edition (Includes C++ & VB) \$ 1,167
- Microsoft SQL Server Developer Training \$ 8,000/Person

Oracle8 Enterprise Edition:

- Oracle Server8 for Windows NT for 100 Concurrent Users \$ 23,600
- Developer's Tools to accommodate Oracle8 Server:
 - Oracle Discoverer 3.0 \$ 995
 - Oracle Designer/2000 Client Server Development \$ 5,995
 - Oracle Developer/2000 2.0 \$ 5,995
 - Oracle Web Developer Suite (Includes Developer & Designer) \$ 9,995
- Oracle8 Application Developer Training \$ 6,720/Person
- *** All financial quotes are based on Government discount rate, excluding sales tax.**

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System Requirements

Microsoft SQL Server 6.5 Enterprise Edition:

Computer/Processor:

- Intel Processor
- Alpha Processor

Memory:

- 64MB RAM

Disk Drives

- 80MB HD
- CD-ROM

Peripheral/Miscellaneous:

- Windows NT Server
- Novell Netware - LAN Environment
- TCP/IP-based Networks

Operating System:

- Microsoft SQL Server 6.5 will only run on Windows NT 4.0 Enterprise Edition

Oracle8 Enterprise Edition:

Computer/Processor:

- Intel Processor
- Alpha Processor
- Power PC
- R4XXX Processor
- Sparc Processor
- Sun Processor

Memory:

- 32MB Free RAM

Disk Drives

- 65MB Free HD
- 275MB Free HD on UNIX

Operating Systems:

- Windows NT 3.51 or later
- UNIX

Training & Education

Microsoft SQL Server 6.5 Enterprise Edition:

- | | |
|------------------------------|----------|
| ➤ System Administrator | 40 Hours |
| ➤ Implementation | 40 Hours |
| ➤ Performance & Tuning | 40 Hours |
| ➤ Development (Transact SQL) | 40 Hours |

Total number of training hours required = 200 Hours

Total expense for training = \$8,000

These classes recommended by Microsoft are a base of training and education, further classes are available for advanced applications.

Oracle8 Enterprise Edition:

- | | |
|--|---------|
| ➤ Introduction to Oracle; SQL & PL/SQL | 5 units |
| ➤ Developer/2000 Foundation | 1 unit |
| ➤ Developer/2000 Forms I | 4 units |
| ➤ Developer/2000 Reports | 4 units |
| ➤ Advanced SQL & SQL *Plus | 2 units |
| ➤ Developer/2000 Forms II | 3 units |
| ➤ Tune Oracle8 Applications | 2 units |

Total number of training units = 21, each unit consists of eight hours.

Total number of hours = 168 hours.

Total expense for Initial training = \$6,720

- Additional training is suggested, 12 more additional units available for advanced training.

Developer's Tools

Microsoft SQL Server 6.5 Enterprise Edition:

- **Visual C++ Enterprise Edition 5.0:** <\$939>
Tool for developing code quickly and easily, allows direct access, allows developer to deploy applications on the Internet, remotely debug stored procedures, remotely review tables, queries and stored procedures, improve productivity with C++ applications and more.
- **Visual Basic Enterprise Edition 5.0:** <\$939>
Optimizes native code compilation, accelerated form rendering and enhanced dB access, allows developers to create fast, high-performance applications and components. Allows developers to transition into new technologies without abandoning existing code.
- **Visual Studio 97 Enterprise Edition:** <\$1,167>
Includes Visual C++, Visual Basic, Visual Interdev, Visual FoxPro, Visual SourceSafe, SQL Server, Transaction Server, Visual J++, and Developer Network Library.
These tools allow rapid application development, flexible development system, Java development system, Web application development system, Essential development information reference, Version control system, Client/server database management system and Transaction processor.

Oracle8 Enterprise Edition:

- **Financial Analyzer:** <\$ 10,000 for integrated or stand alone, additional user fee \$1,250>
Pre-designed, but customizable, set of dB structure and code. Allows developer to report and analyze financial data, manage budgeting and forecasting processes, answer ad hoc requests efficiently, improve cost control and performance measurements, identify areas for profit improvement, and plan more comprehensively and accurately.
- **Designer/2000 2.0:** <\$ 5,995>
Second generation client/server design and development tools. Database process modeling such as DataFlow, then generates SLQ code to create tables, primitive menuing. Supports modeling of complex systems with business process reengineering, analysis, and design diagrammers.
- **Developer/2000 2.0:** <\$ 5,995>
Second generation client/server design and development tools. Empowers organizations with the ability to rapidly and productively build sophisticated systems which scale from workgroup to enterprise. Writes the code, contains FORMS and REPORTS tool, writes triggers.
- **Web Developer Suite 1.1:** <\$ 9,995>
Includes Designer/2000, Developer/2000, Web Application Server, Oracle8 Server, NCA Web Cartridge Developer's Kit, and Oracle Interoffice. It is an integrated set of products for creating scaleable, high performance enterprise and Internet applications. Fully leverage the flexibility and openness of Oracle's Network Computing Architecture to build NCA compliant cartridges and applications, and deploy them in today's multi-platform computing environment.
- **Discoverer Tool 3.0:** <\$ 995>
Data minding tool, allows access to wide variety of source databases, allows metadata manipulation, setting up joining and filters, predicting query time, mix of pre-calculated and real-time data aggregation and integrated database security. Allows user to use wizard to set up easily the information they need to access.

Current Capabilities

Microsoft SQL Server 6.5 Enterprise Edition:

Due to current Microsoft architecture.

- Microsoft recommends usage for databases no larger than 10 GB.
- Unlimited Concurrent users
- * Gartner Group's review stated functionally 100-150 concurrent users
- 4 CPU Multiprocessors without lost performance.
- Supports a natural language interface, for the user to use English rather than SQL.
- Interfaces with Microsoft Transaction Server
- Supports integrated Web Application features
- Extensive Developer's Tools

Oracle8 Enterprise Edition:

Due to current Oracle architecture.

- Oracle recommends usage for databases larger than 10 GB.
- Up to 1,000 concurrent users
- Capable of performing geographic queries
- Bitmap indexing, allows for faster index searches
- Can interface with second tier transaction processors
- Supports integrated Web Application features
- 16 CPU Processors without lost performance (due to hardware limit)
- Extensive Developer's Tools

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Projected Capabilities by Year 2000

Microsoft SQL Server 6.5 Enterprise Edition:

- 300 GB Database
- Unlimited concurrent users
- * Gartner Group review stated functionality no more than 1,000 concurrent users.
- 6 or more CPU Multiprocessors
- Interfaces with Microsoft Transaction Server
- Supports integrated Web Application features
- Extensive Developer's Tools

Oracle8 Enterprise Edition:

- 500 GB Database
- Up to 3,000 concurrent users
- 32 CPU Multiprocessors
- Can interface with second tier transaction processors
- Supports integrated Web Application features
- Extensive Developer's Tools

Based on independent research firms predictions, and specifications given from each company.

Technical Support

Microsoft SQL Server 6.5 Enterprise Edition:

- Pay-Per-Incident Support: <\$195 per incident>
24 hours/day, 7 day/week, including holidays.
- Priority Annual Support: <\$1695 -Annual>
24 hours/day, 7 day/week, base of 10 incidents, including holidays, priority access to support engineers, and anticipate high-volume support needs.
- **Priority Plus Support: (Recommended support option)** <\$ 20,000 - Annual>
24 hours/day, 7 day/week, base of 100 incidents, including holidays, priority incident resolution, including server down support, and access to exclusive information to help plan for smooth product deployments.
- Premier Support: <\$45,000 - Annual>
24 hours/day, 7 day/week, including holidays, proactive service and mission-critical support.

* Upgrades are not included in Microsoft support options.

Oracle8 Enterprise Edition:

- **Oracle BRONZE: (Recommended support option)** <\$ 9,600 - Annual>
Normal business hours, Monday to Friday, telephone response, product upgrades, maintenance releases, transfer rights, information access and download systems provide data browsing and best practice procedures to ensure continued success with Oracle technology.
- Oracle SILVER: <\$11,520 - Annual>
24 hours/day, 7 day/week, service hours increased from Bronze, global toll free telephone routing, for seamless connection to whichever local support center or global support center is on-line, regular account management reporting to promote problem avoidance.

* Upgrades are included in Oracle support options.

Other

Microsoft SQL Server 6.5 Enterprise Edition:

- Good compatibility with existing and future state systems.
- Requires several OS updates to compete with other Enterprise Editions.
- Departmental resources available
- Easier to learn
- Less scaleable
- Runs on WindowsNT only (Scaling SQL Server is linked to scaling WindowsNT)
- Limited row level locking - problems with locking and concurrency.

Oracle8 Enterprise Edition:

- Compatibility may be an issue with existing or future systems
- More expensive developer's tools
- PL/SQL complicated to learn
- More scaleable
- Accommodates more database growth per year
- Manages very large databases
- Longevity and maturity of company

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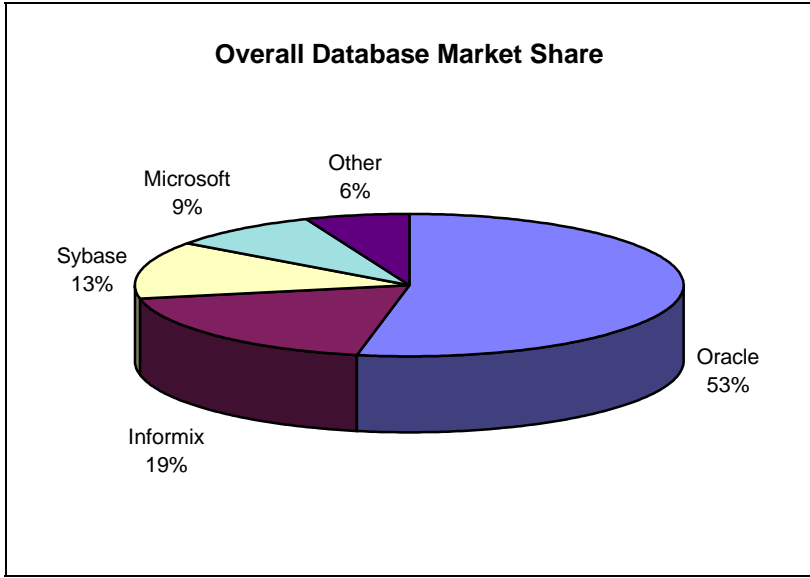
Transaction Processing Performance Council (TPC)

- Documented below is a comparison of identical hardware completed by the Transaction Processing Performance Council (TCP). Neither the Oracle or Microsoft SQL Server software versions used were enterprise editions, in contrast to the other data in this report . (Not enough TPC-C testing has been completed to give comparisons of the enterprise editions using identical hardware.)
- Oracle 7 processed only 73% of what Microsoft SQL Server 6.5 processed. (Statistically, to have an accurate measure, we should base the research on a larger sample of approximately 10-12 installations of each DBM system.)
- Even the lower performing of the two software options compared here by TPC is more than 100 times what is needed based on current SSPS transaction throughput. Although a modified SSPS will operate differently than the current SSPS, it seems apparent that either software would more than meet the needs of SSPS.

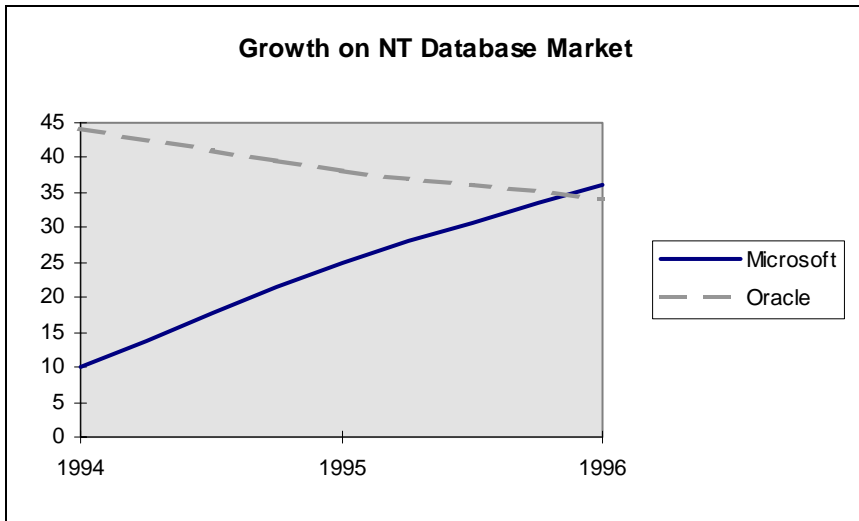
TPC-C Report		
	Example 1	Example 2
Operating System	Microsoft Windows NT 4.0	Microsoft Windows NT 4.0
System	ProLiant 5000 6/200 Model 1X c/s	ProLiant 5000 6/200 Model 2 c/s
Database Software	Microsoft SQL Server 6.5.247	Microsoft SQL Server 6.5.219
DB mfg	Microsoft	Microsoft
Throughput	8070.00	7521.13
PricePref (per tpm)	\$58.00	\$77.67
Operating System	Microsoft Windows NT 4.0	Microsoft Windows NT 4.0
System	ProLiant 5000 6/200 Model 1X c/s	ProLiant 5000 6/200 Model 2 c/s
Database Software	Oracle7 v7.3.4	Oracle7 v7.3.3
DB mfg	Oracle	Oracle
Throughput	5008.47	6393.20
PricePref (per tpm)	\$87.00	\$108.61

The TPC reports used for the comparison in the table above were chosen because they were the only numbers available on comparable machines. However, in the last month, audited TPC numbers have increased the performance of SQL Server 6.5 Enterprise to 13,098 TPC transactions per minute at a reduced cost of \$35.11 per transaction per minute on an ALR server with automatic failover clustering, and to 14,501 TPM at \$78.52 each on the AXIL Northbridge server now being OEM'ed by Hewlett-Packard.

There are no recent new Oracle numbers on Intel processors, but transaction levels have risen to multiple tens of thousands on large Sun UNIX servers where Oracle has no peer as the most robust database available. As noted, all these high transaction levels far exceed SSPS's needs.



Source: Gartner Group, March 1997



Source: Dataquest, October 1997