

A Comparative Investigation and Evaluation of Oracle and Sql Server with respect to Performance.

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1. THE PROBLEM STATEMENT

The Oracle9i and SQL server 2000 are two commercial RDBMS that are currently major contributors to the ever expanding database technology. Due to their popularity, robustness and functionality included in these suits, Database Administrators find themselves in difficulties of determining which of these products performs best under different situations. However there is a checklist of database aspects that when analyzed carefully could assist in weighing up each product capabilities against different real circumstances. These include among others performance and scalability.

Performance however, has been marked with conflicting claims as to which of the two DBMS is better. This is particularly true for the past decade where efficiency has become one of the most significant factor influencing computer systems growth to form huge inter-networked structures. Some say Oracle9i performs better than SQL server 2000 while others think otherwise.

It is at the centre of this **project aim** to investigate these claims, plot and present the analysis results thus hopefully clarify the situation. This would be accomplished through a conclusive evaluation of factors affecting performance (insufficient CPU, memory , I/O , network and other software constraints) and their related tuning and optimization techniques incorporated in these products. Since scalability has great implications on performance, part of the project will assess this concept in the context of these two DBMS. Various load and performance tests will be implemented on a number of time critical business processes and transactions. Transactions to be measured will include among others High frequency, Mission Critical, Update and Read Transactions.

2. LITERATURE SURVEY AND STATE OF THE ART

One big advantage about the database field is that it is one of the most researched areas with a wide range of publications presently on the market. This stems from the fact that databases form an integral part in virtually all industrial and e-business fraternities. This is because they ensure the secure storage of a valuable asset, information. For this project information will come from both the internet and from the traditional sources such as books, journals and articles.

2.1 Books

<http://www.lc.leidenuniv.nl/awcourse/oracle/nav/docindex.htm> provides the whole list of online Oracle9i database books that cover all aspects of the database including performance evaluations.

Coronel C, Rob P (2002). *Database Systems: Design, Implementation and Management* (5th ED) .Course Technology, Boston, USA.

This book gives a general description of the design, Implementation and management aspects of databases.

2.2 Online resources

The most important online resources I will make use of include the well designed Oracle and Microsoft website.

2.3 General Websites

<http://www.freeprogrammingresources.com/database.htm> this website is a pool of information ranging from online books, articles, links to numerous libraries, tutorials, and many more. This will be one of my important sources of reference.

<http://www.tutorialized.com/tutorials/Database/Oracle/1> gives a wide range of tutorials

<http://groups-beta.google.com/groups/dir?sel=16823695,83986080,16823686> allows for the searching of all information and tutorial.

2.4 The Oracle specific websites

http://www.developer.com/db/article.php/10920_1582621_1 Gives the general description of the Oracle database .that is its history, standards, structure and important features.

A manual for Oracle9i is available as part of the *Oracle9i Database Documentation Library* at <http://www.lc.leidenuniv.nl/awcourse/oracle/server.920/a96532/toc.html> . This manual is aimed at anyone planning performance tuning of Oracle database.

http://www.csee.umbc.edu/help/oracle8/server.815/a67775/ch17_dia.htm#2854 ,

<http://www.lc.leidenuniv.nl/awcourse/oracle/server.920/a96533/toc.htm> both explains the main factors affecting performance. These include insufficient CPU, memory , I/O, network and software

constraints. Understanding these factors will help me control external effects on my experiments. It would help for example to know the network transmission effects on transactions performed remotely over the departmental LAN.

<http://www.aptest.com/resources.html> this website provides and explains performance testing tools that will be used in accurately determining aspects such as the response time. Tools to be used (LoadRunner and WebLoad software) will be used to imitate a real working environment as explained in the Preliminary Design Considerations and Implementation Decisions below.

2.5 SQL Server specific websites

The main website will be www.microsoft.com under which you find the SQL documentation at <http://search.microsoft.com/search/results.aspx?st=b&na=88&View=en-us&qu=SQL+server> <http://www.informit.com/guides/content.asp?g=sqlserver&seqNum=132&rl=1> located here is the SQL reference book which explains the entire product's documentation.

3. **PRELIMINARY DESIGN CONSIDERATIONS AND IMPLEMENTATION DECISIONS**

3.1. **IMPLEMENTATION DECISIONS / CONSIDERATIONS**

Important here will be to minimize as far as possible the effect of the external influences on the experiment tests. This means therefore that these DBMSs are to be evaluated against the same database design, data and tests at basically the same time of day to avoid network influences if the DBMS is operated remotely over the network. In relation to the hardware impediments, both DBMS products are already installed on more or less the same P4 computer systems. Both systems use Microsoft Windows Server 2003 Standard Edition. The Oracle PC is an Intel(R) Xeon(TM) CPU 2.40 Hz with 1.00 GB of RAM while the SQL server machine is also an Intel(R) Pentium(R) 4 CPU 2.80GHz with 1.00 GB of RAM. Furthermore both systems are connected to the same ICT LAN network further enhancing standardization. I will, however, need to decide on which experiments and software tools to install for use in the investigations.

Since both DBMSs are already installed my experiment design will only include the following phases: installation of performance measuring software, experiment designing, test implementation and analysis of experiment results.

3.2. MY INTENDED APPROACH: TIMELINE FOR THE IMPLEMENTATION OF EVENTS

First semester	
First term	Proposed dates:
Reading relevant papers and tutorials. Get information for my project proposal	4/03 - 11/03
Write research proposal.	Due 10/03
Familiarize myself with the Oracle and SQL server suits which are already installed and working fine on two different computers	12/03 –31/03
Search and identify performance measuring tools and software and look for a suitable dummy database.	12/03 –31/03
Understand factors affecting performance and how they will be investigated and evaluated using the tools identified above.	12/03 –31/03
Look at the performance tuning techniques and scalability capabilities for both DBMS.	12/03 –31/03
Second term	
Prepare for the first presentation of the project.(oral presentation of 10 minutes) [Second Term: Weeks 1-3 included (Wed)]	04/04/-22/04
Work on Literature Survey (5-10 pages), abstract (or introduction and conclusion) of project, and plan of action	04/04-30/05 Due 30/05
Start doing performance tests	01/04-30/05
Third term	
Prepare project presentation (oral presentation of 15 minutes) [Third term: Weeks 1-3 included]	01/06-22/06 Due 25/06
Continue with the experiments	01/06-22/06
Prepare for the Poster Presentations [Third Term: Week 5]	01/07-19/07
Write Draft Paper (5-7 pages) [Fourth Term: Day 1 (Mon)]	09/09-19/09 Due 19/09
Fourth term	
Write Final paper (5-7 pages) handed in Fourth Term: Week 2 (Mon)	19/09-26/09 Due 26/09
Write First Chapter Drafts of Write Up handed in. Fourth Term: Week 3 (Mon)	19/08-03/09 Due 03/10
Prepare for the final Oral Presentations (20 mins max - assessed) Fourth Term: Swot Week	01/10-31/10 Due 31/09-04/11

Write final paper.	01/10-31/11
Final project write up.	<u>Due 07/11/2005</u>

4. INFORMATION TO BE DERIVED / DELIVERABLES

It is the aim of this project to finally come up with a clear analysis of performance in relation to Oracle and SQL server DBMS. The question: which of the two DBMS is better and why, should be clearly answered. The deliverables will include a conclusive write-up, a set of tables, graphs and associated explanations for the system and experiment implementations.

5. POSSIBLE EXTENSIONS

The most possible extensions to this project as I have already mentioned in the problem statement are likely to be:

- To apply the knowledge gained on from this investigation to open source databases
- Use a different Operating System for this experiment e.g. Linux