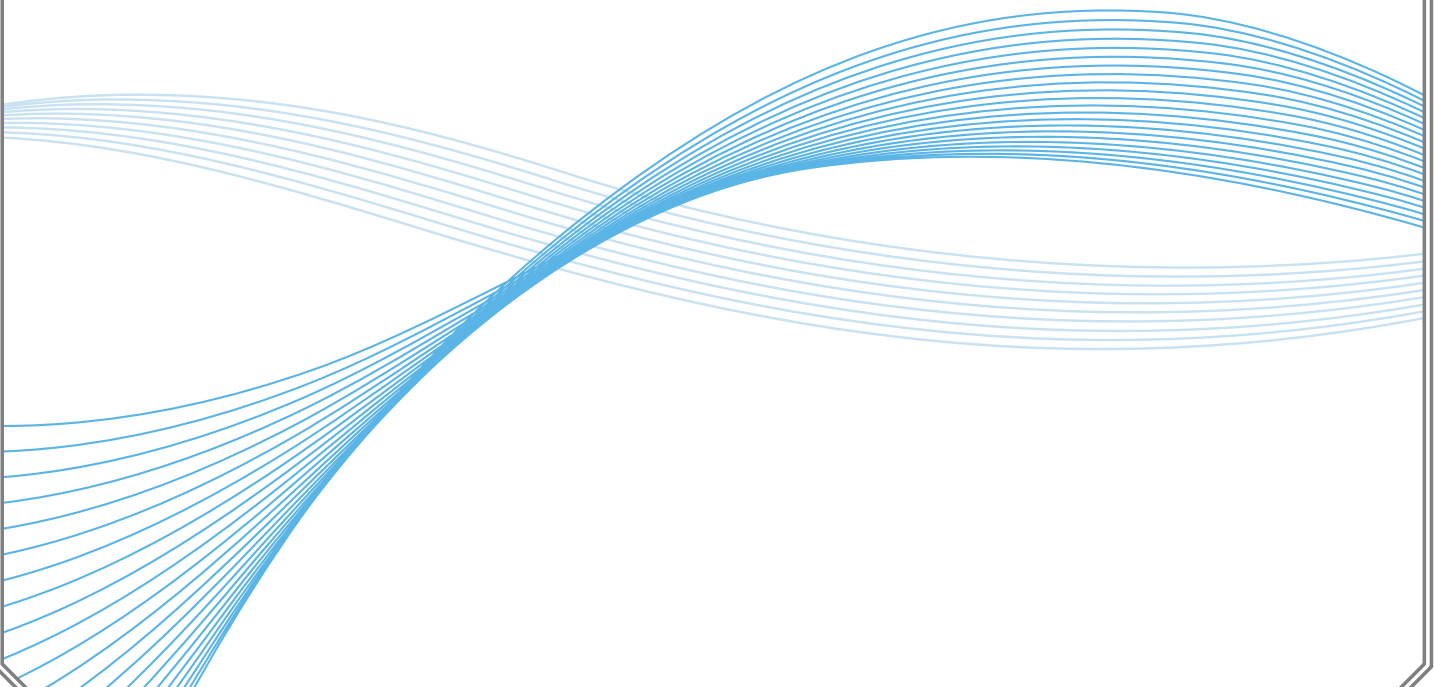


Oracle on Windows: A Natural Fit

A Technical White Paper
March 2008

Technology Strategy Research, LLC



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The Oracle DBMS leverages Windows Server capabilities and Visual Studio for an exceptional Microsoft database solution

Databases are an organization's lifeblood. Because data is essential to most operations, a database must be fast, reliable, and highly available. Because an organization has to watch the bottom line, it has to be cost-effective. And because developers use it as a fundamental part of custom applications, it has to be easily accessible for application development purposes. Windows shops would do well to learn more about what Oracle has to offer. With low-cost editions, easy management, high availability and scalability, and integration with development tools, Oracle is a smart and cost-effective choice for Windows projects of all types.

Database selection for a particular organization and application is a complex process, and one that developers, administrators, and end users have to live with for a long time. For organizations that have standardized on Windows, an Oracle DBMS can represent the best value for the money. If features such as cost, performance and high availability, multi-platform support, and ease of development are important, an Oracle DBMS should be considered highly competitive as the database of choice for development and production use. And in many cases, it is likely that a neutral evaluation will result in the selection of an Oracle DBMS.

Breaking Down the Selection Process

The reasons that organizations choose a database are many and varied. However, most decisions include business factors, development factors, and operational factors.

Business factors include characteristics such as cost, reliability, and availability. Cost covers the initial cost of the right-sized database as well as ongoing maintenance costs and database administration, including the personnel required for administrative activities. Reliability and availability acknowledge that the business has certain requirements for uptime, performance, and scalability. It can impact the number of servers and associated equipment required, and impact cost.

Development factors include ease of development and accessibility. Ease of development refers to the experience of the Windows developer working in Microsoft Visual Studio, the primary .NET development environment for Windows applications. Accessibility is how accessible the database and associated development tools are from Visual Studio.

Last, operational factors include administration/manageability, as well as reliability and availability again. Administration and manageability refers to how easy it is to administer on a day to day basis, and to make changes based on business needs. It is also concerned with the features and availability of tools.

Reliability and availability concern the concept of the Service Level Agreement for uptime and response time requirements, how to keep databases running, and the implications to the business and IT costs.

Whether the process of database selection using these criteria is formal or informal, every organization and many projects engage in this practice. A detailed look at both Oracle and SQL Server according to these criteria demonstrates that Oracle has advantages that may surprise those who automatically considered SQL Server to be the best choice for their application and organization.

Why Oracle on Windows?

The Oracle DBMS was the first commercial relational DBMS on the market, period, first launching in 1977. In part because no Windows operating system was available at that time, Oracle has much more of a UNIX heritage, especially on 32-bit business platforms. For almost two decades, it was the DBMS of choice on both open and proprietary enterprise platforms.

In fact, Oracle offered the first DBMS on Windows NT, in 1993. The commitment to all enterprise operating systems has enabled Oracle to offer a broad range of technologies that provide optimized performance on those platforms while not locking in organizations to a specific technology.

More recent versions of Oracle enhance the platform's unique ability to deliver the benefits of grid computing, in environments that use standard, low-cost hardware in a grid configuration. This technology, available over the last several years, is increasingly helping organizations reduce data center costs through a comprehensive virtualization strategy.

Oracle comes in several editions:

- Express Edition. Express Edition was introduced in 2005, and offers the Oracle DBMS free to distribute on Windows and Linux platforms. It has a footprint of only 150 MB and is restricted to the use of a single CPU, with a maximum of 4 GB of user data and 1 GB of memory.
- Standard Edition One. Standard One was introduced with Oracle 10g. It includes some additional restrictions for those whose database needs are not demanding.
- Standard Edition (SE). SE contains base database functionality. Oracle licenses this product on the basis of sockets, up to a maximum of four. SE has no memory limits, and can utilize clustering with Oracle Real Application Clusters at no additional charge.
- Enterprise Edition (EE). EE includes more features, especially in the areas of performance and security. Oracle licenses this product on the basis of users or of processors, typically for servers running 4 or more CPUs. EE has no memory limits, and can utilize clustering using Oracle Real Application Cluster (RAC) software.

Oracle offers a number of options and additional services, including Real Application Testing, Real Application Clusters, Total Recall, Enterprise Search, and Partitioning. This adds to the flexibility under any operating system, including Windows.

Business Factors

The business factors affecting the selection of a DBMS include reliability, availability, and cost. Cost concerns not only the cost of the DBMS itself, but also the associated hardware, software, and administrative and management support.

In the case of Oracle, cost can be deceiving. While the flagship Enterprise Edition DBMS with all available options can represent a significant price point, the availability of both options and editions enables an organization to choose the right configuration for their particular need and application. And in many cases that configuration will be priced competitively with similar configurations available with other DBMSs, including SQL Server.

Oracle Reliability and Availability

As for reliability and availability, Oracle's high availability products include Oracle Failsafe, Oracle Real Application Clusters (RAC) and Oracle Data Guard. The ultimate in highly available systems is the Oracle Maximum Availability Architecture. This architecture combines both High Availability and Disaster Recovery components, providing a high degree of protection, flexibility and performance.

Oracle Maximum Availability Architecture adds value to organizations by effectively utilizing available system resources to minimize downtime and optimize scalability. This architecture provides full redundancy of components, including network components, application servers and database servers. By using the Oracle Maximum Availability Architecture, an application is protected from system failure, power outages, or even area wide disasters such as hurricanes or earthquakes.

Oracle Fail Safe (OFS) is a Windows specific feature of Oracle 11g that provides high availability for business solutions deployed on Windows clusters. The OFS cluster provides high availability by using a single dedicated server to perform work and access the database at a time. Oracle Fail Safe operating in an active/passive role works with Microsoft Cluster Server to ensure that if a failure occurs on the active server in the cluster, the workload will automatically fail over to the surviving passive server.

Oracle Real Application Clusters (RAC) is designed to tolerate server failures with relatively no impact to mission critical applications and its users. As application workloads and user connections are increased, additional servers can be easily added to the cluster. This product utilizes all nodes in the cluster in an active/active configuration where all nodes perform work and can access the same database simultaneously.

Development Factors

Data-driven application development is an important consideration in the database lifecycle. Ready access to the data through business-critical applications can spell the difference between success and failure. With the speed of business, the ability to rapidly build and deploy new data-driven applications of high quality is a prerequisite.

Application Development

There are several ways to build applications using Oracle. Unlike SQL Server, which is largely dependent upon the .NET languages hosted by Visual Studio, application developers have a wide choice for building applications tied to the Oracle DBMS. In particular, Oracle JDeveloper provides a platform for building applications based on the Java language and framework, and also incorporates tools for writing Java-based stored procedures, as well as for optimizing queries and improving overall performance under Windows.

But Oracle also includes .NET and Visual Studio among its widely used development platforms. With Oracle Developer Tools (ODT) for Visual Studio, the ODP.NET data access provider, and Oracle Providers for ASP.NET, Windows developers can work within the familiar Visual Studio development environment and target Oracle just as easily as they would target SQL Server. ODT is an add-in for Microsoft Visual Studio 2005 and Visual Studio .NET 2003 that includes features such as designers and wizards, automatic .NET code generation, and a fully integrated PL/SQL editor and debugger.

With Oracle development integrated into Visual Studio, development productivity is increased as the time it takes to develop and build .NET applications with Oracle is reduced. Another plus for the developer is the integration of Oracle PL/SQL debugger into Visual Studio, allowing .NET code and PL/SQL debugging without having to leave Visual Studio. Native integration is also provided with ADO.NET 2.0 using the Visual Studio development environment. This gives ADO.NET developers the flexibility to build one set of code that works with multiple database vendors' software.

Application and Database Deployment

On the surface, perhaps the biggest advantage Oracle has over SQL Server is that SQL Server runs only on Windows, while Oracle is cross-platform. In addition to Windows, Oracle runs on Apple Mac OS X Server, HP HP-UX on PA-RISC and Itanium, HP Tru64 UNIX on the Alpha platform, HP OpenVMS on Alpha and Itanium, IBM AIX 5L, IBM z/OS on the mainframe platform, Linux on Intel x86, x86-64, IBM PowerPC, mainframe, and Itanium, and Sun Solaris on SPARC, Intel x86, and x86-64 bit.

There is a long-standing debate in the computing community as to whether such an integration solution, whether real or just marketing, represents a technical advantage or a business limitation. Given the gains of open systems over the past decade, the unbreakable connection between DBMS and operating system at best means that organizations are locked into that vendor. In this case, a selection of SQL Server in any edition immediately defines the target operating system, both for development and deployment. That decision clearly limits future flexibility of any data-driven applications, and stands a good chance of resulting in a business or technology mismatch sometime during the life of the database.

Oracle is available on most operating systems, including Linux, UNIX, and Windows platforms. Its flagship database comes in various versions—Standard Edition One, Standard Edition, and Enterprise Edition—which are designed to address requirements of both small and large business. In addition, Oracle also offers various technical options and middleware solutions that provide additional functionality beneficial to business as requirements change.

Operational Factors

Operational factors represent the heart of a DBMS selection. If a database can be successfully maintained and enhanced over a long period of time, it continues to be valuable to the organization. If it requires additional resources on an ongoing basis, or administration is difficult or expensive, the database will likely degrade over time.

Oracle offers a wide range of options for production uses, supporting testing, compression, clustering, data mining, and a variety of other areas. Manageability of Oracle Database backup and recovery is performed with the Data Recovery Advisor (DRA). This built-in tool diagnoses data failures and recommend repair options that can then be made manually or can be set to automatically correct issues. Data Recovery Advisor can be managed through Enterprise Manager Grid Control or RMAN's command-line interface.

Oracle's integration with Windows Volume Shadow Copy Services (VSS) provides the ability to make a shadow copy of an open Oracle 11g data file, tablespace, or full database. VSS provides a standard way for Windows applications to interact with point-in-time copy capabilities from Oracle and other vendor storage solutions. VSS is supported on Enterprise and Data Center editions of Windows Server 2003 and later.

Enterprise Manager Grid Control provides a common web-based interface for monitoring and managing the overall Oracle technology stack. Configurable alerts and paging can be set to notify on-call staff for corrective action. Performance metrics can be collected across all instances and stored in a repository for future capacity planning and forecasting. Grid Control also allows you to perform database and database cluster-wide operations such as backup and recovery, Real Application Testing, troubleshooting, or standard maintenance all from one central interface.

Security

Security is largely an operational decision factor that has been of growing importance over the last several years due to publicized break-ins of enterprise computing systems. However, few if any of those break-ins were the result of security holes in the DBMS, whether Oracle or SQL Server. In most cases, the breach was due to human error—insecure practices, poor configuration, or application or operating system weaknesses.

The primary security goal of a DBMS is to assist in minimizing human errors and their impacts. Oracle provides for out-of-the-box database security, including fine-grained auditing, virtual private database, row level security, database encryption, and label security. Unique among database products is the ability to protect against the most common type of threat—internal threats—through its Database Vault solution. Oracle Database Vault can prevent highly privileged users, including application DBAs and others, from accessing sensitive applications and data in Oracle databases outside their authorized responsibilities.

Oracle security options and configuration techniques specific to Windows include:

- Oracle's Native Authentication Adapter for use with Microsoft Active Directory Services
- Certificate-based authentication, possible through the use of Oracle database wallets which can be stored in the Windows client registry for added protection.
- Microsoft Certificate Store Integration
- Kerberos implementation interoperates with Microsoft key distribution center

Oracle has a high and comparable security record in terms of identified vulnerabilities over time. The DBMS has a small number of vulnerabilities discovered by research teams and addressed according to their priority and importance. With Oracle, organizations can be satisfied that the DBMS is not the weak link in network or application security.

Conclusions

Taking into account business, development, and operational considerations, Oracle stacks up very well in areas that are important to organizations seeking business, development, and cost justifications for selecting a DBMS. It is not too big, too complex, or too costly for Windows-hosted databases.

Further, given the track record of both the DBMS and the company backing it up, it's clear that Oracle can absolutely be the least risk alternative, even for Windows databases. The availability of several DBMS editions, mature and capable management tools, and a seamless development environment make it a serious alternative.

Further, experience counts. Oracle has a core database engine that first launched in full 32-bit form in 1977, or about twenty years earlier than SQL Server. The collective experience and customer feedback spanning over three decades of mission-critical use provides a level of experience that is unmatched by any modern software product. That experience translates directly into a technically superior product.

Microsoft SQL Server is capable and can be cost-effective for Windows database applications. But for a solution that provides competitive and in many cases superior results on Windows, offered in a variety of editions that make it cost-competitive for specific uses and organizations, and also offers the option to move to other platforms as business conditions warrant, Oracle is the only real alternative.