

# Why Choose 64-Bit Technology as Your Server Platform?

*DataDirect Connect64™*

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## Introduction

Companies are processing more and more data as they analyze business intelligence data or perform complex calculations of very large numbers. As the complexity of the tasks increases, the performance limitations of using 32-bit servers become apparent.

Sun used a vivid analogy to illustrate the difference between 32 bit and 64-bit capacity: “a 32-bit addressing space can keep track of the name and address of every person who has lived in the United States since 1997; a 64-bit addressing space can keep track of the name and address of every person who has ever lived in the world, from the beginning of time.” (28)

Are your 32-bit applications working harder but delivering less—and doing that more slowly? Can you improve performance and the quality of your results by moving to a 64-bit server? More and more software vendors are providing support for 64-bit business applications. Hardware companies such as IBM, HP, and Sun already have 64-bit solutions in place.

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## Background

Most applications today are written for a 32-bit processor, meaning that the CPU can handle 32 bits at a time. Ever since 32-bit computers and applications replaced their 16-bit predecessors, the industry has been talking about moving to 64-bit computers. If you survey the literature on 64-bit technology, you will find that a significant number of articles date back as far as 1995.

In fact, 64-bit operating systems have been in use for more than 10 years. HP (then Digital Equipment Corporation) introduced Tru64 (then Digital UNIX) version 1.2 in March, 1993. (23) In June, 1996, Linux version 2.0 began providing 64-bit processing. (24)

The major database management systems, such as Oracle, Sybase, Informix, SQL Server, and DB2, all support 64-bit versions of their products. Oracle has been running on a real 64-bit machine since October 1999. More recently, Microsoft released versions of SQL Server that are fully compatible with Intel's Itanium 2 processor. DataDirect Technologies has released standards-based 64-bit ODBC drivers to support these database management systems.

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## What Are the Advantages of Using a 64-bit Server?

What kind of edge do you get by moving to a 64-bit server? It could be huge for applications that must deliver peak performance and support a very large number of users.

### Increased scalability

Improved scalability for business applications means that organizations can support more customer databases and more simultaneous users on each server. (19) A single powerful server, or in some configurations, groups of servers, can enable more users to access systems such as enterprise planning, business intelligence, enterprise resource planning (ERP), databases, supply chain management, security, simulation modeling, and scientific research. (3)

Siebel Systems, Inc. and Unisys achieved high performance in a 30,000 concurrent-user benchmark for Siebel eBusiness Applications. The test used 64-bit versions of Microsoft Windows Server 2003 Datacenter Edition and Microsoft SQL Server 2000 Enterprise Edition on the Unisys Enterprise Server ES7000. The benchmark was based on real-world scenarios, derived from more than 4,000 Siebel customers. (29)

Increased scalability for a server in a distributed-server environment delivers improved efficiency. A 64-bit server can support a greater number of larger files. Thus, additional applications can be placed on a single server, increasing the capacity of existing hardware. (16)

In addition, a 64-bit kernel can access more system resources, such as memory allocation per user. (8) A 64-bit processor can handle over 4 billion times more memory addresses than a 32-bit processor. With these resources, even a very large database can be cached in memory. (27)

Liberty Medical Supply is migrating to the 64-bit version of Microsoft SQL Server, preparing for anticipated rapid growth. When they finish moving applications to the 64-bit server, they will eliminate five smaller servers and considerable administration work. If they need additional processing power later, they can add processors and memory to the 64-bit system far more easily than if they added new servers. Liberty Medical Supply is also enjoying improved performance with the new server. Running test scripts, the Itanium II-based 64-bit system delivered an impressive performance gain of 159% over the existing 32-bit servers. (22)

## Increased performance

Over the past six or more years, results on RISC-based systems have shown that 64-bit computing allows large enterprise databases to be loaded into memory, supporting faster searches and faster throughput. Now, servers with Intel Itanium 2 processors are providing more options for users with high-performance computing requirements. All of these 64-bit servers deliver faster query times and better use of memory than their 32-bit counterparts.

### Reduced query times

With more data in memory, a 64-bit processor can work faster because it does not have to move data in and out of memory the way that a 32 bit processor may have to do. Companies are recognizing the advantages of this improved performance, and beginning to move their high-demand applications to 64-bit systems. (3)

Information Resources, Inc. (IRI) provides market research to the healthcare industry. The IRI online analytical processing tool lets end users drill down through terabytes of data to create the business intelligence they need. End-user query performance is between 3 to 360 times faster on the 64-bit system, in part because it can hold so much more data in RAM. The multidimensional OLAP design that IRI was able to implement on the 64-bit system also contributed to the scalability and performance improvements. (20)

### More effective use of memory

Although many business applications run without problems on 32-bit systems, others have grown so complex that they use up the 4 GB memory limitation of a 32-bit address space. For example, SAP R/3 installations have a 3 GB address space limitation that has become inadequate for most SAP work processes. Many implementations require table buffers of over 100 MB. With this large amount of data, fewer memory resources are available to meet memory needs. On a 64 bit server, most queries are able to perform in the buffers available to the database. (17)

### Better number crunching

Applications such as computer-assisted design and computer-assisted engineering can realize an immediate gain in performance. (3) For applications that need to perform complex calculations on very large numbers, the performance improvement will be dramatic.

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## Who Is Using 64-bit Technology?

IBM, HP, and Sun, among others, are producing powerful 64-bit machines aimed at the high-end server market. Databases that support these machines include DB2, Oracle, Sybase, and Microsoft SQL Server 2000.

Linux has been running on 64-bit systems for over six years, with around 16,000 applications available. Microsoft Windows Server 2003 was released in mid-2003; previously, Microsoft supported the Intel Itanium processor through Windows 2000 Limited Edition. (6)

In July, 2003, Intel estimated that 400 64-bit applications were available on Linux, and HP-UX operating systems. (15) HP estimates that they will have ported the 1,000 most popular applications in their portfolio by 2004. (1)

Here are some examples of companies that are currently using 64-bit servers:

123Multimedia processes, creates, and distributes content such as telephone services, television content, chat forums, and games, requiring very large amounts of data processing. Using Itanium 2 and HP, they can now process 1,000,000 transactions in the time they used to process 400,000 transactions. (9)

Airbus UK uses Itanium 2 systems to design wings and fuel systems for the Airbus model. They need backward and upward compatibility for their engineering simulations to ensure that applications will continue to run for a long time. Airbus can run 20 to 30 simulations for wing designs each night. (10)

BEA Systems' WebLogic provides the infrastructure for other 64-bit applications. BEA WebLogic JRockit 8.1 is a high-performance JVM developed for server-side applications and optimized for Intel 32-bit and 64-bit architectures. With BEA WebLogic JRockit, low-cost Intel servers can be used as J2EE application servers. (2)

DataDirect Technologies has released wire-protocol ODBC drivers for Windows Server 2003 64-bit Enterprise and Datacenter Editions, and the 64-bit AIX, HP-UX (IPF), Linux, and Sun Solaris platforms for applications accessing Oracle, DB2, SQL Server, Sybase, and Informix. (5)

Fiat Spain has created a Web portal using Itanium 2 and HP to interact with 200 Fiat dealers across Spain. Fiat Auto plans to expand the use to other European countries. (11)

Fortis Health, a health insurer, is using 64-bit processing primarily for business analytics, and to analyze data that will help them deliver their services more effectively than their competitors do. They run the 64-bit processors on a modular Unisys ES7000, which lets them use either 32-bit or 64-bit processors. (17)

JetBlue Airways migrated its frequent flier applications to a Unisys ES7000 server, eliminating performance problems and using much less

processing power than on the 32-bit ProLiant systems they used previously. (21)

Lower Saxony police deal with mission critical and data-intensive tasks including operative, administrative, and management information tasks. Combining previously separate, unconnected IT systems onto a 64-bit server improved cost overheads and operating efficiencies. (12)

Microsoft released Windows Server 2003 and SQL Server 2000 (64-bit) in April 2003. SQL Server 2000 (64-bit) takes advantage of advanced memory addressing capabilities for essential resources such as buffer pools. Application scalability is improved because of the greater processing capacity. (4)

Multyork Furniture improved routing information through their factory, provided better costing information, and facilitated customer ordering when they dropped their proprietary system and switched to SAP and Itanium 2. (13)

Raymond James Financial uses a 16-processor Itanium 2 HP Superdome to consolidate databases into a single data warehouse that uses Microsoft SQL Server. (17)

Red Hat Linux has announced support for Itanium 2. (25)

SAP AG has actively participated in the Intel Itanium development to deliver improved performance and scalability in complex extended manufacturing environments. (26) SAP expects to have the entire SAP product line available on 64-bit Linux by the end of 2003.

SAS Institute, Inc. is delivering 64-bit applications to provide their customers, such as the U.S. Census Bureau, with improved levels of performance and scalability, as well as continuing to support multiple operating systems. (13)

Siebel Systems, Inc. delivers the Siebel Smart Web Architecture, a zero-footprint Web architecture that allows organizations to integrate front-office and back-office systems, as well as numerous other applications essential to any e-business. (29)

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## Summary

The decision to use 64-bit computing should be based on whether your server can meet the needs of the users and their applications. You need to consider whether the scalability and performance of your existing system can meet current and predicted needs. Server-based applications, such as high-performance databases, business intelligence, and forecasting, will operate with vastly more efficiency by upgrading to 64-bit applications on 64-bit machines.

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