

Pervasive[®] PSQL Summit[™] v10 – 64-bit Technology Overview

Pervasive PSQL White Paper
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PERVASIVE PSQL 64-BIT SUPPORT

Pervasive PSQL Summit v10 now includes platform support for all 64-bit editions of Windows® operating systems, 64-bit editions of SUSE® and Redhat® Enterprise Linux® distributions, and support for the latest Intel and AMD dual-core processors. Now your applications take advantage of the new faster hardware, more memory, and larger address space available in the latest 64-bit systems.

Plus, flexible licensing allows you to add users as you scale your application with 64-bit technology. Licensing starts at 6 users and can scale to hundreds or an unlimited number of users.

INTRODUCTION

With 64-bit architecture comes cost savings to businesses that want single systems running at greater memory capacity and high optimization for fast computations. Both 64-bit CPUs and operating systems are emerging to meet business needs. However, 64-bit software and drivers must be produced to fully take advantage of 64-bit processing.

Parallel application development in the 64-bit processing environment will become an increasing part of the developer's work scope. Pervasive Software, through Pervasive PSQL Summit v10, has taken steps to make sure developers make the smoothest transition to 64-bit Pervasive PSQL. PSQL v10 allows users to run both 32-bit and 64-bit applications on 64-bit platforms.

PERFORMANCE

Pervasive PSQL v10 paves the way for better data management for end users whose 32-bit applications are reaching the limits of the 4GB memory of a 32-bit system. Many businesses require additional application performance that can be achieved when moving to 64-bit computing.

Technologists increasingly need performance improvements, and as 64-bit software becomes more available, 64-bit computing is the attractive solution for computing needs. For applications that access large amounts of data, the move to 64-bit will be critical in increasing the performance required to support a high number of database tables into memory. While most tend to think of this as an enterprise requirement, the reality is that even Small to Medium Businesses (SMBs) require the additional performance gains offered in 64-bit platforms when it comes to faster searches and data retrieval. Using a 64-bit server means organizations can support more simultaneous users, potentially removing the need for extra hardware.

In addition, dual-core processors save on power because energy consumption remains relatively constant with an increasing number of cores, even as performance scales. This decrease in energy costs for servers and desktops (and increased battery life for notebooks) will leave businesses keener to tap these benefits.

The value that 64-bit computing brings to developers and their customers is significant.

A SPECIAL WORD TO 32-BIT USERS

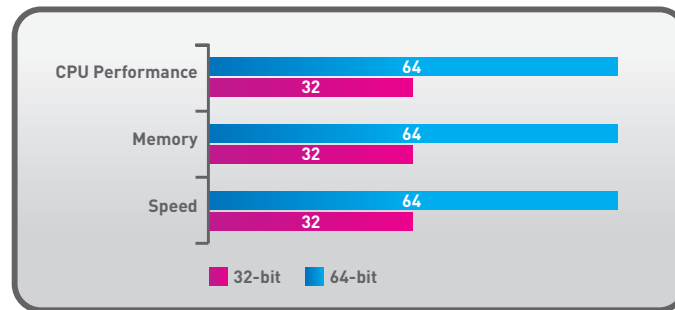
Pervasive sees the transition to 64-bit as a gradual one. First, 32-bit applications are moved to a 64-bit database running on a 64-bit operating system. Future migrations to 64-bit based applications will occur later, as our customers need to do so. The advantage today is that existing applications can perform better with a simple platform and database upgrade to 64-bit.

It's important to current customers that PSQL Summit v10 maintains over 10 years of backward compatibility with Pervasive database file formats, because applications using compatible file formats from Btrieve 6.15 through to Pervasive PSQL v9 will immediately benefit from Pervasive PSQL Summit v10.

NEW 64-BIT BTRIEVE AND DTI APIS

With the 64-bit version of Pervasive PSQL v10, applications also can be written or modified to take advantage of the new 64-bit Btrieve and Distributed Tuning Interface (DTI) APIs. With a new 64-bit client you'll be able to access the database directly in a true 64-bit configuration. Moving forward, other software development kit interfaces will be added to provide the latest 64-bit access for the next generation of applications. When Pervasive customer is ready for 64-bit, Pervasive is ready to facilitate the transition.

64-Bit Performance Benefits



MEMORY

As data sets grow and database and other applications become more complex, address space requirements will increase. Today's 32-bit applications running on Intel and AMD processors and a 32-bit Windows based operating system can access up to 4GB of RAM. In Windows-based machines, that 4GB is split between the operating system and the applications. This means the most memory any given application can access is 2GB. So, if a 32-bit Windows machine has 4GB of RAM, adding memory will not have any effect on performance.

However, a 64-bit application can use 64-bit virtual address space capability to allow up to 16 terabytes to be directly addressed. In fact, a database or other application will be able to run entirely in RAM with 64-bit technology. The advantages of this space capability are unlimited.

Greater memory and more efficient use of memory improve application performance. PSQL includes several enhancements to enable both of these approaches. Pervasive PSQL v10 includes support for Windows Vista. The 64-bit Windows Vista supports from 8GB to 128GB (depending on the version), so applications can preload substantially more data into virtual memory, allowing rapid access and big improvements in application performance. The table below summarizes the address space available to 32- and 64-bit Windows applications:

64-bit vs. 32-bit architecture

ADDRESS SPACE	64-BIT WINDOWS	32-BIT WINDOWS
Virtual memory	16 terabytes	4 gigabytes
Paging file	512 terabytes	16 terabytes
System cache	1 terabyte	1 gigabyte

Again, Pervasive PSQL Summit v10 is available to help those using 32-bit applications move to 64-bit applications. Many customers will continue utilizing 32-bit applications with an eye toward future 64-bit adoption. Our intention is to bring the technology to our customers, so that when they're ready, the transition to 64-bit is seamless.

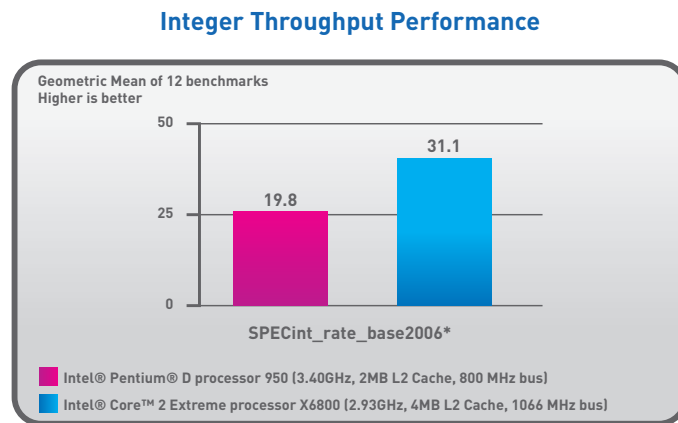
NEW TECHNOLOGIES: THE MOVE TO 64-BIT

Market trends and customer requirements indicate a changing technology world: The time is coming when a single 64-bit server will replace the use of several 32-bit servers on a network.

Intel and AMD are paving the way for greater use of 64-bit computing for a variety of needs, from data mining to interactive coding and advanced engineering applications. Even more, AMD and Intel x64 chips have created an opportunity for 64-bit computing to occur on servers, desktops and notebooks, moving from limited to widespread use.

AMD (Athlon64 and Opteron) and Intel (Xeon and Core2 Dual) chip architecture processes have the ability to address a terabyte of physical memory. Data-intensive, “memory-bound” applications run faster because of fully buffered DIMM technology. Along with 64-bit chips, operating systems, hardware drivers and 64-bit applications are emerging requirements that must be addressed to gain maximum use of this technology.

Highlighting the performance improvement to be expected from 64-bit computing, the following chart describes testing results published on the Intel Web site:



Data Source: Standard Performance Evaluation Corporation (www.spec.org) published result as of July 9, 2007.

64-BIT OPERATING SYSTEM VERSIONS

Microsoft's 64-bit offerings include Windows XP Professional, Windows 2003 (Standard and Enterprise) and multiple Windows Vista Editions. Microsoft has announced that the Windows Server 2008, is expected to be the last 32-bit server operating system.

For developers, Microsoft claims that they will be able to create and run a 32-bit application on a 64-bit system. Microsoft announced that these functions have been modified to reflect the computational precision of the platform on which an application is run. The 64-bit Windows development environment supports the same feature set as 32-bit Windows, including user interface and programming models, networking, security, graphics, multimedia, directory service, plug-and-play, and tools features.

To further assist developers, 64-bit Pervasive PSQL v10™ is designed and tested thoroughly to achieve maximum results in an application or data server mode. Microsoft has allowed Pervasive to test v10 on its platforms and the performance results have been highly positive.

Pervasive PSQL v10 works with these 64-bit operating systems

64-Bit Windows 2003
Windows XP
Windows Vista
Window Server 2008
Red Hat Enterprise Linux® 5
SUSE Linux Enterprise Server 10

EVALUATING APPLICATIONS FOR 64-BIT MIGRATION

There are a number of considerations developers will have as they evaluate 64-bit migrations. Pervasive has worked hard to ensure these areas of consideration are addressed. Current versions of the PSQL database are backwards compatible with file formats 6.x and greater. This allows existing applications to migrate without a file rebuild or update. Since the database is able to read many different file formats users are able to maintain different versions of formats.

As a best practice Pervasive recommends that users evaluate and adopt newer file formats to maintain feature ability.

PLATFORMS AND APPLICATIONS SUPPORT

Pervasive PSQL provides compatibility for 32- and 64-bit applications to be installed on a 64-bit operating system. While most traditional applications install on 32-bit platforms, it will become less and less common with 64-bit platform adoptions. Users will be able to leverage the power of 64-bit computing by installing a 32-bit, 64-bit or both applications on a 64-bit operating system installed with 64-bit Pervasive PSQL v10 Server. This allows the database to interact directly with the operating system and hardware to maximize the power of 64-bit. The chart below outlines your configuration and deployment options:

Application, O/S and Database Support

Applications	Database	Operating System	
32-bit	32-bit	32-bit	PSQL v9
32-bit	32-bit	64-bit	
32-bit	64-bit	64-bit	PSQL v10
64-bit	64-bit	64-bit	

CONCLUSION: CUSTOMER NEEDS FIRST

Pervasive offers support for both 32-bit and 64-bit operating systems and applications today.

Pervasive Software has built Pervasive PSQL Summit v10 as a value-driven database that will assist our customers in anticipation of future technology needs. There are no rewrites or user upgrades needed when moving to PSQL v10 – you will gain the ability to easily work with 32-bit and 64-bit applications and operating systems. With support for Windows Vista, Windows Server 2008 and Linux, Pervasive PSQL is your database of choice for adopting the latest technologies.

As application developers and ISV's evaluate the move to a 64-bit architecture, Pervasive PSQL v10 provides a seamless and simple migration to 64-bit computing. For ends users and businesses that want to maximize on this latest technology through a high performance 64-bit operating system and platform, Pervasive PSQL v10 Server is the 64-bit edition of choice.

Pervasive PSQL users will have an opportunity to achieve a higher level of computing efficiency, especially within growing SMB and Enterprise configurations and demands. Pervasive Software recommends our customers explore the PSQL v10 option now to gain a competitive edge.

Users should also remember that Pervasive is fully committed to those who continue to work with 32-bit applications. Pervasive PSQL Summit v10 brings the technology to our customers to continue maximizing their activities with 32-bit applications and brings the capability to handle 64-bit when needed.

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