



Highlights

- Deploy TmaxSoft Tiberio with IBM® Power Systems™ processors and IBM all-flash storage to lower database costs by 85 percent or more¹
 - Accelerate Linux-based applications more than four times compared to traditional database solutions¹
 - Rely on TmaxSoft and IBM solutions proven by extensive testing and real customer results
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Transformation accelerated

TmaxSoft Tiberio, IBM Power Systems and all-flash storage can help accelerate IT transformation

As enterprises modernize and transform their IT architectures to better meet the demands of 21st-century business, lowering costs and simplifying infrastructure remain foundational objectives. But organizations with significant on-premises traditional relational database management system (RDBMS) implementations have too often seen complexity and costs rise, not fall.

The Tiberio RDBMS from TmaxSoft offers an alternative. When deployed with IBM all-flash storage and Power Systems servers, the suite of market-leading technologies can help lower costs by 85 percent or more, reduce infrastructure complexity and increase system performance by more than four times.¹

A powerful alternative

Many companies rely on traditional RDBMS solutions such as Oracle Database for both the technology itself and the in-house skills needed to support these solutions. But if you currently use Oracle Standard Edition (SE) or Oracle Standard Edition One (SE1) to underpin your applications, then the required migration to Oracle Standard Edition Two (SE2) may mean that the cost and complexity of maintaining your Oracle applications could increase. The potentially higher license costs, less-flexible licensing terms, and higher ongoing support and maintenance expenses resulting from the move to Oracle SE2 could result in fewer resources available for technical investment, a reduction in headcount or possibly outsourcing.²



If your organization has implemented Oracle Real Application Clusters with SE, the licensing associated with a move to Oracle SE2 can limit certain solutions to two single-socket servers with a maximum of eight threads (throttled by Oracle Resource Manager).² These licensing requirements may diminish your ability to fully utilize all the resources available from underlying servers or even lead to reduced application performance and lower end-user satisfaction.

For enterprises looking to benefit from all the advantages offered by Power Systems technology (powered by IBM POWER® processors), Oracle doesn't certify its database for the Linux operating systems on POWER. This means there is currently no solution available for POWER users who want to implement Oracle Database servers on Linux.

To help reduce database costs, avoid the complexities associated with Oracle licensing, more fully utilize existing IT infrastructure, and leverage the cost and performance advantages of Linux on IBM POWER, enterprises around the globe are turning to Tiberio database solutions from TmaxSoft. Tiberio is a drop-in Oracle-compatible database that embraces Linux on POWER, fully supports the superior architecture of the POWER platform, and can offer superior performance and substantial license cost savings compared to Oracle solutions.

Tiberio from TmaxSoft

Founded in 1997 in Seongnam, South Korea, TmaxSoft is a software innovator with 20 locations worldwide, including a global headquarters in Chicago. The company is focused on infrastructure and data modernization, with solutions that offer viable alternatives to traditional RDBMS technologies and drive competitive advantage for today's digital businesses.

Tiberio from TmaxSoft is an enterprise-class database that can provide less complex and more affordable alternatives to traditional RDBMS offerings such as Oracle Database. More than 1,600 companies around the globe have now implemented Tiberio and gained benefits such as:

- **Customer-focused licensing:** In a marketplace of confusing, unrealistic and even misleading licensing terms, the Tiberio licensing model was the first global software program to be verified by the Campaign for Clear Licensing for being clear and easy to understand.³
- **Broad technology compatibility and reduced total cost of ownership (TCO):** To help companies achieve low operating costs for database operations, Tiberio allows database migration with a minimum of code changes through compatibility with RDBMS solutions such as IBM Db2®, Oracle Database and Microsoft SQL Server.
- **Support for mixed workloads:** Tiberio includes several features for efficient hybrid transactional/analytical processing (HTAP), including bitmapped indexes, specialized transformation for star schemas with optimized join queries and automatic creation of partitions by insertion time frame.

Tiberio bridges the gap between legacy relational databases and the new paradigm of running application workloads in virtualized data centers and the cloud. It also enables enterprises to fully leverage IT investments through a simple, utilization-based licensing model.

Tiberio is a highly scalable, resource-efficient RDBMS that responds effectively to high-volume transactional data processing and analytics. It features advanced Oracle compatibility, often at lower costs than equivalent Oracle Database solutions, and includes support for Oracle data types, commands,

schemas, stored procedures and SQL extensions.² Tiberio allows existing Oracle Database-based applications to be ported with less effort and risk than carrying out an Oracle major version upgrade.² Plus, TmaxSoft offers low-cost, no-obligation proof-of-concept to help enterprises evaluate how Tiberio can deliver substantial savings and technical benefits.

Power Systems

Power Systems server platforms deliver the performance and scaling capacity required by 21st-century enterprises of all types and sizes. Power Systems servers provide the ability to:

- Move data in and out of systems more quickly, with twice the memory and input/output (I/O) expansion of many x86 servers
- Achieve greater speed and efficiency for database, online transaction processing (OLTP), and other highly multi-threaded applications with processing memory supported by 50 percent more cores and two times the number of simultaneous threads per core than comparable x86 servers

The current IBM POWER8® microprocessor is the fourth generation of POWER technology that provided the first multi-core server technology in the industry. IBM Research has contributed chip-manufacturing technology that delivers high reliability, high quality and high-density memory with high-bandwidth interconnects. Power Systems solutions are ideal for consolidation of multiple applications and infrastructure workloads in virtualized server environments, bringing together business transaction processing with infrastructure for big data, analytics and OLTP solutions.

TmaxSoft has worked closely with Power Systems to provide high levels of compatibility and reduce costs through Tiberio licensing that fully supports POWER functions such as Live Partition Mobility.⁴

IBM all-flash storage

IBM offers a comprehensive portfolio of flash-optimized storage solutions that offer market-leading features to address the full range of enterprise storage requirements and use cases. All IBM storage solutions share deep integration across the entire IBM storage ecosystem:

- **IBM FlashSystem®** is the flagship high-performance all-flash array in the IBM portfolio.
- **IBM Storwize® family** offers all-flash systems for entry-level and midrange workloads.
- **IBM DS8880 family** has all-flash configurations designed to support mainframe and other business-critical environments where peak availability is non-negotiable.
- **VersaStack** consolidated storage and networking solutions offer multiple high-performance all-flash configuration options for enterprises moving to converged infrastructure.

Figure 1 introduces each of the current IBM storage systems, positioned by product family, the IBM Spectrum Storage™ component from which it is built, and business use case—from entry-level through mission-critical. Cognitive businesses depend on speed because their 21st-century customers won't wait. Whether handling thousands of online customers or sifting through millions of Internet-of-Things data points to thwart cyber attacks, enterprises looking to gain competitive advantage are increasingly turning to IBM flash storage.

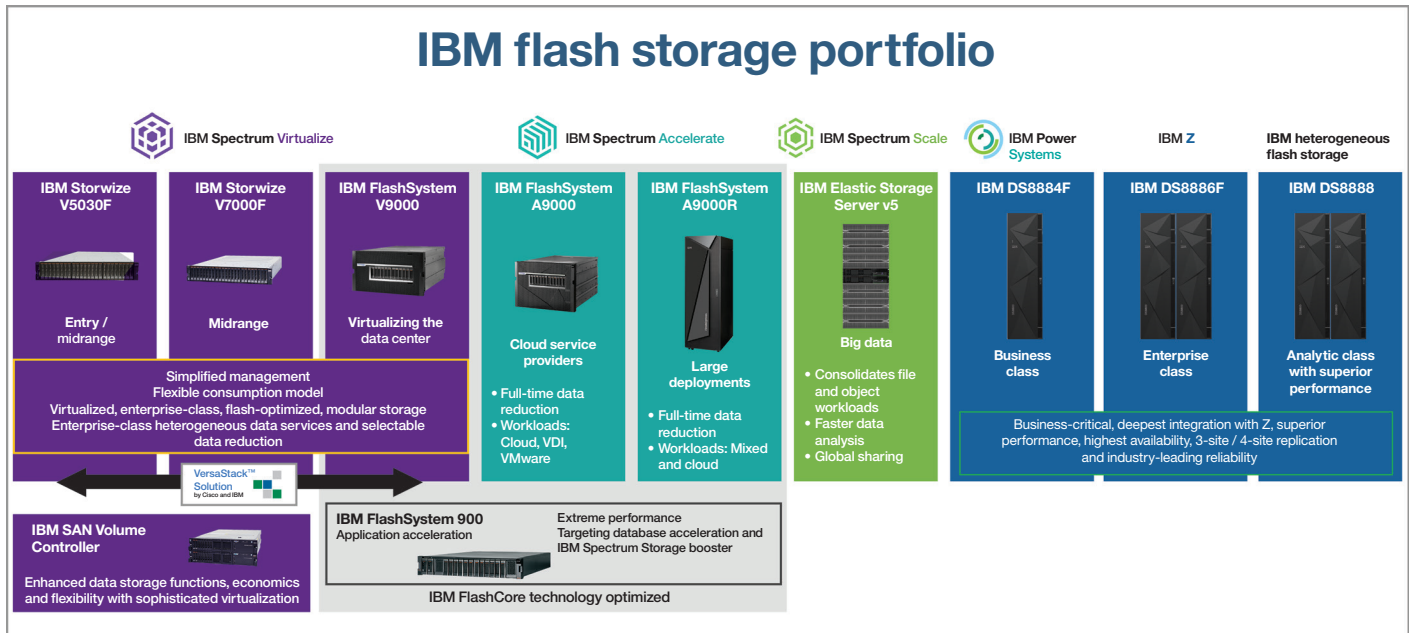


Figure 1. The IBM flash storage system portfolio

A suite of advantages

The combination of TmaxSoft Tiberio with systems based on POWER processors and IBM all-flash storage solutions offers many advantages. First, Tiberio operates equally well with any all-flash solution within the IBM portfolio. You can choose your storage solution based on your specific application workloads and business priorities, without worries about compatibility. Or, you can leverage your existing storage systems by deploying IBM storage solutions that include virtualization

capabilities. For example, you might deploy IBM FlashSystem V9000 and dramatically increase application performance compared to disk while also virtualizing any or all your existing storage systems into one agile, easy-to-manage data center-wide storage resource.

Next, Tiberio offers proven Oracle compatibility through hundreds of successful customer implementations. And it's the only solution available for transparently replacing Oracle on Linux

and POWER8. Tiberio provides extensive third-party tools and applications support. The database “look and feel” is nearly identical to that of Oracle Database. This eliminates extensive retraining for database administrators, developers or support staff. And you can leverage the advantages of industry-standard Linux infrastructure with scale-out and scale-up choices.

Migrating from an existing RDBMS environment such as Oracle to another RDBMS solution can involve significant engineering and testing efforts when application logic and PL/SQL database calls are distributed across enormous application code libraries. The extent of such projects can make staying with existing RDBMS solutions—even those with multiple cost and performance liabilities—the more attractive option. However, Tiberio isn’t just another traditional RDBMS. It has been designed from first principles to be drop-in Oracle compatible. This means that all SQL and PL/SQL commands are compatible with Oracle, which makes application migration far simpler. Tests confirm that Tiberio performance is on par with Oracle on similar hardware, while Tiberio licensing enables greater resource utilization, as noted above.² Because of these advantages, customers have described migrations to Tiberio as being less risky and requiring no more development and testing efforts than would be required for standard Oracle version updates.²

Tiberio solutions based on POWER and flash storage systems can provide significant cost savings compared to traditional RDBMS solutions from major vendors running on Intel/x86 servers with mechanical hard disk drive storage. You can consolidate multiple databases on one server with flexible “use

what you need” licensing. In fact, TmaxSoft claims that Tiberio licensing can be approximately 50 percent less expensive than equivalent solution licensing from Oracle.⁵ Because of simplified migration, there also are no added development costs when Tiberio replaces Oracle instances.

The TCO savings run deeper than simply reducing licensing costs. IBM all-flash storage can also offer substantial TCO benefits when compared to disk.⁶ Figure 2 illustrates an example of the advantages an organization can gain by hosting Tiberio database instances on Power Systems servers. Power Systems servers can perform more work than equivalent x86 servers with fewer processor cores and a smaller data center footprint. And the extra performance of POWER-based database servers allows multiple applications to be migrated to a smaller POWER server footprint. Among many other benefits, these cost savings could release funds for additional POWER-based projects.

Improved performance confirmed

Tiberio database instances running over Linux on POWER servers supported by IBM all-flash storage offer additional advantages beyond lower overall costs and simplified migration and operations. These solutions provide significant application performance benefits as well.

IBM and TmaxSoft engineers have recently completed extensive testing to confirm and quantify the increased performance compared to environments composed of Linux running on x86 servers using traditional disk storage.

Tibero warehouse simulation

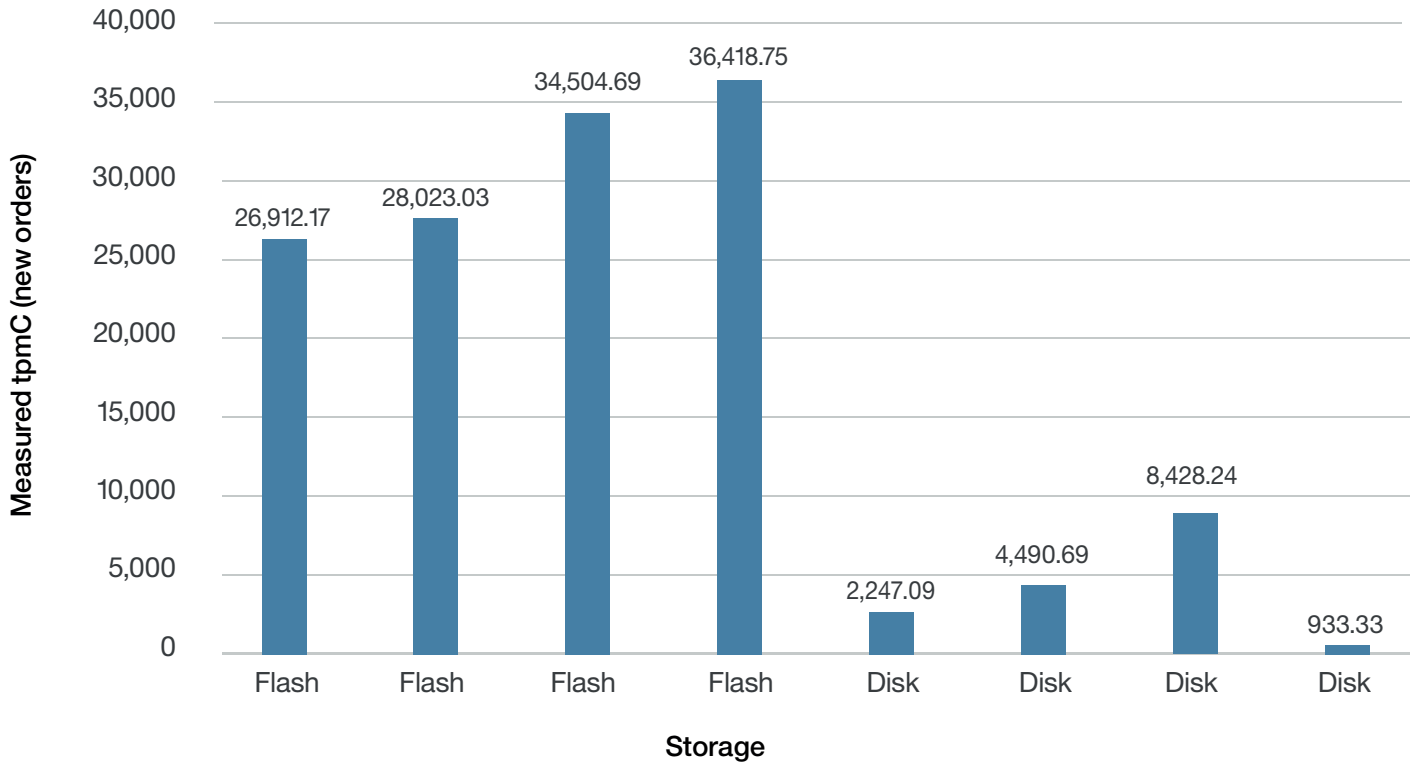


Figure 2. Results of IBM and TmaxSoft tests comparing Tibero performance on flash storage to disk-based storage.

Engineers ran performance tests using a test bed composed of an IBM Power System S822L server running Red Hat Linux, Tiberio 5 FS04 (including Active Clustering), and a single IBM FlashSystem 900 array with 29 TB of available storage. The HTAP workloads were generated by HammerDB and Swingbench. The performance of this configuration was compared to equivalent workloads running against the same Tiberio instance using an all-disk storage array. Figure 2 provides a simple chart of the results. From left to right for both the IBM FlashSystem array (Flash) and disk storage (Disk), each column represents, respectively, the transactions per minute (TPM) for 100, 200, 500 and 1,000 simulated user terminals.

The tests confirmed that IBM FlashSystem storage provided more than four times greater performance than disk-based storage. Also notice that when using flash storage, the performance of the Tiberio/POWER8 configuration continued to climb as the number of user terminals increased, whereas with disk storage, the TPM fell dramatically beyond 500 terminals. And the benefits of flash storage don't stop with substantial performance gains—the simplicity of the IBM FlashSystem-based solution also results in fewer maintenance points, more efficient use of the Tiberio software, and a better end-user experience.⁷

Accelerate your business transformation

The IBM collaboration with TmaxSoft is producing real benefits for our shared customers. For Oracle users looking to lower database costs and complexity, Tiberio offers a proven alternative. Tiberio also provides the only available solution for users of Power Systems servers to deploy a robust RDBMS in a Linux environment. In fact, a database solution employing Tiberio, Linux, POWER and IBM all-flash storage provides a range of important advantages over other RDBMS solutions using

traditional disk storage, from greater flexibility and resource utilization, through lower TCO and less system complexity, to dramatic performance improvements.

IBM, TmaxSoft Tiberio, Power Systems and IBM all-flash storage—together these companies and technologies can accelerate your IT and business transformation.

Why IBM?

Building on decades of storage leadership, IBM offers a comprehensive portfolio of all-flash, hybrid flash and flash-optimized storage and management solutions that can propel organizations into the next era of IT. These proven, easily integrated flash solutions accelerate critical applications such as advanced RDBMS solutions, come with best-in-class reliability and deliver new efficiencies across the entire business environment for a faster return on investment. IBM flash storage solutions can provide enterprises with the application performance they need to compete, innovate and grow.

For more information

To learn more, please contact your IBM representative or IBM Business Partner, or visit the following websites: ibm.com/storage/flash and ibm.com/power

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Actual available storage capacity may be reported for both uncompressed and compressed data and will vary and may be less than stated.



Please Recycle

- ¹ Based on TmaxSoft data and joint IBM/TmaxSoft Tiberio performance testing.
- ² “Tiberio: The Simple Alternative to Oracle,” *TmaxSoft*, 2016. http://www.tmaxsoft.com/us_en/ebooks_us_en/
- ³ TmaxSoft licensing model adheres to the Campaign for Clear Licensing Code of Conduct,” *TmaxSoft press release*, December 7, 2015. http://www.tmaxsoft.com/us_en/2015/12/07/tmaxsoft-dbms-tiberio-licensing-model/
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- ⁷ Based on IBM analysis and projection of IBM/TmaxSoft testing of Tiberio hosted on IBM POWER servers and IBM FlashSystem and IBM Storwize V7000 storage.