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# FIS Accelerates Global Banking with FlashSystem

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**IBM® FlashSystem™ and  
FIS Profile®/GT.M™**

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# Table of Contents

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<b>FIS and IBM: Partners in Leading-Edge Banking and Payments Solutions.....</b>	<b>1</b>
Heavy Hitters in the World of Banking Information Technology .....	1
<b>Growth Leads to Challenges.....</b>	<b>2</b>
Meeting Service Level Agreements in a Growth Environment.....	2
<b>A Solution the Size of a Pizza Box.....</b>	<b>3</b>
IBM FlashSystem: Superior Performance, Efficiency, and Reliability .....	3
FIS Profile: Modular, Powerful, and Ultra-Scalable.....	5
FIS GT.M Database Engine: Secure, Lightning Fast, and Rock Solid .....	5
A Smarter, Faster Solution.....	6
<b>Empowering Growth and Innovation.....</b>	<b>8</b>
<b>Conclusion.....</b>	<b>9</b>
<b>Further Information.....</b>	<b>9</b>



# FIS and IBM: Partners in Leading-Edge Banking and Payments Solutions

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## Heavy Hitters in the World of Banking Information Technology

FIS is the world's largest global provider dedicated to banking and payments technologies. With a long history deeply rooted in the financial services sector, FIS serves more than 14,000 institutions in over 110 countries. Headquartered in Jacksonville, Florida, FIS employs more than 39,000 people worldwide, and holds leadership positions in payment processing and banking solutions, providing software, services, and outsourcing of the technology that drives financial institutions.

For over 40 years, FIS has partnered with IBM to bring leading-edge technologies and solutions to customers worldwide. In fact, FIS has worked closely with IBM since companies were first installing computers. FIS leverages the knowledge and experience of IBM scientists and engineers to analyze, develop, test, recommend, and configure the best information technology (IT) solutions with the most efficient investments to support the needs of its customers. FIS works closely with IBM experts to configure and deploy the full range of *System z*, *AIX*, and *IBM i on Power Systems* hardware and associated IBM software and services. Computer storage solutions are integral for overall solution success. Technical advancements with IBM® FlashSystem™ storage now offer previously unheard of performance capabilities, making the all-flash arrays a new favorite for solving the most demanding storage related challenges.

This white paper highlights how a real world FIS client's utilization of IBM FlashSystem together with the FIS Profile® banking solution<sup>1</sup> yielded dramatic performance improvements, truly accelerating the pace of global banking. This client has been an FIS outsourcing client for 14+ years and counting.

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<sup>1</sup> FIS Profile: [www.fisglobal.com/products-core-coreaccountprocessing-profile](http://www.fisglobal.com/products-core-coreaccountprocessing-profile)

## Growth Leads to Challenges

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### Meeting Service Level Agreements in a Growth Environment

In this white paper we examine how FIS and IBM addressed an online bank's need to support 3x growth in their banking business *and* provide full database encryption, all within the terms of an existing Service Level Agreement (SLA).

As with many FIS customers, this particular client is an "e-provider" of banking services. FIS manages all backend IT production environments for the institution, supplying the latest technology to ensure consistent application and backend system performance and the very best end-user experience. FIS works proactively to bring in the latest technology to support its customers. For this outsourcing client, unprecedented growth and ultimate security requirements drove the need for a technology reassessment and refresh to ensure that processing and data storage components would meet service level agreements for years to come.

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#### ***Situation:***

*The existing disk-based storage arrays were not the optimal solution for this bank's continuous organic growth, very high volume data storage, and encryption demands. To continue to meet the SLA, proactive technology assessments sought to identify changes yielding improved long term performance.*

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As part of the proactive testing to support the 3x growth with full database encryption, a detailed analysis of the client's specific hardware and software components of the application computing environment revealed key findings related to their disk-based storage arrays. Storage response times registered in the 30-50 millisecond range, with spikes climbing much higher. FIS recognized this would lead to challenges in continuing to meet SLA commitments as the online application transaction traffic continued to grow and with the database fully encrypted. It was paramount that the technology refresh must address the situation on several fronts – application/database efficiency, storage latency, and throughput.

## A Solution the Size of a Pizza Box

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FIS followed a careful technology escalation process to address storage performance demands that might eventually threaten the application computing environment's capability to continue to meet mission critical SLAs. After due diligence and testing multiple options, FIS turned to their IBM business technology partners.

IBM storage experts suggested that they could solve the latency and data throughput issues by deploying a platform "the size of a few pizza boxes" (in contrast to the previous multiple racks full of disks and solid state drives). The FIS team was cautiously optimistic but initially unconvinced. FIS was also deeply committed to investigating potential solutions as quickly as possible. The request for an IBM FlashSystem unit went out on a Friday, and by the following Monday the FIS team had the all-flash array deployed in their test environment and had achieved performance beyond anything they had seen before.

FIS configured an application and database solution built from the latest version of the award winning FIS Profile banking product delivered on the FIS GT.M™ database engine<sup>2</sup>. Together, the FlashSystem arrays delivering microsecond latency and the Profile/GT.M application backbone offer the consistent performance, resiliency, and scalability needed by FIS to meet and exceed their outsourcing client's SLAs today and far into the future.

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### ***Solution:***

*The IBM FlashSystem solution delivered improvements in front-end and back-end application response times and reduced overnight scheduled processing timelines and overall operational latency, enabling FIS to continue to meet their customer's SLA requirements, now and in the future.*

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### **IBM FlashSystem: Superior Performance, Efficiency, and Reliability**

Flash technology has transformed storage capabilities and given enterprises the ability to extract extraordinary value from complex data sets. IBM has invested one billion dollars and established worldwide Flash Centers of Competency to help customers

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<sup>2</sup> GT.M: [www.fisglobal.com/products-technologyplatforms-gtm](http://www.fisglobal.com/products-technologyplatforms-gtm)

architect and implement flash-based systems. IBM FlashSystem arrays provide industry leading performance, reliability, and ultra-low latency, while the FlashSystem Family adds the full spectrum of enterprise grade management and feature rich storage services. These IBM solutions provide multiple options for meeting the ultra-low latency requirements of banking and payments systems, overcoming performance bottlenecks, and increasing the effectiveness of financial industry computing environments.

Key differentiators setting FlashSystem apart from other flash storage platforms include:

- FlashSystem architecture is designed with IBM® MicroLatency™ to speed up response times, delivering data reads and writes in the hundred microsecond range. This enables financial enterprises to complete more transactions faster, thus gaining a competitive advantage and increasing revenues.
- Among the engineering objectives of FlashSystem is a focus on Extreme Performance. In addition to a passion to achieve low latency, IBM FlashSystem engineers also optimized inputs/outputs per second (IOPS), as well as bandwidth. The resulting extreme performance ensures that as financial workloads increase, FlashSystem continues to scale performance without latency degradation. Whether supporting a single application that needs to handle large numbers of concurrent users or multiple applications with diverse workloads, FlashSystem's extreme performance translates into performance scalability and better business results.
- FlashSystem is optimized to provide Macro Efficiency through compact physical capacity, low energy consumption, and greater utilization of existing resources. The arrays are some of the highest density solutions on the market, offering dozens of terabytes of usable storage capacity in only two rack units of space. While providing over one million IOPS, they only draw about 600 watts of power, making them extremely power efficient.
- A key FlashSystem pillar is Enterprise Reliability. The system employs eMLC NAND flash plus two RAID dimensions – IBM's patented Variable Stripe RAID™ at the flash module level, as well as system wide RAID – resulting in more data protection levels than are available from competing systems. FlashSystem design achieves a no single-point-of-failure solution and enables rapid data servicing due to the fact that all hot swappable and redundant components (including flash modules, power supplies, fans, batteries, and canisters) are accessible from the front or the back of the system. In addition, both software and firmware updates can be completed with the system up and running.
- The FlashSystem Family offers a wide range of advanced storage services such as snapshots, data reduction through Real-time Compression™, and replication. For financial customers that require an extra layer of data protection for adherence to internal or regulatory requirements, the FlashSystem Family supports AES 256 hardware based encryption for data at rest.

## **FIS Profile: Modular, Powerful, and Ultra-Scalable**

FIS Profile is a real-time, ultra-scalable core banking system. It is a fully integrated solution that addresses the customer, banking product, account, and transactional requirements. Loan and deposit products are built on an extensive inventory of configurable features that are shared across all banking lines of business. With unmatched production scalability and ultra-high availability, FIS Profile is used by hundreds of clients, ranging from de novo startups to top tier global banks.

FIS Profile's real-time processing architecture implements immediate updates to the system of record and commits every transaction at the point of sale, optimizing workflow and virtually eliminating reprocessing and reconciliation. Straight through processing improves operational efficiency, information accuracy, and customer service levels. Clients using FIS Profile as their core banking system experience industry leading total cost of ownership benefits based on increased operational efficiency, as well as dramatically lower infrastructure costs.

## **FIS GT.M Database Engine: Secure, Lightning Fast, and Rock Solid**

GT.M is a database engine with scalability proven in the largest real-time core processing systems in production at financial institutions worldwide, but with a small footprint that scales down for use in individual virtual machines and software appliances.

Optimized for Profile, FIS has engineered in GT.M an engine to deliver transactional integrity with uncompromising scalability. Examples of FIS innovation in Profile/GT.M include:

- Optimistic concurrency control (parallelism) which maintains transactional integrity while scaling
- Query optimization which allows Profile to dynamically compile SQL/JDBC queries for execution at native machine speeds, and retain the compiled code for subsequent execution
- Tight run-time integration that minimizes latency, improves security, and eliminates potential bottlenecks
- Space efficiency techniques which make GT.M databases substantially more compact than traditional relational databases



Further benefits of the FIS GT.M space efficiency include:

- Increasing the information content of each I/O operation reduces the number of I/O operations needed for a given workload
- Reducing the information to be encrypted and decrypted makes whole-database encryption eminently usable for protecting data at rest

GT.M's unique ability to create and deploy logical multi-site configurations of applications provides unrivaled business continuity in the face of not only unplanned events, but also planned events, such as making changes to application logic and schema. Worldwide, GT.M is used in multiple industries, including finance, healthcare, transportation, and manufacturing.

## A Smarter, Faster Solution

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### *Overall Performance Improvements:*

- *Overnight scheduled processing time (the "Day-end" process) was reduced by 40% on average*
- *Front-end application response times improved by 250 milliseconds, or around 38%*
- *Online GT.M database backups accelerated from 6 hours to 1.5 hours, or 75%*
- *With FlashSystem, FIS can continue to achieve optimum performance with a fully encrypted GT.M database*

*FlashSystem continues to provide microsecond read/write response times, allowing FIS to meet time-critical file deliveries and sustain user interface response times under peak load conditions.*

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After exhaustive testing that lasted nearly a half a year, FIS felt comfortable deploying IBM FlashSystem to support their outsourcing client's mission critical Profile application. Backed by the GT.M database engine, this combination is an extremely powerful and resilient solution to address system performance issues and to ensure SLA compliance. Working together with the IBM team, FIS developed architectures supporting high availability and disaster recovery needs that not only met system performance objectives but also favorably managed system costs.

In the primary FIS data center, Profile is configured with GT.M real-time database replication, which also feeds the database updates to

the Profile disaster recovery site. Two IBM FlashSystem arrays are deployed in a mirrored configuration, using the legacy storage array controllers for storage system



management, with data volume (LUN) mirroring enabled at the AIX Logical Volume Manager (LVM) level. Initially, the Profile/GT.M production databases and database journal files were mounted (multiple file systems) on mirrored FlashSystem arrays, to ensure consistent read/write performance even during spikes in application traffic. The databases are mounted on two sets of 32x70GB mirrored LUNs, and the database journal files are mounted on two sets of 32x50GB mirrored LUNs, resulting in a solution architecture with extremely high availability and resiliency, as well as ultra-low latency.

At the disaster recovery site, the configuration utilizes mirrored FlashSystem arrays, also with LUN mirroring enabled at the AIX LVM level.

## Empowering Growth and Innovation

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The FIS high performance solution for this long-time outsourcing client went into production in March 2014. Initial results are very impressive. System latency dropped by a factor of 100x, from tens of milliseconds to approximately 200 microseconds. For Profile, the online transaction processing application, the objectives for better and more consistent storage performance were achieved, with very high IOPS. Software rework was not required.

IBM FlashSystem is rapidly becoming a solution favorite of FIS infrastructure teams. Other FIS banking and payment applications that require high performance storage, such as their fraud detection software, are moving onto FlashSystem as quickly as practical. With a focus on innovation and new product development and enhancements, FIS fosters the institutional culture best suited for adoption of non-disruptive technologies such as FlashSystem.

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*System latency was reduced by a factor of 100x and consistent storage performance achieved without the need for software rework.*

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This particular FIS outsourcing client illustrates a case in point where cutting-edge technology makes a real world difference. FIS and IBM partnered to offer a solution that features extreme performance, ultra-low latency, macro efficiency, and enterprise grade reliability. IBM FlashSystem is a powerful and cost effective tool for accelerating financial systems, meeting and exceeding online customer expectations, and gaining competitive edge in global banking environments.

## Conclusion

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The capabilities and capacity of IBM FlashSystem arrays enable FIS to address multiple computing challenges in production 24/7/365 operational environments quickly, while empowering growth and innovation for FIS and FIS Profile far into the future.

## Further Information

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For further details on FIS Profile and GT.M, please contact:

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For more information on IBM FlashSystem, please visit: [ibm.com/systems/storage/flash](http://ibm.com/systems/storage/flash)