



# Financial Industry Powerhouse Banks using ITC's uPDT™ for IBM® Mainframe Development

## case study

**L**ittle known outside the banking community, FIS™ ([www.fisglobal.com](http://www.fisglobal.com)) is an industry powerhouse on which people and businesses depend to provide connectivity and communication for the world's financial infrastructure.

One of the world's largest global providers of banking and payments technologies with a long history deeply rooted in the financial services sector, FIS serves more than 14,000 institutions in over 100 countries. Headquartered in Jacksonville, Florida, FIS employs more than 30,000 people worldwide and holds a leadership position in payment processing and banking solutions by providing software, services and outsourcing technologies that drive financial institutions.

A member of Standard & Poor's 500 Index, the company consistently ranks

at or near the top of the annual "FinTech 100" rankings of financial technology providers by *American Banker* and *Financial Insights* magazines.

FIS recently enhanced its System z® development environment with the uPDT platform from Virginia-based Information Technology Company (ITC).

uPDT incorporates the IBM System z Personal Development Tool (zPDT®) with state-of-the-art Intel® 64bit IBM and Lenovo® systems to work seamlessly with the Linux® operating system and IBM System z software.

FIS roots extend to the 1960s with the inception of data processing operations at Marshall & Ilsley Bank and launch of the Systematics core banking solution. A former subsidiary of Fidelity National Financial, FIS became a separate NYSE-listed company in 2006. It has processing and technology relationships with 40 of the top 50 global banks, including nine of the top 10.

With 25 strategic operating centers outside of the U.S., FIS is a leading provider of core banking solutions in North America, Europe and Asia and a leading provider of third-party card processing in Brazil, Australia, New Zealand and Thailand.

FIS financial technology solutions support more than 2,800 core processing clients, over six billion items are processed each year on FIS image technology, and more than 80 percent of all North America new deposit accounts are scored.

Globally, FIS supports more than 6.5 million credit card accounts, 9 million loyalty accounts, 60 million debit cards, over 360,000 ATMs (automated teller machines) and 2 million POS (point of sale) locations through its NYCE nationwide EFT/PINdebit network.

FIS is an industry powerhouse on which people and businesses depend, providing connectivity and communication for the world's financial infrastructure. Annually, FIS processes more than 180 million prepaid cards, representing more than 360 million prepaid transactions.

## FIS System z Banking Products

**FIS CONNEX™** is a comprehensive, enterprise-scale solution for ATM and POS terminal driving; transaction acquiring; switching and authorization; interfacing to processors and hosts; transaction routing linking to all major regional, national and international networks; security strategies, fraud blocking and statistical monitoring; network

monitoring and operational control. CONNEX is developed specifically to run on the IBM z/OS® mainframe platform, leveraging industry-leading architecture to provide a robust, high volume, high availability and highly scalable switch processing environment. In addition, it exploits IBM's Parallel Sysplex® technology to run an active environment that facilitates clients' business continuity and disaster recovery strategies.

**FIS DataNavigator®** is a real-time back-office transaction repository and user data access tool, driving transaction inquiry, settlement, device management and exception management.

These robust IBM mainframe products provide behind-scenes processing and connectivity for these universally used business and consumer financial services and products.

System z Connex mostly uses base operating system components such as VTAM®, TCP/IP and RACF® (or equivalent product); VSAM and QSAM files with DB2® are needed only to configure information and are not referenced directly. Optional components include ICSF (Integrated Cryptographic Service Facility) for increased security and Tivoli® Netview for control and automation. Connex can also use WebSphere® MQ to feed near real-time transactions to DataNavigator. DataNavigator on z/OS uses Connex plus DB2 as transaction store.

Both products offer Web-based user dialogs to access the system through WebSphere Application Server on z/OS or a separate server.

Connections to ATM or POS devices can use SNA, X.25 or TCP/IP. Host connections can use those protocols or WebSphere MQ. System user interface

can be Web-based or traditional 3270 terminal-based.

The typical Connex customer is a medium-to-large financial institution, retailer or third-party processor with an IBM mainframe. DataNavigator targets the same customer base plus Unix® or Microsoft Windows®-based systems. FIS offers switching solutions such as Connex on HP NonStop™ or open platforms as well and DataNavigator can also take transaction feeds from these systems. So a typical DataNavigator customer might run mixed hardware.

As a mainframe generalist, Software Principal Consultant David Paull is involved in product development plus, to a lesser degree, presales, support, training and customer site professional services. He mostly supports Connex customers while a few also have DataNavigator.

A self-described geek, Paull values innovative technology such as the uPDT and enjoys stretching FIS products to exploit new hardware and software features.

The real payoff, he said, "is contact with customers and introducing them to offerings or options they may not have been aware of, thus enhancing their use of FIS products."

## uPDT Improves Testing, Validation Demonstrations and Training

The FIS test environment has consisted of two development LPARs (logical partitions) at the Milwaukee area data center and a P/390 system was also previously used for testing. But development LPARs are not really under Paull's control, since they depend on a system software group

for upgrades and are shared with worldwide users around the clock.

The development staff spans the world with offices in Toronto, London, Chennai, Sydney and Melbourne with complementary staff in Milwaukee. Remote workers primarily provide local professional services and customer-funded development. Everyone, local and remote, accesses the Milwaukee area IBM System z mainframe data center. Calling Connex on IBM (paraphrasing Ivory Soap's commercial) "99 and 44/100ths percent" assembler — therefore, lean and fast — Paull is amazed that the word "assembler" strikes fear in the general population.

"When we first started coding the Connex application," he said. "Very few of us were what you would call assembler programmers. It's a language like any other. We use macros extensively for scary parts and the rest is basically compares, branches and moves."

ICSF (z/OS Integrated Cryptographic Service Facility) and other security devices encrypt and validate data, with configuration information stored in DB2 tables.

The uPDT lets Paull closely follow IBM's software updates using the z/OS Application Developers Controlled Distribution (ADCD) offering and provides full system console access to exercise operator commands, not available when using LPARs.

While validating applications for customer environments is still evolving, one purpose for the uPDT is verifying that all code components work well together. Presently, Paull puts the software, as it would be shipped/delivered to a customer, through its entire installation procedure to identify missing steps or components. He notes that this is only

possible on a stand-alone system whose settings or software need not match development systems.

In fact, uPDT testing reveals code issues not visible in the standard development environment.

It's critical for both software lifecycle cost and customer good will to find and fix such problems before they're visible externally, whether they're software bugs or operating environment-related.

Eventually uPDT testing may more closely replicate customer environments including network, other servers, users and end-point devices. And in the future, the uPDT's flexible environment will allow diagnosing and resolving problems unique to specific customer configurations.

Product demonstrations have typically been hit-or-miss, done over Internet and VPN connections to FIS development LPARs — or simply static screen shots embedded in PowerPoint® presentations. And training requiring system access has always been done at development offices. The uPDT enables live-system demos and training at customer sites, enhancing interactivity and realism while greatly reducing FIS and customer travel expenses.

## uPDT Acquisition and Installation

Having previously worked with ITC President Stan King supporting a mutual customer, Paull outlined uPDT capabilities to sell initially skeptical management on the pint-sized, but powerful, system. The deal was sealed using a loaner machine demonstrating its potential.

The uPDT's bottom line is that it's nice when large problems — inflexible test/

development environment and challenging demonstrations and training — have an elegant, cost-effective solution.

ITC completed normal Linux setup and installed the base ADCD software stack. Paull configured WebSphere Application Server and other optional software such as Netview, as well as recently available cryptographic support.

While some staffers envision the uPDT as a mainframe locked in a computer room, Paull sees it as a laptop meant to be portable, using it as a desktop machine and taking it home occasionally.

uPDT portability fulfills decades-long developer and sales dreams of a personal mainframe for development, testing, validation, debugging, training and demonstration.

Use of this technology may spread within FIS to push local computing power for all these functions out to remote locations, replacing LPAR access.

## ITC UltimatePDT (uPDT) Solution

The uPDT technology solution is a complete and ready-to-use mainframe application development system for IBM Independent Software Vendors (ISVs). uPDT systems offer a robust, reliable, and attractively priced platform for IBM System z mainframe development.

uPDT incorporates the IBM System z Personal Development Tool (zPDT) with state-of-the-art Intel 64bit IBM and Lenovo systems to work seamlessly with the Linux operating system and IBM System z software. The result is a low-cost, integrated, fully capable mainframe computing system well-suited for development or demonstration purposes.

The zPDT software-based application tool provides an affordable application development and demonstration platform for commercially available System z products. The zPDT enables a virtual System z architecture environment to run in full capacity on Intel platforms — such as a Lenovo laptop or IBM System.

This powerful tool provides:

- Low-cost IBM System z platform for ISV application development and testing
- Portable System z platform for operating system, application and product training, education and demonstration
- Support for developers in remote or multiple locations where personal systems are more efficient and cost effective than dedicating larger server resources
- Freedom from dedicated LPARs on existing systems
- Complete control of a complete System z environment without risk to – or impact on – other people or other development/test/production work

Three zPDT configurations accommodate differing requirements, providing one, two, or three virtual engines, which can be enabled as separate uniprocessors or as a multiprocessor configuration. Virtual engines can be defined as System z general purpose processors, System z Integrated Information Processors (zIIPs), System z Application Assist Processors (zAAPs), or System z Integrated Facilities for Linux (IFLs).

ITC extends zPDT value and flexibility by creating an underlying image meeting demanding System z development requirements for reliability.

ITC's extensive uPDT design/build/test R&D provides essential experi-

ence in configuring systems, providing deployment-ready uPDT systems for productive application development use.

ITC's uPDT system includes a customer-specified hardware platform (laptop, desktop, or server), IBM zPDT technology (USB Hardware key and appropriate 1090 device software), Intel®-based Linux (Red Hat® or openSUSE), and selected System z operating systems (z/OS, z/VM®, z/VSE®, Linux on System z). The ITC uPDT is a complete, ready-to-use system, built to unique customer specifications, fully tested, and burned in. ITC also provides first- and second-level uPDT technical support.

Recognizing uPDT systems' mission-critical nature, ITC provides a backup-and-restore facility featuring speed, ease of use, flexibility, and completeness. Menu-driven, it works seamlessly to back up and restore the Linux/zPDT environment and mainframe emulated 3390 volumes.

## Information Technology Company, LLC

Since formation in 1992, Information Technology Company, LLC (ITC) has solved clients' real-world IT issues with high-quality service and sound technology. Extensive research, detailed understanding of customer environments, and ongoing R&D efforts—creating value in innovative alternatives for customers—enable ITC to deliver the right solution on time and on budget.

ITC addresses common IT management concerns (e.g., lack of internal financial and human resources for existing operations or undertaking new projects) by providing expertise and experience in all aspects of modern technology.

Expertise spans System z mainframes, large scale servers, personal computers, wireless devices, and operating systems and applications working with these platforms.

ITC solves clients' real-world IT issues with high-quality service and sound technology.

ITC engineers and business staff apply extensive problem-solving knowledge to provide the most efficient and cost-saving solutions. Company projects are not quick-fix shortcuts; managed services are guaranteed for successful completion. This simple philosophy of responsibility and accountability brings a new level of customer care to all projects without surprises or disappointments.

ITC services encompass diverse data center tasks covering every aspect of IT business operation.

- Requirements, analysis and specifications development
- Data center pre-installation preparation
- Hardware and software acquisition planning
- Performance analysis
- Computer system integration with enterprise infrastructure
- Data center procedures development
- Operation, administration and support training
- Remote operation control and monitoring
- Hardware installation and configuration
- Software installation, configuration and customization
- System hardware and software technical support

- Project management
- Disaster recovery design and planning
- Data center relocation

For more information about FIS, visit [www.fisglobal.com](http://www.fisglobal.com).

For more information about ITC, visit [www.p390.com](http://www.p390.com).



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