




# Dispatching the Demanding Dozen: Preparing Your QA, Regression, and Stress Testers to Face The Financial Industry's Top 12 Challenges



Around 500 BC, Greek philosopher, Heraclitus, is quoted as saying, “Nothing endures but change”—and he never had to deal with EMV, SEPA, chip cards, or channel consolidation. Any employee of an IT department in a financial institution (FI) can attest to the breakneck pace of internal changes to payment networks, processing systems, and product and service offerings. Added to that are external forces, such as regulatory pressures, security threats, open standards initiatives, and card association mandates.

What is the common denominator for virtually every change faced by financial institutions today? “Make this change and you’re going to need to test. And test again.” Which changes present the most significant challenges to your FI? What do you need to test, and how? How do you begin to prepare your Quality Assurance (QA) departments and system load analysts for their increasing testing burden? How do you alert your management to the impact these changes will have on your testing budget and staff requirements?

This paper identifies the top 12 challenges and the unique problems each poses during integration, regression, performance, and QA testing. And, whether you’re already using tools to automate testing or are considering automated testing for the first time, it also offers an outline for preparing your staff (and management) for testing requirements in the months to come.

What is the common denominator for virtually every change faced by financial institutions today? “Make this change and you’re going to need to test. And test again.”

Which changes will result in the foremost challenges to your FI? What will you need to test, and how? How do you begin to prepare your testers—and your management—for these challenges?

## A Demanding Dozen: The Top 12 Challenges Increasing the Test Burden of Your QA, Regression, and Load Testing Staff

FIs and processors are likely to face one or more of these challenges in the coming year, and the changes associated with each challenge demand systematic, efficient, and timely testing.

**1** Globalization

**2** Rapidly increasing transaction volumes

**3** Changing mix of payment instruments & transactions

**4** Regulatory pressure

Ramifications	Testing Considerations
More countries are entering the global payments arena. FIs must negotiate cross-border payments and money transfers. European countries begin their migration toward the Single European Payments Area (SEPA).	Must acquire or build test cases that specifically test cross-border payments/transfers, emerging standards (such as SEPA), and emerging networks.
Global Insight Inc. <sup>1</sup> reports that electronic payment transactions, currently at 210 billion, will <i>double</i> by the end of the decade.	Must conduct stress testing of online systems as well as core and settlement systems to prove that ePayments systems can handle projected transaction volumes.
Traditional ATM and credit card transactions are supplemented by transactions from contactless cards (such as Radio Frequency Identification [RFID] cards), prepaid cards (such as NetSpend), stored value cards, and other non-traditional payment instruments.	Must acquire or build specific test cases for each new payment delivery channel and payment instrument supported.
Regulations mandate that FIs adapt to new technologies (such as EMV, Triple DES and RSA security), or institute new procedures (as does Basel II and the Sarbanes-Oxley Act).	Must acquire or build specific test cases for the new technologies. Must adopt documentation and reporting procedures that use tool-supplied data to prove compliance with current regulations.

## 5 Open standards

## 6 Security

## 7 Channel convergence

## 8 Overtaxed payment systems

Ramifications	Testing Considerations
<p>FIs that have benefitted from ISO8583 standards now look toward using XFS-based ATM applications, or IFX messaging systems, that promise cost efficiency and a higher level of service to the customer. But moving to these standards demands major changes to message structures and transaction flows.</p>	<p>Must employ test tools with the flexibility to test new formats, as well as easily incorporate the modifications and enhancements that are inevitable in an ever-changing open standard.</p>
<p>Fraud is an increasing concern as new payment avenues and instruments are explored. FIs must be capable of immediately reacting to security threats, incorporating the latest security measures to circumvent any fraudulent activity.</p>	<p>Must use test tools with the capability for generic transaction modeling and—because fraud alerts are typically published several times a week—the ability to quickly and easily adapt to new schemes as fraud alerts are published.</p>
<p>Most FIs have separate systems, often from different vendors, managing their various delivery channels (ATM, POS, IVR, branch, internet, etc.) Each system requires its own interface to common services (the core banking system, general ledger, settlement, etc.), resulting in a complex, expensive, and difficult to manage environment. Now, FIs are adopting convergence strategies that connect all delivery channels through a ‘payments hub’ with a common messaging architecture (typically using an open standards protocol such as IFX). The hub services all financial messages and gives the organization a common view to the customer, regardless of the delivery channel chosen.</p>	<p>Must be able to test legacy system protocols as well as new open standards protocols (like IFX). As the system is developed (then later, as it grows), you must be able to test any new delivery channel and all other delivery channels on the hub to ensure the new channel does not have any negative impact on the existing channels. Must conduct complete systems testing to ensure the payments hub can support new transactions as well as higher transaction volumes. Must also conduct unit testing, regression testing, and stress testing of each delivery channel.</p>
<p>Many systems saw their last update prior to Y2K, and are now reaching their limits. Perhaps you have a custom system that does not meet global payment standards, a vendor solution that cannot handle additional transaction volumes, or a static system that cannot easily support new payment instruments.</p>	<p>Must perform regression and stress testing for any enhanced or replacement system to ensure the system functions reliably as expected. Must verify not only that processing occurs correctly, but that the system can handle projected transaction volumes. Ideally, you benchmark the existing system, then load test the enhanced or replacement payment system to ensure it can process both current and anticipated transaction volumes.</p>

## 9 Disaster recovery

## 10 Multi-platform ATMs

## 11 Ongoing mandates

## 12 Mergers & acquisitions

Ramifications	Testing Considerations
Recent natural disasters (such as hurricanes and tsunamis) and catastrophic events (such as terrorist attacks) have proven the necessity of regularly scheduled validation of all disaster recovery procedures. The combination of rising transaction volumes and new delivery channels has exponentially increased the potential loss of revenue that can occur when disaster recovery plans fail and FIs are unable to return to service.	Must properly test databases, physical connections, communication infrastructures, and device operations—every endpoint and system path—not only for “fail over” processing through your alternate test site but for “switch back” to your primary processing site. Though this seems a daunting task, it is a viable option with a testing application that enables you to mirror your production system on a standalone test platform, such as a laptop PC, for disaster recovery testing.
As FIs replace OS2-based ATMs with Windows-based systems (such as Apra Edge from NCR, Agilis from Diebold, Procash from Wincor, and VISTAatm from Phoenix), they want to create more robust ATM offerings. Switching to multi-platform ATMs enables the FI to become a solutions integrator that architects an ATM using any vendor’s hardware in combination with any number of ATM applications. In this environment, messages between the host and terminal may not change, but the application running within the ATM may be entirely new.	Must test the ATM solutions stack (the ATM application, operating system, device drivers, etc.) including the XFS layer that controls communication with the hardware components (card readers, dispensers, receipt printers, etc.). Combining many products from many vendors means the FI has no central point of contact for problem resolution. FIs must be able to test each individual element to isolate and unequivocally identify the source of any problems encountered, or possibly face being routed from one vendor’s support department to another’s during problem resolution.
Payment networks and card associations (such as Visa, STAR, MasterCard, and Pulse) are continually updating their requirements for FIs to accommodate new payment types and to counter fraud. Mandate testing is a major activity for FIs connected to these payment networks. Typically these mandates take effect twice a year (in the Spring and Fall). FIs must often re-certify to validate their ability to support the mandates.	Must be able to create baseline tests as well as test each new change. Testing must verify that changes made to support the mandated features have not created problems in your existing system. Because certification testing can be costly, the testing you do must be reliable enough to guarantee your successful implementation of the mandates (and thus reduce your out-of-pocket certification fees).
FIs that acquire or merge with others must complete bank system conversions that enable all transactions to flow through a universal gateway.	Must conduct regression testing (testing all card types, all transaction types, etc.) to verify there is no loss of service to existing customers. Must conduct load testing to determine that systems can handle the increased transaction volume.

## From Analysis to Action

The goal of every development and QA group is to deliver error-free code on time and within budget. Given the challenges that lie ahead, how do you begin to ensure that your staff can meet this goal? Use the following task list to begin moving from analysis to action.

- **Identify the threats and weaknesses to your processing environment that you want your testing to address.** Prioritize your test needs based on various risk factors, identify events that would have the most impact on your organization, and evaluate the probability of those events occurring. The resources and man-hours you assign to address these risks must be proportionate to the perceived risk. Identify a high-risk or high-loss situation in which improved testing can substantially reduce risks or losses. A few weeks of effort in planning and implementing a comprehensive test strategy can pay big dividends in increased system confidence, reduced time to market for new payment types, and lowered blood pressure at your next meeting with your system auditor.
- **Review your test procedures and determine where automation will have a positive impact.** Your goal is to capitalize on any investment in test tools by automating as much of your testing as possible. Automation is the most efficient choice for repetitive tasks, such as regression testing or stress testing, while manual testing may be more appropriate for user acceptance testing. Thorough regression testing is unlikely if your testers are required to manually enter each transaction standing at an ATM. Instead, suggest testers use a script-based tool to automate this effort—saving hours (and aching feet) each time they test. Additionally, note that regression testing is critical but is not sufficient to guarantee your implementation. Applications may stand up well to regression testing, but fail in production when transaction volumes cause bottlenecks in your application or operating environment. Suggest that automated tools are needed to test volume and performance as well. However, avoid tools that force you to spend more time “automating” than you do testing.

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- **Bridge department lines and begin building a team.** Testing occurs throughout your organization by developers, QA personnel, system analysts, and production support. Take an inventory of the test tools used by each department, employ their expertise, and examine the similarities of your test goals. Make the best use of test cases by sharing and reusing them. Automating tests facilitates wider application coverage, test depth is improved, and fewer errors are introduced into the test pool. For example, if your organization uses test-driven development (a process that has developers write very specific unit tests prior to development to test their changes to the code), suggest that the developers create additional tests to verify the integration of their code into the system. Those integration tests could then be passed on to QA for use during regression testing and to production support for use when testing fixes.
- **Talk to industry peers and discuss their test approach and the tools they use.** If you already use tools, ask your vendor to refer you to other users who may have valuable insights on how to get more out of the tools, or who may be able to recommend other processes or tools. If you currently don't use automated test tools, you may be able to obtain tool recommendations from other financial institutions, software development companies that you have used, or your ATM or EFT vendors.
- **Communicate actions and results, identifying possible solutions.** Increase the visibility of the testing already occurring across your organization. Alert management to the threats you've identified and how proper testing can thwart them. Create a sense of urgency. Hundreds of thousands of dollars can be lost when a single obscure change is not properly regression tested, or when fraudulent transactions are not trapped, even though an alert was posted, because an effective test case could not be constructed. Make certain managers understand that the right tools and tests can save your FI from loss of credibility as well as financial losses. Provide an analysis of the tools used by your organization, as well as any tools you want to acquire, including a comparison of their features and their suitability for the testing you have targeted.
- **Acquire any additional tools you need and schedule training for staff members who will be using them.** Ensure you make complete use of these solutions throughout your organization.

To deliver error-free code on time and within budget, you must have tools for:

- **Unit testing** to validate individual software components or modules against the design specifications
- **Conformance testing** to verify the implementation's conformance to industry standards
- **Functional testing** to validate that the application meets the requirement specifications
- **Performance testing** using benchmarks to compare the system to past performance, or to determine the system's ability to scale to anticipated processing rates (as in stress testing)
- **Stress testing** to evaluate a system at or beyond the limits of standard processing rates
- **User acceptance testing** during which the system is tested by prospective users and is evaluated based on whether or not the customer will accept the new system
- **Regression testing** to verify by consistent, repeatable testing that any additions or changes made to the system have not caused the failure of any previously provided functions

## Exploring Test Solutions

Financial institutions must do *more*, with *fewer* resources, and do it *faster* than ever before.

- Could your organization realize a significant time (and therefore, cost) savings by moving from mundane, repetitive, hit-and-miss manual testing—or even moving beyond the limited capabilities of your current automated test tool—to a more robust automated QA and regression test tool with the flexibility to handle ever-changing standards?
- Are you driven to test faster and more efficiently, so you can test more thoroughly—testing more test scenarios in the same time period without increasing your staff?
- Do you need stress testing capabilities that enable you to test all the endpoints on your system (ATMs, POS terminals, switch connections, etc.) at transaction volumes that provide meaningful results?
- Does your global presence create special challenges for testers who need to conduct testing from multiple locations, even over the Internet or your corporate Intranet?

Paragon Application Systems has been helping customers face the dynamic changes of the financial industry for more than a decade. Let us help you find the solution to the testing challenges you face.

<sup>1</sup> ACI Worldwide, "Study Predicts Doubling in Electronic Payment Volumes by 2010". Press release 2006-May-4.  
[http://www.aciworldwide.com/news/archnewsdetail.asp?news\\_id=471](http://www.aciworldwide.com/news/archnewsdetail.asp?news_id=471).  
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## About Paragon Application Systems

Paragon Application Systems is the leading global provider of ePayment simulation, configuration, and testing solutions to the financial industry. More than 370 customers in over 70 countries use Paragon tools to ensure system reliability and reduce time-to-market. Paragon's broad customer base includes 6 of the top 10 US banks, 4 of the 5 top FinTech 100 companies and 2 of the top 3 international card networks. Some of our clients include major interchanges such as KNET, NYCE, STAR and Visa; processors such as eFunds, Elan Financial Services, Metavante and Fiserv; banks such as BB&T Corporation, Citibank, First National Bank of South Africa, Oversea Chinese Banking Corporation and United Bulgarian Bank; leading software providers such as ACI Worldwide and CSF International; and more than 75 credit unions. Visit Paragon Application Systems on the Web at [www.paragonedge.com](http://www.paragonedge.com).