As the healthcare industry gears up to implement far-reaching technology initiatives such as ICD-10, software testing has taken on greater importance. Because business processes increasingly depend on software and system integration to run smoothly, it’s no longer adequate to simply test the technology side of a health plan’s infrastructure. The business side must be tested as well.

The impact of inadequate testing can be profound. A 2002 study conducted by the National Institute of Standards and Technology (NIST) found that software bugs cost the country’s economy $59.5 billion annually. NIST estimated that more than a third could have been avoided if better software testing had been performed. Today’s technology environment is even more sophisticated and interdependent, which means the lack of sufficient testing probably costs more money and disrupts business even more—all of which contributes to lower customer satisfaction.

For health plans, testing challenges are many:

- **Compressed timeframes** – When software development is delayed or takes longer than expected, testing is often the phase of a project where teams try to recover lost time.
- **Conflicting team roles** – When the development team also serves as the testing team, it’s difficult to shift gears and dispassionately analyze their own code for weaknesses.
- **Inefficient processes** – Healthcare IT testing suffers from a lack of best practices. For each new project, many teams develop their methodology from scratch, build their test data manually, and then dump it when the project is complete.
- **Lack of interoperability** – In healthcare especially, there are multiple stakeholder groups with various standards and technologies that don’t really “talk” to each other very well, making true end-to-end testing incredibly difficult.

**Enterprise Testing Beginning to Take Hold**

The good news is that many organizations are taking a much closer look at their testing practices as they prepare for ICD-10. Many health plans are establishing Enterprise Testing Centers of Excellence, which enable more thorough testing to reduce the risks of errors in production environments.

What exactly is “enterprise testing”? It’s the concept that all systems and processes are tested in a production-like environment. Health plans should be able to mimic a provider file coming into their gateway and then route it as if it were in production—including third parties such as vendors and re-pricers. And on the business side, payers need to test and validate the reports and other outputs needed to run operations. External testing with trading partners is another component. All healthcare organizations should be able to share results, thereby reducing the uncertainty of how each partner has interpreted mandated changes, such as ICD-10.

However, many health plans have focused primarily on unit and system testing with some involvement by business subject matter experts during user acceptance testing. In many cases, this level of testing is not sufficient, and many organizations end up spending a lot of money to fix problems in production. Even worse, some organizations actually complete their testing in the production environment, which is obviously the worst-case scenario.

Figure 1 depicts a broad framework to support enterprise testing. It includes the three primary testing components: IT system code testing, business neutrality testing and trading partner testing.

IT system code testing is probably the one facet of enterprise testing most familiar to healthcare organizations, and most probably already have a strong methodology in place. But it’s not enough. Health plans need to build a strong methodology for business neutrality and trading partner testing as well.

Business neutrality testing has found its birthplace in ICD-10;
however, the key principle of ensuring business neutrality after any large implementation should remain in place well after ICD-10 transition. For example, health insurance exchanges and health information exchanges will require the same type of testing, as will other technology initiatives required to support the healthcare industry’s changing core business models. And for trading partners, it’s important to establish testing portals where test data can be easily exchanged and results reviewed by all parties to reduce risks of major failures outside any one entity’s domain.

There’s a reason for all this attention. The costs associated with failure in production are astronomical. The NIST study found that the cost to fix a bug in production was up to 30 percent higher than finding and fixing it during coding and unit testing. As systems become more complex and the integration points more extensive, costs will only go up.

**Five Guidelines for Successful Enterprise Testing**

1. **Adopt a more streamlined and strategic approach to managing test data**
   Organizations need to overcome resource issues, time constraints and the lack of people who know both IT systems and business processes. Many create test data manually and rarely reuse test files for different purposes. A better approach would be to have a central repository that houses all test data and makes it available across the organization. Both IT and business staff members would have access and be able to generate their own test files. Ideally, test data could be imported from multiple sources, modified by business and IT staff and then saved as test files, which could be used in multiple enterprise testing tools. Users should also be able to search existing test data and easily edit it to support new test scenarios, instead of building test data from scratch.

2. **Ensure business experts are heavily involved**
   Business experts often serve in an advisory or observational role, due to the complexity of setting up and managing testing. This can work well for isolated projects, but such an approach will never scale to support the pace of testing required in the final months of a large project. Instead, business users must be involved in steps such as scenario definition, creating test data files to support scenarios and analyzing test results. Health plans need to make it easy for business experts to create test data and edit test files. This promotes the reuse of valuable test data and increases the likelihood that consistent data are used to test complex, multi-process scenarios.

3. **Represent the organization’s actual business ecosystem**
   While this point seems obvious, using test data that represents real members, providers and networks hasn’t been essential to many previous software testing efforts. However, such an approach is critical in business outcome testing if an organization is to gain confidence that business outcomes such as payments, deductibles, co-pays, and automation rates are reaching targets. Organizations need to convert targeted test data (from guideline 2 above) into a wide range of test files representing different users, providers, lines of business and provider network participation models. Generating this diversity of test files will require automation routines that can extract real-world data from member and provider databases, de-identify it and then use it to populate test files.

“...it’s no longer adequate to simply test the technology side... the business side must be tested as well.”
The success of health plans’ and providers’ technology projects will increasingly rely on each other so they need to create shared testing platforms.

4. Invest the effort required to set up the test environment correctly
Moving files into execution for large projects such as ICD-10 is more challenging than traditional software testing because there are so many moving parts. Even something as simple as keeping accumulator buckets set correctly may be difficult. And a lot of testing involves configuration changes more than actual source code changes. It’s very important to control each test environment and ensure the (continued) configuration is correct before testing begins. Health plan policies will continue to change, so configuration management is of utmost importance. Understanding test scenarios and cases up front in the planning process should help health plans identify some of these issues and avoid mistakes—especially since time for adequate testing will be at a premium.

5. Automate test result analysis to handle the sheer volume of testing required
Once the planning, analysis and preparation of test scenarios are done, the final step is analyzing results and determining progress toward the neutrality goal. Having a reporting system within the testing environment can help reduce the manual burden on testers. A good reporting system can help them quickly drill down to the root cause of each problem with minimal research.

The Time for Enterprise Testing is Now
Health plans need to evaluate carefully how to manage the multitude of changes facing the industry without disrupting member care. One way to reduce risk of poor implementations is to adopt enterprise-level testing, which includes IT code testing, business neutrality testing and trading partner testing. The business and operational risks are too great to do otherwise.
Cure for ailing systems: Quality, not quantity

Business users will increasingly play a key role in determining the success or failure of a project, and their ability to identify potential risks to financial neutrality, operational stability, clinical integrity and member care continuity will be crucial. Health plans must find ways to forge a strong partnership among IT and business users throughout test planning, execution and analysis.

The success of health plans’ and providers’ technology projects will increasingly rely on each other, so they need to create shared testing platforms. New technologies—including better, more streamlined ways to create and manage test data, execute comparison testing, and analyze test results—will help make these requirements a reality. The rigor of new types of testing programs, coupled with more advanced testing capabilities, will continue to pay dividends to forward-thinking healthcare organizations.

An industry leader since 1996, Edifecs provides healthcare software solutions that improve operational performance by streamlining the exchange of information among health plans, hospitals, and other healthcare organizations, while enabling compliance with current mandates such as HIPAA, Operating Rules and ICD-10. Today, more than 250 healthcare customers use Edifecs technology to unify transactions from any information channel source and input mechanism, while automating manual business processes such as enrollment, claims and payments management. Edifecs is currently recognized as one of the 100 Fastest Growing Private Companies in the state of Washington, 100 Best Places to Work in the state of Washington, an Inc. 5000 fastest-growing private company and one of the 500 Fastest Growing Companies in North America by Deloitte. Edifecs is headquartered in Bellevue, WA. For more information, please visit http://www.edifecs.com

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