

*“Our new Quality Assurance processes and integration have contributed significantly towards better performance rates and error-free technology for our business areas, partners and customers. QA is proving, on a daily basis, to be one of our cornerstones for organizational success.”*

Janet Wigglesworth, Managing Director, ITS

### **Brief Description**

In July 2010, an online Smartphone banking application had a security defect that affected over 100,000 customers. That same year, a large school district implemented software that left many students with incorrect schedules and created grading conflicts for the first month. Stories like these appear all too frequently in today's headlines. In fact, according to RTI International, software defects cost the United States \$59.6 billion annually.

These are examples of software defects that could have been proactively discovered and corrected with a testing program. Since technology is integral to almost every facet of business, organizations need a structured quality assurance program to provide effective solutions. While testing does not ensure that every defect will be found, it does mitigate risks. Software testing is just one of the quality control tasks in a quality assurance initiative that is key to building value.

At the end of 2005, VHDA's Information Technology Services (ITS) division created a Quality Assurance (QA) department to ensure delivery of improved products and services to our customers. With the support of ITS and VHDA leadership, the QA department instituted procedures and best practices to formalize testing for all work efforts.

### **Why it was Undertaken**

Prior to VHDA's centralized QA department, testing and quality for software development were disbursed among project teams. This meant there was little consistency or repeatable processes. Testing and training efforts were often sacrificed because of project schedules and tight deadlines. Testing for infrastructure projects was often overlooked.

The QA department was established to:

- Improve the quality and delivery of technology products and services to VHDA business users.
- Define and implement quality standards for software and operational work efforts.
- Implement consistent quality practices for product builds and delivery and see that they are followed.
- Ensure that all software, including vendor applications, meet specific quality standards.
- Provide tools and techniques that enable staff to complete jobs in an efficient and effective manner.
- Serve as a shared resource for ITS, the new Project Management Office (PMO), and the business areas.

### **What VHDA Has Accomplished**

VHDA implemented “best practice” methodologies and supporting processes to help ensure we can maintain flexibility as our business needs change. These methodologies offer value through standardization and consistency; factors critical to accelerating delivery without affecting quality.

**The QA department tests an average of 28 projects and large work efforts each year.** These include software development, software upgrades and operational projects. Typically, QA managed testing for 3-4 projects and 6-8 work orders at any given time, while continuing to provide internal consulting and auditing services.

To date the QA department has partnered with various departments and divisions across VHDA by:

- Establishing and documenting a testing process for software development, upgrades and operational efforts
- Initiating procedures for User Acceptance Testing
- Setting up a defect tracking process
- Creating a repository for user documentation test plans, test data and test results
- Promoting uniformity with an expanded a documentation style guide
- Developing a process to review all project business requirements prior to the execution phase
- Incorporating QA as an integral part of the ITS work request, problem management and change control processes

- Improving test coverage and testing efficiencies by creating a library of automated, reusable test cases
- Instituting monthly testing for Data Center maintenance weekends to ensure all systems are production-ready after routine work is completed
- Designing a data obfuscation process to remove or scramble protected data in our development and test environments
- Developing requirements for smaller work efforts
- Producing and expanding metric reporting for defects, QA efforts and internal audits
- Conducting automated vulnerability scans of applications to protect VHDA's environment
- Improving unit and integration testing and code reviews
- Ensuring vendor software has standardized test plans for upgrades, hot fixes and patches, and that any defects have a centralized tracking process

### **Why It Is Meritorious and Meets Judging Criteria**

#### Innovative

Our QA department is unusual in that we test operational, hardware and other work efforts in addition to in-house and vendor-developed software. Some of our recent efforts include:

- Testing operational projects such as a phone system upgrade, an interactive voice response system (IVR) upgrade and a building security implementation.
- Testing print jobs from a variety of applications for business with the new multi-functional devices,
- Creating checklists to ensure repeatable processes for routine work like PC/laptop deployments,
- Partnering with our Database group to test ETL (Extract, Transform, and Load) jobs and customized reports,
- Verifying business requirements and setups for a building expansion project, and
- Verifying production readiness for all change requests before the work is turned over to our business areas.

In addition, vendors have requested copies of our QA test plans and overall QA processes to incorporate into their development lifecycles going forward.

In our organizational structure, QA is located under the Business Systems area of ITS. This is important because QA serves as a liaison for the business users. The testers are not a part of the development or operational areas of ITS. This position in the organizational structure and the support from ITS leadership have provided our QA department with the autonomy to report issues and stop work efforts from moving to production if they do not meet defined standards.

#### Replicable

Any HFA with a collaborative, team-oriented environment can effectively implement a Quality Assurance department. The key is to establish processes and procedures first, and then add automated tools to improve efficiencies. Our initial work included standardizing processes, manually tracking software defects on a spreadsheet, and creating templates for repeatable processes. We were able to expand our services and add automation as the needs within the department and the business efforts grew.

VHDA invested in Microsoft Developer Network (MSDN) licenses for the testing team. This provided access to Visual Basic Studio, Team Foundation Server, Microsoft Test Manager, and other new Microsoft products. QA works with the development team to track defects in Team Foundation Server, allowing both teams to benefit from the data collection and reporting. QA also partnered with our SharePoint/Web team to create document repositories that all staff could access for templates and test plans.

By implementing automated testing with Smart Bear's TestComplete, the QA department was able to create a library of reusable test cases, and we are expanding this to improve software testing efficiencies.

#### Responds to a Management Challenge or Opportunity

ITS reorganized in 2005. As part of this effort, the QA department was added to improve the quality of products and services provided by ITS. Centralizing QA efforts helped ITS establish standards and best practices that are now followed across the division, and not just for software development. QA is an integral part of project management processes, as well as any new processes or initiatives developed for ITS.

### Achieves Measurable Improvements

Since the project management efforts were instituted, we've seen significant improvement in our ability to deliver quality work to VHDA's business users.

- For FY11, 90% of all production change requests had either zero or one "break/fix" tickets after implementation. Since we have been tracking change control and production verifications, we have seen a significant reduction in the number of work efforts that have "break/fix" tickets logged after the implementation. This improvement in quality means that resources do not need to be devoted to troubleshooting or rework after each production move.
- The team is able to correct software development defects before the final stages of the system development lifecycle. This saves budget dollars because the cost for change is lower when made earlier in the SDLC.
- Through our partnership with the PMO, we build quality initiatives into all phases of the Project Management and System Development lifecycles.
- Through our partnership with the PMO and Business Systems, we ensure that business requirements are created for projects and work efforts and that these are reviewed for testability prior to approval.
- Our processes require User Acceptance Testing (UAT) for projects and large work efforts. We have created strong partnerships with the business areas for final testing. These partnerships also foster ownership of applications, systems, and data at the business level.

### Provides Benefits That Outweigh Costs

Integrating QA and the PMO into ITS processes enables us to deliver higher-quality products that require little or no rework after being turned over to the business. This benefits us with the opportunity to use valuable resources in other capacities. For example, ITS no longer needs to reserve full teams for troubleshooting or service calls after implementations.

Initially, VHDA's QA department was staffed with one full-time employee with a temporary contractor to augment support. This contractor position was later replaced with two additional associate positions, one full-time and one part-time. A technical writer was also added to the QA department to assist with test plans, documentation and training materials. For larger testing efforts, the department borrows resources from other areas. With a short orientation and standardized processes and templates, non-testers can easily assist the core team.

### Demonstrates Effective Use of Resources

QA department staff has defined responsibilities, and each associate has performance objectives. In addition, standardized testing and quality processes ensure duplication of effort and rework are avoided. Finally, our expanding library of automated test scripts reduces labor-intensive manual testing, while improving test coverage and consistency.

### Achieves Strategic Objectives

With its best practices, tools and processes, the QA department empowers ITS to provide the highest quality products to our business users, which helps VHDA achieve its strategic objectives. Building libraries of test cases and automated test scripts enables us to improve efficiencies to help ITS respond quickly to our business' ever-changing needs. When an application or service is implemented, we can certify that our testing efforts have greatly reduced the risk of error, and that the work is production-ready.

### **Conclusion**

The purpose of QA is to ensure that the products and services a business provides are the right fit for both external and internal requirements, including customer expectations. QA is now an ongoing process, not just a task that gets done at the end. With its critically important role in defining and enforcing best practices, the QA department constantly proves its value when it comes to delivering quality products and services for our business users. For example, for FY11, 90% of all production change requests had either zero or one "break/fix" tickets after implementation. This type of performance, coupled with other QA improvements, saves significant staff resources and budget dollars. Adding quality assurance components enables ITS to successfully complete strategic and operational projects to benefit VHDA and our customers.