WHITE PAPER

Today’s IT Demands
New Approaches
in QA and Test
Time-to-market is putting increased pressure on Business IT organizations to deliver faster to their clients. IT professionals are being asked to produce new features and products at an ever-increasing rate.

These expectations often come with numerous challenges. IT budgets are not expanding to keep pace with this impact. Complexity is rising on both the consumer and developer sides of the equation with the move toward mobility, cloud and eCommerce. A business’s consumer-facing sites and apps are gateways into ecosystems of partners, fulfillment providers and other companies that all create the end solution. Put simply, IT management is truly called on to do more with less — and to do it faster than ever before.

With this increased time pressure for new products and features that reach the market ever faster in the face of rising complexity, the risk to end user quality is also higher than ever. Automated testing is often seen as a way to speed testing. While this is true, automation is no panacea if it is not performed effectively for a given technical and business situation. The need to bring greater skill and business logic to the automation process is stronger than ever before.

Exceptional Automation is the intersection of tester knowledge, process and automation skill. This whitepaper will explore the methodology behind creating Exceptional Automation — creating an automation practice that scales with the expectations of today’s businesses.

Business Transformation to the Agile World

Businesses are increasingly turning to DevOps and Agile models in order to speed the pace of their application development and delivery to market. In these models, test is more of an activity than a disciplinary role in the process. New open source automation tools allow tests to be written by developers as well as testers. More people writing more tests sounds at first like a good thing. Yet, there are downsides to that “more is better” approach.

Test Driven Development (TDD) and Behavior Driven Design (BDD) result in many test cases being written and automated during a release. By design, this increases the number of automated tests that are available to the project. Often the relentless speed of automation is relied on to ensure that all tests are executed. However, as the application under test (AUT) and process matures, tests must be reviewed and refactored in order to keep the suite relevant and prevent it from expanding beyond the available execution time. This is just one example of automation creating a detrimental effect on the IT operations if not done wisely.

Certainly, these overarching goals of speed, accuracy and robustness in the test suite are not controversial. The art, of
course, is how you implement them.

**Not So New Test Strategies**

Exceptional Automation encompasses techniques in addition to the raw horsepower of automating tasks. This emphasis on technique brings human expertise back into the automation equation. For instance, regardless of the automation tool used, employing test techniques more common to manual testing will result in a tighter set of test cases that can be used in a regression or hardening cycle.

As an example, test strategies that can be used to edit a regression suite include:

- Pair-wise (test all pairs of input parameters at least once)
- Equivalence Partitioning (test all groups of input parameters at least once)
- State transition testing (test events that trigger changes in state/status of the application)
- Risk-based (test based on likelihood or impact of failure)

Using these techniques properly creates tremendous breakthroughs in cost and time savings. For instance, regression testing is a common test requirement across applications. Automated regression testing can speed testing for any one application. But, Exceptional Automation can do more. With some additional coding, a single regression algorithm can be spread across applications raising efficiency across an application set.

One CenturyLink team faced the prospect of 18,871 individual regression tests across its application suite. Each test took an average of 32 minutes to perform manually. That’s a total of 10,064 hours of testing performed by a manual testing team plus the accompanying equipment time tied up to perform the tests. Using the brute force method, it would take 62 testers to complete all the testing within a four-week window.

CenturyLink automated 60 percent of the regression test cases, a total of 11,443 tests. The average execution time dropped to five minutes. Only seven testers were required to complete the regime in a four-week window. Fewer total resources were required to reduce total test time by 60 percent. Scripts were added for different data sets and applications that allowed a single test case to be used in more than one application.

Blending these manual and automated practices produces better results in less time. These tools and techniques obviously produce better coverage and more efficient testing. That is just the first step. To achieve Exceptional Automation, you must also improve the quality of the automation itself.

**Exceptional Automation Ties Tool Technology with Knowledge**

Exceptional Automation integrates automation tools and design techniques with the business expertise to set test priorities. Creating Exceptional Automation is a practice that is not confined to a specific automation tool or any one technique. It requires a holistic view of the testing needs and an overarching strategy to create an automated test environment.

**Achieving this Effort Requires: Creation of a Strategic Automation Framework**

A good framework provides a base on which to build your automation. It allows code to be used in many areas of a company. The primary features of a good framework include:

- **Re-use of elements**: When coded properly a GUI element like an edit field or a button press function can be used across a number of applications of a similar technology type.
- **Data abstraction**: Data can be maintained separately from the application logic to maintain its relation to customers and products.
- **Ease maintenance**: A well-designed framework allows for single location changes to update all locations needed. Data changes can also be made from a central location.
- **Flow control**: A framework can provide flow control in case of error. Scripts should stop, report error and return to a clean slate to set up the next test.
- **Reporting**: Any error reporting should be detailed enough for a manual tester to understand the next steps required from a given error.
Engagement of a Subject Matter Expert (SME)

Often automation is viewed as something “anyone can do.” This is a bit simplistic for an increasingly complex world.

Automation scripts are code and creating them is a development activity. Engaging a SME enables an experienced automator to provide automated solutions that a less experienced automator may not see. SMEs can improve your automation efforts in a number of ways such as:

- **Complex code can solve problems and create a simple solution.** For example, a CenturyLink customer was using third party software tools to generate a Customer Relationship Management (CRM) application. The resulting objects in the application's GUI were named dynamically and complicated the creation of reusable scripts and objects. Our SME was able to use the Document Object Model (DOM) to create functions that used the text of the object to both identify the object as well as acting as application data.

- **Establish best practices from the start.** SMEs can bring in best practices and code used elsewhere to jump start your automation effort and provide a return on your investment sooner.

- **Ensure proper validation is done.** When new automators learn a tool, result validation is either absent or so prevalent that it slows the execution of the script. A SME can ensure that validation is in the correct place and at the correct amount.

Expanding the Scope of your Exceptional Automation

Regression automation is the gold standard of automation. Once your automation is done, however, it can be used to do more than regression testing. Expanding where your automation is used can result in additional benefit from your automation effort. Automation is not traditionally used in areas such as:

- **Self-diagnosing sanity tests:** Application Sanity is a common use of automated testing. However, Exceptional Automation can take this testing further by automating the common checks done by the environment support team and providing a preliminary diagnosis in case of failure.

- **Data mining/data conditioning:** Both manual and automated tests require good data. Experienced automators can automate both finding your data as well as creating data to satisfy the requirements of your test case.

- **End-to-end testing:** The end user experience is often composed of numerous processes that thread through different applications. End to end testing can measure the quality of that overall experience from beginning to end.

- **Data cleanup:** Data is sometimes hard to find. In that case, data needs to be reset between releases.

Exceptional Automation blends the tools, techniques and business understanding necessary to deliver consistently high quality software at a fast pace.
Modern IT Equals Modern Quality Assurance and Test

IT has become a revenue driver rather than a cost center or support service. Business innovation is now directly aligned with the ability to develop and deploy new products and services on a regular basis.

Automated testing is an essential part of today’s IT landscape.

This white paper has proposed the concept of Exceptional Automation as a means of combining tools, techniques and business knowledge into a strategy that can be a game changer for IT organizations.
About CenturyLink Business

CenturyLink, Inc. is the third largest telecommunications company in the United States. Headquartered in Monroe, LA, CenturyLink is an S&P 500 company and is included among the Fortune 500 list of America’s largest corporations. CenturyLink Business delivers innovative private and public networking and managed services for global businesses on virtual, dedicated and colocation platforms. It is a global leader in data and voice networks, cloud infrastructure and hosted IT solutions for enterprise business customers.

For more information visit www.centurylink.com/enterprise.