Web Services API Testing

Features

- API specification review
- Test specification, test framework and test case development
- Test execution and reporting

Benefits

- Ensure your web services API meets your customers’ expectations for function and performance
- Onshore testing at a very competitive price

If your development plans include an API accessible over the Internet via web services, QualityLogic can provide services to assist you in thoroughly testing the functionality and performance of your API. QualityLogic has a long history of testing APIs for some of the largest players in the tech industry.

Although web services are traditionally thought of as XML over SOAP, a far broader range of technologies are used by our customer base to implement their Web APIs, including protocols and data formats such as REST, Atom, GData, RSS, XML-RPC, KML, JSON, KML-GeoRSS, OpenSearch, RDF, YAML, and many others. Regardless of the implementation technologies used for your API, QualityLogic can help with your testing.

QualityLogic’s API testing methodology includes the following steps:

- API Specification Review – A detailed review of the API specification and any related use case documentation. This review of the API specification from a test perspective typically uncovers numerous errors in the implementation before a single test case is written.
- Test Specification Development – A written test specification is developed detailing the test conditions and expected results for each test case.
- Test Framework Development – Although we use standard open source tools like SoapUI and JMeter for our testing, many times a set of static resources need to be developed as a perquisite to automated test case development.
- Test Case Development – This is the actual coding of the test scenarios. Defects are reported to you as they are uncovered during the test case development.
- Sanity Checks – We create test suites to verify basic operation of each API call in a system each time a system upgrade is released.
- Surveillance – We develop test suites to continuously monitor the operation of the production installation and flag any operational degradation to IT immediately.
- Test Execution and Reporting – As API test cases are typically automated, regression testing is quick, with most of the effort being placed in problem isolation and reporting.

QualityLogic offers two distinct types of testing for your Web Services API: Functional Testing and Performance Testing.

Functional Testing

Functional testing takes an external perspective of the API, using the API specification and published Use Cases to determine the valid inputs and expected outputs. This is classic “black box” testing, without an intimate knowledge of the API’s internal structure. A typical API test developed by QualityLogic covers the following areas:

- Baseline Tests – These tests exercise each API method in isolation.
  - Boundary conditions
  - Repeating elements
  - Combinations of parameter values
  - Default value assumptions
  - Data types and sizes
  - Correct return tags and values

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- Business Logic Tests – Multiple API calls are made replicating common tasks and real-world scenarios documented in the Use Cases. Characteristics of these tests are as follows:
  - Dependencies between API calls
  - Calling order
  - Repetitive transactions
  - State transitions
  - Propagation of data to external systems

- Forced Error Tests - These tests contain typical error scenarios, such as missing required elements, empty content, and content exceeding maximum limits, across a representative sampling of the API methods. Test assertions include:
  - Correct error messages
  - Fallback behavior
  - Transaction rollback behavior

- Limit Tests – exercise each resource using all optional elements and maximum allowable content lengths and/or instances of repeated elements

Performance

Performance testing a web services API encompasses a wide range of activities, including creating a test environment, setting realistic performance targets, developing test scenarios, generating high quality test input data, test execution, and root cause analysis. QualityLogic can help with some or all of these activities depending on your needs.

Key performance metrics for web services API performance testing include response times, throughput in terms of API calls and data volume, transaction errors, server and network utilization, and a variety of other key indicators. These metrics are gathered as the result of the following types of performance testing activities conducted by QualityLogic:

- Load Testing – The web services API is loaded up to the target number of transactions per second to determine if the response times and other key performance metrics meet targets.

Typically this testing is done in a number of stages, including establishing a baseline for each transaction, load testing each transaction independently, and finally load testing entire groups of transactions.

- Stress Testing – The load on the web services API is ramped up until some part of the supporting infrastructure fails. The purpose of this testing is to determine how much margin there is between the expected traffic volumes and the point at which the infrastructure starts to fail.

- Endurance (Soak) Testing – The web services API is subjected to typical loads over extended periods of time, with occasional traffic spikes typical of actual usage model. The intent is to identify problems that occur only after extended uptime, such as memory leaks.

- Scalability Testing – A series of load tests are run with varying infrastructure configurations to determine how best to scale in order to deal with traffic loads. This can be a key part of determining the appropriate production hardware necessary to deal with both current and future traffic volumes.

QualityLogic has the experience, skills, and resources to help you quickly roll out a reliable and scalable Web Services API. To learn more, go to www.qualitylogic.com, call us at 208 424-1905, or send an email to info@qualitylogic.com.