Quality Assurance Gates

A Quality Assurance White Paper
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Reference: PMI Quality Gate PMI Whitepaper by Aaron, Bratta and Smith 1993.

ABSTRACT

Oracle ERP Implementation or Upgrade projects that are managed on a Waterfall development methodology always call for extensive Quality Assurance processes. Organizations that work with in-house or offshore modeled Quality Assurance teams realize immediate benefits in the area of improving software and organizational quality and development/ delivery of a quality product to the customer. Unfortunately, most organizations have not yet realized the full potential of investing in a self-managed QA team to support every phase of the software lifecycle, including application implementation and/or upgrade projects.

AUDIENCE

This document is intended for the following audience:
- Oracle E-Business suite users
- Customer Product owners
- Quality Assurance consultants and practitioners.

PROBLEM STATEMENT

In an Oracle ERP Implementation project with a major automotive organization we were faced with the challenge of testing a customized EBS solution across 14 different application systems (some legacy, some custom in house products and some middleware). This was a big challenge as we were neither able to clearly define and measure our success nor were we able to quantify and report issues identified in time to mitigate risks to subsequent testing efforts.

This white paper will address how we worked past the challenges.

SOLUTION

With our long term goals broken down into chunks of testing pipelines, we were able to identify stakeholders for each testing phase. Each of these testing phases was to be assigned Quality Gates. A Quality Gate is a collection of completion criteria and sufficiency standards representing satisfactory execution of a phase of a project plan. These are the Quality Assurance gates that define the success criteria for each testing phase. A test phase does not begin until the earlier phase has passed the exit criteria and the current test phase doesn't pass until all the entry criteria are met for the next phase and so on.

As an organization we got consensus from the Program team that the following would be the test phases we were executing:

- **Unit Testing:**
  Unit testing is an informal testing process followed by the development team to ensure that the system behaves as built/desired confirming to the Technical specifications.
- **Functional Testing:**
  The Functional Testing of the new functional areas, features and configurations and the corresponding processes within the system.
- **System Integration Testing:**
  The purpose of System Integration Testing is to test and document that the solution works holistically. It is an "end-to-end" business process test that verifies that all of the components of the system (including system of record functions, conversions, interfaces, reports, and custom extensions) operate together as designed to provide the expected end results.
- **Regression Testing:**
  Regression testing is a specific type of functional testing which validates the existing functionality based on a known set of previously validated results. Regression testing aids in the detection of defects introduced as an unintended consequence of system enhancement or maintenance activities.
- **Performance Testing:**
  Performance testing is meant to document the baseline and measure the performance of the production environment including all integrated systems
- **User Acceptance Testing:**
  The purpose of User Acceptance Testing is for the end users to validate that the application and its

Performance have met all the business requirements, as per the Requirements List prepared during the Analysis/Design stages
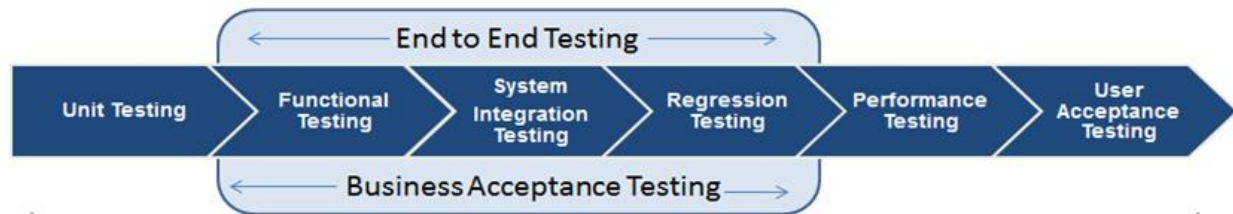
For each testing phase, we defined clear and standard Entry and Exit criteria.

- **Entrance Criteria:**

  Entry Criteria for QA testing is defined as "Specific conditions or on-going activities that must be present before a process can begin". In the Systems Development Life Cycle it also specifies which entry criteria are required at each phase. Additionally, it is also important to define the time interval or required amount of lead time that an entry criteria item is available to the process.

- **Exit Criteria**

  Exit Criteria is defined as "The specific conditions or on-going activities that must be present before a life cycle phase can be considered complete. The life cycle specifies which exit criteria are required at each phase". This definition identifies the intermediate deliverables, and allows us to track them as independent events.

1. **Unit Testing**

Entry Criteria: The entry criteria for configuration unit testing are:
- Checklist criteria prepared for each Oracle module
- Unit testing instance is available
- Required Oracle modules have been configured in EBS.
- Development instance is available.
- Detailed design for custom coded objects have been verified and signed off and built.
- Detailed Performance Test Plan prepared and reviewed.
- Detailed Performance Test Scenarios and checklists have been completed and reviewed.

Exit Criteria: The exit criteria for unit testing are:
- Checklist for module testing completed
- Test conditions for requirements fulfilled through configuration completed
- Patch log has been created and verified. Patch application plan created for all instances.
- Business scenarios for testing have been signed off by the consulting Functional Team leads and members.
- Requirements test conditions fulfilled by RICEFW objects have been successfully tested
- Detailed Functional Test Plan prepared and reviewed.

2. **Functional Testing**

Entry Criteria: The entry criteria for Functional testing are:
- Unit testing has been completed.
- All Business Requirements have been signed off.
- All Technical Requirements have been signed off.
- All Functional Test Cases should be signed off.
- Code is frozen with no new code being added to the applications..
- All corresponding CRs are approved

Exit Criteria: The exit criteria for Functional testing are:
- All Functional Test Scripts are executed.
- All integration points for each system have been tested and confirmed to be working fine.
- All CRs are tested and impacted test cases are executed.
- No Severity 1 and 2 defects are outstanding.
- All other open defects have a workaround and an expected fix date defined and agreed with business.

3. System Integration Testing

Entry Criteria: The entry criteria for System Integration testing are:
- Functional Testing is completed and signed off.
- No Severity 1 and Severity 2 issues are open from Functional Testing.
- Outstanding Severity 3 to Severity 5 issues from Functional Testing, will be evaluated on a case-by-case basis, and cumulatively (several open Severity 3 issues) may merit delay in System Integration Testing.
- All configurations have been completed.
- Data for integration testing has been prepared.
- Detailed Integration Test Plan is completed, reviewed, and signed off.
- Integration Test Scripts have been completed, reviewed, and signed off.
- All approved patches have been applied to the System Integration Test instance.
- All RICEFW elements have been migrated to the Integration test instance and registered in Oracle Applications.
- Code is delivered with release notes and successfully promoted to the Integration Test environment
- Full coverage of requirements in the HP ALM

Exit Criteria: The exit criteria for System Integration testing are:
- All Severity 1 and Severity 2 defects System Integration Testing and any prior testing phases have been closed (retested and verified during the System Integration Testing).
- Severity 3 defects System Integration Testing and any prior testing phases have been identified, addressed and if necessary, workarounds provided, demonstrated, and accepted. For open Severity 3 issues, an action plan is in place for resolution within an "acceptable" timeframe.
- The System Integration Testing signoff has been completed.

4. Regression Testing

Entry Criteria: The entry criteria for Regression testing are:
- System Integration Testing has been completed
- All Severity 1 and Severity 2 defects from Functional and System Integration testing have been closed.
- Outstanding Severity 3 to Severity 5 issues from Functional and System Integration Testing, will be evaluated on a case-by-case basis, and cumulatively (several open Severity 3 issues) may merit delay in Integration Testing.
- Data for regression testing has been prepared.
- Detailed Regression Test Plan is completed, reviewed, and signed off.
- All approved patches have been applied to the Integration Test instance.
- Code is delivered with release notes and successfully promoted to the Regression Test environment.
- The Regression Test Suite composed of both manual and automated tests is available and approved.

Exit Criteria: The exit criteria for Regression testing are:
- All regression test cases (manual and automated) have been executed and testing is complete.
- No unresolved severity 1 or 2 testing defects remain.
- The status of all defects reported during all test phases is "Closed" or "Deferred".
- All unresolved severity 3 to 5 defects have been deferred to a future release and have documented workarounds.
- Appropriate technology and business sign offs are obtained.
- All failures of regression tests have resulted in documented defects.

5. Performance Testing

Entry Criteria: The entry criteria for Performance testing are:
- Benchmarks and acceptance criteria for performance testing have been developed, reviewed, and agreed upon.
- Parameters like number of users and performance metrics have been identified, reviewed and agreed upon.
- The environment for Performance Testing is configured to reflect the production environment.
- Detailed Performance Test Plan prepared and reviewed.
- Detailed Performance Test Scenarios and checklists have been completed and reviewed.
- Automated Performance test scripts have been developed, configured according to the established loading parameters and tested

Exit Criteria: The exit criteria for Performance testing are:
- All Severity 1 Performance Testing issues have been closed (retested and verified).
- All Severity 2 Performance Testing issues have been documented, addressed, and discussed. In case there are open Severity 2 issues, a determination is to be made on a case-by-case basis to identify showstoppers. Mitigation strategies would need to be put in place for all Severity 2 issues which are open.
- All Severity 3 Performance Testing issues are evaluated, and may require resolution.
- The Performance Testing signoff has been completed.

6. **User Acceptance Testing**

Entry Criteria: The entry criteria for User Acceptance testing are:
- Integration Testing is completed and signed off.
- No Severity 1 and Severity 2 defects are open from Integration Testing.
- Outstanding Severity 3 to Severity 5 issues from Integration Testing, will be evaluated on a case-by-case basis, and cumulatively (several open Severity 2 issues) may merit delay in User Acceptance Testing.
- All updates to configurations for Manheim have been completed.
- The second iteration of Mock Conversion (if applicable) has been completed satisfactorily and signed off.
- Detailed User Acceptance Test Plan is completed, reviewed, and signed off.
- User Acceptance Test Scripts have been completed, reviewed, and signed off.
- All approved patches have been moved to the User Acceptance Test instance.
- All RICEFW elements have been migrated to the UAT instance and registered in Oracle Applications.
- Necessary training documentation and user procedures documentation is completed and distributed to end users.

Exit Criteria: The exit criteria for User Acceptance testing are:
- All Severity 1 and Severity 2 UAT issues or defects have been resolved.
- All Severity 3 to Severity 5 UAT issues or defect have been documented, addressed, and discussed. In case there are open Severity 3 - 5 issues or defects, a determination is to be made on a case-by-case basis to identify showstoppers. Mitigation strategies would need to be put in place for all Severity 3 – 5 defects or issues which are open at the end of User Acceptance Testing.
- The User Acceptance Testing signoff has been completed.
- All necessary changes to Training and Procedures documentation have been completed.