System Testing and Implementation
Testing Specialized Systems and Applications

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Specialized Systems and Applications

- Client/server systems.

- Rapid application development.

- Web-based systems.

- Off-the-shelf software.

- Multi-platform environment.

- Security.

- Data warehouse.

Testing Client/Server Systems (1)

Concerns:

- Organizational readiness.

- Client installation.

- Security.

- Client data.

- Client/server standards.

Testing Client/Server Systems (2)

- **Assess readiness.**
  - Motivation.
  - Investment.
  - Client/server skills.
  - User education.
  - Culture.
  - Client/server support staff.
  - Client/server aids/tools.
  - Software development process maturity.

- **Assess key components.**
  - Client installations are done correctly.
  - Adequate security is provided for the client/server system.
  - Client data is adequately protected.
  - Client/server standards are in place and working.

- **Test the system.**

Testing Rapid Application Development (1)

Concerns:

- Test information from iteration.

- Test information about components.

- Test information about performance.

- Record test information.

Testing Rapid Application Development (2)

- Test planning iterations.

- Test subsequent planning iterations.

- Test final planning iteration.

Testing Web-based Systems (1)

Concerns:

- Browser compatibility.

- Functional correctness.

- Integration.

- Usability.

- Security.

- Performance.

- Verification of code.

Testing Web-based Systems (2)

- Select web-based risks to include in the test plan.
  Key areas of concern:
    - Security risk.
    - Performance.
    - Correctness.
    - Compatibility.
    - Reliability.
    - Data integrity.
    - Usability.
    - Recoverability.
- Select web-based tests.
- Select web-based test tools.
- Test web-based systems.

Testing Web-based Systems (3)

Security risk:

- External intrusion.

- Protection of secured transactions.

- Viruses.

- Access control.

- Authorization levels.

Testing Web-based Systems (4)

Performance:

- Concurrency.

- Stress.

- Throughput.

Testing Web-based Systems (5)

Correctness:

- Functionality.

- Calculations.

- Navigation.

Testing Web-based Systems (6)

Compatibility:

- Operating systems/platforms.
- Browser.

Testing Web-based Systems (7)

Reliability:

- Server and system availability.

- Consistently correct results.

Testing Web-based Systems (8)

Data integrity:

- Ensuring only correct data is accepted.

- Ensuring data stays in a correct state.

Testing Web-based Systems (9)

Usability:

- Ensuring the application is easy to use and understand.

- Ensuring that users know how to interpret and use the information delivered from the application.

- Ensuring that navigation is clear and correct.

Testing Web-based Systems (10)

Recoverability:

- Lost connections.
    - Timeouts.
    - Dropped lines.
- Client system crashes.
- Server system crashes or other application problems.

Testing Web-based Systems (11)

Web-based tests:

- Unit or component test.

- Integration test.

- System test.

- User acceptance test (business process validation).

- Performance test.

- Load/stres test.

- Regression test.

- Usability test.

- Compatibility test.

Testing Off-the-shelf Software (1)

Concerns:

- Task/item missing.

- Software fails to perform.

- Extra features.

- Does not need business needs.

- Does not meet operational needs.

- Does not meet people needs.

Testing Off-the-shelf Software (2)

- Test business fit.
  - Completeness of needs specification.
  - Critical success factor test.

- Test operational fit.
  - Compatibility with your hardware, operating system, and other software packages.
  - Integrating the software into your business system work flow.
  - Demonstrating the software in operation.

- Test people fit.

- Acceptance test software processing.
  - Create functional test conditions.
  - Create structural test conditions.

Testing in a Multi-platform Environment (1)

Concerns:

- The platforms in the test lab will not be representative of the platform in the real world.

- The software will be expected to work on platforms not included in the test labs.

- The supporting software on various platforms is not comprehensive.

Testing in a Multi-platform Environment (2)

- Design platform configuration concerns.

- List needed platform configurations.

- Assess test room configuration.

- List software structure platform effects.

- List interfaces platform effects.

- Execute tests.

Testing Security (1)

- Identify potential perpetrators.
- Identify potential points of penetration.
- Create a penetration point matrix.
- Identify high risks points of penetration.
- Execute security risks.
  - Evaluate the adequacy of security controls at identified points.
  - Determine if penetration can occur at identified point(s).
  - Determine if penetration has actually occurred at this point.

Testing Security (2): Functional vulnerabilities

- Poor controls over manual handling of input/output data.
- Weak or nonexistent physical access controls.
- Computer and terminal operational procedures.
- Weaknesses in the business test process.
- Weaknesses in the control of computer programs.
- Weaknesses in operating system access and integrity.
- Poor controls over access through impersonation.
- Weaknesses in media control.

Testing Security (3): Location of vulnerabilities

- Computer data and report preparation facilities.

- Computer operations.

- Non-IT areas.

- Central processors.

- Programming offices.

- Magnetic media storage facilities.

- On-line terminal systems.

- On-line data preparation and output report handling areas.

- On-line operations.

Testing Data Warehouse (1)

Concerns:

- Inadequate assignment of responsibilities.

- Inaccurate or incomplete data in a data warehouse.

- Losing an update to a single data item.

- Inadequate audit trail to reconstruct transactions.

- Unauthorized access to data in a data warehouse.

- Inadequate service level.

- Placing data in the wrong calendar period.

- Failure of data warehouse software to function as specified.

- Improper use of data.

- Lack of skilled independent data warehouse reviewers.

Testing Data Warehouse (2)

Concerns: (continued)

- Inadequate documentation.

- Loss of continuity of processing.

- Lack of criteria to evaluate.

- Lack of management support.

Testing Data Warehouse (3)

- Measure the magnitude of data warehouse concerns.

- Identify data warehouse activity processes to test.

- Test the adequacy of data warehouse activity processes.

References

[1] William E. Perry, *Effective Methods for Software Testing*, 2nd ed., *John Wiley & Sons*, 2000.