
Stuart Reid,
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ISO/IEC 29119
The New International Software Testing Standard

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Scope

- The purpose of standards
- Types of standard
- Development of standards
- Overview of ISO 29119
- Applicability
- Recent developments
- Timeline
- Future work
What are standards?

“Guideline documentation that reflects agreements on products, practices, or operations by nationally or internationally recognized industrial, professional, trade associations or governmental bodies”

- Guidelines documents as they are not compulsory unless mandated by an individual or an organization
- Agreements because they often reflect a certain level of consensus

- ISO
Pre-standardization?
Why use standards?

• Consumers
  – Confidence in compliant products
  – Authors provide expertise in standards

• Manufacturers
  – Conformance and Marketing
  – Safety from liability
  – Guidelines on production

• But not ‘Best Practice’...
Quality and Standards

Quality

Best Practice

Good Practice

Current Practice
What use are standards?

Standards describe a current ‘body of knowledge’ that provides the basis for a professional discipline

• Basis for:
  – Communication – common terminology
  – Professional qualifications
  – Certification/compliance schemes
  – Benchmark of ‘good industry practice’
  – Contracts
  – Interoperability and consistency……
A Case in Point
Standardization Bodies
ISO/IEC Software Standards

Published
Maintained
Motivation for ISO 29119

• Conflicts in definitions, processes & procedures
  – plethora of standards to be replaced by one
    • e.g. IEEE 829, IEEE 1008, BS 7925-1/-2, IEEE 1028
  – practitioners do not know which standard to follow

• Lacking in current standards:
  – Organizational Testing not covered
    • e.g. Test Policy and Organizational Test Strategy
  – no Project Test Management
  – BS 7925 only covers unit testing
  – common functional techniques missing
  – poor coverage of non-functional testing
ISO/IEC SC7 – WG26

ISO

TC176
Quality

JTC1
Information
Technology

SC7
Software &
Systems
Engineering

SC22
Programming
Languages

SC27
IT Security

SC32
Data
Management &
Interchange

IEC

TC56
Dependability

SWG1

.............

WG26
Software
Testing

Representatives
of National
Standards Bodies
ISO 29119 – Scope & Structure
Part 1: Concepts & Vocabulary

- Software testing concepts
  - Introduction to software testing
  - Relationship between testing, development & maintenance
  - Implications of lifecycle models
  - Approaches to testing

- Testing vocabulary
Part 2: Testing Processes

ORGANIZATIONAL TEST PROCESS

TEST MANAGEMENT PROCESSES
- TEST PLANNING
- TEST MONITORING & CONTROL
- TEST COMPLETION

FUNDAMENTAL TEST PROCESSES
- TEST DESIGN & IMPLEMENTATION
- TEST ENVIRONMENT SET-UP
- TEST EXECUTION
- TEST INCIDENT REPORTING
Instantiating Testing Processes

(ORGANIZATIONAL TEST PROCESS)

(ORGANIZATIONAL TEST POLICY)

(ORGANIZATIONAL TEST STRATEGY)

(PROJECT) TEST MANAGEMENT PROCESSES

(UNIT/SYSTEM/ACCEPTANCE/PERFORMANCE/USABILITY/ETC.)

TEST MANAGEMENT PROCESSES

(FUNDAMENTAL TEST PROCESSES)
Organizational Test Process

1. **Develop test specification**
   - Draft Test Specification
   - Gain consensus on test specification
   - Approved Test Specification
   - Publish test specification

2. **Monitor and control use of test specification**
   - Published Test Specification
   - Updated Test Specification

3. **Review test specification**
   - [No issues identified with Test Specification]
   - [No change required]
   - [Major revision required]
   - [Issues identified or Scheduled review due or Major organizational change]
   - [Minor revision required]

4. **Update test specification**
Test Planning Process

1. **Understand Context**
2. **Organise Test Plan Development**
3. **Identify & Analyze Risks**
4. **Identify Risk Treatment Approaches**
5. **Determine Staffing and Scheduling**
6. **Document Test Plan**
7. **Gain Consensus on Test Plan**
8. **Draft Test Plan**
9. **Schedule, Staffing Profile**
10. **Design Test Strategy**
11. **Test Strategy**
12. **Test Plan**
13. **Approved Test Plan**
14. **Published Test Plan**

**Steps:**
- **Scope**
- **Analyzed Risks**
- **Treatment Approaches**
- **Gain Consensus on Test Plan**
Test Monitoring & Control Process

Set-Up - Monitor - Control

Test plan - test measures - test progress info - test status report

Test progress info - test control info - [testing incomplete]

Measures - control directives

...TEST PROCESS...

TEST MANAGEMENT PROCESSES - FUNDAMENTAL TEST PROCESSES
Fundamental Test Processes

(LEVEL) TEST MANAGEMENT PROCESS

(LEVEL) TEST PLAN

CONTROL DIRECTIVES

TEST MEASURES

FUNDAMENTAL TEST PROCESSES

TEST DESIGN & IMPLEMENTATION

TEST SPEC’N

TEST ENVIRONMENT SET-UP

TEST RESULTS

[NO ISSUES NOTICED]

[ISSUE NOTICED or RETEST RESULT]

TEST INCIDENT REPORTING

TEST RESULTS

INCIDENT REPORT

TEST ENV’T READINESS REPORT

TEST EXECUTION
Test Process Descriptions Example – Organizational Test Process

• Each testing process is described using a standard template (following ISO 24774), for example:

• **Purpose**
  – The purpose of the *Organizational Test Process* is to develop and maintain organizational test specifications, such as the Test Policy and Organizational Test Strategy.

• **Outcomes**
  – As a result of the successful implementation of the *Organizational Test Process*:
    • The organizational test specification is developed based on stakeholder requirements;
    • The organizational test specification is agreed by stakeholders;
    • The organizational test specification is published and accessible to stakeholders;
    • Conformance of stakeholders with the organizational test specification is managed;
    • The organizational test specification is reviewed on a periodic basis;
    • Minor updates to the organizational test specification are made as necessary.

• **Activities and tasks**
  – The tester shall implement the following activities and tasks in accordance with applicable organization policies and procedures with respect to the *Organizational Test Process*.

  ➢ **Develop Test Specification**
    • This activity consists of the following tasks:
      – Analyze any relevant source documents and the current testing practices within the organization to identify requirements for the organizational test specification.
      – etc.

  ➢ **Gain Consensus on Test Specification**
  ➢ etc.

• **Information items**
  – The output of the *Organizational Test Process* is the organizational test specification. The Organizational Test Policy and Organizational Test Strategy are typical examples of organizational test specifications.

• **Note** that ISO 24774 (and this format) has changed since we started, so we have had to rewrite all the process descriptions 😊
Part 3: Documentation

- Organizational test documentation
  - Test policy
  - Test strategy
- Project test documentation
  - Project test plan
  - Test project completion report
- Test Level documentation
  - Test plan
  - Test specification
  - Test results
  - Anomaly reports
  - Level test status report
  - Test environment report
  - Test level completion report
- Appendices
  - examples of documents at each level of testing
Part 4: Techniques

• Test case design techniques
  – Static testing techniques
    • Reviews - inspections & walkthroughs, etc.
  – Dynamic testing techniques
    • Black-box, white-box, etc.
  – Non-functional testing techniques
    • Security, performance, usability, etc.

• Test measurement techniques (e.g. coverage)

• Appendices
  – Examples of each technique, at each level of testing
  – Test technique effectiveness
  – Mappings to existing standards
Applicability

- Intended to be a generic standard
  - support all domains
- Some domains are more standards-oriented, e.g.
  - safety-related
  - telecoms
- Some domains will become more regulated, e.g.
  - financial – banks, stock market, etc.
- Needs trialling in all domains and project types
  - Applicability to sequential, iterative and agile
  - Applicability to new and maintenance projects
  - Applicability to IS and embedded
  - E.g. when wouldn’t you be selecting and using techniques? When wouldn’t you plan?
When can you start using it... and when can you get involved?

• Typical ISO standards take over 7 years
  – ISO 12207 was conceived in 1988 and published in 1995 and represents 17,000 person hours (8.5 person years)

• BS 7925-1 & -2 took 8 years to develop

• IEEE estimates 2-4 years to develop a standard, at a cost of between $2,000 and $10,000 per page [1998]
Do you want to be involved?

- Join the working group
  - through your national standards body
  - 6 day meetings, every 6 months
  - contribute between meetings
- Contribute materials
- Review drafts
Current status

• First draft of ‘Part 2 – Process’ – sent out for review – over 1500 comments!!!
  • we know it is not the finished article
  • earlier feedback ⇒ greater influence

• Countries attending meetings:
  – Denmark, India, China, UK, South Africa, Hong Kong, Spain, Germany, USA, Finland, Australia, Korea, Canada, France, Poland, Japan, Russian Federation

• Last meeting – Lima, November 2009

• Next meeting – Niigata, May 2010
Conclusions

• International standard will provide practitioners with guidelines for testing that cover all aspects of the life cycle
  – Provides a consistent set of definitions, processes, procedures & techniques for software testing

• Will be adopted by IEEE, BSI, ISO and other national standards bodies

• Currently has representation from 17 nations & is being reviewed by software testing professionals world-wide

• We still need to ensure widespread applicability
Any Questions?
Any Volunteers?
For more information

- sreid@testing-solutions.com
  - if interested in trialling the standard on a project, reviewing drafts or writing examples
- http://softwaretestingstandard.org/
  - WG26 website
- http://www.jtc1-sc7.org/
  - access to official documents released by WG 26