Standarization effort: ISO/IEC 29119 Software Testing

Javier Tuya
Software Engineering Research Group
University of Oviedo
Coordinator of the workgroup
AEN/CTN 71/SC7/GT26 – AENOR

AST Meeting, Seville, October 19th 2011
What are standards?

- “Set of mandatory requirements established by consensus and maintained by a recognized body to prescribe a disciplined uniform approach or specify a product, that is, mandatory conventions and practices” (ISO/IEC 24765:2009 Systems and software engineering vocabulary)

- Standards provide a 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…….
Standards for Software Testing

- IEEE & BSI Standards
  - IEEE 829 deals with documentation (implicit process)
  - IEEE 1008 deals with unit testing
  - BS 7925-1 & 2 unit testing standards

- Not covered:
  - Integration testing, system testing, acceptance
  - Explicit test process model
  - Project test management & organization-level
  - Partial view of testing techniques

- Conflicting definitions, processes & procedures
- Practitioners may not know which standard to follow
ISO/IEC 29119 - Scope

- Proposal of 29119 ISO project: February 2007
  - This project will produce a software testing standard applicable to all types of software products and software-intensive systems.
  - Purpose: unify and integrate the currently fragmented corpus of normative literature regarding testing that is currently offered by three distinct standards-makers: BSI, IEEE, and ISO/IEC JTC 1/SC 7.
- Four Parts
Organization

- ISO/IEC & National Bodies
  - ISO
  - IEC
  - AENOR
  - JTC1
  - CTN71
  - SC7
  - WG26
  - GT26

- ISO Committees & Working Groups:
  - ISO: International Organization for Standardization
  - JTC1: Information Technology
  - SC7: Software & Systems Engineering
  - WG26: Software Testing

- National Body (ES)
  - AENOR: Asociación Española de Normalización y Certificación
  - GT26: Pruebas del Software
  - [http://in2test.lsi.uniovi.es/gt26/](http://in2test.lsi.uniovi.es/gt26/)
ISO/IEC 29119 Software Testing - Structure

Part 1
Concepts & Vocabulary

BS 7925-1

Part 2
Processes (organizational, project & test levels)

BS 7925-2
IEEE 1008

Part 3
Documentation

IEEE 829

Part 4
Testing Techniques

BS 7925-2
Timelines

Working Draft (WD)
Committee Draft (CD)
Draft International Standard (DIS)
Final Draft International Standard (FDIS)
Final International Standard (FIS)

Aug 2008
WD public
P2,3

Sep 2009
Redef.
Proc.
Model

Jun 2010
WD/CDs
P1,2,3

May 2011
CDs
P1,2,3,4

Parts 2 & 3

Parts 1 & 4

WD
CD1
CD2
CD3
DIS
FDIS
FIS

WD
CD1
CD2
CD3
DIS
FDIS
FIS

May 10
May 11
May 12
May 13
Part 1 – Concepts & Vocabulary (informative)

- Vocabulary of testing terms
- Software testing concepts (goal, levels, types, test basis, risk based testing)
- Testing in different life cycle models
  - Sequential
  - Agile
  - Evolutionary
  - Risk based Testing
- Roles and Responsibilities
- Metrics and Measures
P2 - Process Model

- Static Testing (reviews, static analysis...): covered by other standards, eg. IEEE 1012, 1028
P2 - Organizational Test Process

ORGANIZATIONAL TEST PROCESS
(applied to TEST POLICY)

ORGANIZATIONAL TEST POLICY

FEEDBACK ON ORGANIZATIONAL TEST POLICY

ORGANIZATIONAL TEST POLICY

ORGANIZATIONAL TEST PROCESS
(applied to TEST STRATEGY)

ORGANIZATIONAL TEST STRATEGY

FEEDBACK ON ORGANIZATIONAL TEST STRATEGY

TEST MANAGEMENT PROCESSES
(applied to PROJECT TEST MANAGEMENT)
The inputs to the Test Planning process may include:

- Organizational Test Policy
- Organizational Test Strategy
- Regulatory Standards
- Project Test Plan (if planning testing for a specific phase or type within a project)
- Incident reports

- Project Management Plan
- Applicable product documentation (e.g., System Requirements, Test Item Specifications)
- Software Development Plan
- Project and Product Risks
- Test Plan Updates

Test Planning Process

The process is shown as purely sequential, but in practice some activities may need to be revisited. See text for details.
Test Monitoring & Control Process

The inputs to the Test Monitor and Control Process may include:
- Test Plan(s)
- Applicable product documentation, e.g. System Requirements, Contract, etc.
  and, if available:
  - Organizational Test Policy;
  - Organizational Test Strategy;
  - Control Directives (from a higher level Test Monitor and Control Process);
  - Measures (from the Test Process being managed).

Test status report

test progress info

Report (TMC4)

test control info

[testing incomplete]

Control (TMC3)

[testing complete]

Set-Up (TMC1)

test plan

test measures

Monitor (TMC2)

test progress info

DYNAMIC TEST PROCESSES

...TEST PROCESS...

measures

control directives

TEST MANAGEMENT PROCESSES

The process is shown as purely sequential, but in practice some activities may need to be revisited. See text for details.
P2 - Dynamic Test Process

TEST MANAGEMENT PROCESSES

TEST DESIGN & IMPLEMENTATION

TEST SPECIFICATION

TEST ENVIRONMENT REQUIREMENTS

TEST ENVIRONMENT SET-UP

TEST EXECUTION

TEST RESULTS

[NO ISSUES NOTICED]

[ISSUE NOTICED or RETEST RESULT]

TEST INCIDENT REPORTING

INCIDENT REPORT

TEST MEASURES

CONTROL DIRECTIVES

TEST PLAN
Test Design & Implementation Process

1. Identify Feature Sets (TD1)
2. Derive Test Conditions (TD2)
3. Derive Test Coverage Items (TD3)
4. Derive Test Cases (TD4)
5. Assemble Test Sets (TD5)
6. Derive Test Procedures (TD6)

The inputs to Test Design & Implementation process may include:
- Test basis;
- Test plan;
- Test strategy;
- Test items;
- Test design techniques.

The process is shown as purely sequential, but in practice some activities may need to be revisited. See text for details.
Parts 3,4 – Documentation and Techniques

- P3 - Documentation
  - Content + Templates + Examples

- P4 - Techniques
  - Description + Examples
  - Static Testing (covered in other standards)
  - Test Measurement Techniques
  - Test of Quality Characteristics
More: Test Process Assessment

- May 2010 Proposal New Work Item (part 5?)
  - ISO/IEC 15504-2 as a Reference Assessment Model
  - ISO/IEC 29119-2 as a Reference Process Model
  - Consider TMMi & TPI

- To consider include it in the new versions of 15504 (33000 series)
  - ISO/IEC 33063 Process Assessment Model for Software testing processes
Conclusion

- International standard ISO/IEC 29119 will provide practitioners with guidelines for testing that cover all aspects of the life cycle
  - Provide consistent set of definitions, processes, procedures & techniques for software testing
  - Fill gaps not covered by current standards
  - To be adopted by national standards bodies
  - Currently has representation from 18 nations and is being reviewed by software testing professionals world-wide

- More Info: