ISO/IEC 29119
The New International Software Testing Standard

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Scope

• The purpose 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
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
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
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/IEC 29119 – Structure

- Part 1: Concepts & Vocabulary
  - BS 7925-1
  - Processes

- Part 2: Processes
  - 'Part 5'
  - Process Assessment
  - Actually ISO/IEC 33063

- Part 3: Documentation
  - IEEE 829

- Part 4: Testing Techniques
  - BS 7925-2
Part 1: Concepts & Vocabulary

- Scope, Conformance, Normative References
- DEFINITIONS
- SOFTWARE TESTING CONCEPTS
- TESTING IN DIFFERENT LIFE CYCLE MODELS
- ROLES AND RESPONSIBILITIES IN TESTING
- ANNEXES – Metrics, Examples, Bibliography
Part 2: Testing Processes

- Organizational Test Processes
- Test Management Processes
- Dynamic Test Processes
Instantiating Testing Processes

- **TEST MANAGEMENT PROCESSES**
  - ORGANIZATIONAL TEST PROCESS
    - TEST POLICY
    - TEST STRATEGY
  - PROJECT TEST MANAGEMENT PROCESSES
    - UNIT/SYSTEM/Acceptance/Performance/Usability/ETC.
  - DYNAMIC TEST PROCESSES
Test Management Processes
Dynamic Test Processes

(LEVEL) TEST MANAGEMENT PROCESS

(LEVEL) TEST PLAN

CONTROL DIRECTIVES

TEST MEASURES

DYNAMIC TEST PROCESSES

TEST DESIGN & IMPLEMENTATION

TEST ENVIRONMENT SET-UP

TEST ENVIRONMENT READINESS REQUIREMENTS

TEST SPECIFICATION

TEST EXECUTION

TEST RESULTS

[NO ISSUES NOTICED]

[ISSUE NOTICED or RETEST RESULT]

TEST INCIDENT REPORTING

INCIDENT REPORT

TEST PLAN

CONTROL DIRECTIVES

TEST MEASURES

TEST RESULTS
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 – Test Documentation

Scope, Conformance, Normative References

TEST DOCUMENTATION

ANNEXES - EXAMPLES
Part 3: Test 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 – Test Techniques

Scope, Conformance, Normative References

TEST DESIGN TECHNIQUES
- BLACK BOX
- WHITE BOX

TEST COVERAGE MEASUREMENT

ANNEXE – TESTING OF QUALITY CHARACTERISTICS

ANNEXE – SELECTION OF TECHNIQUES

ANNEXE – TEST TECHNIQUE EFFECTIVENESS
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 markets, 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]
Timelines – all going to plan!

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

Parts 2 & 3
Parts 1 & 4
Do you want to be involved?

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

• Drafts are out for review
  – Unsurprisingly (for a testing standard) we get plenty of comments (1000s)

• Countries attending meetings include:
  – Denmark, India, China, UK, South Africa, Hong Kong, Spain, Germany, USA, Finland, Australia, Korea, Canada, France, Poland, Japan, Russian Federation, Columbia, Sweden, Brazil, Malaysia, New Zealand, Argentina, India, Peru, Colombia, Turkey

• Last meeting – Mumbai, Nov 2011

• Next meeting – Korea, May 2012
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 18 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](mailto:sreid@testing-solutions.com)
  - if interested in trialling the standard on a project, reviewing drafts or writing examples

- [http://softwaretestingstandard.org/](http://softwaretestingstandard.org/)
  - WG26 website

  - access to official documents released by WG 26