The Core of International Software Testing Standard, ISO/IEC29119

As one of the Delegates of KATS (Korean Agency for Technology and Standards)
MKE (Ministry Of Knowledge Economy)

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Who is presenting?

- **Presenter**: Wonil KWON (wonil@sten.or.kr)
  - Representative of STA Consulting Inc. and STEN (Software Test Engineers Network)
  - President of KTB (Korea Testing Board of ISTQB)
  - Board member of SW quality certification by MKE (Ministry of Knowledge Economy)
  - Experience at ETRI (Electronics and Telecommunications Research Institute), TTA
  - Consulting and Training – Hyundai Mobis, Prudential Life Insurance, LG Electronics, LSIS, Samsung Electronics, SUN Microsystems, IBM, Samsung SDS, LG Hitachi, Hanwha S&C, Posdata, Humax, AhnLab, Kookmin Bank, Industrial Bank of Korea, etc.
  - Books
    - Practical Software Testing Foundation 2nd edition
    - Software Testing Terminology
    - Learn Software Testing Through Questions
    - Testing Embedded Software (Translated)

www.softwaretesting.co.kr
## Contents

1. Standard?
2. Introduction to ISO/IEC WG
3. Contents of ISO/IEC 29119 SW Testing Standards
4. How you and your organization use 29119?
5. Conclusion and References
Do you see the value of the international software testing standard?

What contents do you expect of the international SW testing standard?

Do you think the int’l standard world got to recognize the importance of SW testing? Do you think it is worthwhile SW testing getting attention from the int’l standard?

In what conditions are you going to use the standards?

Aren’t you confused by multiple testing concepts and terminologies with the similar meanings, vice versa?
Need Standard?
“Guideline documentation that reflects agreements on products, practices, or operations by nationally or internationally recognized industrial, professional, trade associations or governmental bodies”

- ISO

- **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
Standards provide a ‘body of knowledge’ that provides the basis for a professional discipline

Standards are **basis** for:

- Communication – common terminology
- Professional qualifications
- Certification/compliance schemes
- Benchmark of ‘good industry practice’
- Contracts
- Interoperability and consistency
Quality and Standards

QUALITY

Current Practice

Good Practice

Best Practice
### SC7 Working Groups

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<th>JWG ISO/TC 54</th>
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<th>WG6</th>
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<td>• Systems &amp; Software Documentation</td>
<td>• Tools &amp; Environment</td>
<td>• SW Product Measurement &amp; Evaluation</td>
<td>• Life Cycle Management</td>
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<td>• ODP &amp; Modeling Languages</td>
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<th>WG24</th>
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<td>• SLC Profiles &amp; Guidelines for VSE</td>
<td>• IT Service Management</td>
<td>• Software Testing</td>
<td>• Architecture</td>
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### Some of the WG26 Members
- Dr. Stuart Reid (UK) - convener
- Ms. Ursula Parker, representing IEEE (USA)
- Ms. Tafline Murnane (Australia)
- Mr. Wonil KWON (Korea)
- Dr. Alastair Walker (South Africa)
- plus....
Process Context

- System Engineering
  - ISO 15288
- Software Engineering
  - ISO 12207
- Software Verification and Validation
  - IEEE 1012
- Software Testing
  - BS 7925-2
  - IEEE 1008
ISO/IEC 29119 - Scope

ISO 29119 is to be applicable to “all types” and throughout the “development and maintenance” of software products and software-intensive systems.

Part 1
Concepts & Vocabulary

Part 2
Processes (organizational, project & test levels)

Part 3
Documentation

Part 4
Testing Techniques

BS 7925-1

BS 7925-2

BS 7925-2

IEEE 1008

IEEE 829
ISO/IEC 29119 - Overview

Part 1 - Concepts and Vocabulary

Part 2 - Testing Process

- Organizational Test Process
  - Test Policy
  - Test strategy
- Test management process
  - Test strategy
  - Test process monitoring
  - Test project completion
- Test process
  - Test planning
  - Test design
  - Test execution
  - Bug reporting
  - Test completion
- Status reporting
  - Project status reporting
  - Test status reporting
- Test environment support

Part 3 - Testing Documentation

- Organizational Test Policy and Strategy Documentation
- TM Process Documentation
- Test Documentation
- Interim status report
- Test environment report

Part 4 - Testing Techniques

IEEE 1008, ISO/IEC 12207 aligned with software development lifecycle

IEEE 829

BS 7925-1 (IEEE 829)

*TM : Test Management*
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 Process

ISO/IEC 29119 - 4 Layered Model
Organizational Test Processes

Organizational Test Policy Process

Create/Update Test Policy

IT Policy Management Policy

Test Policy

Test Policy Updates

Organizational Test Strategy Process

Create/Update Test Strategy

IT Project Management Policy

Test Policy

Test Strategy

Interim Project Test Status Reports

Project Test Completion Report

Project Test Management Process
Project Test Management Process

Organizational Test Strategy Process

- Project Management Plan
- Product Documentation
- Software Development Plan
- Regulatory Standards

Test Strategy

Comments on Organizational Test Strategy usage

Project Test Management Process

Create/Update Project Test Plan (TM1)

Project Test Plan

Monitor and Control (TM2)

Project Test Status Reports

Control Directives

Report Test Project Completion (TM3)

Project Test Completion Report

Level Test Plan, Level Test Status Reports

Test Level Process
Test Level Process

Project Test Management Process

Test Level Process

- Plan Testing (TL1)
  - Level Test Plan
  - Level Test Plan Updates

- Monitor and Control (TL2)
  - Test Level Status Report
  - Test Process Info
  - Control Directives
  - Measures
  - Test Result

- Close Down Testing (TL7)
  - Asset Info
  - Project Test Plan

- Report Test Level Completion (TL8)
  - Level Test Completion Reports

Test Execution Cycle

- Design & Build Tests (TL3)
  - Test Specification
  - Specific Test Env’t Requirements

- Run Tests (TL5)
  - Test Environment Readiness Report

- Set-up & Maintain Test Environment (TL4)
  - Test Environment Readiness Report

- Report Anomalies (TL6)
  - Anomaly Report
  - [Issue noticed]
  - [No issues noticed]
Test Activity Descriptions

Example - Design & build tests (TL3)

- Each testing activity is described using a standard template.
  (following ISO 24774), for example:

**Purpose**
The purpose of Design and Build Tests is to design and document test cases that will be executed during testing.

**Entry Criteria**
- the Test Plan has been agreed
- the Test Item Specification(s) is available

**Inputs**
- Test Plan
- Test Item Specification(s)
- System Requirements

**Roles**
- Test Designer

**Tasks**
1. Analyse the test item specification(s) to identify specification items;
2. Determine the test conditions by identifying which specification items to test using the selection criteria from the Test Plan;
3. Derive test coverage items to be exercised by applying the test case design technique(s) to the test conditions;
4. Derive test cases by selecting input values to exercise the test coverage items and corresponding expected results;
5. Create a test set by rationalising the test cases (i.e. removing redundancy, duplication, etc.);
6. Derive a test script by ordering the test cases within the test set using their pre- and post-conditions;
7. Identify and document any specific test environment requirements that are not already included in the Test Plan.

**Outputs**
- Test Specification
- Specific Test Environment Requirements

**Outcomes**
- the Test Specification has been documented.

**Exit Criteria**
- the Test Specification has been agreed.
## Test levels

<table>
<thead>
<tr>
<th>Test Level</th>
<th>Focus</th>
<th>Player</th>
<th>Environment</th>
<th>Formality</th>
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<tbody>
<tr>
<td>Maintenance</td>
<td>Requirement Testing</td>
<td>SM Tester</td>
<td>Running system</td>
<td>(In)Formal</td>
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<tr>
<td></td>
<td>None-Functional Test</td>
<td>Tester</td>
<td>Testing system</td>
<td>Formal</td>
</tr>
<tr>
<td>Acceptance</td>
<td>Overall function Non-functional T</td>
<td>Tester (BA)</td>
<td>Representative</td>
<td>Formal(In)</td>
</tr>
<tr>
<td>System</td>
<td>Interfaces/Interaction</td>
<td>Integrator / tester / developer</td>
<td>On target hardware &amp;</td>
<td>Formal</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>representative environment,</td>
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<td></td>
<td></td>
<td></td>
<td>including interfaces with</td>
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<td></td>
<td></td>
<td></td>
<td>other systems</td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td>Code structure within unit</td>
<td>Developer / tester</td>
<td>(May use) Stubs, drivers and</td>
<td>(In)Formal</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>test harness</td>
<td></td>
</tr>
<tr>
<td>Unit/Component</td>
<td></td>
<td></td>
<td>Stubs, drivers and test</td>
<td>(In)Formal</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>harness</td>
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</table>
Part 3: Documentation

Test management documentation
- Test policy
- Test strategy
- Test project completion report

Test documentation
- Test plan
- Test specification
- Test results
- Anomaly reports
- Test level completion reports

Test status reporting
- Level test status report
- Test environment 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
Conclusions

International standard 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

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

Currently has representation from many nations & will be reviewed by software testing specialists world-wide
Conclusions

Some examples of ISO/IEC 29119 usage and spread-ing in Korea

- Testing knowledge map
- SSTC conference
- Local seminar & presentation (on-site incl.)
- Industry project
- Gov. supported project → Testing process guideline
- Training course
  - **Online training course**

*Testing Treasure Map info : sites.google.com/site/swtestingmap

- I want you to make absolute full use of it through the contribution to this lovely international testing standard
- We all want this standard to turn out to be reflecting the “Best Practices” (for us to enjoy the value of standard)
Conclusion

One of the examples of ISO/IEC 29119 evolution can be the inclusion of "Test Process Assessment" model part in the standard.
Reference:

The New International Software Testing Standard

Stuart Reid
sreid@testing-solutions.com

A Vision for International Standardization in Software and Systems Engineering

François Coallier
francois.coallier@etsmtl.ca

Sixth International Conference on the Quality of Information and Communications Technology
IEEE 2007
• Current status of standard. See website

www.softwaretestingstandard.org

• Need more testing experts involvement
• Need more national bodies participation