



Key Performance Indicator			
Line Counting			
Lines of Code	481219	↗	✓
Source Lines Of Code	401326	↗	✓
Effective Lines Of Code	325196	↗	✓
Cyclomatic Complexity	12265	↗	✓
Comment Rate	16 %	↘	✗
Decision Making			
Business Value	1912	→	I
Technical Debt	3626	↗	I
Maturity Index	65 %	↘	C
Stability Index	84 %	↗	B
Reusability Index	44 %	↘	D

## Squore 16.3.0

### Reference Manual

Reference : REF\_Squore  
Version : 16.3.0  
Date : 28/04/2017

# Reference Manual

Copyright © 2017 Squoring Technologies

## Abstract

This edition of the Reference Manual applies to Squore 16.3.0 and to all subsequent releases and modifications until otherwise indicated in new editions.

## Licence

No part of this publication may be reproduced, transmitted, stored in a retrieval system, nor translated into any human or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual or otherwise, without the prior written permission of the copyright owner, Squoring Technologies.

Squoring Technologies reserves the right to revise this publication and to make changes from time to time without obligation to notify authorised users of such changes. Consult Squoring Technologies to determine whether any such changes have been made.

The terms and conditions governing the licensing of Squoring Technologies software consist solely of those set forth in the written contracts between Squoring Technologies and its customers.

All third-party products are trademarks or registered trademarks of their respective companies.

## Warranty

Squoring Technologies makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Squoring Technologies shall not be liable for errors contained herein nor for incidental or consequential damages in connection with the furnishing, performance or use of this material.

## Table of Contents

1. Introduction .....	1
1.1. Foreword .....	1
1.2. About This Document .....	1
1.3. Contacting Squoring Technologies Product Support .....	1
1.4. Responsibilities .....	1
1.5. Getting the Latest Version of this Manual .....	2
2. Coding Standards .....	3
2.1. Ada Rule Set .....	3
2.1.1. Backward goto .....	3
2.1.2. No Abort .....	3
2.1.3. No final else .....	3
2.1.4. Use of goto .....	3
2.1.5. Exit Label .....	3
2.1.6. Exit when .....	4
2.1.7. Loop name .....	4
2.1.8. No Delay .....	4
2.1.9. 'when others' in exception handler .....	4
2.1.10. Parameter order .....	4
2.1.11. Multiple exits .....	4
2.1.12. Multiple Exit in loop .....	5
2.2. C-Style Rule Set .....	5
2.2.1. Use of continue .....	5
2.2.2. Multiple break .....	5
2.2.3. Multiple exits .....	5
2.2.4. No Compound statement .....	5
2.2.5. Label out a switch .....	6
2.2.6. Missing Break .....	6
2.2.7. No final else .....	6
2.2.8. Missing Default .....	6
2.2.9. No case in switch .....	6
2.2.10. Fallthrough .....	7
2.2.11. Assignment in Boolean .....	7
2.2.12. Assignment without Comparison .....	7
2.2.13. Use of goto .....	7
2.2.14. Backward goto .....	7
2.2.15. Code before first case .....	7
2.2.16. Risky Empty Statement .....	8
2.3. COBOL Rule Set .....	8
2.3.1. Column 7 for * and D Only .....	8
2.3.2. Code in Uppercase .....	8
2.3.3. Empty line after EXIT .....	8
2.3.4. Empty lines around DIVISION .....	8
2.3.5. Empty line after SECTION .....	9
2.3.6. COMPUTE instead of ADD .....	9
2.3.7. COMPUTE instead of SUBTRACT .....	9
2.3.8. No Conditional GOTO .....	9
2.3.9. Perform with no THRU .....	9
2.3.10. Missing END-IF .....	9
2.3.11. Missing END-EVALUATE .....	10
2.3.12. Variable declaration format .....	10

2.3.13. No Backward Goto .....	10
2.3.14. Single GOBACK .....	10
2.3.15. No procedural COPY .....	10
2.3.16. No RENAMES .....	11
2.3.17. No Homonymous .....	11
2.3.18. No more than 3 nested IF .....	11
2.3.19. No ALTER .....	11
2.3.20. No MOVE CORRESPONDING .....	11
2.3.21. Use COMP for OCCURS .....	11
2.3.22. Use SYNCHRONIZED .....	12
2.3.23. Open file once .....	12
2.3.24. Close file once .....	12
2.3.25. No DEBUG MODE .....	12
2.3.26. No Variables S9(9) .....	12
2.3.27. BLOCK Clause .....	13
2.3.28. Use WHEN OTHER .....	13
2.3.29. No INITIALIZE .....	13
2.3.30. Close open file .....	13
2.3.31. Use FILE STATUS .....	13
2.3.32. READ-WRITE Instruction .....	13
2.3.33. Standard Label .....	14
2.4. COBOL CICS Rule Set .....	14
2.4.1. No SORT under .....	14
2.4.2. No RELEASE under CICS .....	14
2.4.3. No RETURN under CICS .....	14
2.4.4. No MERGE under CICS .....	14
2.4.5. No FILE CONTROL under CICS .....	15
2.4.6. No FILE SECTION under CICS .....	15
2.4.7. No USE under CICS .....	15
2.4.8. No ACCEPT under CICS .....	15
2.4.9. No CLOSE under CICS .....	15
2.4.10. No DELETE under CICS .....	15
2.4.11. No DISPLAY CONSOLE under CICS .....	16
2.4.12. No DISPLAY SYSPUNCH under CICS .....	16
2.4.13. No OPEN under CICS .....	16
2.4.14. No READ under CICS .....	16
2.4.15. No RERUN under CICS .....	16
2.4.16. No REWRITE under CICS .....	17
2.4.17. No START under CICS .....	17
2.4.18. No STOP under CICS .....	17
2.4.19. No WRITE under CICS .....	17
2.4.20. Use CALL .....	17
2.4.21. Single ENTRY .....	17
2.4.22. No INPUT-OUTPUT under CICS .....	18
2.4.23. No I-O CONTROL under CICS .....	18
2.4.24. No FD under CICS .....	18
2.4.25. No SD under CICS .....	18
<b>3. Source Code Metrics .....</b>	<b>19</b>
3.1. ada Metrics .....	19
3.1.1. Number of Parameters .....	19
3.1.2. Cyclomatic Complexity .....	19
3.1.3. Maximum Nested Structures .....	19
3.1.4. Non-Cyclic Paths .....	19

3.1.5. Return Statements .....	19
3.1.6. IF Statements .....	20
3.1.7. ELSE Clauses .....	20
3.1.8. For Statements .....	20
3.1.9. While Statements .....	20
3.1.10. Loop Statements .....	20
3.1.11. Case statements .....	20
3.1.12. Orelse operators .....	21
3.1.13. Andthen Operators .....	21
3.1.14. OR operators .....	21
3.1.15. AND operators .....	21
3.1.16. Case Blocks .....	21
3.1.17. Exit statements .....	22
3.1.18. GOTO Statements .....	22
3.1.19. Exception handlers .....	22
3.1.20. Exception When blocks .....	22
3.1.21. Raise statements .....	22
3.1.22. Label Statements .....	22
3.1.23. Declare operators .....	23
3.1.24. Types .....	23
3.1.25. Subtypes .....	23
3.1.26. Derived types .....	23
3.1.27. Variables .....	23
3.1.28. Constants .....	24
3.1.29. Renamed objects .....	24
3.1.30. Exceptions .....	24
3.1.31. Declared functions .....	24
3.1.32. Separate functions/procedures .....	24
3.1.33. Separate packages .....	24
3.1.34. Separate tasks .....	25
3.1.35. Protected objects .....	25
3.1.36. With statements .....	25
3.1.37. Public variables .....	25
3.1.38. Public types .....	25
3.1.39. Public constants .....	26
3.1.40. Public exceptions .....	26
3.1.41. Public functions .....	26
3.1.42. Private variables .....	26
3.1.43. Private types .....	26
3.1.44. Private constant .....	26
3.1.45. Private exceptions .....	27
3.1.46. Private functions/Procedures .....	27
3.1.47. Entry Statements .....	27
3.1.48. Generic object .....	27
3.2. C-Style Metrics .....	27
3.2.1. Number of Functions .....	27
3.2.2. Assignment Operators .....	28
3.2.3. Comparison Operators .....	28
3.2.4. Standard Operators .....	28
3.2.5. Special Operators .....	28
3.2.6. Cyclomatic Complexity .....	28
3.2.7. Non-Cyclic Paths .....	28
3.2.8. Return Statements .....	29

3.2.9. Number of Parameters .....	29
3.2.10. For Statements .....	29
3.2.11. While Statements .....	29
3.2.12. Do While Statements .....	29
3.2.13. Switch Statements .....	30
3.2.14. Continue Statements .....	30
3.2.15. Loop Statements .....	30
3.2.16. Orelse operators .....	30
3.2.17. Andthen Operators .....	30
3.2.18. Ternary operators .....	30
3.2.19. Break in Switch .....	31
3.2.20. Break in Loop .....	31
3.2.21. Case Labels .....	31
3.2.22. Case Blocks .....	31
3.2.23. Call to exit .....	31
3.3. OO Metrics .....	32
3.3.1. Number of Classes .....	32
3.3.2. Depth of Inheritance Tree .....	32
3.3.3. Depth of Inheritance Tree .....	32
3.3.4. Multiple Inheritance Indicator .....	32
3.3.5. Number of Ancestors .....	32
3.3.6. Depth of Descendant Tree .....	32
3.3.7. Number Of Children .....	33
3.3.8. Number of Descendants .....	33
3.3.9. Number of Methods .....	33
3.3.10. Number of Method Implemented .....	33
3.3.11. Weighted Method per Class .....	33
3.3.12. Public Methods .....	34
3.3.13. Private Methods .....	34
3.3.14. Protected Internal Methods .....	34
3.3.15. Protected Methods .....	34
3.3.16. Internal Methods .....	34
3.3.17. Methods without Accessibility .....	34
3.3.18. Static Methods .....	35
3.3.19. Number of Attributes .....	35
3.3.20. Public Data .....	35
3.3.21. Private data .....	35
3.3.22. Protected Internal Data .....	35
3.3.23. Protected Data .....	36
3.3.24. Internal Data .....	36
3.3.25. Number of data without accessibility .....	36
3.3.26. Static Data .....	36
3.3.27. Constant Data .....	36
3.3.28. Properties .....	36
3.3.29. Public Properties .....	37
3.3.30. Private Properties .....	37
3.3.31. Protected Internal Properties .....	37
3.3.32. Protected Properties .....	37
3.3.33. Internal Properties .....	37
3.3.34. Properties without Accessibility .....	38
3.3.35. Static Properties .....	38
3.3.36. Constant Properties .....	38
3.3.37. Properties with Get .....	38

3.3.38. Properties with Set .....	38
3.3.39. Throw Statements .....	38
3.3.40. Catch Statements .....	39
3.3.41. Try Statements .....	39
3.4. COBOL Metrics .....	39
3.4.1. Number of Files .....	39
3.4.2. Number of Sections .....	39
3.4.3. Number of paragraphs .....	39
3.4.4. Line Count .....	40
3.4.5. Comment Lines .....	40
3.4.6. Blank Lines .....	40
3.4.7. Source Lines Of Code .....	40
3.4.8. Operator Occurrences .....	40
3.4.9. Operand Occurrences .....	40
3.4.10. Distinct Operators .....	41
3.4.11. Distinct Operands .....	41
3.4.12. Maximum Nested Structures .....	41
3.4.13. Executable Statements .....	41
3.4.14. EXIT Statements .....	41
3.4.15. STOP Statements .....	42
3.4.16. GOTO Statements .....	42
3.4.17. IF Statements .....	42
3.4.18. EVALUATE Statements .....	42
3.4.19. PERFORM Statements .....	42
3.4.20. VARYING Clauses .....	42
3.4.21. TIMES Clauses .....	43
3.4.22. UNTIL Clauses .....	43
3.4.23. ELSE Clauses .....	43
3.4.24. WHEN Clauses .....	43
3.4.25. CALL Statements .....	43
3.4.26. Conditions .....	44
3.4.27. Data Declarations .....	44
3.4.28. File Declarations .....	44
3.4.29. Data Used .....	44
3.4.30. Files Used .....	44
3.4.31. Arithmetic Operators .....	44
3.5. XML Metrics .....	45
3.5.1. Number of Files .....	45
3.5.2. Line Count .....	45
3.5.3. Comment Lines .....	45
3.5.4. Blank Lines .....	45
3.5.5. Source Lines Of Code .....	45
3.5.6. Operator Occurrences .....	46
3.5.7. Operand Occurrences .....	46
3.5.8. Distinct Operators .....	46
3.5.9. Distinct Operands .....	46
3.5.10. Maximum Nested Structures .....	46
3.5.11. Number of XML elements .....	46
3.5.12. Number of attributes .....	47
3.5.13. Number of comment blocks .....	47
3.5.14. Number of text blocks .....	47
4. Repository Connectors .....	48
4.1. Folder Path .....	48

4.1.1. Description .....	48
4.1.2. Usage .....	48
4.2. Zip Upload .....	48
4.2.1. Description .....	48
4.2.2. Usage .....	48
4.3. CVS .....	48
4.3.1. Description .....	48
4.3.2. Usage .....	49
4.4. ClearCase .....	49
4.4.1. Description .....	49
4.4.2. Usage .....	49
4.5. Perforce .....	50
4.5.1. Description .....	50
4.5.2. Usage .....	50
4.6. Git .....	51
4.6.1. Description .....	51
4.6.2. Usage .....	51
4.7. PTC Integrity .....	51
4.7.1. Description .....	51
4.7.2. Usage .....	52
4.8. TFS .....	52
4.8.1. Description .....	52
4.8.2. Usage .....	53
4.9. Synergy .....	53
4.9.1. Description .....	53
4.9.2. Usage .....	54
4.10. SVN .....	54
4.10.1. Description .....	54
4.10.2. Usage .....	54
4.11. Using Multiple Nodes .....	55
4.12. Using Data Provider Input Files From Version Control .....	55
5. Data Providers .....	57
5.1. AntiC .....	57
5.1.1. Description .....	57
5.1.2. Usage .....	57
5.2. Automotive Coverage Import .....	57
5.2.1. Description .....	57
5.2.2. Usage .....	57
5.3. Automotive Tag Import .....	57
5.3.1. Description .....	57
5.3.2. Usage .....	58
5.4. BullseyeCoverage Code Coverage Analyzer .....	58
5.4.1. Description .....	58
5.4.2. Usage .....	58
5.5. CPD .....	58
5.5.1. Description .....	58
5.5.2. Usage .....	58
5.6. CPD (plugin) .....	58
5.6.1. Description .....	59
5.6.2. Usage .....	59
5.7. Cppcheck .....	59
5.7.1. Description .....	59
5.7.2. Usage .....	59



5.8. Cppcheck (plugin) .....	59
5.8.1. Description .....	59
5.8.2. Usage .....	60
5.9. CPPTest .....	60
5.9.1. Description .....	60
5.9.2. Usage .....	60
5.10. Cantata .....	60
5.10.1. Description .....	60
5.10.2. Usage .....	60
5.11. CheckStyle .....	61
5.11.1. Description .....	61
5.11.2. Usage .....	61
5.12. CheckStyle (plugin) .....	61
5.12.1. Description .....	61
5.12.2. Usage .....	61
5.13. CheckStyle for SQALE (plugin) .....	62
5.13.1. Description .....	62
5.13.2. Usage .....	62
5.14. Cobertura .....	62
5.14.1. Description .....	62
5.14.2. Usage .....	62
5.15. CodeSonar .....	62
5.15.1. Description .....	63
5.15.2. Usage .....	63
5.16. Compiler .....	63
5.16.1. Description .....	63
5.16.2. Usage .....	63
5.17. Coverity .....	63
5.17.1. Description .....	63
5.17.2. Usage .....	63
5.18. FindBugs .....	64
5.18.1. Description .....	64
5.18.2. Usage .....	64
5.19. FindBugs (plugin) .....	64
5.19.1. Description .....	64
5.19.2. Usage .....	64
5.20. Function Relaxer .....	65
5.20.1. Description .....	65
5.20.2. Usage .....	65
5.21. FxCop .....	65
5.21.1. Description .....	65
5.21.2. Usage .....	65
5.22. GCov .....	65
5.22.1. Description .....	65
5.22.2. Usage .....	65
5.23. GNATcheck .....	66
5.23.1. Description .....	66
5.23.2. Usage .....	66
5.24. GNATCompiler .....	66
5.24.1. Description .....	66
5.24.2. Usage .....	66
5.25. JUnit .....	66
5.25.1. Description .....	67

5.25.2. Usage .....	67
5.26. JaCoCo .....	67
5.26.1. Description .....	67
5.26.2. Usage .....	67
5.27. Klocwork .....	67
5.27.1. Description .....	67
5.27.2. Usage .....	67
5.28. Rational Logiscope .....	68
5.28.1. Description .....	68
5.28.2. Usage .....	68
5.29. MemUsage .....	68
5.29.1. Description .....	68
5.29.2. Usage .....	68
5.30. NCover .....	68
5.30.1. Description .....	68
5.30.2. Usage .....	68
5.31. Oracle PLSQL compiler Warning checker .....	69
5.31.1. Description .....	69
5.31.2. Usage .....	69
5.32. MISRA Rule Checking using PC-lint .....	69
5.32.1. Description .....	69
5.32.2. Usage .....	69
5.33. PMD .....	70
5.33.1. Description .....	70
5.33.2. Usage .....	70
5.34. PMD (plugin) .....	70
5.34.1. Description .....	70
5.34.2. Usage .....	70
5.35. Polyspace .....	70
5.35.1. Description .....	71
5.35.2. Usage .....	71
5.36. Polyspace MISRA .....	71
5.36.1. Description .....	71
5.36.2. Usage .....	71
5.37. Polyspace (plugin) .....	71
5.37.1. Description .....	71
5.37.2. Usage .....	72
5.38. MISRA Rule Checking with QAC .....	72
5.38.1. Description .....	72
5.38.2. Usage .....	72
5.39. Unit Test Code Coverage from Rational Test RealTime .....	73
5.39.1. Description .....	73
5.39.2. Usage .....	73
5.40. ReqIF .....	73
5.40.1. Description .....	73
5.40.2. Usage .....	73
5.41. SQL Code Guard .....	73
5.41.1. Description .....	73
5.41.2. Usage .....	74
5.42. Squan Sources .....	74
5.42.1. Description .....	74
5.42.2. Usage .....	74
5.43. Squore Import .....	76

5.43.1. Description .....	76
5.43.2. Usage .....	76
5.44. Squore Virtual Project .....	76
5.44.1. Description .....	76
5.44.2. Usage .....	77
5.45. StyleCop .....	77
5.45.1. Description .....	77
5.45.2. Usage .....	77
5.46. StyleCop (plugin) .....	77
5.46.1. Description .....	77
5.46.2. Usage .....	77
5.47. Tessy .....	78
5.47.1. Description .....	78
5.47.2. Usage .....	78
5.48. VectorCAST 6.3 .....	78
5.48.1. Description .....	78
5.48.2. Usage .....	78
5.49. Configuration Checker .....	78
5.49.1. Description .....	78
5.49.2. Usage .....	78
5.50. Csv Coverage Import .....	79
5.50.1. Description .....	79
5.50.2. Usage .....	79
5.51. CSV Findings .....	79
5.51.1. Description .....	79
5.51.2. Usage .....	79
5.52. Csv Tag Import .....	79
5.52.1. Description .....	79
5.52.2. Usage .....	79
5.53. Csv Test Results Import .....	80
5.53.1. Description .....	80
5.53.2. Usage .....	80
5.54. OSLC .....	80
5.54.1. Description .....	80
5.54.2. Usage .....	80
5.55. pep8 .....	81
5.55.1. Description .....	81
5.55.2. Usage .....	81
5.56. pep8 (plugin) .....	81
5.56.1. Description .....	81
5.56.2. Usage .....	81
5.57. pylint .....	81
5.57.1. Description .....	81
5.57.2. Usage .....	81
5.58. pylint (plugin) .....	82
5.58.1. Description .....	82
5.58.2. Usage .....	82
5.59. Qac_8_2 .....	82
5.59.1. Description .....	82
5.59.2. Usage .....	82
5.60. Creating your own Data Providers .....	82
5.60.1. Choosing the Right Data Provider Framework .....	83
5.60.2. Extending a Framework .....	84

5.60.3. Data Provider Parameters .....	84
5.60.4. Localising your Data Provider .....	86
<b>6. Cloning Detection .....</b>	<b>89</b>
6.1. Cloning Metrics .....	89
6.1.1. CC - Code Cloned .....	89
6.1.2. CFTC - Control Flow Token (CFT) Cloned .....	89
6.1.3. CAC - Children Artefact Cloned .....	89
6.1.4. CN - Clones Number .....	90
6.1.5. RS - Repeated Substrings (Repeated Code Blocks) .....	90
6.1.6. CFTRS - Repeated Substrings in Control Flow Token .....	90
6.1.7. ICC - Inner Code Cloned .....	90
6.1.8. ICFTC - Inner Control Flow Token Cloned .....	90
6.2. Cloning Violations .....	91
6.2.1. CC (R_NOCC) .....	91
6.2.2. CFTC (R_NOCFCTC) .....	91
6.2.3. CAC (R_NOCAC) .....	91
6.2.4. RS (R_NORS) .....	91
6.2.5. CFTRS (R_NOCFTRS) .....	91
<b>7. Glossary .....</b>	<b>92</b>
7.1. Acceptance Testing .....	92
7.2. Accessibility .....	92
7.3. Accuracy .....	92
7.4. Accuracy of Measurement .....	93
7.5. Acquirer .....	93
7.6. Action .....	94
7.7. Activity .....	94
7.8. Actor .....	95
7.9. Adaptability .....	95
7.10. Agreement .....	96
7.11. Analysability .....	96
7.12. Analysis Model .....	96
7.13. Architecture .....	96
7.14. Attractiveness .....	97
7.15. Attribute .....	97
7.16. Availability .....	98
7.17. Base Measure .....	98
7.18. Baseline .....	99
7.19. Branch .....	99
7.20. Branch Coverage .....	100
7.21. Branch Testing .....	100
7.22. Budget .....	101
7.23. Build .....	101
7.24. Call Graph .....	101
7.25. Capability Maturity Model .....	102
7.26. Certification .....	102
7.27. Certification Criteria .....	102
7.28. Change Control Board .....	103
7.29. Change Control System .....	103
7.30. Change Management .....	103
7.31. Changeability .....	104
7.32. Co-existence .....	104
7.33. Code .....	104
7.34. Code Coverage .....	105

7.35. Code Freeze .....	105
7.36. Code Review .....	105
7.37. Code Verification .....	105
7.38. Coding .....	106
7.39. Cohesion .....	106
7.40. Commercial-Off-The-Shelf (COTS) .....	107
7.41. Commit .....	107
7.42. Commitment .....	107
7.43. Compatibility .....	108
7.44. Complexity .....	108
7.45. Component .....	109
7.46. Conciseness .....	109
7.47. Condition .....	110
7.48. Configuration .....	110
7.49. Configuration Control .....	111
7.50. Configuration Item .....	111
7.51. Configuration Management .....	112
7.52. Configuration Management System .....	112
7.53. Conflict .....	113
7.54. Conformance .....	113
7.55. Connectivity .....	114
7.56. Consistency .....	114
7.57. Constraint .....	114
7.58. Content Coupling .....	115
7.59. Context of Use .....	115
7.60. Contract .....	116
7.61. Control Coupling .....	116
7.62. Control Flow .....	116
7.63. Control Flow Diagram .....	117
7.64. Convention .....	117
7.65. Correctability .....	117
7.66. Correctness .....	117
7.67. Coupling .....	118
7.68. Coverage .....	118
7.69. Criteria .....	119
7.70. Criticality .....	119
7.71. Custom Software .....	120
7.72. Customer .....	120
7.73. Data .....	121
7.74. Data Coupling .....	121
7.75. Data Flow .....	122
7.76. Data Flow Diagram .....	122
7.77. Data Management .....	122
7.78. Data Model .....	123
7.79. Data Processing .....	123
7.80. Data Provider .....	123
7.81. Data Store .....	124
7.82. Data Type .....	124
7.83. Database .....	124
7.84. Decision Criteria .....	125
7.85. Decoupling .....	125
7.86. Defect .....	125
7.87. Degree of Confidence .....	126

7.88. Deliverable .....	126
7.89. Delivery .....	127
7.90. Dependability .....	127
7.91. Deployment .....	127
7.92. Derived Measure .....	127
7.93. Design .....	128
7.94. Design Pattern .....	129
7.95. Developer .....	129
7.96. Development .....	129
7.97. Development Testing .....	130
7.98. Direct Measure .....	130
7.99. Direct Metric .....	131
7.100. Document .....	131
7.101. Documentation .....	132
7.102. Dynamic Analysis .....	133
7.103. Earned Value .....	133
7.104. Effectiveness .....	133
7.105. Efficiency .....	133
7.106. Efficiency Compliance .....	134
7.107. Effort .....	134
7.108. Encapsulation .....	135
7.109. End User .....	135
7.110. Entity .....	135
7.111. Entry Point .....	136
7.112. Environment .....	136
7.113. Error .....	137
7.114. Error Tolerance .....	137
7.115. Evaluation .....	138
7.116. Evaluation Activity .....	138
7.117. Evaluation Group .....	138
7.118. Evaluation Method .....	139
7.119. Evaluation Module .....	139
7.120. Evaluation Technology .....	140
7.121. Evaluation Tool .....	140
7.122. Execute .....	140
7.123. Execution Efficiency .....	141
7.124. Execution Time .....	141
7.125. Exit .....	141
7.126. Expandability .....	142
7.127. Extendability .....	142
7.128. External Attribute .....	142
7.129. External Measure .....	142
7.130. External Quality .....	143
7.131. External Software Quality .....	144
7.132. Facility .....	144
7.133. Failure .....	144
7.134. Failure Rate .....	145
7.135. Fault .....	146
7.136. Fault Tolerance .....	146
7.137. Feasibility .....	147
7.138. Feature .....	147
7.139. Feature Freeze .....	147
7.140. Finite State Machine .....	148

7.141. Flexibility .....	148
7.142. Frozen Branch .....	148
7.143. Function .....	148
7.144. Functional Analysis .....	149
7.145. Functional Requirement .....	149
7.146. Functional Size .....	150
7.147. Functional Testing .....	150
7.148. Functional Unit .....	150
7.149. Functionality .....	150
7.150. Functionality Compliance .....	151
7.151. Generality .....	151
7.152. Generic Practice .....	151
7.153. Glossary .....	152
7.154. Goal .....	152
7.155. Granularity .....	152
7.156. Historical Information .....	152
7.157. Hybrid Coupling .....	152
7.158. Impact Analysis .....	153
7.159. Implementation .....	153
7.160. Implied Needs .....	154
7.161. Incremental Development .....	154
7.162. Indicator .....	154
7.163. Indicator Value .....	155
7.164. Indirect Measure .....	155
7.165. Indirect Metric .....	156
7.166. Information .....	156
7.167. Information Analysis .....	156
7.168. Information Management .....	157
7.169. Information Need .....	157
7.170. Information Product .....	157
7.171. Inspection .....	157
7.172. Installability .....	158
7.173. Installation Manual .....	158
7.174. Integration .....	158
7.175. Integration Test .....	159
7.176. Integrity .....	159
7.177. Interface Testing .....	159
7.178. Intermediate Software Product .....	160
7.179. Internal Attribute .....	160
7.180. Internal Measure .....	160
7.181. Internal Quality .....	161
7.182. Internal Software Quality .....	161
7.183. Interoperability .....	162
7.184. Interoperability Testing .....	162
7.185. Interval Scale .....	162
7.186. Item .....	163
7.187. Iteration .....	163
7.188. Key Practices .....	163
7.189. Key Process Area .....	164
7.190. Knowledge Base .....	164
7.191. Learnability .....	165
7.192. Lessons Learned .....	165
7.193. Level of Performance .....	165

7.194. Life Cycle .....	165
7.195. Life Cycle Model .....	166
7.196. Maintainability .....	166
7.197. Maintainability Compliance .....	167
7.198. Maintainer .....	167
7.199. Maintenance .....	167
7.200. Maintenance Manual .....	168
7.201. Maturity .....	169
7.202. Measurable Concept .....	169
7.203. Measurand .....	169
7.204. Measure .....	169
7.205. Measurement .....	170
7.206. Measurement Analyst .....	171
7.207. Measurement Experience Base .....	171
7.208. Measurement Function .....	171
7.209. Measurement Method .....	172
7.210. Measurement Procedure .....	172
7.211. Measurement Process .....	173
7.212. Measurement Process Owner .....	173
7.213. Measurement Sponsor .....	173
7.214. Measurement User .....	173
7.215. Metric .....	174
7.216. Milestone .....	174
7.217. Mock Object .....	175
7.218. Model .....	175
7.219. Modifiability .....	175
7.220. Modifiable .....	176
7.221. Modularity .....	176
7.222. Module .....	176
7.223. Moke Object .....	177
7.224. Multidimensional Analysis .....	177
7.225. Network .....	177
7.226. Nonfunctional Requirement .....	178
7.227. Nontechnical Requirement .....	178
7.228. Object .....	178
7.229. Object Model .....	179
7.230. Object Oriented Design .....	179
7.231. Observation .....	179
7.232. Observation Period .....	180
7.233. Operability .....	180
7.234. Operand .....	180
7.235. Operational Testing .....	180
7.236. Operator .....	181
7.237. Operator Manual .....	182
7.238. Optional Attribute .....	182
7.239. Optional Requirement .....	182
7.240. Organisational Unit .....	183
7.241. Path .....	183
7.242. Path Analysis .....	183
7.243. Path Testing .....	184
7.244. Pathological Coupling .....	184
7.245. Peer Review .....	184
7.246. Performance .....	185



7.247. Performance Indicator .....	185
7.248. Performance Testing .....	185
7.249. Pilot Project .....	186
7.250. Portability .....	186
7.251. Portability Compliance .....	186
7.252. Practice .....	187
7.253. Precision .....	187
7.254. Predictive Metric .....	188
7.255. Procedure .....	188
7.256. Process .....	188
7.257. Process Assessment .....	189
7.258. Process Assessment Model .....	189
7.259. Process Capability .....	190
7.260. Process Capability Determination .....	190
7.261. Process Capability Level .....	190
7.262. Process Context .....	190
7.263. Process Improvement .....	191
7.264. Process Improvement Objective .....	191
7.265. Process Improvement Program .....	191
7.266. Process Improvement Project .....	192
7.267. Process Metric .....	192
7.268. Process Outcome .....	192
7.269. Process Performance .....	193
7.270. Process Purpose .....	193
7.271. Product .....	194
7.272. Product Line .....	195
7.273. Product Metric .....	195
7.274. Productivity .....	195
7.275. Programmer Manual .....	195
7.276. Project .....	196
7.277. Project Management .....	196
7.278. Project Phase .....	197
7.279. Prototype .....	197
7.280. Qualification .....	198
7.281. Qualification Testing .....	198
7.282. Quality .....	198
7.283. Quality Assurance .....	199
7.284. Quality Control .....	200
7.285. Quality Evaluation .....	200
7.286. Quality Factor .....	201
7.287. Quality Management .....	201
7.288. Quality Measure Element .....	201
7.289. Quality Metric .....	202
7.290. Quality Model .....	202
7.291. Quality in Use .....	202
7.292. Rating .....	203
7.293. Rating Level .....	204
7.294. Readability .....	204
7.295. Recoverability .....	204
7.296. Recovery .....	205
7.297. Reengineering .....	205
7.298. Regression Testing .....	205
7.299. Release .....	206

7.300. Reliability .....	206
7.301. Reliability Compliance .....	207
7.302. Repeatability of Results of Measurements .....	207
7.303. Replaceability .....	208
7.304. Reproducibility of Results of Measurements .....	208
7.305. Request For Change .....	209
7.306. Request For Information .....	209
7.307. Request For Proposal .....	209
7.308. Requirement .....	209
7.309. Requirements Analysis .....	210
7.310. Requirements Derivation .....	211
7.311. Requirements Document .....	211
7.312. Requirements Engineering .....	212
7.313. Requirements Partitioning .....	212
7.314. Requirements Review .....	212
7.315. Requirements Specification .....	213
7.316. Requirements Traceability .....	213
7.317. Requirements Traceability Matrix .....	213
7.318. Resource .....	214
7.319. Resource Utilisation .....	214
7.320. Result .....	215
7.321. Retirement .....	215
7.322. Reverse Engineering .....	215
7.323. Risk .....	216
7.324. Risk Acceptance .....	216
7.325. Risk Analysis .....	217
7.326. Robustness .....	217
7.327. Role .....	217
7.328. Routine .....	218
7.329. Run .....	218
7.330. Safety .....	219
7.331. Satisfaction .....	219
7.332. Scale .....	219
7.333. Security .....	220
7.334. Service .....	221
7.335. Service Level Agreement .....	221
7.336. Simplicity .....	221
7.337. Software .....	222
7.338. Software Asset Management .....	222
7.339. Software Development Process .....	223
7.340. Software Engineering .....	223
7.341. Software Item .....	223
7.342. Software Life Cycle .....	224
7.343. Software Product Evaluation .....	224
7.344. Software Quality .....	225
7.345. Software Quality Characteristic .....	225
7.346. Software Quality Evaluation .....	225
7.347. Software Quality Measure .....	226
7.348. Software Repository .....	226
7.349. Software Unit .....	226
7.350. Source Code .....	227
7.351. Specification .....	227
7.352. Stability .....	227

7.353. Stage .....	228
7.354. Stakeholder .....	228
7.355. Standard .....	229
7.356. Standard Process .....	229
7.357. Statement .....	229
7.358. Statement Testing .....	230
7.359. Statement of Work .....	230
7.360. Static Analysis .....	230
7.361. Statistical Process Control .....	231
7.362. Step .....	231
7.363. Stress Testing .....	232
7.364. Structural Testing .....	232
7.365. Stub .....	233
7.366. Suitability .....	233
7.367. Supplier .....	234
7.368. Support .....	234
7.369. Support Manual .....	234
7.370. System .....	235
7.371. System Testing .....	235
7.372. Task .....	236
7.373. Technical Requirement .....	236
7.374. Technique .....	237
7.375. Test .....	237
7.376. Test Case .....	238
7.377. Test Case Suite .....	238
7.378. Test Coverage .....	238
7.379. Test Documentation .....	239
7.380. Test Environment .....	239
7.381. Test Objective .....	239
7.382. Test Plan .....	240
7.383. Test Procedure .....	240
7.384. Testability .....	241
7.385. Testing .....	241
7.386. Testing Description .....	242
7.387. Time Behaviour .....	242
7.388. Tool .....	242
7.389. Total Quality Management .....	243
7.390. Traceability .....	243
7.391. Traceable .....	244
7.392. Trunk .....	244
7.393. Understandability .....	244
7.394. Unit Test .....	245
7.395. Unit of Measurement .....	245
7.396. Usability .....	245
7.397. Usability Compliance .....	246
7.398. User .....	246
7.399. User Documentation .....	247
7.400. User Manual .....	248
7.401. Validation .....	248
7.402. Value .....	249
7.403. Verification .....	250
7.404. Version .....	251
7.405. Work Breakdown Structure .....	251

7.406. Work Product .....	252
<b>8. Standards .....</b>	<b>253</b>
8.1. CMMi .....	253
8.2. DOD-STD-2167A .....	253
8.3. IEC 61508 .....	253
8.4. IEC 61508-3 .....	254
8.5. IEC 61508-7 .....	254
8.6. IEEE 1012 .....	254
8.7. IEEE 1058 .....	254
8.8. IEEE 1061 .....	255
8.9. IEEE 1074 .....	255
8.10. IEEE 1220 .....	255
8.11. IEEE 1233 .....	255
8.12. IEEE 1320 .....	256
8.13. IEEE 1362 .....	256
8.14. IEEE 1490 .....	256
8.15. IEEE 610.12 .....	256
8.16. IEEE 829 .....	257
8.17. IEEE 830 .....	257
8.18. IEEE 982 .....	257
8.19. ISO 5806 .....	257
8.20. ISO 8402 .....	258
8.21. ISO 9001 .....	258
8.22. ISO 9127 .....	258
8.23. ISO 9241 .....	258
8.24. ISO 9241-10 .....	260
8.25. ISO 9241-11 .....	260
8.26. ISO/IEC 12119 .....	261
8.27. ISO/IEC 12207 .....	262
8.28. ISO/IEC 14143 .....	262
8.29. ISO/IEC 14143-1 .....	262
8.30. ISO/IEC 14143-3 .....	263
8.31. ISO/IEC 14598 .....	263
8.32. ISO/IEC 14598-1 .....	264
8.33. ISO/IEC 14598-2 .....	264
8.34. ISO/IEC 14598-3 .....	265
8.35. ISO/IEC 14598-4 .....	265
8.36. ISO/IEC 14598-5 .....	266
8.37. ISO/IEC 14598-6 .....	266
8.38. ISO/IEC 14756 .....	267
8.39. ISO/IEC 14764 .....	267
8.40. ISO/IEC 15026 .....	267
8.41. ISO/IEC 15026-1 .....	268
8.42. ISO/IEC 15026-2 .....	268
8.43. ISO/IEC 15288 .....	268
8.44. ISO/IEC 15289 .....	269
8.45. ISO/IEC 15414 .....	269
8.46. ISO/IEC 15474 .....	269
8.47. ISO/IEC 15474-1 .....	270
8.48. ISO/IEC 15474-2 .....	270
8.49. ISO/IEC 15504 .....	270
8.50. ISO/IEC 15504-1 .....	271
8.51. ISO/IEC 15504-2 .....	272

8.52. ISO/IEC 15504-3 .....	272
8.53. ISO/IEC 15504-4 .....	273
8.54. ISO/IEC 15504-5 .....	273
8.55. ISO/IEC 15504-6 .....	274
8.56. ISO/IEC 15504-7 .....	275
8.57. ISO/IEC 15846 .....	275
8.58. ISO/IEC 15910 .....	276
8.59. ISO/IEC 15939 .....	276
8.60. ISO/IEC 19759 .....	276
8.61. ISO/IEC 19770 .....	277
8.62. ISO/IEC 19770-1 .....	277
8.63. ISO/IEC 19770-2 .....	278
8.64. ISO/IEC 20000 .....	278
8.65. ISO/IEC 2382 .....	278
8.66. ISO/IEC 2382-1 .....	280
8.67. ISO/IEC 25000 .....	280
8.68. ISO/IEC 25001 .....	281
8.69. ISO/IEC 25010 .....	281
8.70. ISO/IEC 25012 .....	282
8.71. ISO/IEC 25020 .....	282
8.72. ISO/IEC 25021 .....	282
8.73. ISO/IEC 25030 .....	283
8.74. ISO/IEC 25040 .....	283
8.75. ISO/IEC 25045 .....	284
8.76. ISO/IEC 25051 .....	284
8.77. ISO/IEC 25060 .....	284
8.78. ISO/IEC 25062 .....	285
8.79. ISO/IEC 26514 .....	285
8.80. ISO/IEC 29881 .....	285
8.81. ISO/IEC 90003 .....	286
8.82. ISO/IEC 9126 .....	286
8.83. ISO/IEC 9126-1 .....	286
8.84. ISO/IEC 9126-2 .....	287
8.85. ISO/IEC 9126-3 .....	287
8.86. ISO/IEC 9126-4 .....	288
8.87. ISO/IEC 9294 .....	288
8.88. ISO/IEC 99 .....	289
8.89. ISO/IEC SQuaRE .....	289
8.90. ISO/IEC/IEEE 15289 .....	290
8.91. ISO/IEC/IEEE 24765 .....	290
8.92. RTCA/EUROCAE .....	291
8.93. SIGIST .....	291
8.94. Team Software Process .....	291
Index .....	292

# 1. Introduction

## 1.1. Foreword

This document was released by Squoring Technologies.

It is part of the user documentation of the Squore software product edited and distributed by Squoring Technologies.

## 1.2. About This Document

The Reference Manual provides a complete reference for the metrics, glossary and standards used in Squore 16.3.0.

This manual is intended for Squore administrators and end-users. It gives useful information about the technical background of Squore and important knowledge basis to understand what is measured and how.

If you are already familiar with Squore, you can navigate this manual by looking for what has changed since the previous version. New functionality is tagged with **(new in 16.3)** throughout this manual. A summary of the new features described in this manual is available in the entry \* **What's New in Squore 16.3?** of this manual's Index.

For information on how to use and configure Squore, the full suite of manuals includes:

- Squore Installation Checklist
- Squore Installation and Administration Guide
- Squore Getting Started Guide
- Squore Command Line Interface
- Squore Configuration Guide
- Squore Eclipse Plugin Guide
- Squore Reference Manual


## 1.3. Contacting Squoring Technologies Product Support

If the information provided in this manual is erroneous or inaccurate, or if you encounter problems during your installation, contact Squoring Technologies Product Support: <http://support.squoring.com/>

You will need a valid Squore customer account to submit a support request. You can create an account on the support website if you do not have one already.

For any communication:

 [support@squoring.com](mailto:support@squoring.com)

 **Squoring Technologies Product Support**  
76, allées Jean Jaurès / 31000 Toulouse - FRANCE

## 1.4. Responsibilities

Approval of this version of the document and any further updates are the responsibility of Squoring Technologies.

## 1.5. Getting the Latest Version of this Manual

The version of this manual included in your Squore installation may have been updated. If you would like to check for updated user guides, consult the Squoring Technologies documentation site to consult or download the latest Squore manuals at <http://support.squoring.com/documentation/16.3.0>. Manuals are constantly updated and published as soon as they are available.

## 2. Coding Standards

The following sections describe the coding standards available for Rule Checking in Squore according to the related programming language or environment. C-Style applies to C, C++, C# and Java unless stated.

### 2.1. Ada Rule Set

#### 2.1.1. Backward goto

**Mnemonic:** BWGOTO

**Description:** Backward gotos shall not be used.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

#### 2.1.2. No Abort

**Mnemonic:** R\_NOABORT

**Description:** Use of 'abort'

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

#### 2.1.3. No final else

**Mnemonic:** ELSEFINAL

**Description:** All if ... else if constructs shall be terminated with an else clause.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

#### 2.1.4. Use of goto

**Mnemonic:** NOGOTO

**Description:** The 'goto' statement shall not be used.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

#### 2.1.5. Exit Label

**Mnemonic:** R\_EXTLABEL

**Description:** Each exit label shall be named.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0



### 2.1.6. Exit when

**Mnemonic:** R\_EXTWHEN

**Description:** Use 'exit when' instead of if... exit syntax.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

### 2.1.7. Loop name

**Mnemonic:** R\_LOOPNAMED

**Description:** Each loop shall be named.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

### 2.1.8. No Delay

**Mnemonic:** R\_NODELAY

**Description:** Use of 'delay'

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

### 2.1.9. 'when others' in exception handler

**Mnemonic:** R\_NOWHEN\_OTHERS

**Description:** There shall be no 'when others' in exception handler.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

### 2.1.10. Parameter order

**Mnemonic:** R\_PARAMORDER

**Description:** Parameters shall be ordered: 'IN', 'OUT', 'IN OUT'.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

### 2.1.11. Multiple exits

**Mnemonic:** RETURN

**Description:** A function shall have a single point of exit at the end.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

### 2.1.12. Multiple Exit in loop

**Mnemonic:** R\_SGLEXT

**Description:** There shall be a single exit by loop.

**Artefact Type:** PACK;TASK;FUNCTION

**Default Value:** 0

## 2.2. C-Style Rule Set

### 2.2.1. Use of continue

**Mnemonic:** NOCONT

**Description:** The 'continue' statement shall not be used (see [MISRA-C:2004]: RULE 14.5).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.2. Multiple break

**Mnemonic:** SGLBRK

**Description:** For any iteration statement there shall be at most one 'break' statement used for loop termination (see [MISRA-C:2004]: RULE 14.6).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.3. Multiple exits

**Mnemonic:** RETURN

**Description:** A function shall have a single point of exit at the end (see [MISRA-C:2004]: RULE 14.7).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.4. No Compound statement

**Mnemonic:** COMPOUND

**Description:** The statement forming the body of a switch, while, do ... while or for statement shall be a compound statement (see [MISRA-C:2004]: RULES 14.8 and 14.9).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.5. Label out a switch

**Mnemonic:** NOLABEL

**Description:** A switch label shall only be used when the most closely-enclosing compound statement is the body of a switch statement (see [MISRA-C:2004]: RULE 15.1).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.6. Missing Break

**Mnemonic:** BRKFINAL

**Description:** An unconditional break statement shall terminate every non-empty switch clause (see [MISRA-C:2004]: RULE 15.2).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.7. No final else

**Mnemonic:** ELSEFINAL

**Description:** All if ... else if constructs shall be terminated with an else clause (see [MISRA-C:2004]: RULE 14.10).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.8. Missing Default

**Mnemonic:** DEFAULT

**Description:** The final clause of a switch statement shall be the default clause (see [MISRA-C:2004]: RULE 15.3).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.9. No case in switch

**Mnemonic:** ONECASE

**Description:** Every switch statement shall have at least one case clause (see [MISRA-C:2004]: RULE 15.5).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.10. Fallthrough

**Mnemonic:** NOFALLTHROUGH

**Description:** There shall be no fallthrough the next case in a switch statement.

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.11. Assignment in Boolean

**Mnemonic:** NOASGCOND

**Description:** Assignment operators shall not be used in expressions that yield a boolean value

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.12. Assignment without Comparison

**Mnemonic:** NOASGINBOOL

**Description:** Assignment operators shall not be used in expressions that do not contain comparison operators.

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.13. Use of goto

**Mnemonic:** NOGOTO

**Description:** The 'goto' statement shall not be used (see [MISRA-C:2004]: RULE 14.4).

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.14. Backward goto

**Mnemonic:** BWGOTO

**Description:** Backward gotos shall not be used.

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.15. Code before first case

**Mnemonic:** NOCODEBEFORECASE

**Description:** There shall be a no code before the first case of a switch statement.

**Artefact Type:** FUNCTION

**Default Value:** 0

### 2.2.16. Risky Empty Statement

**Mnemonic:** RISKYEMPTY

**Description:** Risky Empty Statement

**Artefact Type:** FUNCTION

**Default Value:** 0

## 2.3. COBOL Rule Set

### 2.3.1. Column 7 for \* and D Only

**Mnemonic:** COLUMN7

**Description:** Only \* and D shall be used in column 7.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.2. Code in Uppercase

**Mnemonic:** UPPERCASE

**Description:** The program shall be written in uppercase except literals.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.3. Empty line after EXIT

**Mnemonic:** CPRS\_EXIT

**Description:** An empty line shall follow an EXIT statement.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.4. Empty lines around DIVISION

**Mnemonic:** CPRS\_DIVISION

**Description:** An empty line shall precede and follow a DIVISION.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.5. Empty line after SECTION

**Mnemonic:** CPRS\_SECTION

**Description:** An empty line shall follow a SECTION.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.6. COMPUTE instead of ADD

**Mnemonic:** NOCPXADD

**Description:** COMPUTE shall be used to add more than 3 data instead of ADD.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.7. COMPUTE instead of SUBSTRACT

**Mnemonic:** NOCPXSUBSTRACT

**Description:** COMPUTE shall be used to add more than 3 data instead of SUBSTRACT.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.8. No Conditional GOTO

**Mnemonic:** NOCONDGOTO

**Description:** Conditional GO TO shall not be used. Use EVALUATE instead.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.9. Perform with no THRU

**Mnemonic:** PERFORMWITHTHRU

**Description:** The call of a paragraph shall be made in the use of PERFORM paragraphName THRU paragraphNameExit.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.10. Missing END-IF

**Mnemonic:** IFWITHENDIF

**Description:** An IF statement shall be closed by an END-IF

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.11. Missing END-EVALUATE

**Mnemonic:** EVALWITHENDEVAL

**Description:** An EVALUATE statement shall be closed by END-EVALUATE

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.12. Variable declaration format

**Mnemonic:** DCLWS

**Description:** A variable shall be declared in the WORKING STORAGE using the format ^W

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.13. No Backward Goto

**Mnemonic:** BWGOTO

**Description:** Backward gotos shall not be used.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.14. Single GOBACK

**Mnemonic:** GOBACK

**Description:** Only a single GOBACK shall be used in a subprogram.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.15. No procedural COPY

**Mnemonic:** NOPROCCOPY

**Description:** Procedural COPY clauses shall not be used. Use subprograms instead.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.16. No RENAMES

**Mnemonic:** NORENAMES

**Description:** The RENAMES clause shall not be used.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.17. No Homonymous

**Mnemonic:** VARNAME

**Description:** There shall be no homonymous variables.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.18. No more than 3 nested IF

**Mnemonic:** NESTEDIF

**Description:** There shall be no more than 3 nested IF statements

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.19. No ALTER

**Mnemonic:** NOALTER

**Description:** The ALTER statement shall not be used. Labels are decided only at execution time.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.20. No MOVE CORRESPONDING

**Mnemonic:** NOCORRESPONDING

**Description:** MOVE CORRESPONDING shall not be used.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.21. Use COMP for OCCURS

**Mnemonic:** OCCURSCOMP

**Description:** For the OCCURS DEPENDING ON clause, the corresponding item shall be declared using COMP.



**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.22. Use SYNCHRONIZED

**Mnemonic:** USESYNCH

**Description:** SYNCHRONIZED shall be used for COMP, COMP-1, COMP-2, POINTER and INDEX variables.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.23. Open file once

**Mnemonic:** FILEOPENONCE

**Description:** A file shall be opened only once

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.24. Close file once

**Mnemonic:** FILECLOSEONCE

**Description:** A file shall be closed only once

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.25. No DEBUG MODE

**Mnemonic:** NODEBUG

**Description:** DEBUGGING-MODE shall not be used

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.26. No Variables S9(9)

**Mnemonic:** NOVARS9

**Description:** The variables shall not be declared in S9(9) COMP. It implies a conversion

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.27. BLOCK Clause

**Mnemonic:** BLOCKSIZE

**Description:** In the FILE-DESCRIPTION section, each file description shall always use the BLOCK CONTAINS 0 RECORDS clause. The system will assign the BLOCK-SIZE automatically when allocating the file.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.28. Use WHEN OTHER

**Mnemonic:** WHENOTHER

**Description:** EVALUATE shall end by a WHEN OTHER clause.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.29. No INITIALIZE

**Mnemonic:** NOINITIALIZE

**Description:** INITIALIZE shall not be used. Use MOVE to initialize variable.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.30. Close open file

**Mnemonic:** FILEOPENCLOSE

**Description:** A file shall be opened and closed in the same program

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.31. Use FILE STATUS

**Mnemonic:** FILESTATUS

**Description:** FILE STATUS shall be used to manage I/O errors.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.32. READ-WRITE Instruction

**Mnemonic:** READWRITE

**Description:** READ A INTO B or WRITE A FROM B forms shall be used for reading/writing a file.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.3.33. Standard Label

**Mnemonic:** LABELSTD

**Description:** In the FILE-DESCRIPTION section, each file description shall always use the LABEL RECORD STANDARD clause. Only the standard labels are checked by the system.

**Artefact Type:** PROGRAM

**Default Value:** 0

## 2.4. COBOL CICS Rule Set

### 2.4.1. No SORT under

**Mnemonic:** NOSORT

**Description:** The SORT clause shall not be used under CICS. Sorting resources are no more shared.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.2. No RELEASE under CICS

**Mnemonic:** NORELEASE

**Description:** The RELEASE clause shall not be used under CICS. Sorting resources are no more shared.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.3. No RETURN under CICS

**Mnemonic:** NORETURN

**Description:** The RETURN clause shall not be used under CICS. Sorting resources are no more shared.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.4. No MERGE under CICS

**Mnemonic:** NOMERGE

**Description:** The MERGE clause is not supported by CICS

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.5. No FILE CONTROL under CICS

**Mnemonic:** NOFILECONTROL

**Description:** FILE CONTROL is not supported by CICS

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.6. No FILE SECTION under CICS

**Mnemonic:** NOFILESECTION

**Description:** FILE SECTION is not supported by CICS

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.7. No USE under CICS

**Mnemonic:** NOUSE

**Description:** The USE clause shall only be used as USE FOR DEBUGGING. It is not supported by CICS

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.8. No ACCEPT under CICS

**Mnemonic:** NOACCEPT

**Description:** ACCEPT is not supported by CICS

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.9. No CLOSE under CICS

**Mnemonic:** NOCLOSE

**Description:** CLOSE is not supported by CICS

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.10. No DELETE under CICS

**Mnemonic:** NODELETE

**Description:** DELETE is not supported by CICS

**Artefact Type:** PROGRAM

**Default Value:** 0

#### 2.4.11. No DISPLAY CONSOLE under CICS

**Mnemonic:** NODISPCONSOLE

**Description:** DISPLAY UPON CONSOLE is not supported by CICS

**Artefact Type:** PROGRAM

**Default Value:** 0

#### 2.4.12. No DISPLAY SYSPUNCH under CICS

**Mnemonic:** NODISPSYSPUNCH

**Description:** DISPLAY UPON SYSPUNCH is not supported by CICS

**Artefact Type:** PROGRAM

**Default Value:** 0

#### 2.4.13. No OPEN under CICS

**Mnemonic:** NOOPEN

**Description:** OPEN is not supported by CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

#### 2.4.14. No READ under CICS

**Mnemonic:** NOREAD

**Description:** READ is not supported by CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

#### 2.4.15. No RERUN under CICS

**Mnemonic:** NORERUN

**Description:** RERUN is not supported by CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.16. No REWRITE under CICS

**Mnemonic:** NOREWRITE

**Description:** REWRITE is not supported by CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.17. No START under CICS

**Mnemonic:** NOSTART

**Description:** START is not supported by CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.18. No STOP under CICS

**Mnemonic:** NOSTOP

**Description:** STOP is not supported by CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.19. No WRITE under CICS

**Mnemonic:** NOWRITE

**Description:** WRITE is not supported by CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.20. Use CALL

**Mnemonic:** USECALL

**Description:** Under CICS, program calls shall be done using the CALL clause. The EXEC CICS LINK shall not be used.

**Artefact Type:** PROGRAM

**Default Value:** 0

### 2.4.21. Single ENTRY

**Mnemonic:** SGLENTRY

**Description:** Multiple Entry points are not allowed under CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

#### 2.4.22. No INPUT-OUTPUT under CICS

**Mnemonic:** NOINPUTOUTPUT

**Description:** The section INPUT-OUTPUT shall not be used under CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

#### 2.4.23. No I-O CONTROL under CICS

**Mnemonic:** NOIOCONTROL

**Description:** The paragraph I-O-CONTROL shall not be used under CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

#### 2.4.24. No FD under CICS

**Mnemonic:** NOFD

**Description:** The FD entry shall not be used under CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

#### 2.4.25. No SD under CICS

**Mnemonic:** NOSD

**Description:** The SD entry shall not be used under CICS.

**Artefact Type:** PROGRAM

**Default Value:** 0

## 3. Source Code Metrics

The following sections describe the base measures available for source code metrics in Squore according to the related programming language or environment.

### 3.1. ada Metrics

#### 3.1.1. Number of Parameters

**Mnemonic:** NOP

**Description:** Number of formal parameters in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

#### 3.1.2. Cyclomatic Complexity

**Mnemonic:** CCN

**Description:** Number of linearly independent paths in the function control graph.

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 1

#### 3.1.3. Maximum Nested Structures

**Mnemonic:** NEST

**Description:** Maximum number of nested structures

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

#### 3.1.4. Non-Cyclic Paths

**Mnemonic:** PATH

**Description:** Number of non-cyclic paths in the function.

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 1

#### 3.1.5. Return Statements

**Mnemonic:** RETURN

**Description:** Number of 'return' statements in the function

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 1



### 3.1.6. IF Statements

**Mnemonic:** IF

**Description:** Number of IF statements

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.7. ELSE Clauses

**Mnemonic:** ELSE

**Description:** Number of ELSE clauses in IF statements

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.8. For Statements

**Mnemonic:** FOR

**Description:** Number of 'for' statements in the function

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.9. While Statements

**Mnemonic:** WHIL

**Description:** Number of 'while' statements in the function

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.10. Loop Statements

**Mnemonic:** LOOP

**Description:** Number of loop statements in the function

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.11. Case statements

**Mnemonic:** SWIT

**Description:** Number of Case statements

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.12. Orelse operators

**Mnemonic:** OREL

**Description:** Number of 'orelse' operators

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.13. Andthen Operators

**Mnemonic:** ANTH

**Description:** Number of 'andthen' operators

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.14. OR operators

**Mnemonic:** NBOR

**Description:** Number of OR operators

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.15. AND operators

**Mnemonic:** NBAND

**Description:** Number of AND operators

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.16. Case Blocks

**Mnemonic:** CABL

**Description:** Number of 'case' blocks in 'switch' in the function

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.17. Exit statements

**Mnemonic:** EXIT

**Description:** Number of Exit statements

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.18. GOTO Statements

**Mnemonic:** GOTO

**Description:** Number of GOTO statements

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.19. Exception handlers

**Mnemonic:** EXGR

**Description:** Number of Exception handlers

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.20. Exception When blocks

**Mnemonic:** EXBL

**Description:** Number of 'when' blocks in 'exception handler'.

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.21. Raise statements

**Mnemonic:** RAISE

**Description:** Number of Raise statements

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.22. Label Statements

**Mnemonic:** LABEL

**Description:** Number of Label statements

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.23. Declare operators

**Mnemonic:** DECBL

**Description:** Number of Declare operators

**Artefact Type:** PACK;FUNCTION;TASK

**Default Value:** 0

### 3.1.24. Types

**Mnemonic:** NBTYP

**Description:** Number of Types

**Artefact Type:** SPACK;PACK;TASK;FUNCTION

**Default Value:** 0

### 3.1.25. Subtypes

**Mnemonic:** NBSTYP

**Description:** Number of Subtypes

**Artefact Type:** SPACK;PACK;TASK;FUNCTION

**Default Value:** 0

### 3.1.26. Derived types

**Mnemonic:** NBTYPDRV

**Description:** Number of Derived types

**Artefact Type:** SPACK;PACK;TASK;FUNCTION

**Default Value:** 0

### 3.1.27. Variables

**Mnemonic:** NBVAR

**Description:** Number of Variables

**Artefact Type:** SPACK;PACK;TASK;FUNCTION

**Default Value:** 0

### 3.1.28. Constants

**Mnemonic:** NBCONST

**Description:** Number of Constants

**Artefact Type:** SPACK;PACK;TASK;FUNCTION

**Default Value:** 0

### 3.1.29. Renamed objects

**Mnemonic:** NBRENA

**Description:** Number of Renamed object

**Artefact Type:** SPACK;PACK;TASK;FUNCTION

**Default Value:** 0

### 3.1.30. Exceptions

**Mnemonic:** NBEXCEPT

**Description:** Number of Declared Exceptions

**Artefact Type:** SPACK;PACK;TASK;FUNCTION

**Default Value:** 0

### 3.1.31. Declared functions

**Mnemonic:** NBDFUNC

**Description:** Number of Declared functions/procedures

**Artefact Type:** SPACK;PACK;SPROTOBJ

**Default Value:** 0

### 3.1.32. Separate functions/procedures

**Mnemonic:** NBFUNCSEP

**Description:** Number of Separate functions/procedures

**Artefact Type:** PACK

**Default Value:** 0

### 3.1.33. Separate packages

**Mnemonic:** NBPACKSEP

**Description:** Number of package declared Separate

**Artefact Type:** PACK

**Default Value:** 0

### 3.1.34. Separate tasks

**Mnemonic:** NBTASKDSEP

**Description:** Number of task declared Separate

**Artefact Type:** PACK

**Default Value:** 0

### 3.1.35. Protected objects

**Mnemonic:** NBPROTOBJDSEP

**Description:** Number of Declred Protected objects

**Artefact Type:** PACK

**Default Value:** 0

### 3.1.36. With statements

**Mnemonic:** NBWITH

**Description:** Number of With statements

**Artefact Type:** FILE

**Default Value:** 0

### 3.1.37. Public variables

**Mnemonic:** NBVARPUB

**Description:** Number of Public variables

**Artefact Type:** SPACK

**Default Value:** 0

### 3.1.38. Public types

**Mnemonic:** NBTYPPUB

**Description:** Number of Public types

**Artefact Type:** SPACK

**Default Value:** 0

### 3.1.39. Public constants

**Mnemonic:** NBCONSTPUB

**Description:** Number of Public constants

**Artefact Type:** SPACK

**Default Value:** 0

### 3.1.40. Public exceptions

**Mnemonic:** NBEXCEPTUB

**Description:** Number of Public exceptions

**Artefact Type:** SPACK

**Default Value:** 0

### 3.1.41. Public functions

**Mnemonic:** NBDFUNCPUB

**Description:** Number of Public functions/procedures

**Artefact Type:** SPACK

**Default Value:** 0

### 3.1.42. Private variables

**Mnemonic:** NBVARPRIV

**Description:** Number of Private variables

**Artefact Type:** SPACK;SPROTOBJ

**Default Value:** 0

### 3.1.43. Private types

**Mnemonic:** NBTYPPRIV

**Description:** Number of Private types

**Artefact Type:** SPACK

**Default Value:** 0

### 3.1.44. Private constant

**Mnemonic:** NBCONSTPRIV

**Description:** Number of Private constants

**Artefact Type:** SPACK

**Default Value:** 0

### 3.1.45. Private exceptions

**Mnemonic:** NBEXCEPTPRIV

**Description:** Number of Private exceptions

**Artefact Type:** SPACK

**Default Value:** 0

### 3.1.46. Private functions/Procedures

**Mnemonic:** NBDFUNCPRIV

**Description:** Number of Private function/Procedure

**Artefact Type:** SPACK

**Default Value:** 0

### 3.1.47. Entry Statements

**Mnemonic:** ENTRY

**Description:** Number of Entry statements

**Artefact Type:** STASK;SPROTOBJ

**Default Value:** 0

### 3.1.48. Generic object

**Mnemonic:** ISGEN

**Description:** The object is declared generic

**Artefact Type:** SPACK

**Default Value:** 0

## 3.2. C-Style Metrics

### 3.2.1. Number of Functions

**Mnemonic:** FUNC

**Description:** Total number of functions defined in the source file

**Artefact Type:** FILE;HEADER

**Default Value:** 0



### 3.2.2. Assignment Operators

**Mnemonic:** ASOP

**Description:** Number of assignment operators used in the source file

**Artefact Type:** FILE;HEADER;FUNCTION;CLASS

**Default Value:** 0

### 3.2.3. Comparison Operators

**Mnemonic:** CPOP

**Description:** Number of comparison operators used in the source file

**Artefact Type:** FILE;HEADER;FUNCTION;CLASS

**Default Value:** 0

### 3.2.4. Standard Operators

**Mnemonic:** STOP

**Description:** Number of standard operators used in the source file

**Artefact Type:** FILE;HEADER;FUNCTION;CLASS

**Default Value:** 0

### 3.2.5. Special Operators

**Mnemonic:** SPOP

**Description:** Number of special operators used in the source file

**Artefact Type:** FILE;HEADER;FUNCTION;CLASS

**Default Value:** 0

### 3.2.6. Cyclomatic Complexity

**Mnemonic:** CCN

**Description:** Number of linearly independent paths in the function control graph.

**Artefact Type:** FUNCTION

**Default Value:** 1

### 3.2.7. Non-Cyclic Paths

**Mnemonic:** PATH

**Description:** Number of non-cyclic paths in the function.

**Artefact Type:** FUNCTION

**Default Value:** 1

### 3.2.8. Return Statements

**Mnemonic:** RETURN

**Description:** Number of 'return' statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 1

### 3.2.9. Number of Parameters

**Mnemonic:** NOP

**Description:** Number of formal parameters in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.10. For Statements

**Mnemonic:** FOR

**Description:** Number of 'for' statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.11. While Statements

**Mnemonic:** WHIL

**Description:** Number of 'while' statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.12. Do While Statements

**Mnemonic:** DOWH

**Description:** Number of 'do...while' statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.13. Switch Statements

**Mnemonic:** SWIT

**Description:** Number of 'switch' statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.14. Continue Statements

**Mnemonic:** CONT

**Description:** Number of 'continue' statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.15. Loop Statements

**Mnemonic:** LOOP

**Description:** Number of loop statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.16. Orelse operators

**Mnemonic:** OREL

**Description:** Number of 'orelse' operators

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.17. Andthen Operators

**Mnemonic:** ANTH

**Description:** Number of 'andthen' operators

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.18. Ternary operators

**Mnemonic:** TERN

**Description:** Number of ternary operators i.e. ?:

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.19. Break in Switch

**Mnemonic:** BRKS

**Description:** Number of 'break' statements in 'switch' in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.20. Break in Loop

**Mnemonic:** BRKL

**Description:** Number of 'break' statements in loop in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.21. Case Labels

**Mnemonic:** CASE

**Description:** Number of 'case' labels in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.22. Case Blocks

**Mnemonic:** CABL

**Description:** Number of 'case' blocks in 'switch' in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.2.23. Call to exit

**Mnemonic:** EXIT

**Description:** Number of calls to the exit function

**Artefact Type:** FUNCTION

**Default Value:** 0

## 3.3. 00 Metrics

### 3.3.1. Number of Classes

**Mnemonic:** CLAS

**Description:** Total number of classes defined in the project source files

**Artefact Type:** APPLICATION

**Default Value:** 0

### 3.3.2. Depth of Inheritance Tree

**Mnemonic:** DITM

**Description:** Maximum depth of the class inheritance tree

**Artefact Type:** APPLICATION

**Default Value:** 1

### 3.3.3. Depth of Inheritance Tree

**Mnemonic:** DIT

**Description:** Maximun depth of the class inheritance tree

**Artefact Type:** CLASS

**Default Value:** 1

### 3.3.4. Multiple Inheritance Indicator

**Mnemonic:** MII

**Description:** Number of classes from which the class inherits directly

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.5. Number of Ancestors

**Mnemonic:** NAC

**Description:** Number of classes from which the class inherits directly or indirectly

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.6. Depth of Descendant Tree

**Mnemonic:** DDT

**Description:** Maximun depth of the inheritance tree from the class

**Artefact Type:** CLASS

**Default Value:** 1

### 3.3.7. Number Of Children

**Mnemonic:** NOC

**Description:** Number of classes which inherit directly from the class

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.8. Number of Descendants

**Mnemonic:** NDC

**Description:** Number of classes which inherit from the class directly or indirectly

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.9. Number of Methods

**Mnemonic:** NOM

**Description:** Number of methods defined in the class

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.10. Number of Method Implemented

**Mnemonic:** METI

**Description:** Number of methods implemented within the class definition

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.11. Weighted Method per Class

**Mnemonic:** XWMC

**Description:** Sum of cyclomatic complexities of methods implemented outside the class definition

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.12. Public Methods

**Mnemonic:** MPBL

**Description:** Number of public methods

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.13. Private Methods

**Mnemonic:** MPRV

**Description:** Number of private methods

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.14. Protected Internal Methods

**Mnemonic:** MPIN

**Description:** Number of protected internal methods(only applicable to C#)

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.15. Protected Methods

**Mnemonic:** MPRT

**Description:** Number of protected methods

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.16. Internal Methods

**Mnemonic:** MINT

**Description:** Number of internal methods (only applicable to C#)

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.17. Methods without Accessibility

**Mnemonic:** MNON

**Description:** Number of methods without any accessibility specifier

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.18. Static Methods

**Mnemonic:** MSTA

**Description:** Number of static methods

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.19. Number of Attributes

**Mnemonic:** ANBR

**Description:** Number of attributes

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.20. Public Data

**Mnemonic:** APBL

**Description:** Number of public data

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.21. Private data

**Mnemonic:** APRV

**Description:** Number of private data

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.22. Protected Internal Data

**Mnemonic:** APIN

**Description:** Number of protected internal data (only applicable to C#)

**Artefact Type:** CLASS

**Default Value:** 0



### 3.3.23. Protected Data

**Mnemonic:** APRT

**Description:** Number of protected data

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.24. Internal Data

**Mnemonic:** AINT

**Description:** Number of internal data (only applicable to C#)

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.25. Number of data without accessibility

**Mnemonic:** ANON

**Description:** Number of data without accessibility

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.26. Static Data

**Mnemonic:** ASTA

**Description:** Number of static data

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.27. Constant Data

**Mnemonic:** ACST

**Description:** Number of constant data

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.28. Properties

**Mnemonic:** PNBR

**Description:** Total number of properties

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.29. Public Properties

**Mnemonic:** PPBL

**Description:** Number of public properties

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.30. Private Properties

**Mnemonic:** PPRV

**Description:** Number of private properties

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.31. Protected Internal Properties

**Mnemonic:** PPIN

**Description:** Number of protected internal properties (only applicable to C#)

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.32. Protected Properties

**Mnemonic:** PPRT

**Description:** Number of protected properties

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.33. Internal Properties

**Mnemonic:** PINT

**Description:** Number of internal properties (only applicable to C#)

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.34. Properties without Accessibility

**Mnemonic:** PNON

**Description:** Number of properties without accessibility specifier

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.35. Static Properties

**Mnemonic:** PSTA

**Description:** Number of static properties in the class

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.36. Constant Properties

**Mnemonic:** PCST

**Description:** Number of constant properties

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.37. Properties with Get

**Mnemonic:** PGET

**Description:** Number of properties with a setter (only applicable to C#)

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.38. Properties with Set

**Mnemonic:** PSET

**Description:** Number of properties with a getter (only applicable to C#)

**Artefact Type:** CLASS

**Default Value:** 0

### 3.3.39. Throw Statements

**Mnemonic:** THRO

**Description:** Number of 'throw' statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.3.40. Catch Statements

**Mnemonic:** CATC

**Description:** Number of 'catch' statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

### 3.3.41. Try Statements

**Mnemonic:** TRY

**Description:** Number of 'try' statements in the function

**Artefact Type:** FUNCTION

**Default Value:** 0

## 3.4. COBOL Metrics

### 3.4.1. Number of Files

**Mnemonic:** FILE

**Description:** Total number of source code files.

**Artefact Type:** APPLICATION

**Default Value:** 1

### 3.4.2. Number of Sections

**Mnemonic:** SECT

**Description:** Number of sections.

**Artefact Type:** APPLICATION;FILE;PROGRAM;PROCEDUREDIVISION

**Default Value:** 0

### 3.4.3. Number of paragraphs

**Mnemonic:** PARA

**Description:** Number of paragraphs.

**Artefact Type:** APPLICATION;FILE;PROGRAM;PROCEDUREDIVISION;SECTION

**Default Value:** 0

### 3.4.4. Line Count

**Mnemonic:** LC

**Description:** Number of lines.

**Artefact Type:** APPLICATION;FILE;PROGRAM;DATADIVISION;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 1

### 3.4.5. Comment Lines

**Mnemonic:** CLOC

**Description:** Number of lines of comments.

**Artefact Type:** APPLICATION;FILE;PROGRAM;DATADIVISION;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.6. Blank Lines

**Mnemonic:** BLAN

**Description:** Number of blank lines of code.

**Artefact Type:** APPLICATION;FILE;PROGRAM;DATADIVISION;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.7. Source Lines Of Code

**Mnemonic:** SLOC

**Description:** Number of lines of source code.

**Artefact Type:** APPLICATION;FILE;PROGRAM;DATADIVISION;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 1

### 3.4.8. Operator Occurrences

**Mnemonic:** TOPT

**Description:** Number of occurrences of operators.

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 1

### 3.4.9. Operand Occurrences

**Mnemonic:** TOPD

**Description:** Number of occurrences of operands.

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 1

### 3.4.10. Distinct Operators

**Mnemonic:** DOPT

**Description:** Number of distinct operators.

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 1

### 3.4.11. Distinct Operands

**Mnemonic:** DOPD

**Description:** Number of distinct operands.

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 1

### 3.4.12. Maximum Nested Structures

**Mnemonic:** NEST

**Description:** Maximum number of nested structures

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.13. Executable Statements

**Mnemonic:** STAT

**Description:** Total number of executable statements.

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.14. EXIT Statements

**Mnemonic:** EXIT

**Description:** Number of EXIT statements

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.15. STOP Statements

**Mnemonic:** STOP

**Description:** Number of STOP statements

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 1

### 3.4.16. GOTO Statements

**Mnemonic:** GOTO

**Description:** Number of GOTO statements

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.17. IF Statements

**Mnemonic:** IF

**Description:** Number of IF statements

**Artefact Type:** APPLICATION;FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.18. EVALUATE Statements

**Mnemonic:** EVAL

**Description:** Number of EVALUATE statements

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.19. PERFORM Statements

**Mnemonic:** PERF

**Description:** Number of PERFORM statements

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.20. VARYING Clauses

**Mnemonic:** VARY

**Description:** Number of VARYING clauses in PERFORM statements

**Artefact Type:** APPLICATION;FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.21. TIMES Clauses

**Mnemonic:** TIME

**Description:** Number of TIMES clauses in PERFORM statements

**Artefact Type:** APPLICATION;FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.22. UNTIL Clauses

**Mnemonic:** UNTL

**Description:** Number of UNTIL clauses in PERFORM statements

**Artefact Type:** APPLICATION;FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.23. ELSE Clauses

**Mnemonic:** ELSE

**Description:** Number of ELSE clauses in IF statements

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.24. WHEN Clauses

**Mnemonic:** WHEN

**Description:** Number of WHEN and WHENOTHER clauses in EVALUATE Statements

**Artefact Type:** APPLICATION;FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.25. CALL Statements

**Mnemonic:** CALL

**Description:** Number of CALL statements

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0



### 3.4.26. Conditions

**Mnemonic:** COND

**Description:** Number of conditions

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.27. Data Declarations

**Mnemonic:** DATADEC

**Description:** Number of data declarations

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.28. File Declarations

**Mnemonic:** FD

**Description:** Number of file declarations

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.29. Data Used

**Mnemonic:** DATA

**Description:** Number of references to data

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.30. Files Used

**Mnemonic:** FDUS

**Description:** Number of references to files

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

### 3.4.31. Arithmetic Operators

**Mnemonic:** AROP

**Description:** Number of arithmetic operators

**Artefact Type:** FILE;PROGRAM;PROCEDUREDIVISION;SECTION;PARAGRAPH

**Default Value:** 0

## 3.5. XML Metrics

### 3.5.1. Number of Files

**Mnemonic:** FILE

**Description:** Total number of source code files.

**Artefact Type:** APPLICATION

**Default Value:** 1

### 3.5.2. Line Count

**Mnemonic:** LC

**Description:** Number of lines.

**Artefact Type:** APPLICATION;FILE

**Default Value:** 1

### 3.5.3. Comment Lines

**Mnemonic:** CLOC

**Description:** Number of lines of comments.

**Artefact Type:** APPLICATION;FILE

**Default Value:** 0

### 3.5.4. Blank Lines

**Mnemonic:** BLAN

**Description:** Number of blank lines of code.

**Artefact Type:** APPLICATION;FILE

**Default Value:** 0

### 3.5.5. Source Lines Of Code

**Mnemonic:** SLOC

**Description:** Number of lines of source code.

**Artefact Type:** APPLICATION;FILE

**Default Value:** 1

### 3.5.6. Operator Occurrences

**Mnemonic:** TOPT

**Description:** Number of occurrences of operators.

**Artefact Type:** FILE

**Default Value:** 1

### 3.5.7. Operand Occurrences

**Mnemonic:** TOPD

**Description:** Number of occurrences of operands.

**Artefact Type:** FILE

**Default Value:** 1

### 3.5.8. Distinct Operators

**Mnemonic:** DOPT

**Description:** Number of distinct operators.

**Artefact Type:** FILE

**Default Value:** 1

### 3.5.9. Distinct Operands

**Mnemonic:** DOPD

**Description:** Number of distinct operands.

**Artefact Type:** FILE

**Default Value:** 1

### 3.5.10. Maximum Nested Structures

**Mnemonic:** NEST

**Description:** Maximum number of nested structures

**Artefact Type:** FILE

**Default Value:** 0

### 3.5.11. Number of XML elements

**Mnemonic:** ELT

**Description:** Number of XML elements.

**Artefact Type:** APPLICATION;FILE

**Default Value:** 0

### 3.5.12. Number of attributes

**Mnemonic:** ATTR

**Description:** Number of attributes.

**Artefact Type:** APPLICATION;FILE

**Default Value:** 0

### 3.5.13. Number of comment blocks

**Mnemonic:** BCOM

**Description:** Number of comment blocks.

**Artefact Type:** APPLICATION;FILE

**Default Value:** 0

### 3.5.14. Number of text blocks

**Mnemonic:** TEXT

**Description:** Number of text blocks.

**Artefact Type:** APPLICATION;FILE

**Default Value:** 0

## 4. Repository Connectors

### 4.1. Folder Path

#### 4.1.1. Description

The simplest method to analyse source code in Squore is to provide a path to a folder containing your code.

##### Note

Remember that the path supplied for the analysis is a path local to the machine running the analysis, which may be different from your local machine. If you analyse source code on your local machine and then send results to the server, you will not be able to view the source code directly in Squore, since it will not have access to the source code on the other machine. A common workaround to this problem is to use UNC paths (`\\Server\Share`, `smb://server/share...`) or a mapped server drive in Windows.

#### 4.1.2. Usage

Folder Path has the following options:

- **Datapath (path, mandatory)** Specify the absolute path to the files you want to include in the analysis. The path specified must be accessible from the server.

The full command line syntax for Folder Path is:

```
-r "type=FROMPATH,path=[text]"
```

## 4.2. Zip Upload

#### 4.2.1. Description

This Repository Connector allows you to upload a zip file containing your sources to analyse. Select a file to upload in the project wizard and it will be extracted and analysed on the server.

##### Note

The contents of the zip file are extracted into Squore Server's temp folder. If you want to upload files to persist, contact your Squore administrator so that the uploaded zip files and extracted sources are moved to a location that is not deleted at each server restart.

#### 4.2.2. Usage

This Repository Connector is only available from the web UI, not from the command line interface.

## 4.3. CVS

#### 4.3.1. Description

The Concurrent Versions System (CVS), is a client-server free software revision control system in the field of software development.

For more details, refer to <http://savannah.nongnu.org/projects/cvs>.

**Note**

The following is a list of commands used by the CVS Repository Connector to retrieve sources:

```
→ cvs -d $repository export [-r $branch] $project
→ cvs -d $repository co -r $artefactPath -d $tmpFolder
```

### 4.3.2. Usage

CVS has the following options:

- **Repository (repository, mandatory)** Specify the location of the CVS Repository.
- **Project (project, mandatory)** Specify the name of the project to get files from.
- **Tag or Branch (branch)** Specify the tag or branch to get the files from.

The full command line syntax for CVS is:

```
-r "type=CVS,repository=[text],project=[text],branch=[text]"
```

## 4.4. ClearCase

### 4.4.1. Description

IBM Rational ClearCase is a software configuration management solution that provides version control, workspace management, parallel development support, and build auditing. The command executed on the server to check out source code is: \$cleartool \$view\_root\_path \$view \$vob\_root\_path.

For more details, refer to <http://www-03.ibm.com/software/products/en/clearcase>.

**Note**

The ClearCase tool is configured for Linux by default. It is possible to make it work for Windows by editing the configuration file

### 4.4.2. Usage

ClearCase has the following options:

- **View root path (view\_root\_path, mandatory, default: /view)** Specify the absolute path of the ClearCase view.
- **Vob Root Path (vob\_root\_path, mandatory, default: /projets)** Specify the absolute path of the ClearCase vob.
- **View (view)** Specify the label of the view to analyse sources from. If no view is specified, the current ClearCase view will be used automatically, as retrieved by the command `cleartool pwv -s`.
- **Server Display View (server\_display\_view)** When viewing source code from the Explorer after building the project, this parameter is used instead of the view parameter specified earlier. Leave this field empty to use the same value as for view.
- **Sources Path (sub\_path)** Specify a path in the view to restrict the scope of the source code to analyse. The value of this field must not contain the vob nor the view. Leave this field empty to analyse the code in the entire view. This parameter is only necessary if you want to restrict to a directory lower than root.

The full command line syntax for ClearCase is:

```
-r "type=ClearCase,view_root_path=[text],vob_root_path=[text],view=[text],server_display_view=[text]"
```

## 4.5. Perforce

### 4.5.1. Description

The Perforce server manages a central database and a master repository of file versions. Perforce supports both Git clients and clients that use Perforce's own protocol.

For more details, refer to <http://www.perforce.com/>.

#### Note

The Perforce repository connector assumes that the specified depot exists on the specified Perforce server, that Squore can access this depot and that the Perforce user defined has the right to access it. The host where the analysis takes place must have a Perforce command-line client (p4) installed and fully functional. The P4PORT environment variable is not read by Squore. You have to set it in the form. The path to the p4 command can be configured in the `perforce_conf.tcl` file located in the `configuration/repositoryConnectors/Perforce` folder. The following is a list of commands used by the Perforce Repository Connector to retrieve sources:

```
→ p4 -p $p4port [-u username] [-P password] client -i <$tmpFolder/  
p4conf.txt  
→ p4 -p $p4port [-u username] [-P password] -c $clientName sync  
"$depot/...@$label"  
→ p4 -p $p4port [-u username] [-P password] client -d $clientName  
→ p4 -p $p4port [-u username] [-P password] print -q -o $outputFile  
$artefactPath
```

The format of the `p4conf.txt` file is:

```
Client: $clientName  
Root: $tmpFolder  
Options: noallwrite noclobber nocompress unlocked nomodtime normdir  
SubmitOptions: submitunchanged  
view:  
$depot/... //$clientName/...
```

### 4.5.2. Usage

Perforce has the following options:

- **P4PORT (p4port, mandatory)** Specify the value of P4PORT using the format [protocol:]host:port (the protocol is optional). This parameter is necessary even if you have specified an environment variable on the machine where the analysis is running.
- **Depot (depot, mandatory)** Specify the name of the depot (and optionally subfolders) containing the sources to be analysed.
- **Revision (label)** Specify a label, changelist or date to retrieve the corresponding revision of the sources. Leave this field empty to analyse the most recent revision for the sources.
- **Authentication (useAccountCredentials, default: NO\_CREDENTIALS)**
- **Username (username)**
- **Password (password)**

The full command line syntax for Perforce is:

```
-r  
"type=Perforce,p4port=[text],depot=[text],label=[text],useAccountCredentials=[multipleChoice]
```

## 4.6. Git

### 4.6.1. Description

Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

For more details, refer to <http://git-scm.com/>.

#### Note

The following is a list of commands used by the Git Repository Connector to retrieve sources:

```
→ git clone [$username:$password@$url] $tmpFolder  
→ git checkout $commit  
→ git log -1 "--format=%H"  
→ git config --get remote.origin.url  
→ git clone [$username:$password@$url] $tmpFolder  
→ git checkout $commit  
→ git fetch  
→ git --git-dir=$gitRoot show $artefactPath
```

### 4.6.2. Usage

Git has the following options:

- **URL (url, mandatory)** URL of the git repository to get files from. The local, HTTP(s), SSH and Git protocols are supported.
- **Branch or commit (commit)** This field allows specifying the SHA1 of a commit or a branch name. If a SHA1 is specified, it will be retrieved from the default branch. If a branch label is specified, then its latest commit is analysed. Leave this field empty to analyse the latest commit of the default branch.
- **Sub-directory (subDir)** Specify a subfolder name if you want to restrict the analysis to a subpath of the repository root.
- **Authentication (useAccountCredentials, default: NO\_CREDENTIALS)**
- **Username (username)**
- **Password (password)**

The full command line syntax for Git is:

```
-r  
"type=Git,url=[text],commit=[text],subDir=[text],useAccountCredentials=[multipleChoice],username=[text],password=[text]
```

## 4.7. PTC Integrity

### 4.7.1. Description

This Repository Connector allows analysing sources hosted in PTC Integrity, a software system lifecycle management and application lifecycle management platform developed by PTC.



For more details, refer to <http://www.ptc.com/products/integrity/>.

### Note

You can modify some of the settings of this repository connector if the `si.exe` and `mksAPIViewer.exe` binaries are not in your path. For versions that do not support the `--xmlapi` option, you can also turn off this method of retrieving file information. These settings are available by editing `mks_conf.tcl` in the repository connector's configuration folder.

## 4.7.2. Usage

PTC Integrity has the following options:

- **Server Hostname (hostname, mandatory)** Specify the name of the Integrity server. This value is passed to the command line using the parameter `--hostname`.
- **Port (port)** Specify the port used to connect to the Integrity server. This value is passed to the command line using the parameter `--port`.
- **Project (project)** Specify the name of the project containing the sources to be analysed. This value is passed to the command line using the `--project` parameter.
- **Revision (revision)** Specify the revision number for the sources to be analysed. This value is passed to the command line using the `--projectRevision` parameter.
- **Scope (scope, default: name:\*.c,name:\*.h)** Specifies the scope (filter) for the Integrity sandbox extraction. This value is passed to the command line using the `--scope` parameter.
- **Authentication (useAccountCredentials, default: NO\_CREDENTIALS)**
- **Username (username)**
- **Password (password)**

The full command line syntax for PTC Integrity is:

```
-r  
"type=MKS,hostname=[text],port=[text],project=[text],revision=[text],scope=[text],useAccountC
```

## 4.8. TFS

### 4.8.1. Description

Team Foundation Server (TFS) is a Microsoft product which provides source code management, reporting, requirements management, project management, automated builds, lab management, testing and release management capabilities. This Repository Connector provides access to the sources hosted in TFS's revision control system.

For more details, refer to <https://www.visualstudio.com/products/tfs-overview-vs>.

### Note

The TFS repository connector (Team Foundation Server - Team Foundation Version Control) assumes that a TFS command-line client (Visual Studio Client or Team Explorer Everywhere) is installed on the Squore server and fully functional. The configuration of this client must be set up in the `tfs_conf.tcl` file. The repository connector form must be filled according to the TFS standard (eg. the Project Path must begin with the '\$' character...). Note that this repository connector works with a temporary workspace that is deleted at the end of the analysis. The following is a list of commands used by the TFS Repository Connector to retrieve sources:

```
→ tf workspace [/login:$username,$password] /server:$url /noprompt /new $workspace
→ tf workfold [/login:$username,$password] /map $path $tempFolder /workspace:$workspace
→ tf get [/login:$username,$password] /version:$version /recursive /force $path
→ tf workspace [/login:$username,$password] /delete $workspace
→ tf view [/login:$username,$password] /server:$artefactPath
```

## 4.8.2. Usage

TFS has the following options:

- **URL (URL, mandatory)** Specify the URL of the TFS server.
- **Path (path, mandatory)** Path the project to be analysed. This path usually starts with \$.
- **Version (version)** Specify the version of the sources to analyse. This field accepts a changeset number, date, or label. Leave the field empty to analyse the most recent revision of the sources.
- **Authentication (useAccountCredentials, default: NO\_CREDENTIALS)**
- **Username: (username)**
- **Password (password)**

The full command line syntax for TFS is:

```
-r "type=TFS,URL=[text],path=[text],version=[text],useAccountCredentials=[multipleChoice],username=[text],password=[text]"
```

## 4.9. Synergy

### 4.9.1. Description

Rational Synergy is a software tool that provides software configuration management (SCM) capabilities for all artifacts related to software development including source code, documents and images as well as the final built software executable and libraries.

For more details, refer to <http://www-03.ibm.com/software/products/en/ratisyne>.

#### Note

The Synergy repository connector assumes that a project already exists and that the Synergy user defined has the right to access it. The host where the analysis takes place must have Synergy installed and fully functional. Note that, as stated in IBM's documentation on [http://pic.dhe.ibm.com/infocenter/synhelp/v7m2r0/index.jsp?topic=%2Fcom.ibm.rational.synergy.manage.doc%2Ftopics%2Fsc\\_t\\_h\\_start\\_cli\\_session.html](http://pic.dhe.ibm.com/infocenter/synhelp/v7m2r0/index.jsp?topic=%2Fcom.ibm.rational.synergy.manage.doc%2Ftopics%2Fsc_t_h_start_cli_session.html), using credentials is only supported on Windows, so use the NO\_CREDENTIALS option when Synergy runs on a Linux host. The following is a list of commands used by the Synergy Repository Connector to retrieve sources:

```
→ ccm start -d $db -nogui -m -q [-s $server] [-pw $password] [-n $user -pw password]
→ ccm prop "$path@$projectSpec"
→ ccm copy_to_file_system -path $tempFolder -recurse $projectSpec
→ ccm cat "$artefactPath@$projectSpec"
```

```
→ ccm stop
```

## 4.9.2. Usage

Synergy has the following options:

- **Server URL (server)** Specify the Synergy server URL, if using a distant server. If specified, the value is used by the Synergy client via the `-s` parameter.
- **Database (db, mandatory)** Specify the database path to analyse the sources it contains.
- **Project Specification (projectSpec, mandatory)** Specify the project specification for the analysis. Source code contained in this project specification will be analysed recursively.
- **Subfolder (subFolder)** Specify a subfolder name if you want to restrict the scope of the analysis to a particular folder.
- **Authentication: (useAccountCredentials, default: NO\_CREDENTIALS)** Note that, as stated in IBM's documentation, using credentials is only supported on Windows. The "No Credentials" must be used option when Synergy runs on a Linux host. For more information, consult [http://pic.dhe.ibm.com/infocenter/synhelp/v7m2r0/index.jsp?topic=%2Fcom.ibm.rational.synergy.manage.doc%2Ftopics%2Fsc\\_t\\_h\\_start\\_cli\\_session.html](http://pic.dhe.ibm.com/infocenter/synhelp/v7m2r0/index.jsp?topic=%2Fcom.ibm.rational.synergy.manage.doc%2Ftopics%2Fsc_t_h_start_cli_session.html).
- **(name)**
- **Password (password)**

The full command line syntax for Synergy is:

```
-r
" type=Synergy , server=[ text ] , db=[ text ] , projectSpec=[ text ] , subFolder=[ text ] , useAccountCredentials=[ text ]
```

## 4.10. SVN

### 4.10.1. Description

Connecting to an SVN server is supported using svn over ssh, or by using a username and password. The command run by the server to extract the source code is `svn export --force --non-interactive $url`.

For more details, refer to <https://subversion.apache.org/>.

#### Note

The following is a list of commands used by the SVN Repository Connector to retrieve sources (you can edit the common command base or the path to the executable in `<SQUARE_HOME>/configuration/repositoryConnectors/SVN/svn_conf.tcl` if needed):

- `svn info --xml --non-interactive --trust-server-cert --no-auth-cache [--username $username] [--password $password] [-r $revision] $url`
- `svn export --force --non-interactive --trust-server-cert --no-auth-cache [--username $username] [--password $password] [-r $revision] $url`

### 4.10.2. Usage

SVN has the following options:

- **URL (url, mandatory)** Specify the URL of the SVN repository to export and analyse. The following protocols are supported: `svn://`, `svn+ssh://`, `http://`, `https://`.
- **Revision (rev)** Specify a revision number in this field, or leave it blank to analyse files at the HEAD revision.

- **Authentication (useAccountCredentials, default: NO\_CREDENTIALS)**
- **Username (username)**
- **Password (password)**

The full command line syntax for SVN is:

```
-r
" type=SVN, url=[ text ], rev=[ text ], useAccountCredentials=[ multipleChoice ], username=[ text ], password=[ text ]"
```

## 4.11. Using Multiple Nodes

Squore allows using multiple repositories in the same analysis. If your project consists of some code that is spread over two distinct servers or SVN repositories, you can set up your project so that it includes both locations in the project analysis. This is done by labelling each source code node before specifying parameters, as shown below

```
-r " type=FROMPATH, alias=Node1, path=/home/projects/client-code"
-r " type=FROMPATH, alias=Node2, path=/home/projects/common/lib"
```

Note that only alpha-numeric characters are allowed to be used as labels. In the artefact tree, each node will appear as a separate top-level folder with the label provided at project creation.

Using multiple nodes, you can also analyse sources using different Repository Connectors in the same analysis:

```
-r " type=FROMPATH, alias=Node1, path=/home/projects/common-config"
-r " type=SVN, alias=Node2, url=svn+ssh://10.10.0.1/var/svn/project/src, rev=HEAD"
```

## 4.12. Using Data Provider Input Files From Version Control

Input files for Squore's Data Providers, like source code, can be located in your version control system. When this is the case, you need to specify a variable in the input field for the Data Provider instead of an absolute path to the input file.

**Select Data Providers**

AntiC
  CPPCheck (plugin)
  CPPCheck

Note: Data Providers listed as plugins above require a one-time download of binary components before they can be executed for the first time. Consult the Installation Guide for more information.

---

▼ **CPPCheck**

XML file containing CPPCheck results:

A Data Provider using an input file extracted from a remote repository

The variable to use varies depending on your scenario:

- **You have only one node of source code in your project**  
In this case, the variable to use is `$src`.

→ **You have more than one node of source code in your project**

In this case, you need to tell Squore in which node the input file is located. This is done using a variable that has the same name as the alias you defined for the source code node in the previous step of the wizard. For example, if your nodes are labelled `Node1` and `Node2` (the default names), then you can refer to them using the `$Node1` and `$Node2` variables.

**Tip**

When using these variables from the command line on a linux system, the `$` symbol must be escaped:

```
-d "type=PMD,configFile=\\$src/pmd_data.xml"
```

## 5. Data Providers

This chapter describes the Data Providers shipped with Squore and the default parameters that they accept via the Command Line Interface.

### 5.1. AntiC

#### 5.1.1. Description

AntiC is a part of the jlint static analysis suite and is launched to analyse C and C++ source code and produce findings.

For more details, refer to <http://jlint.sourceforge.net/>.

##### Note

On Linux, the antiC executable must be compiled manually before you run it for the first time by running the command:

```
# cd <SQUORE_HOME>/addons/tools/Antic_auto/bin/ && gcc antic.c -o antic
```

#### 5.1.2. Usage

AntiC has the following options:

→ **Source code directory to analyse (dir)** Leave this parameter empty if you want to analyse all sources specified above.

The full command line syntax for AntiC is:

```
-d "type=Antic_auto,dir=[text]"
```

## 5.2. Automotive Coverage Import

#### 5.2.1. Description

Automotive Coverage Import: generic import mechanism for coverage results at FUNCTION level

#### 5.2.2. Usage

Automotive Coverage Import has the following options:

→ **Enter the CSV file for coverage measures (csv)** CSV File shall contain the following (PATH;NAME;TESTED\_C1;OBJECT\_C1;TESTED\_MCC;OBJECT\_MCC;TESTED\_MCDC;OBJECT\_MCDC)

The full command line syntax for Automotive Coverage Import is:

```
-d "type=Automotive_Coverage,csv=[text]"
```

## 5.3. Automotive Tag Import

#### 5.3.1. Description

### 5.3.2. Usage

Automotive Tag Import has the following options:

- **Enter the CSV file for measures (csv)**

The full command line syntax for Automotive Tag Import is:

```
-d "type=Automotive_Tag_Import , csv=[ text ] "
```

## 5.4. BullseyeCoverage Code Coverage Analyzer

### 5.4.1. Description

BullseyeCoverage is a code coverage analyzer for C++ and C. The coverage report file is used to generate metrics.

For more details, refer to <http://www.bullseye.com/>.

### 5.4.2. Usage

BullseyeCoverage Code Coverage Analyzer has the following options:

- **HTML report (html)** Specify the path to the HTML report file generated by BullseyeCoverage.

The full command line syntax for BullseyeCoverage Code Coverage Analyzer is:

```
-d "type=BullseyeCoverage , html=[ text ] "
```

## 5.5. CPD

### 5.5.1. Description

CPD is an open source tool which generates Copy/Paste metrics. The detection of duplicated blocks is set to 100 tokens. CPD provides an XML file which can be imported to generate metrics as well as findings.

For more details, refer to <http://pmd.sourceforge.net/pmd-5.3.0/usage/cpd-usage.html>.

### 5.5.2. Usage

CPD has the following options:

- **CPD XML results (xml)** Specify the path to the XML results file generated by CPD. The minimum supported version is PMD/CPD 4.2.5.

The full command line syntax for CPD is:

```
-d "type=CPD , xml=[ text ] "
```

## 5.6. CPD (plugin)

### 5.6.1. Description

CPD is an open source tool which generates Copy/Paste metrics. The detection of duplicated blocks is set to 100 tokens. CPD provides an XML file which can be imported to generate metrics as well as findings.

For more details, refer to <http://pmd.sourceforge.net/pmd-5.3.0/usage/cpd-usage.html>.

#### Note

This data provider requires an extra download to extract the CPD binary in `<SQUORE_HOME>/addons/tools/CPD_auto/`. For more information, refer to the Installation and Administration Guide's Third-Party Plugins and Applications [`../install_admin_manual/index.html#sect_thirdparty_plugins`] section.

### 5.6.2. Usage

CPD (plugin) has the following options:

- **Run CPD during the analysis. (cpd\_auto, default: true)** Check this box if you want to run CPD during the analysis in order to generate metrics and findings for the source code specified.

The full command line syntax for CPD (plugin) is:

```
-d "type=CPD_auto,cpd_auto=[booleanChoice]"
```

## 5.7. Cppcheck

### 5.7.1. Description

Cppcheck is a static analysis tool for C/C++ applications. The tool provides an XML output which can be imported to generate findings.

For more details, refer to <http://cppcheck.sourceforge.net/>.

### 5.7.2. Usage

Cppcheck has the following options:

- **Cppcheck XML results (xml)** Specify the path to the XML results file from Cppcheck. Note that the minimum required version of Cppcheck for this data provider is 1.61.

The full command line syntax for Cppcheck is:

```
-d "type=CPPCheck,xml=[text]"
```

## 5.8. Cppcheck (plugin)

### 5.8.1. Description

Cppcheck is a static analysis tool for C/C++ applications. The tool provides an XML output which can be imported to generate findings.

For more details, refer to <http://cppcheck.sourceforge.net/>.



**Note**

On Windows, this data provider requires an extra download to extract the Cppcheck binary in `<SQUORE_HOME>/addons/tools/CppCheck_auto/`. On Linux, you can install the cppcheck application anywhere you want. The path to the Cppcheck binary for Linux can be configured in `config.tcl`. For more information, refer to the Installation and Administration Guide's Third-Party Plugins and Applications [`../install_admin_manual/index.html#sect_thirdparty_plugins`] section.

## 5.8.2. Usage

Cppcheck (plugin) has the following options:

- **Source code folder (dir)** Specify the folder containing the source files to analyse. If you want to analyse all of source repositories specified for the project, leave this field empty.

The full command line syntax for Cppcheck (plugin) is:

```
-d "type=CPPCheck_auto,dir=[text]"
```

## 5.9. CPPTest

### 5.9.1. Description

Parasoft C/C++test is an integrated solution for automating a broad range of best practices proven to improve software development team productivity and software quality for C and C++. The tool provides an XML output file which can be imported to generate findings and metrics.

For more details, refer to <http://www.parasoft.com/product/cpptest/>.

### 5.9.2. Usage

CPPTest has the following options:

- **XML results file (xml)** Specify the path to the CPPTest results file. This data provider is compatible with files exported from CPPTest version 7.2.10.34 and up.

The full command line syntax for CPPTest is:

```
-d "type=CPPTest ,xml=[text]"
```

## 5.10. Cantata

### 5.10.1. Description

Cantata is Test Coverage tools. It provides an XML output which can be imported to generate coverage metrics at function level.

For more details, refer to <http://www.qa-systems.com/cantata.html>.

### 5.10.2. Usage

Cantata has the following options:

- **Cantata XML results (xml)** Specify the path to the XML results file from Cantata 6.2

The full command line syntax for Cantata is:

```
-d "type=Cantata,xml=[text]"
```

## 5.11. CheckStyle

### 5.11.1. Description

CheckStyle is an open source tool that verifies that Java applications adhere to certain coding standards. It produces an XML file which can be imported to generate findings.

For more details, refer to <http://checkstyle.sourceforge.net/>.

### 5.11.2. Usage

CheckStyle has the following options:

- **CheckStyle results file (xml)** Point to the XML file that contains Checkstyle results. Note that the minimum supported version is Checkstyle 5.3.

The full command line syntax for CheckStyle is:

```
-d "type=CheckStyle,xml=[text]"
```

## 5.12. CheckStyle (plugin)

### 5.12.1. Description

CheckStyle is an open source tool that verifies that Java applications adhere to certain coding standards. It produces an XML file which can be imported to generate findings.

For more details, refer to <http://checkstyle.sourceforge.net/>.

#### Note

This data provider requires an extra download to extract the CheckStyle binary in `<SQUORE_HOME>/addons/tools/CheckStyle_auto/`. For more information, refer to the Installation and Administration Guide's Third-Party Plugins and Applications [[../install\\_admin\\_manual/index.html#sect\\_thirdparty\\_plugins](#)] section.

### 5.12.2. Usage

CheckStyle (plugin) has the following options:

- **Configuration file (configFile)** A Checkstyle configuration specifies which modules to plug in and apply to Java source files. Modules are structured in a tree whose root is the Checker module. Specify the name of the configuration file only, and the data provider will try to find it in the CheckStyle\_auto folder of your custom configuration. If no custom configuration file is found, a default configuration will be used.
- **Xmx (xmx, default: 1024m)** Maximum amount of memory allocated to the java process launching Checkstyle.

The full command line syntax for CheckStyle (plugin) is:

```
-d "type=CheckStyle_auto,configFile=[text],xmx=[text]"
```

## 5.13. CheckStyle for SQALE (plugin)

### 5.13.1. Description

CheckStyle is an open source tool that verifies that Java applications adhere to certain coding standards. It produces an XML file which can be imported to generate findings.

For more details, refer to <http://checkstyle.sourceforge.net/>.

#### Note

This data provider requires an extra download to extract the CheckStyle binary in `<SQUORE_HOME>/addons/tools/CheckStyle_auto_for_SQALE/`. For more information, refer to the Installation and Administration Guide's Third-Party Plugins and Applications [[../install\\_admin\\_manual/index.html#sect\\_thirdparty\\_plugins](#)] section.

### 5.13.2. Usage

CheckStyle for SQALE (plugin) has the following options:

- **Configuration file (configFile, default: config\_checkstyle\_for\_sqale.xml)** A Checkstyle configuration specifies which modules to plug in and apply to Java source files. Modules are structured in a tree whose root is the Checker module. Specify the name of the configuration file only, and the data provider will try to find it in the CheckStyle\_auto folder of your custom configuration. If no custom configuration file is found, a default configuration will be used.
- **Xmx (xmx, default: 1024m)** Maximum amount of memory allocated to the java process launching Checkstyle.

The full command line syntax for CheckStyle for SQALE (plugin) is:

```
-d "type=CheckStyle_auto_for_SQALE,configFile=[text],xmx=[text]"
```

## 5.14. Cobertura

### 5.14.1. Description

Cobertura is a free code coverage library for Java. Its XML report file can be imported to generate code coverage metrics for your Java project.

For more details, refer to <http://cobertura.github.io/cobertura/>.

### 5.14.2. Usage

Cobertura has the following options:

- **XML report (xml)** Specify the path to the XML report generated by Cobertura.

The full command line syntax for Cobertura is:

```
-d "type=Cobertura,xml=[text]"
```

## 5.15. CodeSonar

### 5.15.1. Description

Codesonar is a static analysis tool for C and C++ code designed for zero tolerance defect environments. It provides an XML output file which is imported to generate findings.

For more details, refer to <http://www.grammatech.com/codesonar>.

### 5.15.2. Usage

CodeSonar has the following options:

- **XML results file (xml)** Specify the path to the XML results file generated by Codesonar. The minimum version of Codesonar compatible with this data provider is 3.3.

The full command line syntax for CodeSonar is:

```
-d "type=CodeSonar ,xml=[ text ] "
```

## 5.16. Compiler

### 5.16.1. Description

Compiler Warning impor allows to import information from compiler

For more details, refer to Compiler.

### 5.16.2. Usage

Compiler has the following options:

- **Compiler output csv file (Path;Line;Rule;Descr - with: Rule = COMP\_ERR|COMPILER\_WARN|COMPILER\_INFO) (txt, mandatory)**

The full command line syntax for Compiler is:

```
-d "type=Compiler ,txt=[ text ] "
```

## 5.17. Coverity

### 5.17.1. Description

Coverity is a static analysis tool for C, C++, Java and C#. It provides an XML output which can be imported to generate findings.

For more details, refer to <http://www.coverity.com/>.

### 5.17.2. Usage

Coverity has the following options:

- **XML results file (xml)** Specify the path to the XML file containing Coverity results.

The full command line syntax for Coverity is:

```
-d "type=Coverity,xml=[text]"
```

## 5.18. FindBugs

### 5.18.1. Description

Findbugs is an open source tool that looks for bugs in Java code. It produces an XML result file which can be imported to generate findings.

For more details, refer to <http://findbugs.sourceforge.net/>.

### 5.18.2. Usage

FindBugs has the following options:

- **XML results file (xml)** Specify the location of the XML file containing Findbugs results. Note that the minimum supported version of FindBugs is 1.3.9.

The full command line syntax for FindBugs is:

```
-d "type=Findbugs,xml=[text]"
```

## 5.19. FindBugs (plugin)

### 5.19.1. Description

Findbugs is an open source tool that looks for bugs in Java code. It produces an XML result file which can be imported to generate findings. Note that the data provider requires an extra download to extract the Findbugs binary in [INSTALLDIR]/addons/tools/Findbugs\_auto/. You are free to use FindBugs 3.0 or FindBugs 2.0 depending on what your standard is. For more information, refer to the Installation and Administration Manual's "Third-Party Plugins and Applications" section.

For more details, refer to <http://findbugs.sourceforge.net/>.

#### Note

This data provider requires an extra download to extract the Findbugs binary in <SQUORE\_HOME>/addons/tools/Findbugs\_auto/. For more information, refer to the Installation and Administration Guide's Third-Party Plugins and Applications [../install\_admin\_manual/index.html#sect\_thirdparty\_plugins] section.

### 5.19.2. Usage

FindBugs (plugin) has the following options:

- **Classes (class\_dir, mandatory)** Specify the folders and/or jar files for your project in classpath format, or point to a text file that contains one folder or jar file per line.
- **Auxiliary Class path (auxiliarypath)** Specify a list of folders and/or jars in classpath format, or specify the path to a text file that contains one folder or jar per line. This information will be passed to FindBugs via the -auxclasspath parameter.
- **Memory Allocation (xmx, default: 1024m)** Maximum amount of memory allocated to the java process launching FindBugs.

The full command line syntax for FindBugs (plugin) is:

```
-d "type=Findbugs_auto,class_dir=[text],auxiliarypath=[text],xmx=[text]"
```

## 5.20. Function Relaxer

### 5.20.1. Description

### 5.20.2. Usage

Function Relaxer has the following options:

→ **Enter the CSV file for measures (csv)**

The full command line syntax for Function Relaxer is:

```
-d "type=Function_Relaxer,csv=[text]"
```

## 5.21. FxCop

### 5.21.1. Description

FxCop is an application that analyzes managed code assemblies (code that targets the .NET Framework common language runtime) and reports information about the assemblies, such as possible design, localization, performance, and security improvements. FxCop generates an XML results file which can be imported to generate findings.

For more details, refer to [https://msdn.microsoft.com/en-us/library/bb429476\(v=vs.80\).aspx](https://msdn.microsoft.com/en-us/library/bb429476(v=vs.80).aspx).

### 5.21.2. Usage

FxCop has the following options:

→ **XML results file (xml)** Specify the XML file containing FxCop's analysis results. Note that the minimum supported version of FxCop is 1.35.

The full command line syntax for FxCop is:

```
-d "type=FxCop,xml=[text]"
```

## 5.22. GCov

### 5.22.1. Description

GCov is a Code coverage program for C application. GCov generates raw text files which can be imported to generate metrics.

For more details, refer to <http://gcc.gnu.org/onlinedocs/gcc/Gcov.html>.

### 5.22.2. Usage

GCov has the following options:

- **Directory containing results files (dir)** Specify the path of the root directory containing the GCov results files.
- **Results files extension (ext, default: \*.c.gcov)** Specify the file extension of GCov results files.

The full command line syntax for GCov is:

```
-d "type=GCov,dir=[text],ext=[text]"
```

## 5.23. GNATcheck

### 5.23.1. Description

GNATcheck is an extensible rule-based tool that allows developers to completely define a coding standard. The results are output to a log file that can be imported to generate findings.

For more details, refer to <http://www.adacore.com/gnatpro/toolsuite/gnatcheck/>.

### 5.23.2. Usage

GNATcheck has the following options:

- **Log file (txt)** Specify the path to the log file generated by the GNATcheck run.

The full command line syntax for GNATcheck is:

```
-d "type=GnatCheck,txt=[text]"
```

## 5.24. GNATCompiler

### 5.24.1. Description

GNATCompiler is a free-software compiler for the Ada programming language which forms part of the GNU Compiler Collection. It supports all versions of the language, i.e. Ada 2012, Ada 2005, Ada 95 and Ada 83. It creates a log file that can be imported to generate findings.

For more details, refer to <http://www.adacore.com/gnatpro/toolsuite/compilation/>.

### 5.24.2. Usage

GNATCompiler has the following options:

- **Log file (log)** Specify the path to the log file containing the compiler warnings.

The full command line syntax for GNATCompiler is:

```
-d "type=GnatCompiler,log=[text]"
```

## 5.25. JUnit

### 5.25.1. Description

JUnit is a simple framework to write repeatable tests. It is an instance of the xUnit architecture for unit testing frameworks. JUnit XML result files are imported to generate findings and the total number of tests is made available as a measure.

For more details, refer to <http://junit.org/>.

### 5.25.2. Usage

JUnit has the following options:

- **Results folder (resultDir, mandatory)** Specify the path to the folder containing the JUnit results. The data provider will parse all available XML files. Note that the minimum support version of JUnit is 4.10.

The full command line syntax for JUnit is:

```
-d "type=JUnit,resultDir=[text]"
```

## 5.26. JaCoCo

### 5.26.1. Description

JaCoCo is a free code coverage library for Java. Its XML report file can be imported to generate code coverage metrics for your Java project.

For more details, refer to <http://www.eclemma.org/jacoco/>.

### 5.26.2. Usage

JaCoCo has the following options:

- **XML report (xml, mandatory)** Specify the path to the XML report generated by JaCoCo. Note that the folder containing the XML file must also contain JaCoCo's report DTD file, available from <http://www.eclemma.org/jacoco/trunk/coverage/report.dtd>. XML report files are supported from version 0.6.5.

The full command line syntax for JaCoCo is:

```
-d "type=Jacoco,xml=[text]"
```

## 5.27. Klocwork

### 5.27.1. Description

Klocwork is a static analysis tool. Its XML result file can be imported to generate findings.

For more details, refer to <http://www.klocwork.com>.

### 5.27.2. Usage

Klocwork has the following options:

- **XML results file (xml)** Specify the path to the XML results file exported from Klocwork. Note that Klocwork version 9.6.1 is the minimum required version.



The full command line syntax for Klocwork is:

```
-d "type=Klocwork ,xml=[ text ]"
```

## 5.28. Rational Logiscope

### 5.28.1. Description

The Logiscope suite allows the evaluation of source code quality in order to reduce maintenance cost, error correction or test effort. It can be applied to verify C, C++, Java and Ada languages and produces a CSV results file that can be imported to generate findings.

For more details, refer to <http://www.kalimetrix.com/en/logiscope>.

### 5.28.2. Usage

Rational Logiscope has the following options:

→ **RuleChecker results file (csv)** Specify the path to the CSV results file from Logiscope.

The full command line syntax for Rational Logiscope is:

```
-d "type=Logiscope ,csv=[ text ]"
```

## 5.29. MemUsage

### 5.29.1. Description

### 5.29.2. Usage

MemUsage has the following options:

→ **Memory Usage excel file (excel)**

The full command line syntax for MemUsage is:

```
-d "type=MemUsage ,excel=[ text ]"
```

## 5.30. NCover

### 5.30.1. Description

NCover is a Code coverage program for C# application. NCover generates an XML results file which can be imported to generate metrics.

For more details, refer to <http://www.ncover.com/>.

### 5.30.2. Usage

NCover has the following options:

- **XML results file (xml)** Specify the location of the XML results file generated by NCover. Note that the minimum supported version is NCover 3.0.

The full command line syntax for NCover is:

```
-d "type=NCover , xml=[ text ] "
```

## 5.31. Oracle PLSQL compiler Warning checker

### 5.31.1. Description

This data provider reads an Oracle compiler log file and imports the warnings as findings. Findings extracted from the log file are filtered using a prefix parameter.

For more details, refer to <http://www.oracle.com/>.

### 5.31.2. Usage

Oracle PLSQL compiler Warning checker has the following options:

- **Compiler log file (log)**
- **Prefixes (prefix)** Prefixes and their replacements are specified as pairs using the syntax [prefix1|node1;prefix2|node2]. Leave this field empty to disable filtering. The parsing algorithm looks for lines fitting this pattern: [PATH;SCHEMA;ARTE\_ID;ARTE\_TYPE;LINE;COL;SEVERITY\_TYPE;WARNING\_ID;SEVERITY\_ID;DESCR] and keeps lines where [PATH] begins with one of the input prefixes. In each kept [PATH], [prefix] is replaced by [node]. If [node] is empty, [prefix] is removed from [PATH], but not replaced. Some valid syntaxes for prefix: One prefix to remove: svn://aaaa:12345/valid/path/from/svn One prefix to replace: svn://aaaa:12345/valid/path/from/svn|node1 Two prefixes to remove: svn://aaaa:12345/valid/path/from/svn|svn://bbbb:12345/valid/path/from/other\_svn| Two prefixes to replace: svn://aaaa:12345/valid/path/from/svn;svn://bbbb:12345/valid/path/from/other\_svn Two prefixes to replace: svn://aaaa:12345/valid/path/from/svn|node1;svn://bbbb:12345/valid/path/from/other\_svn|node2

The full command line syntax for Oracle PLSQL compiler Warning checker is:

```
-d "type=Oracle_PLSQLCompiler , log=[ text ] , prefix=[ text ] "
```

## 5.32. MISRA Rule Checking using PC-lint

### 5.32.1. Description

PC-lint is a static code analyser. The PC-lint data provider reads an PC-lint log file and imports MISRA violations as findings.

For more details, refer to <http://www.gimpel.com/html/pcl.htm>.

### 5.32.2. Usage

MISRA Rule Checking using PC-lint has the following options:

- **Log file folder (logDir)** Specify the path to the folder containing the PC-lint log files.
- **Extensions to exclude (excludedExtensions, default: .h;.H)** Specify the file extensions to exclude from the reported violations.

The full command line syntax for MISRA Rule Checking using PC-lint is:

```
-d "type=PC_Lint_MISRA,logDir=[text],excludedExtensions=[text]"
```

## 5.33. PMD

### 5.33.1. Description

PMD scans Java source code and looks for potential problems like possible bugs, dead code, sub-optimal code, overcomplicated expressions, duplicate code... The XML results file it generates is read to create findings.

For more details, refer to <http://pmd.sourceforge.net>.

### 5.33.2. Usage

PMD has the following options:

- **XML results file (xml)** Specify the path to the PMD XML results file. Note that the minimum supported version of PMD for this data provider is 4.2.5.

The full command line syntax for PMD is:

```
-d "type=PMD,xml=[text]"
```

## 5.34. PMD (plugin)

### 5.34.1. Description

PMD scans Java source code and looks for potential problems like possible bugs, dead code, sub-optimal code, overcomplicated expressions, duplicate code ... The XML results file it generates is read to create findings.

For more details, refer to <http://pmd.sourceforge.net>.

#### Note

This data provider requires an extra download to extract the PMD binary in `<SQUORE_HOME>/addons/tools/PMD_auto/`. For more information, refer to the Installation and Administration Guide's Third-Party Plugins and Applications [[../install\\_admin\\_manual/index.html#sect\\_thirdparty\\_plugins](#)] section.

### 5.34.2. Usage

PMD (plugin) has the following options:

- **Ruleset file (configFile)** Specify the path to the PMD XML ruleset you want to use for this analysis. If you do not specify a ruleset, the default one from `INSTALLDIR/addons/tools/PMD_auto` will be used.

The full command line syntax for PMD (plugin) is:

```
-d "type=PMD_auto,configFile=[text]"
```

## 5.35. Polyspace

### 5.35.1. Description

Polyspace is a static analysis tool which includes a MISRA checker. It produces an XML output which can be imported to generate findings. Polyspace Verifier detects RTE (RunTime Error) such as Division by zero, Illegal Deferencement Pointer, Out of bound array index... Such information is turned into statistical measures at function level. Number of Red (justified/non-justified), Number of Grey (justified/non-justified), Number of Orange (justified/non-justified), Number of Green.

For more details, refer to <http://www.mathworks.com/products/polyspace/index.html>.

### 5.35.2. Usage

Polyspace has the following options:

- **XML results file (xml)** Specify the path to the XML results file generated by Polyspace.

The full command line syntax for Polyspace is:

```
-d "type=Polyspace ,xml=[ text ] "
```

## 5.36. Polyspace MISRA

### 5.36.1. Description

Polyspace is a static analysis tool which includes a MISRA checker. It produces an XML output which can be imported to generate findings. Polyspace Verifier detects RTE (RunTime Error) such as Division by zero, Illegal Deferencement Pointer, Out of bound array index... Such information is turned into statistical measures at function level. Number of Red (justified/non-justified), Number of Grey (justified/non-justified), Number of Orange (justified/non-justified), Number of Green.

For more details, refer to <http://www.mathworks.com/products/polyspace/index.html>.

### 5.36.2. Usage

Polyspace MISRA has the following options:

- **Results folder (resultDir)** Specify the folder containing the Polyspace results. The data provider will parse all sub-folders searching for XML result files called "MISRA-CPP-report.xml" or "MISRA-C-report.xml" located in a "Polyspace-Doc" folder and aggregate results.
- **Unit by Unit (unitByUnit, default: true)** Check this box if the Polyspace verification was run unit by unit.

The full command line syntax for Polyspace MISRA is:

```
-d "type=Polyspace_MISRA ,resultDir=[ text ] ,unitByUnit=[ booleanChoice ] "
```

## 5.37. Polyspace (plugin)

### 5.37.1. Description

Polyspace is a static analysis tool which includes a MISRA checker. It produces an binary output format which can be imported to generate findings. Polyspace Verifier detects RTE (RunTime Error) such as Division by zero, Illegal Deferencement Pointer, Out of bound array index... Such information is turned into statistical measures at function level. Number of Red (justified/non-justified), Number of Grey (justified/non-justified), Number

of Orange (justified/non-justified), Number of Green. Note that this data provider requires an extra download to extract the Polyspace Export binary in [INSTALLDIR]/addons/tools/Polyspace\_RTE/. For more information, refer to the Installation and Administration Manual's "Third-Party Plugins and Applications" section.

For more details, refer to <http://www.mathworks.com/products/polyspace/index.html>.

**Note**

This data provider requires an extra download to extract the Polyspace Export binary in <SQUORE\_HOME>/addons/tools/Polyspace\_RTE. For more information, refer to the Installation and Administration Guide's Third-Party Plugins and Applications [../install\_admin\_manual/index.html#sect\_thirdparty\_plugins] section.

### 5.37.2. Usage

Polyspace (plugin) has the following options:

- **Results folder (resultDir)** Specify the folder containing the Polyspace results. The data provider will run the polyspace-export binary on all sub-folders to export results to XML and aggregate them.
- **Unit by Unit (unitByUnit, default: true)** Check this box if the Polyspace verification was run unit by unit.

The full command line syntax for Polyspace (plugin) is:

```
-d "type=Polyspace_RTE,resultDir=[text],unitByUnit=[booleanChoice]"
```

## 5.38. MISRA Rule Checking with QAC

### 5.38.1. Description

QAC identifies problems in C source code caused by language usage that is dangerous, overly complex, non-portable, difficult to maintain, or simply diverges from coding standards. Its CSV results file can be imported to generate findings.

For more details, refer to <http://www.phaedsys.com/principals/programmingresearch/pr-qac.html>.

### 5.38.2. Usage

MISRA Rule Checking with QAC has the following options:

- **Code Folder (logDir)** Specify the path to the folder that contains the annotated files to process. For the findings to be successfully linked to their corresponding artefact, several requirements have to be met: - The annotated file name should be [Original source file name].txt e.g. The annotation of file "controller.c" should be called "controller.c.txt" - The annotated file location in the annotated directory should match the associated source file location in the source directory. e.g. The annotation for source file "[SOURCE\_DIR]/subDir1/subDir2/controller.c" should be located in "[ANNOTATIONS\_DIR]/subDir1/subDir2/controller.c.txt" The previous comment suggests that the source and annotated directory are different. However, these directories can of course be identical, which ensures that locations of source and annotated files are the same.
- **Extension (ext, default: html)** Specify the extension used by QAC to create annotated files.

The full command line syntax for MISRA Rule Checking with QAC is:

```
-d "type=QAC_MISRA,logDir=[text],ext=[text]"
```

## 5.39. Unit Test Code Coverage from Rational Test RealTime

### 5.39.1. Description

Rational Test RealTime is a cross-platform solution for component testing and runtime analysis of embedded software. Metrics are generated from its CSV results file.

For more details, refer to <http://www-01.ibm.com/software/awdtools/test/realtime/>.

### 5.39.2. Usage

Unit Test Code Coverage from Rational Test RealTime has the following options:

- **.xrd folder (logDir)** Specify the path to the folder containing the .xrd files generated by RTRT.
- **Excluded file extensions (excludedExtensions, default: .h;.H)**

The full command line syntax for Unit Test Code Coverage from Rational Test RealTime is:

```
-d "type=RTRT,logDir=[text],excludedExtensions=[text]"
```

## 5.40. ReqIF

### 5.40.1. Description

RIF/ReqIF (Requirements Interchange Format) is an XML file format that can be used to exchange requirements, along with its associated metadata, between software tools from different vendors.

For more details, refer to <http://www.omg.org/spec/ReqIF/>.

### 5.40.2. Usage

ReqIF has the following options:

- **ReqIF file (file)** Specify the path to the XML ReqIF file. Note that the XML file will be validated using the schema available from <http://www.omg.org/spec/ReqIF/20110401/reqif.xsd>.
- **Spec Object Type (objType, default: \_AUTO\_)** Specify the SPEC\_OBJECT\_TYPE property LONG-NAME to be used to process the ReqIf file. Using the \_AUTO\_ value will let the Data Provider extract the value from the ReqIf file, and assumes that there is only one such definition.

The full command line syntax for ReqIF is:

```
-d "type=ReqIf,file=[text],objType=[text]"
```

## 5.41. SQL Code Guard

### 5.41.1. Description

SQL Code Guard is a free solution for SQL Server that provides fast and comprehensive static analysis for T-Sql code, shows code complexity and objects dependencies.

For more details, refer to <http://www.sqlcodeguard.com>.

## 5.41.2. Usage

SQL Code Guard has the following options:

- **XML results (xml)** Specify the path to the XML files containing SQL Code Guard results.

The full command line syntax for SQL Code Guard is:

```
-d "type=SQLCodeGuard,xml=[text]"
```

## 5.42. Squan Sources

### 5.42.1. Description

Squan Sources provides basic-level analysis of your source code.

For more details, refer to <http://www.squoring.com>.

#### Note

The analyser can output info and warning messages in the build logs. Recent additions to those logs include better handling of structures in C code, which will produce these messages:

- [Analyzer] Unknown syntax declaration for function XXXXX at line yyy to indicate that we would have found a function but, probably due to preprocessing directives, we are not able to parse it.
- [Analyzer] Unbalanced () blocks found in the file. Probably due to preprocessing directives, parenthesis in the file are not well balanced.
- [Analyzer] Unbalanced {} blocks found in the file. Probably due to preprocessing directives, curly brackets in the file are not well balanced.

#### Tip

You can specify the languages for your source code by passing pairs of language and extensions to the **languages** parameter. For example, a project mixing php and javascript files can be analysed with:

```
--dp "type=SQuORE,languages=php:.php;javascript:.js,.JS"
```

### 5.42.2. Usage

Squan Sources has the following options:

- **Languages** (languages, default: **abap;ada;c;cpp;mindc;csharp;cobol;java;javascript;fortran77;fortran90;php;sql;python;tsql;vbnet;xaml**)  
Check the boxes for the languages used in the specified source repositories. Adjust the list of file extensions as necessary. Note that two languages cannot use the same file extension, and that the list of extensions is case-sensitive. Tip: Leave all the boxes unchecked and Squan Sources will auto-detect the language parser to use.
- **Force full analysis (rebuild\_all, default: false)** Analyses are incremental by default. Check this box if you want to force the source code parser to analyse all files instead of only the ones that have changed since the previous analysis. This is useful if you added new rule files or text parsing rules and you want to re-evaluate all files based on your modifications.
- **Generate control graphs (genCG, default: true)** This option allows generating a control graph for every function in your code. The control graph is visible in the dashboard of the function when the analysis completes.

- **Use qualified names (qualified, default: false)** Note: This option cannot be modified in subsequent runs after you create the first version of your project.
- **Limit analysis depth (depth, default: false)** Use this option to limit the depth of the analysis to file-level only. This means that Squan Sources will not create any class or function artefacts for your project.
- **Add a 'Source Code' node (scnode, default: false)** Using this options groups all source nodes under a common source code node instead of directly under the APPLICATION node. This is useful if other data providers group non-code artefacts like tests or requirements together under their own top-level node. This option can only be set when you create a new project and cannot be modified when creating a new version of your project.
- **'Source Code' node label (scnode\_name, default: Source Code)** Specify a custom label for your main source code node. Note: this option is not modifiable. It only applies to projects where you use the "Add a 'Source Code' node" option. When left blank, it defaults to "Source Code".
- **Compact folders (compact\_folder, default: true)** When using this option, folders with only one son are aggregates together. This avoids creating many unnecessary levels in the artefact tree to get to the first level of files in your project. This option cannot be changed after you have created the first version of your project.
- **Content exclusion via regexp (pattern)** Specify a PERL regular expression to automatically exclude files from the analysis if their contents match the regular expression. Leave this field empty to disable content-based file exclusion.
- **File Filtering (files\_choice, default: Exclude)** Specify a pattern and an action to take for matching file names. Leave the pattern empty to disable file filtering.
- **pattern (pattern\_files)** Use a shell-like wildcard e.g. '\*-test.c'. \* Matches any sequence of characters in string, including a null string. ? Matches any single character in string. [chars] Matches any character in the set given by chars. If a sequence of the form x-y appears in chars, then any character between x and y, inclusive, will match. On Windows, this is used with the -nocase option, meaning that the end points of the range are converted to lower case first. Whereas {[A-z]} matches '\_' when matching case-sensitively ('\_' falls between the 'Z' and 'a'), with -nocase this is considered like {[A-Za-z]}. \x Matches the single character x. This provides a way of avoiding the special interpretation of the characters \*?[] in pattern. Tip: Use ; to separate multiple patterns.
- **Folder Filtering (dir\_choice, default: Exclude)** Specify a pattern and an action to take for matching folder names. Leave the pattern empty to disable folder filtering.
- **pattern (pattern\_dir)** Use a shell-like wildcard e.g. 'Test\_\*'. \* Matches any sequence of characters in string, including a null string. ? Matches any single character in string. [chars] Matches any character in the set given by chars. If a sequence of the form x-y appears in chars, then any character between x and y, inclusive, will match. On Windows, this is used with the -nocase option, meaning that the end points of the range are converted to lower case first. Whereas {[A-z]} matches '\_' when matching case-sensitively ('\_' falls between the 'Z' and 'a'), with -nocase this is considered like {[A-Za-z]}. \x Matches the single character x. This provides a way of avoiding the special interpretation of the characters \*?[] in pattern. Tip: Use ; to separate multiple patterns.
- **Detect algorithmic cloning (clAlg, default: true)** When checking this box, Squan Sources launches a cloning detection tool capable of finding algorithmic cloning in your code.
- **Detect text cloning (clTxt, default: true)** When checking this box, Squan Sources launches a cloning detection tool capable of finding text duplication in your code.
- **Backwards-compatible cloning (clBw, default: false)** When checking this box, the cloning detection tool is run in a way that produces metrics that are backwards-compatible with earlier versions of this product (2014-A): exact matching is used for algorithmic cloning and a 5% margin is used for text duplication. This legacy behaviour should only be used if you are using an old configuration that was developed before 2014-B.
- **Cloning fault ratio (clFR, default: 0.1)** This threshold defines how much cloning between two artefacts is necessary for them to be considered as clones by the cloning detection tool. For example, a fault ratio of



0.1 means that two artefacts are considered clones if less than 10% of their contents differ. Note that this option is ignored if you are using backwards-compatible cloning.

- **Detect Open Source cloning (deprecated) (cIOS, default: false)** This option is no longer supported and should not be used anymore.
- **Compute Textual stability (genTs, default: true)** This option allows keeping track of the stability of the code analysed for each version. The computed stability is available on the dashboard as a metric called and can be interpreted as 0% meaning completely changed and 100% meaning not changed at all.
- **Compute Algorithmic stability (genAs, default: true)** This option allows keeping track of the stability of the code analysed for each version. The computed stability is available on the dashboard as a metric called Stability Index (SI) and can be interpreted as 0% meaning completely changed and 100% meaning not changed at all.
- **Detect artefact renaming (clRen, default: true)** This option allows Squan Sources to detect artefacts that have been moved since the previous version, ensuring that the stability metrics of the previous artefact are passed to the new one. This is typically useful if you have moved a file to a different folder in your source tree and do not want to lose the previous metrics generated for this file. If you do not use this option, moved artefacts will be considered as new artefacts.
- **Additional parameters (additional\_param)** These additional parameters can be used to pass instructions to external processes started by this data provider. This value is generally left empty in most cases.

The full command line syntax for Squan Sources is:

```
-d  
"type=SQuORE, languages=[multipleChoice], rebuild_all=[booleanChoice], genCG=[booleanChoice], qua
```

## 5.43. Squore Import

### 5.43.1. Description

Squore Import is a data provider used to import the results of another data provider analysis. It is generally only used for debugging purposes.

For more details, refer to <http://www.squoring.com>.

### 5.43.2. Usage

Squore Import has the following options:

- **XML folder (inputDir)** Specify the folder that contains the `squore_data_*.xml` files that you want to import.

The full command line syntax for Squore Import is:

```
-d "type=SQuOREImport, inputDir=[text]"
```

## 5.44. Squore Virtual Project

### 5.44.1. Description

Squore Virtual Project is a data provider that can use the output of several projects to compile metrics in a meta-project composed of the import sub-projects.

For more details, refer to <http://www.squoring.com>.

## 5.44.2. Usage

Squore Virtual Project has the following options:

- **Paths to output.xml files (output)** Specify the paths to all the output.xml files you want to include in the virtual project. Separate paths using ';'.

The full command line syntax for Squore Virtual Project is:

```
-d "type=SquOREVirtualProject,output=[text]"
```

## 5.45. StyleCop

### 5.45.1. Description

StyleCop is a C# code analysis tool. Its XML output is imported to generate findings.

For more details, refer to <https://stylecop.codeplex.com/>.

### 5.45.2. Usage

StyleCop has the following options:

- **XML results file (xml)** Specify the path to the StyleCop XML results file. The minimum version compatible with this data provider is 4.7.

The full command line syntax for StyleCop is:

```
-d "type=StyleCop,xml=[text]"
```

## 5.46. StyleCop (plugin)

### 5.46.1. Description

StyleCop is a C# code analysis tool. Its XML output is imported to generate findings.

For more details, refer to <https://stylecop.codeplex.com/>.

#### Note

Note that this data provider is not supported on Linux. On windows, this data provider requires an extra download to extract the StyleCop binary in `<SQUORE_HOME>/addons/tools/StyleCop_auto/`. For more information, refer to the Installation and Administration Guide's Third-Party Plugins and Applications [[../install\\_admin\\_manual/index.html#sect\\_thirdparty\\_plugins](#)] section.

### 5.46.2. Usage

StyleCop (plugin) has the following options:

- **Solution (sln)** Specify the path to the .sln file to analyse. Leave empty to analyse all .sln found in the source repository.

The full command line syntax for StyleCop (plugin) is:

```
-d "type=StyleCop_auto,sln=[text]"
```

## 5.47. Tessy

### 5.47.1. Description

Tessy is a tool automating module/unit testing of embedded software written in dialects of C/C++. Tessy generates an XML results file which can be imported to generate metrics. This data provider supports importing files that have a `xml_version="1.0"` attribute in their header.

For more details, refer to <https://www.hitex.com/en/tools/tessy/>.

### 5.47.2. Usage

Tessy has the following options:

- **Results folder (resultDir)** Specify the top folder containing XML result files from Tessy. Note that this data provider will recursively scan sub-folders looking for `index.xml` files to aggregate results.

The full command line syntax for Tessy is:

```
-d "type=Tessy,resultDir=[text]"
```

## 5.48. VectorCAST 6.3

### 5.48.1. Description

VectorCAST 6.3

For more details, refer to VectorCAST 6.3.

### 5.48.2. Usage

VectorCAST 6.3 has the following options:

- **HTML Report (html\_report)** Enter the path to the HTML report which contains the Coverage results

The full command line syntax for VectorCAST 6.3 is:

```
-d "type=VectorCAST,html_report=[text]"
```

## 5.49. Configuration Checker

### 5.49.1. Description

Use this tool to check for duplicated files or XML Elements between a custom configuration and the standard configuration.

### 5.49.2. Usage

Configuration Checker has the following options:

→ **Standard Configuration Path (st)**

→ **Custom Configurations Path (ps)**

The full command line syntax for Configuration Checker is:

```
-d "type=conf-checker,st=[text],ps=[text]"
```

## 5.50. Csv Coverage Import

### 5.50.1. Description

Csv Coverage Import: generic import mechanism for coverage results at FUNCTION level

### 5.50.2. Usage

Csv Coverage Import has the following options:

→ **Enter the CSV file for coverage measures (csv)** CSV File shall contain the following (PATH;NAME;TESTED\_C1;OBJECT\_C1;TESTED\_MCC;OBJECT\_MCC;TESTED\_MCDC;OBJECT\_MCDC;TCOV\_MCC;TCOV\_MCDC;

The full command line syntax for Csv Coverage Import is:

```
-d "type=csv_coverage,csv=[text]"
```

## 5.51. CSV Findings

### 5.51.1. Description

CSV Findings (Generic Import of findings )

### 5.51.2. Usage

CSV Findings has the following options:

→ **CSV File (FILE;FUNCTION;RULE\_ID;MESSAGE;LINE;COL;STATUS;STATUS\_MESSAGE;TOOL) (csv)**  
Your CSV file should include the following as a header:  
FILE;FUNCTION;RULE\_ID;MESSAGE;LINE;COL;STATUS;STATUS\_MESSAGE;TOOL. CSV files in other formats are not supported.

The full command line syntax for CSV Findings is:

```
-d "type=csv_findings,csv=[text]"
```

## 5.52. Csv Tag Import

### 5.52.1. Description

Csv Tag Import

### 5.52.2. Usage

Csv Tag Import has the following options:

→ **Enter the CSV file for measures (csv)**

The full command line syntax for Csv Tag Import is:

```
-d "type=csv_tag_import,csv=[text]"
```

## 5.53. Csv Test Results Import

### 5.53.1. Description

Csv Test Results Import: generic import mechanism for Test results at FILES level

### 5.53.2. Usage

Csv Test Results Import has the following options:

- **Enter the CSV file for Test Results measures at FILES level (csv)** CSV File shall contain the following (PATH;NB\_TEST;NB\_ERROR;NB\_FAILURE;NB\_PASS)

The full command line syntax for Csv Test Results Import is:

```
-d "type=csv_test,csv=[text]"
```

## 5.54. OSLC

### 5.54.1. Description

OSLC-CM allows retrieving information from Change Management systems following the OSLC standard. Metrics and artefacts are created by connecting to the OSLC system and retrieving issues with the specified query.

For more details, refer to <http://open-services.net/>.

### 5.54.2. Usage

OSLC has the following options:

- **Change Server (server)** Specify the URL of the project you want to query on the OSLC server. Typically the URL will look like this: <http://myserver:8600/change/oslc/db/3454a67f-656ddd4348e5/role/User/>
- **Query (query)** Specify the query to send to the OSLC server (e.g.: `release="9TDE/TDE_00_01_00_00"`). It is passed to the request URL via the `?oslc_cm.query=` parameter.

- |                |   |                     |                 |
|----------------|---|---------------------|-----------------|
| → <b>Query</b> | <b>Properties</b>   | <b>(properties,</b> | <b>default:</b> |
|                | <b>request_type,problem_number,crstatus,severity,submission_area,functionality,mb_code,professional_line,ir_submitted</b> |                     |                 |
- Specify the properties to add to the query. They are passed to the OSLC query URL using the `?oslc_cm.properties=` parameter.

- **Login (login)**

- **Password (password)**

The full command line syntax for OSLC is:

```
-d "type=oslc_cm,server=[text],query=[text],properties=[text],login=[text],password=[password]"
```

## 5.55. pep8

### 5.55.1. Description

pep8 is a tool to check your Python code against some of the style conventions in PEP 88. Its CSV report file is imported to generate findings.

For more details, refer to <https://pypi.python.org/pypi/pep8>.

### 5.55.2. Usage

pep8 has the following options:

→ **CSV results file (csv)** Specify the path to the CSV report file created by pep8.

The full command line syntax for pep8 is:

```
-d "type=pep8,csv=[text]"
```

## 5.56. pep8 (plugin)

### 5.56.1. Description

Style Guide for Python Code. Pep8 results are imported to produce findings on Python code. This data provider requires having pep8 installed on the machine running the analysis and the pep8 command to be available in the path. It is compatible with pep8 1.4.6 and may also work with older versions.

### 5.56.2. Usage

pep8 (plugin) has the following options:

→ **Source code directory to analyse (dir)** Leave this field empty to analyse all sources.

The full command line syntax for pep8 (plugin) is:

```
-d "type=pep8_auto,dir=[text]"
```

## 5.57. pylint

### 5.57.1. Description

Pylint is a Python source code analyzer which looks for programming errors, helps enforcing a coding standard and sniffs for some code smells (as defined in Martin Fowler's Refactoring book). Pylint results are imported to generate findings for Python code.

For more details, refer to <http://www.pylint.org/>.

### 5.57.2. Usage

pylint has the following options:

- **CSV results file (csv)** Specify the path to the CSV file containing pylint results. Note that the minimum version supported is 1.1.0.

The full command line syntax for pylint is:

```
-d "type=pylint,csv=[text]"
```

## 5.58. pylint (plugin)

### 5.58.1. Description

Coding Guide for Python Code. Pylint results are imported to produce findings on Python code. This data provider requires having pylint installed on the machine running the analysis and the pylint command to be available in the path. It is known to work with pylint 1.7.0 and may also work with older versions.

### 5.58.2. Usage

pylint (plugin) has the following options:

- **Source code directory to analyse (dir)** Leave this field empty to analyse all sources.

The full command line syntax for pylint (plugin) is:

```
-d "type=pylint_auto,dir=[text]"
```

## 5.59. Qac\_8\_2

### 5.59.1. Description

QA-C is a static analysis tool for MISRA checking.

For more details, refer to <http://www.programmingresearch.com/static-analysis-software/qac-qacpp-static-analyzers/>.

### 5.59.2. Usage

Qac\_8\_2 has the following options:

- **QAC output file (.tab file) (txt, mandatory)**

The full command line syntax for Qac\_8\_2 is:

```
-d "type=qac,txt=[text]"
```

## 5.60. Creating your own Data Providers

You can create your own Data Providers by using the built-in frameworks included in Squore. Each solution uses a different approach, but the overall goal is to produce one or more CSV files that your Data Provider will send to Squore to associate metrics, findings, textual information or links to artefacts in your project.

This section helps you choose the right framework for your custom Data Provider and covers the basics of creating a custom configuration folder to extend Squore.

### 5.60.1. Choosing the Right Data Provider Framework

The following is a list of the available Data Provider frameworks:

	Import Metrics	Import Textual Information	Import Findings	Import Links	Create Artefacts	Parse Subfolders
<b>CSV</b>	✓	✓	✗	✗	✓	✓
<b>csv_findings</b>	✗	✗	✓	✗	✗	✗
<b>CSVPerl</b>	✓	✓	✗	✗	✓	✓
<b>Generic</b>	✓	✓	✓	✓	✓	✗
<b>GenericPerl</b>	✓	✓	✓	✓	✓	✓
<b>FindingsPerl</b>	✗	✗	✓	✗	✗	✓
<b>ExcelMetrics</b>	✓	✓	✓	✗	✓	✓

✓ Supported

✓ Your Perl script needs to handle subfolder parsing

✗ Not Supported

Data Provider frameworks and their capabilities

- Csv**  
 The Csv framework is used to import metrics or textual information and attach them to artefacts of type Application or File. While parsing one or more input CSV files, if it finds the same metric for the same artefact several times, it will only use the last occurrence of the metric and ignore the previous ones. Note that the type of artefacts you can attach metrics to is limited to Application and File artefacts. If you are working with File artefacts, you can let the Data Provider create the artefacts by itself if they do not exist already. Refer to the full Csv Reference for more information.
- csv\_findings**  
 The csv\_findings framework is used to import findings in a project and attach them to artefacts of type Application, File or Function. It takes a single CSV file as input and is the only framework that allows you to import relaxed findings directly. Refer to the full csv\_findings Reference for more information.
- CsvPerl**  
 The CsvPerl framework offers the same functionality as Csv, but instead of dealing with the raw input files directly, it allows you to run a perl script to modify them and produce a CSV file with the expected input format for the Csv framework. Refer to the full CsvPerl Reference for more information.
- FindingsPerl**  
 The FindingsPerl framework is used to import findings and attach them to existing artefacts. Optionally, if an artefact cannot be found in your project, the finding can be attached to the root node of the project instead. When launching a Data Provider based on the FindingsPerl framework, a perl script is run first. This perl script is used to generate a CSV file with the expected format which will then be parsed by the framework. Refer to the full FindingsPerl Reference for more information.
- Generic**  
 The Generic framework is the most flexible Data Provider framework, since it allows attaching metrics, findings, textual information and links to artefacts. If the artefacts do not exist in your project, they will be created automatically. It takes one or more CSV files as input (one per type of information you want to import) and works with any type of artefact. Refer to the full Generic Reference for more information.
- GenericPerl**  
 The GenericPerl framework is an extension of the Generic framework that starts by running a perl script in order to generate the metrics, findings, information and links files. It is useful if you have an input file



whose format needs to be converted to match the one expected by the Generic framework, or if you need to retrieve and modify information exported from a web service on your network. Refer to the full GenericPerl Reference for more information.

#### 7. **ExcelMetrics**

The ExcelMetrics framework is used to extract information from one or more Microsoft Excel files (.xls or .xlsx). A detailed configuration file allows defining how the Excel document should be read and what information should be extracted. This framework allows importing metrics, findings and textual information to existing artefacts or artefacts that will be created by the Data Provider. Refer to the full ExcelMetrics Reference for more information.

The Data Providers that are not based on these frameworks can do a lot more than just import information from CSV files. Here is a non-exhaustive list of what some of them do:

- Use XSLT files to transform XML files
- Read information from microsoft Word Files
- Parse HTML test result files
- Query web services
- Export data from OSLC systems
- Launch external processes

If you are interested in developing Data Providers that go beyond the scope of what is described in the open frameworks, consult Squoring Technologies to learn more about the available training courses in writing Data Providers.

### 5.60.2. Extending a Framework

After you choose the framework to extend, you should follow these steps to make your custom Data Provider known to Squore:


1. Create a new configuration `tools` folder to save your work in your custom configuration folder: `MyConfiguration/configuration/tools`.
2. Create a new folder for your data provider inside the new `tools` folder: **CustomDP**. This folder needs to contain the following files:
  - **form.xml** defines the input parameters for the Data Provider, and the base framework to use
  - **form\_en.properties** contains the strings displayed in the web interface for this Data Provider
  - **config.tcl** contains the parameters for your custom Data Provider that are specific to the selected framework
  - **CustomDP.pl** is the perl script that is executed automatically if your custom Data Provider uses one of the \*Perl frameworks.
3. Edit Squore Server's configuration file to register your new configuration path, as described in the Installation and Administration Guide.
4. Log into the web interface as a Squore administrator and reload the configuration.

Your new Data Provider is now known to Squore and can be triggered in analyses. Note that you may have to modify your Squore configuration to make your wizard aware of the new Data Provider and your model aware of the new metrics it provides. Refer to the relevant sections of the Configuration Guide for more information.

### 5.60.3. Data Provider Parameters

A Data Provider's parameters are defined in a file called `form.xml`. The following is an example of `form.xml` for a Data Provider extending the GenericPerl framework:

▼ CustomDP



ux   
 tests  it   
 ut   
 ignore\_missing\_sources  
 input\_file   
 old\_results  Exclude  Include  
 password\*

CustomDP parameters

```

<?xml version="1.0" encoding="UTF-8"?>
<tags baseName="GenericPerl" needSources="true" image="CustomDP.png"
projectStatusOnFailure="ERROR">
  <tag type="multipleChoice" displayType="checkbox" optionTitle=" " key="tests">
    <value key="ux" option="usability" />
    <value key="it" option="integration" />
    <value key="ut" option="unit" />
  </tag>
  <tag type="booleanChoice" key="ignore_missing_sources" defaultValue="false" />
</tags>
  <tag type="text" key="input_file" defaultValue="myFile.xml"
changeable="false" />
  <tag type="multipleChoice" key="old_results" style="margin-left:10px"
displayType="radioButton" defaultValue="Exclude">
    <value key="Exclude" />
    <value key="Include" />
  </tag>
  <tag type="text" key="java_path" defaultValue="/usr/bin/java" hide="true" />
  <tag type="password" required="true" key="password" />
</tags>
  
```

The **tags** element accepts the following attributes:

- **baseName (mandatory)** indicates which framework you are basing this Data Provider on
- **needSources (optional, default: false)** allows specifying whether the Data Provider requires sources or not. When set to true, an error will be displayed if you try to select this Data Provider without adding any Repository Connector to your project.
- **image (optional, default: none)** allows displaying a logo in the web UI for the Data Provider
- **projectStatusOnFailure (optional, default: ERROR)** defines what status the project ends in when this Data Provider produces an error. The following values are allowed:
  - **IGNORE**

- **WARNING**
- **ERROR**
- **projectStatusOnWarning (optional, default: WARNING)** defines what status the project ends in when this Data Provider produces a warning. The following values are allowed:
  - **IGNORE**
  - **WARNING**
  - **ERROR**

Each `tag` element is a Data Provider option and allows the following attributes:

- **key (mandatory)** is the option's key that will be passed to the perl script, or can be used to specify the parameter's value from the command line
- **type (mandatory)** defines the type of the parameter. The following values are accepted:
  - **text** for free text entry
  - **password** for password fields
  - **booleanChoice** for a boolean
  - **multipleChoice** for offering a selection of predefined values

#### Note

Predefined values are specified with a `value` element with a mandatory `key` attribute and an optional `option` attribute that allows modifying the value of the option from the UI.

- **displayType (optional)** allows specifying how to display a `multipleChoice` parameter by using one of:
  - **comboBox**
  - **radioButton**
  - **checkbox**
- **defaultValue (optional, default: empty)** is the value used for the parameter when not specified
- **hide (optional, default: false)** allows hiding a parameter from the web UI, which is useful when combining it with a default value
- **changeable (optional, default: true)** allows making a parameter configurable only when creating the project but read-only for following analyses when set to true
- **style (optional, default: empty)** allows setting basic css for the attribute in the web UI
- **required (optional, default: false)** allows showing a red asterisk next to the field in the web UI to make it visibly required. Note that this is only a visual aid at the moment and cannot be used to force users to enter a value for the parameter.

### 5.60.4. Localising your Data Provider

In order to display your Data Provider parameters in different languages in the web UI, your Data Provider's `form.xml` does not contain any hard-coded strings. Instead, Squore uses each parameter's `key` attribute to dynamically retrieve a translation from a `form_xx.properties` file located next to `form.xml`.

When you create a Data Provider, it is mandatory to include at least an English version of the strings in a file called `form_en.properties`. You are free to add other languages as needed. Here is a sample `.properties` for for the CustomDP you created in the previous section:

```
FORM.GENERAL.NAME = CustomDP
```

```
FORM.DASHBOARD.NAME = Test Status
FORM.GENERAL.DESCR = CustomDP imports test results for my project
FORM.GENERAL.URL = http://example.com/CustomDP

TAG.tests.NAME = Test Types
TAG.tests.DESCR = Check the boxes next to the types of test results contained in
the results

TAG.ignore_missing_sources.NAME = Ignore Missing Sources

TAG.input_file.NAME = Test Results
TAG.input_file.DESCR = Specify the absolute path to the file containing the test
results

TAG.old_results.NAME = Old Test Results
TAG.old_results.DESCR = If the previous analysis contained results that are not
in this results file, what do you want to do with the old results?
OPT.Exclude.NAME = discard
OPT.Include.NAME = keep

TAG.password.NAME = File Password
TAG.password.DESCR = Specify the password to decrypt the test results file
```

The syntax for the `.properties` file is as follows:

- **FORM.GENERAL.NAME** is the display name of the Data Provider in the project wizard
- **FORM.DASHBOARD.NAME** is the display name of the Data Provider in the Explorer
- **FORM.GENERAL.DESCR** is the description displayed in the Data Provider's tooltip in the web UI
- **FORM.GENERAL.URL** is a reference URL for the Data Provider. Note that it is not displayed in the web UI yet.
- **TAG.tag\_name.NAME** allows setting the display name of a parameter
- **TAG.tag\_name.DESCR** is a help text displayed in a tooltip next to the Data Provider option in the web UI
- **OPT.option\_name.NAME** allows setting the display name of an option

Using the `form_en.properties` above for CustomDP results in the following being displayed in the web UI when launching an analysis:

▼ CustomDP

usability

Test Types  integration

unit

Ignore Missing Sources

Test Results

Old Test Results  discard  keep

File Password \*

If the previous analysis contained results that are not in this results file, what do you want to do with the old results?

CustomDP pulling translations from a `.properties` file

## 6. Cloning Detection

This chapter lists the various metrics collected in Squore when running the cloning detection tool, as well as the violations presented in the Findings tab of the web interface.

Note that the concepts used for cloning detection in Squore are based on the notions of `longest common subsequence problem` ([http://en.wikipedia.org/wiki/Longest\\_common\\_subsequence\\_problem](http://en.wikipedia.org/wiki/Longest_common_subsequence_problem)) and `longest repeated substring problem` ([http://en.wikipedia.org/wiki/Longest\\_repeated\\_substring\\_problem](http://en.wikipedia.org/wiki/Longest_repeated_substring_problem)).

### 6.1. Cloning Metrics

None of the metrics below are set by the cloning detection tool if thresholds are not met. That is, if an artefact has no CC measure in the output file, that does NOT mean that it has no line in common with other artefacts. In models, metrics default to 0 though.

The two main thresholds are:

- A minimum size, to skip small artefacts
- A minimum cloning ratio, to keep only similar artefacts

#### 6.1.1. CC - Code Cloned

Length of the highest Longest Common Substring (LCS) among all cloned artefacts.

Clones are looked in the whole application, in artefacts with the same language and the same type.

- Textual detection, using lines, with trailing spaces removed
- Two artefacts are cloned if they have 90% of lines in common, for  $LC \geq 10$

**Scope:** all artefacts but the root node.

#### 6.1.2. CFTC - Control Flow Token (CFT) Cloned

Length of the highest LCS among all cloned CFT.

Clones are looked in the whole application, in artefacts with the same language and the same type.

- Algorithmic detection, using CFT characters
- Two artefacts are cloned if they have 90% of characters in common, for  $CFT \geq 50$

**Scope:** all artefacts but the root node.

#### 6.1.3. CAC - Children Artefact Cloned

Number of clones in direct children of an artefact.

Parent clones are looked in the whole application, in artefacts with the same language and the same type.

Two classes may have two methods in common, for example, without being cloned. The CAC metric for these two classes will be two (assuming that they only have these two methods in common). Such artefacts should be re-factored (using inheritance for example).

- Use both textual ( $CC > 0$ ) and algorithmic ( $CFTC > 0$ ) cloning when counting
- Two parent artefacts are cloned if 25% of their direct children are cloned

→ Small children artefacts ( $LC < 10$ ) are taken in account, using exact comparison

**Scope:** all artefacts but the root node.

#### 6.1.4. CN - Clones Number

Number of cloned artefacts.

Clones are looked in the whole application, in artefacts with the same language and the same type.

→ Use both textual ( $CC > 0$ ) and algorithmic ( $CFTC > 0$ ) cloning when counting

**Scope:** all artefacts but the root node.

#### 6.1.5. RS - Repeated Substrings (Repeated Code Blocks)

Length of all Repeated Substrings in the artefact definition.

That is, duplicated blocks in a function for example.

→ Textual detection, using lines, with trailing spaces removed

→ The metric is triggered if blocks longer than 10 are found, for  $LC \geq 10$

**Scope:** files and all children artefacts.

#### 6.1.6. CFTRS - Repeated Substrings in Control Flow Token

Length of all Repeated Substrings in the artefact CFT.

That is, duplicated algorithmic blocks in a function for example.

→ Algorithmic detection, using CFT characters

→ The metric is triggered if blocks longer than 20 are found, for  $CFT \geq 50$

**Scope:** artefacts with a CFT, like functions.

#### 6.1.7. ICC - Inner Code Cloned

Number of duplicated lines in an artefact.

Clones are looked in all descendants of the artefact. This basically sums all duplicated lines in descendants.

→ Use textual cloning ( $CC > 0$ ) when counting

**Scope:** all artefacts.

#### 6.1.8. ICFTC - Inner Control Flow Token Cloned

Number of duplicated tokens in an artefact.

Clones are looked in all descendants of the artefact. This basically sums all cloned tokens in descendants.

→ Use algorithmic cloning ( $CFTC > 0$ ) when counting

**Scope:** all artefacts.

## 6.2. Cloning Violations

This section lists all the findings that are reported by Squore cloning detection tool.

### 6.2.1. CC (R\_NOCC)

Avoid code duplication.

- Similar artefacts (transitive closure) are part of the same violation
- Use artefacts with textual cloning (CC > 0) when grouping

**Scope:** files and all children artefacts.

### 6.2.2. CFTC (R\_NOCFTC)

Avoid algorithmic cloning.

- Similar artefacts (transitive closure) are part of the same violation
- Use artefacts with algorithmic cloning (CFTC > 0) when grouping

**Scope:** artefacts with a CFT, like functions.

### 6.2.3. CAC (R\_NOCAC)

Consider refactorisation.

- Similar artefacts (transitive closure) are part of the same violation
- Use "refactorable" artefacts (CAC > 0) when grouping

**Scope:** files and all children artefacts.

### 6.2.4. RS (R\_NORS)

Consider refactorisation.

- One violation per "refactorable" artefact (RS > 0)

**Scope:** files and all children artefacts.

### 6.2.5. CFTRS (R\_NOCFTRS)

Consider algorithmic refactorisation.

- One violation per "refactorable" artefact (CFTRS > 0)

**Scope:** artefacts with a CFT, like functions.



## 7. Glossary

### 7.1. Acceptance Testing

Formal testing conducted to enable a user, customer, or other authorised entity to determine whether to accept a system or component. [ SIGIST ]

#### Other Definitions

Acceptance Testing [ IEEE 610.12 ]: Formal testing conducted to determine whether or not a system satisfies its acceptance criteria and to enable the customer to determine whether or not to accept the system.

#### See also

Standards:

- SIGIST
- IEEE 610.12

External Links:

- Wikipedia article: Acceptance\_testing [http://en.wikipedia.org/wiki/Acceptance\_testing]

### 7.2. Accessibility

Usability of a product, service, environment or facility by people with the widest range of capabilities. [ ISO/IEC/IEEE 24765, ISO/IEC 25062 ]

#### Notes

- Although "accessibility" typically addresses users who have disabilities, the concept is not limited to disability issues. [ ISO/IEC/IEEE 24765 ]

#### See also

Standards:

- ISO/IEC 25062
- ISO/IEC/IEEE 24765

### 7.3. Accuracy

The capability of the software product to provide the right or agreed results or effects with the needed degree of precision. [ ISO/IEC 9126-1 ]

#### Other Definitions

Accuracy [ ISO/IEC/IEEE 24765 ]:

1. A qualitative assessment of correctness, or freedom from error.
2. A quantitative measure of the magnitude of error

## See also

Standards:

- ISO/IEC 9126-1
- ISO/IEC/IEEE 24765

## 7.4. Accuracy of Measurement

The closeness of the agreement between the result of a measurement and the true value of the measurand. [ ISO/IEC 14143-3, ISO/IEC/IEEE 24765 ]

### Notes

- Accuracy is a qualitative concept. The term precision should not be used for "accuracy"<sup>1</sup>. A true value is a value consistent with the definition of a given particular quantity and this is a value that would be obtained by a perfect measurement. In contexts where perfect measurement is not practically feasible, a conventional true value is a value attributed to a particular quantity and accepted, sometimes by convention, as having an uncertainty appropriate for a given purpose. 'Conventional true value', in the same reference, is sometimes called assigned value, best estimate of the value, conventional value or reference value. The accuracy should be expressed in terms of the Mean magnitude of relative error. [ ISO/IEC 14143-3 ]

## See also

Standards:

- ISO/IEC 99
- ISO/IEC 14143
- ISO/IEC/IEEE 24765

## 7.5. Acquirer

Individual or organisation that procures a system, software product, or software service from a supplier. [ ISO/IEC 9126-1, ISO/IEC 15939 ]

### Other Definitions

Acquirer [ ISO/IEC/IEEE 24765, ISO/IEC 12207 ]: Stakeholder that acquires or procures a product or service from a supplier.

Acquirer [ IEEE 1058, ISO/IEC 15288 ]: The individual or organization that specifies requirements for and accepts delivery of a new or modified software product and its documentation.

### Notes

- The acquirer may be internal or external to the supplier organization. Acquisition of a software product may involve, but does not necessarily require, a legal contract or a financial transaction between the acquirer and supplier. [ ISO/IEC/IEEE 24765 ]
- "buyer", "customer", "owner", "purchaser" are synonyms for acquirer. [ ISO/IEC/IEEE 24765 ]

---

<sup>1</sup> ISO/IEC 99:2007 International vocabulary of metrology - Basic and general concepts and associated terms

## See also

Glossary:

→ Supplier

Standards:

- IEEE 1058
- ISO/IEC 9126-1
- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC 15939
- ISO/IEC/IEEE 24765

## 7.6. Action

Element of a step that a user performs during a procedure. [ ISO/IEC 26514 ]

## See also

Glossary:

- Procedure
- Step
- Task

Standards:

- ISO 5806
- ISO/IEC 26514

## 7.7. Activity

Any step taken or function performed, both mental and physical, toward achieving some objective. Activities include all the work the managers and technical staff do to perform the tasks of the project and organization. [ CMMi ]

## Other Definitions

Activity [ ISO/IEC 12207, ISO/IEC 15288 ]: Set of cohesive tasks of a process.

Activity [ IEEE 1490 ]: A component of work performed during the course of a project.

Activity [ ISO/IEC 14756 ]: An order submitted to the system under test (SUT) by a user or an emulated user demanding the execution of a data processing operation according to a defined algorithm to produce specific output data from specific input data and (if requested) stored data.

Activity [ IEEE 1074 ]: A defined body of work to be performed, including its required input information and output information

Activity [ ISO/IEC 90003 ]: Collection of related tasks.

Activity [ IEEE 829 ]: Element of work performed during the implementation of a process.

## Notes

- An activity normally has an expected duration, cost, and resource requirements. Activities are often subdivided into tasks. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Task

Standards:

- CMMi
- IEEE 829
- IEEE 1074
- IEEE 1490
- ISO/IEC 12207
- ISO/IEC 14756
- ISO/IEC 15288
- ISO/IEC 90003
- ISO/IEC/IEEE 24765

## 7.8. Actor

A role (with respect to that action) in which the enterprise object fulfilling the role participates in the action. [ ISO/IEC 15414 ]

## See also

Standards:

- ISO/IEC 15414

## 7.9. Adaptability

The capability of the software product to be adapted for different specified environments without applying actions or means other than those provided for this purpose for the software considered. [ ISO/IEC 9126-1 ]

## Notes

- Adaptability includes the scalability of internal capacity (e.g. screen fields, tables, transaction volumes, report formats, etc.). [ ISO/IEC 9126-1 ]
- If the software is to be adapted by the end user, adaptability corresponds to suitability for individualisation as defined in ISO 9241-10, and may affect operability. [ ISO/IEC 9126-1 ]

## See also

Glossary:

→ Changeability

→ Flexibility

Standards:

→ ISO/IEC 9126-1

→ IEEE 610.12

## 7.10. Agreement

Mutual acknowledgement of terms and conditions under which a working relationship is conducted. [ ISO/IEC 12207, ISO/IEC 15288 ]

### See also

Standards:

→ ISO/IEC 12207

→ ISO/IEC 15288

## 7.11. Analysability

The capability of the software product to be diagnosed for deficiencies or causes of failures in the software, or for the parts to be modified to be identified. [ ISO/IEC 9126-1 ]

### See also

→ ISO/IEC 9126-1

## 7.12. Analysis Model

Algorithm or calculation combining one or more base and/or derived measures with associated decision criteria. [ ISO/IEC 25000 ]

### See also

Standards:

→ ISO/IEC 25000

## 7.13. Architecture

Fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution. [ ISO/IEC 15288 ]

### Notes

→ Architecture sometimes refers to the design of a system's hardware and software components. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC 15288
- ISO/IEC/IEEE 24765

## 7.14. Attractiveness

The capability of the software product to be attractive to the user. [ ISO/IEC 9126-1 ]

### Other Definitions

Other definitions of this word are..

## See also

- ISO/IEC 9126-1

## 7.15. Attribute

A measurable physical or abstract property of an entity. [ ISO/IEC 12207, ISO/IEC 14598 ]

### Other Definitions

Attribute [ IEEE 610.12 ]: A characteristic of an item; for example, the item's color, size, or type.

Attribute [ ISO/IEC 15939, ISO/IEC 25000 ]: Inherent property or characteristic of an entity that can be distinguished quantitatively or qualitatively by human or automated means.

Attribute for Quality Measure [ ISO/IEC 25000 ]: Attribute that relates to software product itself, to the use of the software product or to its development process.

### Notes

- Can refer either to general characteristics such as reliability, maintainability, and usability or to specific features of a software product. ISO 9000 distinguishes two types of attributes: a permanent characteristic existing inherently in something; and an assigned characteristic of a product, process or system (e.g. the price of a product, the owner of a product). The assigned characteristic is not an inherent quality characteristic of that product, process or system. An attribute expresses some characteristic that is generally common to the instances of a class. The name of the attribute is the name of the role that the value class plays in describing the class, which may simply be the name of the value class (as long as using the value class name does not cause ambiguity). [ ISO/IEC/IEEE 24765 ]
- Attributes for quality measure are used in order to obtain quality measure elements. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- External Attribute
- Internal Attribute
- Optional Attribute

Standards:

- IEEE 610.12
- ISO/IEC 12207
- ISO/IEC 14598
- ISO/IEC 15939
- ISO/IEC/IEEE 24765

## 7.16. Availability

The degree to which a system or component is operational and accessible when required for use. [ ISO/IEC 20000 ]

### Other Definitions

Availability [ ISO/IEC 20000 ]: Ability of a component or service to perform its required function at a stated instant or over a stated period of time.

### Notes

- Often expressed as a probability. Availability is usually expressed as a ratio of the time that the service is actually available for use by the business to the agreed service hours. [ ISO/IEC 25000 ]

### See also

Glossary:

- Fault Tolerance

Standards:

- ISO/IEC 25000

## 7.17. Base Measure

Measure defined in terms of an attribute and the method for quantifying it. [ ISO/IEC 99, ISO/IEC 15939, ISO/IEC 25000 ]

### Notes

- A base measure is functionally independent of other measures. [ ISO/IEC 15939 ]

### See also

Glossary:

- Measure
- Derived Measure
- Direct Measure
- External Measure
- Indirect Measure
- Internal Measure

Standards:

- ISO/IEC 99
- ISO/IEC 15939
- ISO/IEC 25000

## 7.18. Baseline

Formally approved version of a configuration item, regardless of media, formally designated and fixed at a specific time during the configuration item's life cycle. [ ISO/IEC 19770-1 ]

### Other Definitions

Baseline [ ISO/IEC 12207, ISO/IEC 15288 ]: Specification or product that has been formally reviewed and agreed upon, that thereafter serves as the basis for further development, and that can be changed only through formal change control procedures.

Baseline [ ISO/IEC 20000 ]: Snapshot of the state of a service or individual configuration items at a point in time.

Baseline [ IEEE 1490 ]: An approved plan (for a project), plus or minus approved changes. It is compared to actual performance to determine if performance is within acceptable variance thresholds. Generally refers to the current baseline, but may refer to the original or some other baseline. Usually used with a modifier (e.g., cost performance baseline, schedule baseline, performance measurement baseline, technical baseline).

### Notes

- A baseline should be changed only through formal configuration management procedures. Some baselines may be project deliverables while others provide the basis for further work. Baselines, plus approved changes from those baselines, constitute the current configuration identification. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Configuration Management

Standards:

- IEEE 1490
- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC 20000
- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.19. Branch

A Branch is either:

- a conditional transfer of control from any statement to any other statement in a component, or
- an unconditional transfer of control from any statement to any other statement in the component except the next statement, or



- when a component has more than one entry point, a transfer of control to an entry point of the component. [ SIGIST ]

## Other Definitions

Branch [ ISO/IEC/IEEE 24765 ]:

1. a computer program construct in which one of two or more alternative sets of program statements is selected for execution.
2. a point in a computer program at which one of two or more alternative sets of program statements is selected for execution.
3. to perform the selection in (1).
4. any of the alternative sets of program statements in (1).
5. a set of evolving source file versions.

## Notes

- Every branch is identified by a tag. Often, a branch identifies the file versions that have been or will be released as a product release. May denote unbundling of arrow meaning, i.e., the separation of object types from an object type set. Also refers to an arrow segment into which a root arrow segment has been divided. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Branch Coverage

Standards:

- SIGIST
- ISO/IEC/IEEE 24765

## 7.20. Branch Coverage

The percentage of branches that have been exercised by a test case suite. [ SIGIST ]

## See also

Glossary:

- Branch
- Coverage

Standards:

- SIGIST

## 7.21. Branch Testing

Testing designed to execute each outcome of each decision point in a computer program. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Path Testing
- Statement Testing
- Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.22. Budget

The approved estimate for the project or any work breakdown structure component or any schedule activity. [ IEEE 1490 ]

### Notes

- Often used also to refer to work effort as well as, or instead of, money. [ IEEE 1490 ]

## See also

Standards:

- IEEE 1490

## 7.23. Build

An operational version of a system or component that incorporates a specified subset of the capabilities that the final product will provide. [ IEEE 610.12, ISO/IEC/IEEE 24765 ]

## See also

Standards:

- IEEE 610.12
- ISO/IEC/IEEE 24765

## 7.24. Call Graph

A diagram that identifies the modules in a system or computer program and shows which modules call one another. [ ISO/IEC/IEEE 24765 ]

### Notes

- The result is not necessarily the same as that shown in a structure chart. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC/IEEE 24765

## 7.25. Capability Maturity Model

Model that contains the essential elements of effective processes for one or more disciplines and describes an evolutionary improvement path from ad hoc, immature processes to disciplined, mature processes with improved quality and effectiveness. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Capability Maturity Model [ CMMi ]: A description of the stages through which software organizations evolve as they define, implement, measure, control, and improve their software processes. This model provides a guide for selecting process improvement strategies by facilitating the determination of current process capabilities and the identification of the issues most critical to software quality and process improvement.

### See also

Standards:

- CMMi
- ISO/IEC/IEEE 24765

## 7.26. Certification

A formal demonstration that a system or component complies with its specified requirements and is acceptable for operational use. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Certification [ ISO/IEC/IEEE 24765 ]:

1. A written guarantee that a system or component complies with its specified requirements and is acceptable for operational use.
2. The process of confirming that a system or component complies with its specified requirements and is acceptable for operational use.

### Example

- A written authorization that a computer system is secure and is permitted to operate in a defined environment. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Certification Criteria

Standards:

- ISO/IEC/IEEE 24765

## 7.27. Certification Criteria

A set of standards, rules, or properties to which an asset must conform in order to be certified to a certain level. [ ISO/IEC/IEEE 24765 ]

## Notes

- Certification criteria are defined by a certification policy. Certification criteria may be specified as a set of certification properties that must be met. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Certification

Standards:

- ISO/IEC/IEEE 24765

## 7.28. Change Control Board

A formally constituted group of stakeholders responsible for reviewing, evaluating, approving, delaying, or rejecting changes to a project, with all decisions and recommendations being recorded. [ IEEE 1490 ]

## See also

Standards:

- IEEE 1490

## 7.29. Change Control System

A collection of formal documented procedures that define how project deliverables and documentation will be controlled, changed, and approved. [ IEEE 1490, ISO/IEC/IEEE 24765 ]

## Notes

- In most application areas, the change control system is a subset of the configuration management system. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Change Management
- Configuration Management

Standards:

- IEEE 1490
- ISO/IEC/IEEE 24765

## 7.30. Change Management

Judicious use of means to effect a change, or a proposed change, to a product or service. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Change Control System
- Configuration Management

Standards:

- ISO/IEC/IEEE 24765

## 7.31. Changeability

The capability of the software product to enable a specified modification to be implemented. [ ISO/IEC 9126-1 ]

### Notes

- Implementation includes coding, designing and documenting changes. [ ISO/IEC 9126-1 ]
- If the software is to be modified by the end user, changeability may affect operability. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Flexibility

Standards:

- ISO/IEC 9126-1

## 7.32. Co-existence

The capability of the software product to co-exist with other independent software in a common environment sharing common resources. [ ISO/IEC 9126-1 ]

## See also

Standards:

- ISO/IEC 9126-1

## 7.33. Code

In software engineering, computer instructions and data definitions expressed in a programming language or in a form output by an assembler, compiler, or other translator. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Code (verb) [ ISO/IEC/IEEE 24765 ]: To express a computer program in a programming language.

## See also

Glossary:

→ Coding

Standards:

→ ISO/IEC/IEEE 24765

## 7.34. Code Coverage

An analysis method that determines which parts of the software have been executed (covered) by the test case suite and which parts have not been executed and therefore may require additional attention. [ SIGIST ]

### See also

Glossary:

→ Coverage

Standards:

→ SIGIST

## 7.35. Code Freeze

A period during which non-critical changes to the code are not allowed. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Code

→ Feature Freeze

Standards:

→ ISO/IEC/IEEE 24765

## 7.36. Code Review

A meeting at which software code is presented to project personnel, managers, users, customers, or other interested parties for comment or approval. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Code

→ Coding

Standards:

→ ISO/IEC/IEEE 24765

## 7.37. Code Verification

Ensures by static verification methods the conformance of source code to the specified design of the software module, the required coding standards, and the safety planning requirements. [ IEC 61508-3 ]

### See also

→ IEC 61508-3

## 7.38. Coding

In software engineering, the process of expressing a computer program in a programming language. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Coding [ ISO/IEC/IEEE 24765 ]: The transforming of logic and data from design specifications (design descriptions) into a programming language.

### See also

Glossary:

→ Code

Standards:

→ ISO/IEC/IEEE 24765

## 7.39. Cohesion

In software design, a measure of the strength of association of the elements within a module. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Cohesion [ ISO/IEC/IEEE 24765 ]: The manner and degree to which the tasks performed by a single software module are related to one another.

### Notes

→ Types include coincidental, communicational, functional, logical, procedural, sequential, and temporal. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Coupling

Standards:

→ ISO/IEC/IEEE 24765

## 7.40. Commercial-Off-The-Shelf (COTS)

Software defined by a market-driven need, commercially available, and whose fitness for use has been demonstrated by a broad spectrum of commercial users. [ ISO/IEC 25051 ]

### Notes

- COTS software product includes the product description (including all cover information, data sheet, web site information, etc.), the user documentation (necessary to install and use the software), the software contained on a computer sensible media (disk, CD-ROM, internet downloadable, etc.). Software is mainly composed of programs and data. This definition applies also to product descriptions, user documentation and software which are produced and supported as separate manufactured goods, but for which typical commercial fees and licensing considerations may not apply. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Software Product

Standards:

- ISO/IEC 15289
- ISO/IEC 25051
- ISO/IEC 90003
- ISO/IEC/IEEE 24765

## 7.41. Commit

To integrate the changes made to a developer's private view of the source code into a branch accessible through the version control system's repository. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Configuration Management
- Software Repository

Standards:

- ISO/IEC/IEEE 24765

## 7.42. Commitment

An action resulting in an obligation by one or more of the participants in the act to comply with a rule or perform a contract. [ ISO/IEC 15414 ]

### Other Definitions

Commitment [ CMMi ]: A pact that is freely assumed, visible, and expected to be kept by all parties.



## Notes

- The enterprise object(s) participating in an action of commitment may be parties or agents acting on behalf of a party or parties. In the case of an action of commitment by an agent, the principal becomes obligated. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- CMMi
- ISO/IEC 15414
- ISO/IEC/IEEE 24765

## 7.43. Compatibility

The ability of two or more systems or components to perform their required functions while sharing the same hardware or software environment. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Compatibility [ ISO/IEC/IEEE 24765 ]: The ability of two or more systems or components to exchange information.

Compatibility [ ISO/IEC 2382-1 ]: The capability of a functional unit to meet the requirements of a specified interface without appreciable modification.

## See also

Standards:

- ISO/IEC 2382-1
- ISO/IEC/IEEE 24765

## 7.44. Complexity

The degree to which a system's design or code is difficult to understand because of numerous components or relationships among components. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Complexity [ ISO/IEC/IEEE 24765 ]: The degree to which a system or component has a design or implementation that is difficult to understand and verify.

## See also

Glossary:

- Maintainability

Metrics:

- :Category:Complexity Metrics

Standards:

→ ISO/IEC/IEEE 24765

## 7.45. Component

An entity with discrete structure, such as an assembly or software module, within a system considered at a particular level of analysis. [ ISO/IEC 15026 ]

### Other Definitions

Component [ SIGIST ]: A minimal software item for which a separate specification is available.

Component [ IEEE 829 ]: One of the parts that make up a system.

Component [ ISO/IEC 29881 ]: Set of functional services in the software, which, when implemented, represents a well-defined set of functions and is distinguishable by a unique name.

Software Component [ IEEE 1061 ]: A general term used to refer to a software system or an element, such as module, unit, data, or document.

Software Component [ ISO/IEC/IEEE 24765 ]: A functionally or logically distinct part of a software configuration item, distinguished for the purpose of convenience in designing and specifying a complex SCI as an assembly of subordinate elements.

### Notes

→ A component may be hardware or software and may be subdivided into other components. The terms "module," "component," and "unit" are often used interchangeably or defined to be sub-elements of one another in different ways depending upon the context. The relationship of these terms is not yet standardized. A component may or may not be independently managed from the end-user or administrator's point of view. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Configuration Item

Standards:

→ IEEE 829

→ IEEE 1061

→ ISO/IEC 15026

→ ISO/IEC 29881

→ ISO/IEC/IEEE 24765

→ SIGIST

## 7.46. Conciseness

Software attributes that provide implementation of a function with a minimum amount of code. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.47. Condition

A boolean expression containing no boolean operators. For instance  $A < B$  is a condition but  $A$  and  $B$  is not. [ RTCA/EUROCAE ]

## Other Definitions

Condition [ ISO 5806, ISO/IEC/IEEE 24765 ]: a description of a contingency to be considered in the representation of a problem, or a reference to other procedures to be considered as part of the condition.

## See also

Standards:

→ RTCA/EUROCAE

→ ISO/IEC/IEEE 24765

## 7.48. Configuration

The arrangement of a computer system or component as defined by the number, nature, and interconnections of its constituent parts. [ ISO/IEC/IEEE 24765 ]

## Other Definitions

Configuration [ ISO/IEC/IEEE 24765 ]: In configuration management, the functional and physical characteristics of hardware or software as set forth in technical documentation or achieved in a product.

Configuration [ ISO/IEC/IEEE 24765 ]: The arrangement of a system or network as defined by the nature, number, and chief characteristics of its functional units.

Configuration [ ISO/IEC/IEEE 24765 ]: The requirements, design, and implementation that define a particular version of a system or system component.

Configuration [ ISO/IEC 2382-1 ]: The manner in which the hardware and software of an information processing system are organized and interconnected.

## See also

Glossary:

→ Configuration Item

→ Configuration Management

Standards:

→ ISO/IEC 2382-1

→ ISO/IEC/IEEE 24765

## 7.49. Configuration Control

An element of configuration management, consisting of the evaluation, coordination, approval or disapproval, and implementation of changes to configuration items after formal establishment of their configuration identification. [ IEEE 610.12, ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Configuration Management

Standards:

→ IEEE 610.12

→ ISO/IEC/IEEE 24765

## 7.50. Configuration Item

Entity within a configuration that satisfies an end use function and that can be uniquely identified at a given reference point. [ ISO/IEC 12207 ]

### Other Definitions

Configuration Item [ ISO/IEC 19770 ]: Item or aggregation of hardware or software or both that is designed to be managed as a single entity.

Configuration Item [ ISO/IEC 20000-1 ]: Component of an infrastructure or an item which is, or will be, under the control of configuration management.

Configuration Item [ ISO/IEC/IEEE 24765 ]: An aggregation of hardware, software, or both, that is designated for configuration management and treated as a single entity in the configuration management process.

Configuration Item [ ISO/IEC/IEEE 24765 ]: Aggregation of work products that is designated for configuration management and treated as a single entity in the configuration management process.

Software Configuration Item [ ISO/IEC/IEEE 24765 ]: A software entity that has been established as a configuration item.

### Notes

→ Configuration items may vary widely in complexity, size and type, ranging from an entire system including all hardware, software and documentation, to a single module or a minor hardware component. [ ISO/IEC/IEEE 24765 ]

→ The SCI (Software Configuration Item) exists where functional allocations have been made that clearly distinguish equipment functions from software functions and where the software has been established as a configurable item. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Configuration

→ Configuration Management

Standards:

- ISO/IEC 12207
- ISO/IEC 19770
- ISO/IEC 20000
- ISO/IEC/IEEE 24765

## 7.51. Configuration Management

A discipline applying technical and administrative direction and surveillance to

- identify and document the functional and physical characteristics of a configuration item,
- control changes to those characteristics, record and report change processing and implementation status, and
- verify compliance with specified requirements. [ IEEE 610.12, ISO/IEC/IEEE 24765 ]

### Other Definitions

Configuration Management <ref name="sting">Software Technology Interest Group On-line Glossary, <http://www.apl.jhu.edu/Notes/Hausler/web/glossary.html> .</ref>: The process of identifying, defining, recording and reporting the configuration items in a system and the change requests. Controlling the releases and change of the items throughout the life-cycle.

Configuration Management [ ISO/IEC 29881 ]: Technical and organizational activities comprising configuration identification, control, status accounting, and auditing.

Software Configuration Management [ ISO/IEC 15846 ]: The process of applying configuration management throughout the software life cycle to ensure the completeness and correctness of Software Configuration Items.

### See also

Glossary:

- Change Management
- Configuration Control
- Configuration Item

Standards:

- IEEE 610.12
- ISO/IEC 15846
- ISO/IEC 29881
- ISO/IEC/IEEE 24765

External Links:

- Wikipedia article: Software Configuration Management [[http://en.wikipedia.org/wiki/Software\\_configuration\\_management](http://en.wikipedia.org/wiki/Software_configuration_management)]

## 7.52. Configuration Management System

The discipline of identifying the components of a continually evolving system to control changes to those components and maintaining integrity and traceability throughout the life cycle. [ ISO/IEC/IEEE 24765 ]

## Notes

- A subsystem of the overall project management system. It is a collection of formal documented procedures used to apply technical and administrative direction and surveillance to:
- \* identify and document the functional and physical characteristics of a product, result, service, or component;
- \* control any changes to such characteristics;
- \* record and report each change and its implementation status; and
- \* support the audit of the products, results, or components to verify conformance to requirements.

:It includes the documentation, tracking systems, and defined approval levels necessary for authorizing and controlling changes. [ IEEE 1490 ]

## See also

Glossary:

- Configuration Management

Standards:

- IEEE 1490
- ISO/IEC/IEEE 24765

## 7.53. Conflict

A change in one version of a file that cannot be reconciled with the version of the file to which it is applied. [ ISO/IEC/IEEE 24765 ]

## Notes

- Conflicts can occur when versions from different branches are merged or when two committers work concurrently on the same file. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Version

Standards:

- ISO/IEC/IEEE 24765

## 7.54. Conformance

The fulfillment by a product, process or service of specified requirements. [ ISO/IEC 12207 ]

## See also

Glossary:

→ Requirement

Standards:

→ ISO/IEC 12207

## 7.55. Connectivity

The capability of a system or device to be attached to other systems or devices without modification. [ ISO/IEC 2382-1 ]

### See also

Standards:

→ ISO/IEC 2382-1

## 7.56. Consistency

The degree of uniformity, standardization, and freedom from contradiction among the documents or parts of a system or component. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Consistency [ ISO/IEC/IEEE 24765 ]: Software attributes that provide uniform design and implementation techniques and notations.

### See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.57. Constraint

A restriction on the value of an attribute or the existence of any object based on the value or existence of one or more others. [ ISO/IEC 15474-1 ]

### Other Definitions

Constraint [ IEEE 1362 ]: An externally imposed limitation on system requirements, design, or implementation or on the process used to develop or modify a system.

Constraint [ IEEE 1490 ]: The state, quality, or sense of being restricted to a given course of action or inaction. An applicable restriction or limitation, either internal or external to a project, which will affect the performance of the project or a process. For example, a schedule constraint is any limitation or restraint placed on the project schedule that affects when a schedule activity can be scheduled and is usually in the form of fixed imposed dates.

Constraint [ IEEE 1233 ]: A statement that expresses measurable bounds for an element or function of the system.

## Notes

- That is, a constraint is a factor that is imposed on the solution by force or compulsion and may limit or modify the design changes. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Requirement

Standards:

- IEEE 1233
- IEEE 1362
- IEEE 1490
- ISO/IEC 15474-1
- ISO/IEC/IEEE 24765

## 7.58. Content Coupling

A type of coupling in which some or all of the contents of one software module are included in the contents of another module. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Control Coupling
- Coupling
- Data Coupling
- Hybrid Coupling
- Pathological Coupling

Standards:

- ISO/IEC/IEEE 24765

## 7.59. Context of Use

Users, tasks, equipment (hardware, software and materials), and the physical and social environments in which a product is used. [ ISO/IEC 25000 ]

## See also

Glossary:

- Environment

Standards:

- ISO/IEC 25000



## 7.60. Contract

Binding agreement between two parties, especially enforceable by law, or a similar internal agreement wholly within an organization. [ ISO/IEC 12207 ]

### Other Definitions

Contract [ IEEE 1490 ]: A mutually binding agreement that obligates the seller to provide the specified product or service or result and obligates the buyer to pay for it.

### See also

Standards:

- IEEE 1490
- ISO/IEC 12207

## 7.61. Control Coupling

A type of coupling in which one software module communicates information to another module for the explicit purpose of influencing the latter module's execution. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Content Coupling
- Coupling
- Data Coupling
- Hybrid Coupling
- Pathological Coupling

Standards:

- ISO/IEC/IEEE 24765

## 7.62. Control Flow

The sequence in which operations are performed during the execution of a computer program. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Control Flow Diagram
- Data Flow

Standards:

- ISO/IEC/IEEE 24765

## 7.63. Control Flow Diagram

A diagram that depicts the set of all possible sequences in which operations may be performed during the execution of a system or program. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Types include box diagram, flowchart, input-process-output chart, state diagram. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Control Flow
- Data Flow Diagram

Standards:

- ISO/IEC/IEEE 24765

## 7.64. Convention

Requirement employed to prescribe a disciplined, uniform approach to providing consistency in a software product, that is, a uniform pattern or form for arranging data. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO/IEC/IEEE 24765

## 7.65. Correctability

The degree of effort required to correct software defects and to cope with user complaints. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Maintainability

Standards:

- ISO/IEC/IEEE 24765

## 7.66. Correctness

The degree to which a system or component is free from faults in its specification, design, and implementation. [ ISO/IEC/IEEE 24765 ]

## Other Definitions

Correctness [ ISO/IEC/IEEE 24765 ]: The degree to which software, documentation, or other items meet specified requirements.

Correctness [ ISO/IEC/IEEE 24765 ]: The degree to which software, documentation, or other items meet user needs and expectations, whether specified or not.

## See also

Glossary:

→ Fault

Standards:

→ ISO/IEC/IEEE 24765

## 7.67. Coupling

The manner and degree of interdependence between software modules. [ ISO/IEC/IEEE 24765 ]

## Other Definitions

Coupling [ ISO/IEC 19759 ]: The strength of the relationships between modules.

Coupling [ ISO/IEC/IEEE 24765 ]: A measure of how closely connected two routines or modules are.

Coupling [ ISO/IEC/IEEE 24765 ]: In software design, a measure of the interdependence among modules in a computer program

## Notes

→ Types include common-environment coupling, content coupling, control coupling, data coupling, hybrid coupling, and pathological coupling. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Cohesion

→ Control Coupling

→ Data Coupling

Standards:

→ ISO/IEC 19759

→ ISO/IEC/IEEE 24765

## 7.68. Coverage

The degree, expressed as a percentage, to which a specified coverage item has been exercised by a test case suite. [ SIGIST ]

## Other Definitions

Test Coverage [ ISO/IEC 12207 ]: Extent to which the test cases test the requirements for the system or software product.

test Coverage [ ISO/IEC/IEEE 24765 ]: The degree to which a given test or set of tests addresses all specified requirements for a given system or component.

## See also

Glossary:

- Code Coverage
- Test Case
- Test Case Suite

Standards:

- ISO/IEC 12207
- ISO/IEC/IEEE 24765
- SIGIST

## 7.69. Criteria

Specific data items identified as contents of information items for appraising a factor in an evaluation, audit, test or review. [ ISO/IEC 15289 ]

## Other Definitions

Criteria [ ISO/IEC 15289 ]: standards, rules, or tests on which a judgment or decision can be based, or by which a product, service, result, or process can be evaluated.

## See also

Glossary:

- Certification Criteria
- Decision Criteria

Standards:

- ISO/IEC 15289

## 7.70. Criticality

The degree to which a system or component is operational and accessible when required for use. [ IEEE 829 ]

## See also

Standards:

- IEEE 829

## 7.71. Custom Software

Software product developed for a specific application from a user requirements specification. [ ISO/IEC 25000 ]

### See also

Glossary:

- Product
- Requirement

Standards:

- ISO/IEC 25000

## 7.72. Customer

Organization or person that receives a product or service. [ ISO/IEC 12207, ISO/IEC 15288 ]

### Other Definitions

Customer [ IEEE 1233 ]: The entity or entities for whom the requirements are to be satisfied in the system being defined and developed.

Customer [ IEEE 1362 ]: An individual or organization who acts for the ultimate user of a new or modified hardware or software product to acquire the product and its documentation.

Customer [ IEEE 830 ]: The person, or persons, who pay for the product and usually (but not necessarily) decide the requirements.

### Notes

- Synonyms of Customer are: acquirer, buyer, beneficiary, purchaser. [ ISO/IEC/IEEE 24765 ]
- A customer can be internal or external to the organization. The customer may be a higher level project. This is the entity to whom the system developer must provide proof that the system developed satisfies the system requirements specified. Customers are a subset of stakeholders. [ ISO/IEC/IEEE 24765 ]
- Example: an end-user of the completed system, an organization within the same company as the developing organization (e.g., System Management). [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Stakeholder

Standards:

- IEEE 830
- IEEE 1233
- IEEE 1362
- ISO/IEC 12207

- ISO/IEC 15288
- ISO/IEC/IEEE 24765

## 7.73. Data

Collection of values assigned to base measures, derived measures, and/or indicators. [ ISO/IEC 15939, ISO/IEC 25000 ]

### Other Definitions

Data [ ISO/IEC/IEEE 24765 ]: A representation of facts, concepts, or instructions in a manner suitable for communication, interpretation, or processing by humans or by automatic means.

Data [ ISO/IEC 2382-1 ]: A reinterpretable representation of information in a formalized manner suitable for communication, interpretation, or communication, or processing.

### See also

Glossary:

- Base Measure
- Derived Measure
- Indicator

Standards:

- ISO/IEC 2382-1
- ISO/IEC 15939
- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.74. Data Coupling

A type of coupling in which output from one software module serves as input to another module. [ ISO/IEC/IEEE 24765 ]

### Notes

- Synonym for Data Coupling: input-output coupling. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Content Coupling
- Control Coupling
- Coupling
- Hybrid Coupling
- Pathological Coupling

Standards:

→ ISO/IEC/IEEE 24765

## 7.75. Data Flow

The sequence in which data transfer, use, and transformation are performed during the execution of a computer program. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Control Flow

Standards:

→ ISO/IEC/IEEE 24765

## 7.76. Data Flow Diagram

A diagram that depicts data sources, data sinks, data storage, and processes performed on data as nodes, and logical flow of data as links between the nodes. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Synonyms for Data Flow Diagram: data flowchart, data flow graph. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Data Flow

→ Control Flow Diagram

Standards:

→ ISO/IEC/IEEE 24765

## 7.77. Data Management

In a data processing system, the functions that provide access to data, perform or monitor the storage of data, and control input-output operations. [ ISO/IEC 2382-1 ]

### Other Definitions

Data Management [ ISO/IEC/IEEE 24765 ]: The disciplined processes and systems that plan for, acquire, and provide stewardship for business and technical data, consistent with data requirements, throughout the data lifecycle.

### See also

Glossary:

→ Data

Standards:

- ISO/IEC 2382-1
- ISO/IEC/IEEE 24765

## 7.78. Data Model

A model about data by which an interpretation of the data can be obtained in the modeling tool industry.  
[ ISO/IEC 15474-1 ]

### Notes

- A data model is one that may be encoded and manipulated by a computer. A data model identifies the entities, domains (attributes), and relationships (associations) with other data and provides the conceptual view of the data and the relationships among data. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Data
- Model

Standards:

- ISO/IEC 15474-1
- ISO/IEC/IEEE 24765

## 7.79. Data Processing

The systematic performance of operations upon data. [ ISO/IEC 2382-1 ]

### Notes

- Example: arithmetic or logic operations upon data, merging or sorting of data, assembling or compiling of programs, or operations on text, such as editing, sorting, merging, storing, retrieving, displaying, or printing. [ ISO/IEC/IEEE 24765 ]
- The term data processing should not be used as a synonym for information processing. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Data

Standards:

- ISO/IEC 2382-1
- ISO/IEC/IEEE 24765

## 7.80. Data Provider



Individual or organisation that is a source of data. [ ISO/IEC 15939 ]

### See also

Standards:

→ ISO/IEC 15939

## 7.81. Data Store

Organised and persistent collection of data and information that allows for its retrieval. [ ISO/IEC 15939 ]

### See also

Standards:

→ ISO/IEC 15939

## 7.82. Data Type

A class of data, characterized by the members of the class and the operations that can be applied to them. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Example: integers, real numbers, and character strings. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Data

Standards:

→ ISO/IEC/IEEE 24765

## 7.83. Database

A collection of data organized according to a conceptual structure describing the characteristics of the data and the relationships among their corresponding entities, supporting one or more application areas. [ ISO/IEC 2382-1 ]

### Other Definitions

Database [ ISO/IEC/IEEE 24765 ]: A collection of interrelated data stored together in one or more computerized files.

Database [ ISO/IEC 29881 ]: Collection of data describing a specific target area that is used and updated by one or more applications.

### See also

Glossary:

- Data
- Data Store

Standards:

- ISO/IEC 2382-1
- ISO/IEC 29881
- ISO/IEC/IEEE 24765

## 7.84. Decision Criteria

Thresholds, targets, or patterns used to determine the need for action or further investigation, or to describe the level of confidence in a given result. [ ISO/IEC 15939, ISO/IEC 25000 ]

### See also

Glossary:

- Criteria

Standards:

- ISO/IEC 15939
- ISO/IEC 25000

## 7.85. Decoupling

The process of making software modules more independent of one another to decrease the impact of changes to, and errors in, the individual modules. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Coupling

Standards:

- ISO/IEC/IEEE 24765

## 7.86. Defect

A flaw in a system or system component that causes the system or component to fail to perform its required function. A defect, if encountered during execution, may cause a failure of the system. [ CMMi ]

### Other Definitions

Defect [ IEEE 1490 ]: An imperfection or deficiency in a project component where that component does not meet its requirements or specifications and needs to be either repaired or replaced.

## Notes

- (1) Omissions and imperfections found during early life cycle phases and (2) faults contained in software sufficiently mature for test or operation. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Failure
- Fault
- Defect Density

Standards:

- CMMi
- IEEE 1490

## 7.87. Degree of Confidence

The degree of confidence that software conforms to its requirements. [ ISO/IEC 15026 ]

## See also

Standards:

- ISO/IEC 15026

## 7.88. Deliverable

Items whose delivery to the customer is a requirement of the contract. [ ISO/IEC 15910 ]

## Other Definitions

Deliverable [ IEEE 1490 ]: Any unique and verifiable product, result, or capability to perform a service that must be produced to complete a process, phase, or project. Often used more narrowly in reference to an external deliverable, which is a deliverable that is subject to approval by the project sponsor or customer.

Deliverable [ ISO/IEC/IEEE 24765 ]: Item<sup>2</sup> to be provided to an acquirer or other designated recipient as specified in an agreement.

Deliverables [ ISO/IEC 15910 ]: Items whose delivery to the customer is a requirement of the contract.

## See also

Glossary:

- Software Product

Standards:

- IEEE 1490

---

<sup>2</sup>This item can be a document, hardware item, software item, service, or any type of work product.

- ISO/IEC 15910
- ISO/IEC/IEEE 24765

## 7.89. Delivery

Release of a system or component to its customer or intended user. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Deliverable

Standards:

- ISO/IEC/IEEE 24765

## 7.90. Dependability

Measure of the degree to which an item is operable and capable of performing its required function at any (random) time during a specified mission profile, given item availability at the start of the mission. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Dependability [ IEEE 982 ]: Trustworthiness of a computer system such that reliance can be justifiably placed on the service it delivers.

### Notes

- Reliability, availability, and maintainability are aspects of dependability. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- IEEE 982
- ISO/IEC/IEEE 24765

## 7.91. Deployment

Phase of a project in which a system is put into operation and cutover issues are resolved. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO/IEC/IEEE 24765

## 7.92. Derived Measure

Measure that is defined as a function of two or more values of base measures. [ ISO/IEC 99, ISO/IEC 15939, ISO/IEC 25000 ]

## Notes

- A derived measure is a measure that is defined as a function of two or more values of base measures. Derived measures capture information about more than one attribute or the same attribute from multiple entities. Simple transformations of base measures (for example, taking the square root of a base measure) do not add information, thus do not produce derived measures. Normalisation of data often involves converting base measures into derived measures that can be used to compare different entities. [ ISO/IEC 15939 ]
- A transformation of a base measure using a mathematical function can also be considered as a derived. [ ISO/IEC 25000 ]

## See also

Glossary:

- Measure
- Base Measure
- Direct Measure
- Indirect Measure

Standards:

- ISO/IEC 99
- ISO/IEC 15939
- ISO/IEC 25000

## 7.93. Design

The process of defining the architecture, components, interfaces, and other characteristics of a system or component. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Design [ ISO/IEC/IEEE 24765 ]: The result of the process of defining the architecture, components, interfaces, and other characteristics of a system or component.

Design [ ISO/IEC/IEEE 24765 ]: The process of defining the software architecture, components, modules, interfaces, and data for a software system to satisfy specified requirements.

Design [ ISO/IEC/IEEE 24765 ]: The process of conceiving, inventing, or contriving a scheme for turning a computer program specification into an operational program.

Design [ ISO/IEC/IEEE 24765 ]: Activity that links requirements analysis to coding and debugging.

Design [ ISO/IEC 26514 ]: Stage of documentation development that is concerned with determining what documentation will be provided in a product and what the nature of the documentation will be.

## See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.94. Design Pattern

A description of the problem and the essence of its solution to enable the solution to be reused in different settings. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Not a detailed specification, but a description of accumulated wisdom and experience. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.95. Developer

Individual or organisation that performs development activities (including requirements analysis, design, testing through acceptance) during the software lifecycle process. [ ISO/IEC 12207, ISO/IEC 9126-1 ]

### Notes

→ May include new development, modification, reuse, reengineering, maintenance, or any other activity that results in software products, and includes the testing, quality assurance, configuration management, and other activities applied to these products. Developers apply methodologies via enactment. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

→ ISO/IEC 9126-1

→ ISO/IEC 12207

→ ISO/IEC/IEEE 24765

## 7.96. Development

Software life cycle process that contains the activities of requirements analysis, design, coding, integration, testing, installation and support for acceptance of software products. [ ISO/IEC 90003, ISO/IEC 12207, ISO/IEC 15939 ]

### Other Definitions

Development [ ISO/IEC 26514 ]: Activity of preparing documentation after it has been designed.

### See also

Glossary:

→ Developer

- Development Testing
- Process
- Software Life Cycle

Standards:

- ISO/IEC 12207
- ISO/IEC 15939
- ISO/IEC 26514
- ISO/IEC 90003

## 7.97. Development Testing

Formal or informal testing conducted during the development of a system or component, usually in the development environment by the developer. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Development Testing [ IEEE 829 ]: Testing conducted to establish whether a new software product or software-based system (or components of it) satisfies its criteria.

### See also

Glossary:

- Acceptance Testing
- Qualification Testing
- Operational Testing
- Testing

Standards:

- IEEE 829
- ISO/IEC/IEEE 24765

## 7.98. Direct Measure

A measure of an attribute that does not depend upon a measure of any other attribute. [ ISO/IEC 14598, ISO/IEC 9126-1 ]

### See also

Glossary:

- Base Measure
- Derived Measure
- Indirect Measure
- Measure

Papers:

→ Software Engineering Metrics: What Do They Measure And How Do We Know

Standards:

→ ISO/IEC 9126-1

→ ISO/IEC 14598

## 7.99. Direct Metric

A metric that does not depend upon a measure of any other attribute. [ IEEE 1061 ]

### See also

Glossary:

→ Direct Measure

→ Indirect Metric

→ Metric

Standards:

→ IEEE 1061

## 7.100. Document

Uniquely identified unit of information for human use, such as a report, specification, manual or book, in printed or electronic form. [ ISO/IEC 9294 ]

### Other Definitions

Document (verb) [ ISO/IEC/IEEE 24765 ]: To add comments to a computer program.

Document [ ISO/IEC 15910 ]: An item of documentation.

Document [ ISO/IEC 20000 ]: Information and its supporting medium.

Document [ ISO/IEC 26514 ]: Separately identified piece of documentation which could be part of a documentation set.

### Notes

→ Example: in software engineering: project plans, specifications, test plans, user manuals. [ ISO/IEC/IEEE 24765 ]

→ Documents include both paper and electronic documents. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Documentation

→ Installation Manual

→ Maintenance Manual



- Operator Manual
- Support Manual
- User Manual

Standards:

- ISO/IEC 9294
- ISO/IEC 15910
- ISO/IEC 20000
- ISO/IEC 26514
- ISO/IEC/IEEE 24765

## 7.101. Documentation

Collection of related documents that are designed, written, produced and maintained. [ ISO/IEC 9294 ]

### Other Definitions

Documentation [ ISO/IEC 26514 ]: Information that explains how to use a software product.

Documentation [ IEEE 829 ]:

1. A collection of documents on a given subject.
2. Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.
3. The process of generating or revising a document.
4. The management of documents, including identification, acquisition, processing, storage, and dissemination.

### Examples

- Printed manuals, on-screen information, and stand-alone online help. [ ISO/IEC 26514 ]

### Notes

- Documentation can be provided as separate documentation or as embedded documentation or both. [ ISO/IEC 26514 ]

### See also

Glossary:

- Document
- Installation Manual
- Maintenance Manual
- Operator Manual
- Programmer Manual
- Support Manual

- Test Documentation
- User Documentation
- User Manual

Standards:

- IEEE 829
- ISO/IEC 9294
- ISO/IEC 26514

## 7.102. Dynamic Analysis

The process of evaluating a system or component based on its behavior during execution. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.103. Earned Value

The value of work performed expressed in terms of the approved budget assigned to that work for a schedule activity or work breakdown structure component. [ IEEE 1490 ]

### See also

Standards:

- IEEE 1490

## 7.104. Effectiveness

The capability of the software product to enable users to achieve specified goals with accuracy and completeness in a specified context of use. [ ISO/IEC 9126-1 ]

### Other Definitions

Effectiveness [ ISO/IEC 25062 ]: The accuracy and completeness with which users achieve specified goals.

### See also

- ISO/IEC 9126-1

## 7.105. Efficiency

Resources expended in relation to the accuracy and completeness with which users achieve goals. [ ISO/IEC 25062 ]

## Other Definitions

Efficiency [ IEEE 610.12, ISO/IEC/IEEE 24765 ]: The degree to which a system or component performs its designated functions with minimum consumption of resources.

Efficiency [ ISO/IEC 9126-1 ]: The capability of the software product to provide appropriate performance, relative to the amount of resources used, under stated conditions.

## Notes

- Resources may include other software products, the software and hardware configuration of the system, and materials (e.g. print paper, diskettes). [ ISO/IEC 9126-1 ]
- For a system which is operated by a user, the combination of functionality, reliability, usability and efficiency can be measured externally by quality in use. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Efficiency Compliance

Standards:

- IEEE 610.12
- ISO/IEC 9126-1
- ISO/IEC/IEEE 24765
- ISO/IEC 25062

## 7.106. Efficiency Compliance

The capability of the software product to adhere to standards or conventions relating to efficiency. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Efficiency

Standards:

- ISO/IEC 9126-1

## 7.107. Effort

The number of labor units required to complete a schedule activity or work breakdown structure component. Usually expressed as staff hours, staff days, or staff weeks. [ IEEE 1490 ]

## See also

Standards:

- IEEE 1490

## 7.108. Encapsulation

A software development technique that consists of isolating a system function or a set of data and operations on those data within a module and providing precise specifications for the module. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Encapsulation [ IEEE 1320 ]: The concept that access to the names, meanings, and values of the responsibilities of a class is entirely separated from access to their realization.

Encapsulation [ ISO/IEC/IEEE 24765 ]: The idea that a module has an outside that is distinct from its inside, that it has an external interface and an internal implementation.

### See also

Standards:

- IEEE 1320
- ISO/IEC/IEEE 24765

## 7.109. End User

Individual person who ultimately benefits from the outcomes of the system. [ ISO/IEC 25000 ]

### Other Definitions

End User [ IEEE 1233 ]: The person or persons who will ultimately be using the system for its intended purpose. [ IEEE 1233 ]

End User [ ISO 9127 ]: The person who uses the software package.

End User [ ISO/IEC 29881 ]: Any person that communicates or interacts with the software at any time.

### See also

Standards:

- IEEE 1233
- ISO 9127
- ISO/IEC 25000
- ISO/IEC 29881

## 7.110. Entity

Object<sup>3</sup> that is to be characterised by measuring its attributes. [ ISO/IEC 15939, ISO/IEC 25000 ]

### Other Definitions

Entity [ IEEE 1320 ]: The representation of a set of real or abstract things that are recognized as the same type because they share the same characteristics and can participate in the same relationships.

---

<sup>3</sup>An object can be a process, product, project, or resource.

Entity [ ISO/IEC 15474 ]: An object (i.e., thing, event or concept) that occurs in a model (i.e., transfer).

Entity [ ISO/IEC/IEEE 24765 ]: In computer programming, any item that can be named or denoted in a program.

Entity [ ISO/IEC 29881 ]: Logical component of the data store, representing fundamental things of relevance to the user, and about which persistent information is stored.

## Examples

→ A data item, program statement, or subprogram. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- IEEE 1320
- ISO/IEC 15474
- ISO/IEC 15939
- ISO/IEC/IEEE 24765
- ISO/IEC 25000
- ISO/IEC 29881

## 7.111. Entry Point

A point in a software module at which execution of the module can begin. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Exit

Standards:

- ISO/IEC/IEEE 24765

## 7.112. Environment

The configuration(s) of hardware and software in which the software operates. [ ISO 9127 ]

## Other Definitions

Environment [ IEEE 1362 ]: The circumstances, objects, and conditions that surround a system to be built.

Environment [ IEEE 1233 ]: The circumstances, objects, and conditions that will influence the completed system.

Environment [ IEEE 1320 ]: A concept space, i.e., an area in which a concept has an agreed-to meaning and one or more agreed-to names that are used for the concept.

## See also

Standards:

- IEEE 1233
- IEEE 1320
- IEEE 1362
- ISO 9127

## 7.113. Error

A human action that produces an incorrect result, such as software containing a fault. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Error [ ISO/IEC/IEEE 24765 ]:

1. An incorrect step, process, or data definition.
2. An incorrect result
3. The difference between a computed, observed, or measured value or condition and the true, specified, or theoretically correct value or condition.

### Notes

- Example: omission or misinterpretation of user requirements in a software specification, incorrect translation, or

omission of a requirement in the design specification. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Defect
- Failure
- Fault

Standards:

- ISO/IEC/IEEE 24765

## 7.114. Error Tolerance

The ability of a system or component to continue normal operation despite the presence of erroneous inputs. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Fault Tolerance
- Robustness

Standards:

- ISO/IEC/IEEE 24765

## 7.115. Evaluation

Systematic determination of the extent to which an entity meets its specified criteria. [ ISO/IEC 12207 ]

### Other Definitions

Evaluation [ ISO/IEC 15414 ]: An action that assesses the value of something.

### Notes

- Example: The action by which an ODP system assigns a relative status to some thing according to estimation by the system. Value can be considered in terms of usefulness, importance, preference, acceptability, etc.; the evaluated target may be a credit rating, a system state, a potential behavior. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Evaluation Activity
- Evaluation Group
- Evaluation Method
- Evaluation Module
- Evaluation Technology

Standards:

- ISO/IEC 12207
- ISO/IEC 15414
- ISO/IEC/IEEE 24765

## 7.116. Evaluation Activity

Assessment of a software product against identified and applicable quality characteristics performed using applicable techniques or methods. [ ISO/IEC 25001 ]

### See also

Glossary:

- Evaluation
- Evaluation Group
- Evaluation Method
- Evaluation Module
- Evaluation Technology

Standards:

- ISO/IEC 25001

## 7.117. Evaluation Group

Organization responsible for specifying the software quality requirements as well as managing and implementing the software quality evaluation activities through the provision of technology, tools, experiences, and management skills. [ ISO/IEC 25001 ]

## See also

Glossary:

- Evaluation
- Evaluation Activity
- Evaluation Method
- Evaluation Module
- Evaluation Technology

Standards:

- ISO/IEC 25001

## 7.118. Evaluation Method

Procedure describing actions to be performed by the evaluator in order to obtain results for the specified measurement applied to the specified product components or on the product as a whole. [ ISO/IEC 25000 ]

## See also

Glossary:

- Evaluation
- Evaluation Activity
- Evaluation Group
- Evaluation Module
- Evaluation Technology

Standards:

- ISO/IEC 25000

## 7.119. Evaluation Module

A package of evaluation technology for a specific software quality characteristic or sub-characteristic. [ ISO/IEC 9126-1, ISO/IEC 14598 ]

## Notes

- The package includes evaluation methods and techniques, inputs to be evaluated, data to be measured and collected and supporting procedures and tools. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Evaluation



- Evaluation Activity
- Evaluation Group
- Evaluation Method
- Evaluation Technology

Standards:

- ISO/IEC 9126-1
- ISO/IEC 14598

## 7.120. Evaluation Technology

Technique, processes, tools, measures and relevant technical information used for evaluation. [ ISO/IEC 25001 ]

### See also

Glossary:

- Evaluation
- Evaluation Activity
- Evaluation Group
- Evaluation Method
- Evaluation Module

Standards:

- ISO/IEC 25001

## 7.121. Evaluation Tool

An instrument that can be used during evaluation to collect data, to perform interpretation of data or to automate part of the evaluation. [ ISO/IEC 14598-5 ]

### See also

Glossary:

- Evaluation

Standards:

- ISO/IEC 14598-5

## 7.122. Execute

To carry out an instruction, process, or computer program. [ IEEE 1490 ]

### Other Definitions

Execute [ IEEE 1490 ]: Directing, managing, performing, and accomplishing the project work, providing the deliverables, and providing work performance information.

## See also

Standards:

→ IEEE 1490

## 7.123. Execution Efficiency

The degree to which a system or component performs its designated functions with minimum consumption of time. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Efficiency

→ Execution Time

Standards:

→ ISO/IEC/IEEE 24765

## 7.124. Execution Time

The time which elapses between task submission and completion. [ ISO/IEC 14756 ]

## Notes

→ Processor time is usually less than elapsed time because the processor may be idle (for example, awaiting needed computer resources) or employed on other tasks during the execution of a program. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Execution Efficiency

Standards:

→ ISO/IEC 14756

→ ISO/IEC/IEEE 24765

## 7.125. Exit

A point in a software module at which execution of the module can terminate. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Entry Point

Standards:

→ ISO/IEC/IEEE 24765

## 7.126. Expandability

The degree of effort required to improve or modify software functions' efficiency. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.127. Extendability

The ease with which a system or component can be modified to increase its storage or functional capacity. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Expandability

→ Flexibility

→ Maintainability

Standards:

→ ISO/IEC/IEEE 24765

## 7.128. External Attribute

A measurable property of an entity which can only be derived with respect to how it relates to its environment. [ ISO/IEC 14598-3 ]

### Notes

→ External attributes are those that relate to requirements (external properties of the software). External attributes can only be derived from the operational behavior of the system of which it is a part. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Internal Attribute

Standards:

→ ISO/IEC 14598

## 7.129. External Measure

An indirect measure of a product derived from measures of the behaviour of the system of which it is a part.  
[ ISO/IEC 9126-1, ISO/IEC 14598 ]

## Notes

- The system includes any associated hardware, software (either custom software or off-the-shelf software) and users. [ ISO/IEC 9126-1 ]
- The number of failures found during testing is an external measure of the number of faults in the program because the number of failures are counted during the operation of a computer system running the program. [ ISO/IEC 9126-1 ]
- External measures can be used to evaluate quality attributes closer to the ultimate objectives of the design. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Base Measure
- Derived Measure
- Direct Measure
- Indirect Measure
- Internal Measure
- Measure

Standards:

- ISO/IEC 14598
- ISO/IEC 9126-1

## 7.130. External Quality

The extent to which a product satisfies stated and implied needs when used under specified conditions. [ ISO/IEC 9126-1, ISO/IEC 14598 ]

## Notes

- External Quality is the totality of characteristics of the software product from an external view. It is the quality when the software is executed, which is typically measured and evaluated while testing in a simulated environment with simulated data using external metrics. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- External Software Quality
- Internal Quality
- Quality
- Quality in Use

Standards:

- ISO/IEC 9126-1

- ISO/IEC 9126-2
- ISO/IEC 14598

## 7.131. External Software Quality

Capability of a software product to enable the behavior of a system to satisfy stated and implied needs when the system is used under specified conditions. [ ISO/IEC 25000 ]

### Notes

- The number of failures found during testing is an external software quality measure related to the number of faults present in the program. The two measures are not necessarily identical since testing may not find all faults, and a fault may give rise to apparently different failures in different circumstances. [ ISO/IEC/IEEE 24765 ]
- Attributes of the behavior can be verified and/or validated by executing the software product during testing and operation. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- External Quality
- Internal Software Quality

Standards:

- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.132. Facility

Physical means or equipment for facilitating the performance of an action. [ ISO/IEC 12207, ISO/IEC 15288 ]

### Notes

- Buildings, instruments, tools. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC/IEEE 24765

## 7.133. Failure

The termination of the ability of a product to perform a required function or its inability to perform within previously specified limits. [ ISO/IEC 9126-1, ISO/IEC 14598-5, ISO/IEC 25000 ]

### Other Definitions

Failure [ SIGIST ]: Deviation of the software from its expected delivery or service.

Failure [ IEEE 610.12 ]: The inability of a system or component to perform its required functions within specified performance requirements.

Failure [ ISO/IEC/IEEE 24765 ]: An event in which a system or system component does not perform a required function within specified limits.

## Notes

- According to Laprie et al.<sup>4</sup>, "a system failure occurs when the delivered service no longer complies with the specifications, the latter being an agreed description of the system's expected function and/or service". This definition applies to both hardware and software system failures. Faults or bugs in a hardware or a software component cause errors. An error is defined by Laprie et al. as that part of the system which is liable to lead to subsequent failure, and an error affecting the service is an indication that a failure occurs or has occurred. If the system comprises of multiple components, errors can lead to a component failure. As various components in the system interact, failure of one component might introduce one or more faults in another. [ University of Duke ]
- The fault tolerance discipline distinguishes between a human action (a mistake), its manifestation (a hardware or software fault), the result of the fault (a failure), and the amount by which the result is incorrect (the error). [ IEEE 610.12 ]

## See also

Glossary:

- Defect
- Fault
- Fault Tolerance

Standards:

- IEEE 610.12
- ISO/IEC 9126-1
- ISO/IEC 14598-5
- ISO/IEC 25000
- ISO/IEC/IEEE 24765
- SIGIST

## 7.134. Failure Rate

The ratio of the number of failures of a given category to a given unit of measure. [ ISO/IEC/IEEE 24765 ]

## Notes

- Failures per unit of time, failures per number of transactions, failures per number of computer runs. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Defect Density

---

<sup>4</sup>J. C. Laprie (Ed.). Dependability: Basic Concepts and Terminology. Springer-Verlag, Wein, New York, 1992.

→ Failure

Standards:

→ IEEE 829

## 7.135. Fault

An incorrect step, process or data definition in a computer program. [ IEEE 610.12, ISO/IEC 9126-1 ]

### Other Definitions

Fault [ RTCA/EUROCAE ]: A manifestation of an error in software. A fault, if encountered may cause a failure.

Fault [ ISO/IEC/IEEE 24765 ]:

1. a manifestation of an error in software.
2. an incorrect step, process, or data definition in a computer program.
3. a defect in a hardware device or component.

### See also

Glossary:

→ Defect

→ Failure

Standards:

→ IEEE 610.12

→ ISO/IEC 9126-1

→ ISO/IEC/IEEE 24765

→ RTCA/EUROCAE

## 7.136. Fault Tolerance

The capability of the software product to maintain a specified level of performance in cases of software faults or of infringement of its specified interface. [ ISO/IEC 9126-1 ]

### Other Definitions

Fault Tolerance [ IEEE 610.12 ]:

1. The ability of a system or component to continue normal operation despite the presence of hardware or software faults.
2. The number of faults a system or component can withstand before normal operation is impaired.
3. Pertaining to the study of errors, faults, and failures, and of methods for enabling systems to continue normal operation in the presence of faults.

### Notes

→ The specified level of performance may include fail safe capability. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Fault
- Reliability

Standards:

- ISO/IEC 9126-1
- IEEE 610.12

## 7.137. Feasibility

The degree to which the requirements, design, or plans for a system or component can be implemented under existing constraints. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC/IEEE 24765

## 7.138. Feature

Distinguishing characteristic of a system item. [ IEEE 829 ]

## Notes

- Includes both functional and nonfunctional attributes such as performance and reusability. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- IEEE 829
- ISO/IEC/IEEE 24765

## 7.139. Feature Freeze

A period during which no new features are added to a specific branch. [ IEEE 829 ]

## Notes

- Allows the branch to stabilize for a release. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Code Freeze
- Feature



Standards:

- IEEE 829
- ISO/IEC/IEEE 24765

## 7.140. Finite State Machine

A computational model consisting of a finite number of states and transitions between those states, possibly with accompanying actions. [ ISO/IEC/IEEE 24765 ]

See also

Standards:

- ISO/IEC/IEEE 24765

## 7.141. Flexibility

The ease with which a system or component can be modified for use in applications or environments other than those for which it was specifically designed. [ ISO/IEC/IEEE 24765, IEEE 610.12 ]

See also

Glossary:

- Adaptability
- Changeability

Standards:

- ISO/IEC/IEEE 24765
- IEEE 610.12

## 7.142. Frozen Branch

A branch where no development takes place, either in preparation for a release or because active development has ceased on it. [ ISO/IEC/IEEE 24765 ]

See also

Standards:

- ISO/IEC/IEEE 24765

## 7.143. Function

A software module that performs a specific action, is invoked by the appearance of its name in an expression, may receive input values, and returns a single value. [ ISO/IEC/IEEE 24765 ]

Other Definitions

Function [ IEEE 1233 ]: A task, action, or activity that must be accomplished to achieve a desired outcome.

Function [ IEEE 1320 ]: A transformation of inputs to outputs, by means of some mechanisms, and subject to certain controls, that is identified by a function name and modeled by a box.

Function [ ISO/IEC 26514 ]: Part of an application that provides facilities for users to carry out their tasks.

Function [ ISO/IEC/IEEE 24765 ]: A defined objective or characteristic action of a system or component.

## See also

Glossary:

→ Routine

Standards:

→ IEEE 1233

→ IEEE 1320

→ ISO/IEC 26514

→ ISO/IEC/IEEE 24765

## 7.144. Functional Analysis

A systematic investigation of the functions of a real or planned system. [ ISO/IEC 2382-1 ]

### Other Definitions

Functional Analysis [ ISO/IEC/IEEE 24765 ]: Examination of a defined function to identify all the sub-functions necessary to accomplish that function, to identify functional relationships and interfaces (internal and external) and capture these in a functional architecture, to flow down upper-level performance requirements and to assign these requirements to lower-level sub-functions.

### See also

Standards:

→ ISO/IEC 2382-1

→ ISO/IEC/IEEE 24765

## 7.145. Functional Requirement

A statement that identifies what a product or process must accomplish to produce required behavior and/or results. [ IEEE 1220 ]

### Other Definitions

Model [ ISO/IEC/IEEE 24765 ]: A requirement that specifies a function that a system or system component must be able to perform.

### See also

Glossary:

→ Nonfunctional Requirement

→ Requirement

Standards:

- IEEE 1220
- ISO/IEC/IEEE 24765

## 7.146. Functional Size

A size of the software derived by quantifying the functional user requirements. [ ISO/IEC 14143-1 ]

See also

Standards:

- ISO/IEC 14143

## 7.147. Functional Testing

Testing that ignores the internal mechanism of a system or component and focuses solely on the outputs generated in response to selected inputs and execution conditions. [ ISO/IEC/IEEE 24765 ]

Other Definitions

- Testing conducted to evaluate the compliance of a system or component with specified functional requirements. [ ISO/IEC/IEEE 24765 ]

See also

Glossary:

- Performance Testing
- Structural Testing
- Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.148. Functional Unit

An entity of hardware or software, or both, capable of accomplishing a specified purpose. [ ISO/IEC 2382-1 ]

See also

Standards:

- ISO/IEC 2382-1

## 7.149. Functionality

The capability of the software product to provide functions which meet stated and implied needs when the software is used under specified conditions. [ ISO/IEC 9126-1 ]

## Other Definitions

Functionality [ IEEE 1362 ]: The capabilities of the various computational, user interface, input, output, data management, and other features provided by a product.

## Notes

- Functionality is one of the six characteristics of quality in the ISO/IEC 9126 quality model.
- This characteristic is concerned with what the software does to fulfil needs, whereas the other characteristics are mainly concerned with when and how it fulfils needs. [ ISO/IEC 9126-1 ]
- For a system which is operated by a user, the combination of functionality, reliability, usability and efficiency can be measured externally by quality in use. [ ISO/IEC 9126-1 ]

## See also

Standards:

- IEEE 1362
- ISO/IEC 9126-1

## 7.150. Functionality Compliance

The capability of the software product to adhere to standards, conventions or regulations in laws and similar prescriptions relating to functionality. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Functionality

Standards:

- ISO/IEC 9126-1

## 7.151. Generality

The degree to which a system or component performs a broad range of functions. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC/IEEE 24765

## 7.152. Generic Practice

An activity that, when consistently performed, contributes to the achievement of a specific process attribute. [ ISO/IEC 15504 ]

## See also

Standards:

→ ISO/IEC 15504

## 7.153. Glossary

The collection of the names and narrative descriptions of all terms that may be used for defined concepts within an environment. [ IEEE 1320 ]

### See also

Standards:

→ IEEE 1320

## 7.154. Goal

Intended outcome of user interaction with a product. [ ISO/IEC 25062 ]

### Other Definitions

Goal [ ISO/IEC 9126-4 ]: An intended outcome.

### See also

Standards:

→ ISO/IEC 9126

→ ISO/IEC 25062

## 7.155. Granularity

The depth or level of detail at which data is collected. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.156. Historical Information

Documents and data on prior projects including project files, records, correspondence, closed contracts, and closed projects. [ IEEE 1490 ]

### See also

Standards:

→ IEEE 1490

## 7.157. Hybrid Coupling

A type of coupling in which different subsets of the range of values that a data item can assume are used for different and unrelated purposes in different software modules. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Coupling

Standards:

→ ISO/IEC/IEEE 24765

## 7.158. Impact Analysis

Identification of all system and software products that a change request affects and development of an estimate of the resources needed to accomplish the change. [ ISO/IEC/IEEE 24765 ]

### Notes

→ This includes determining the scope of the changes to plan and implement work, accurately estimating the resources needed to perform the work, and analyzing the requested changes' cost and benefits. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.159. Implementation

The process of translating a design into hardware components, software components, or both. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Implementation ISO/IEC/IEEE 24765 ]: The installation and customization of packaged software.

Implementation ISO/IEC/IEEE 24765 ]: Construction.

Implementation ISO/IEC 2382 ]: The system development phase at the end of which the hardware, software and procedures of the system considered become operational.

Implementation ISO/IEC 26514 ]: Phase of development during which user documentation is created according to the design, tested, and revised.

## See also

Glossary:

→ Coding

Standards:

→ ISO/IEC/IEEE 24765

## 7.160. Implied Needs

Needs that may not have been stated but are actual needs. [ ISO/IEC 25000 ]

### Other Definitions

Implied Needs [ ISO/IEC 9126-1, ISO/IEC 14598-1 ]: Needs that may not have been stated but are actual needs when the entity is used in particular conditions.

### Notes

→ Implied needs are real needs which may not have been documented. [ ISO/IEC 9126-1 ]

### See also

Glossary:

→ Requirement

Standards:

→ ISO/IEC 9126-1

→ ISO/IEC 14598-1

→ ISO/IEC 25000

## 7.161. Incremental Development

A software development technique in which requirements definition, design, implementation, and testing occur in an overlapping, iterative (rather than sequential) manner, resulting in incremental completion of the overall software product. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Waterfall Model

Standards:

→ ISO/IEC/IEEE 24765

## 7.162. Indicator

Measure that provides an estimate or evaluation of specified attributes derived from a model with respect to defined information needs. [ ISO/IEC 15939, ISO/IEC 25000 ]

### Other Definitions

Indicator [ ISO/IEC 9126-1, ISO/IEC 14598-1 ]: A measure that can be used to estimate or predict another measure.

### Notes

→ Example: A flag or semaphore. [ ISO/IEC/IEEE 24765 ]

- The predicted measure may be of the same or a different software quality characteristic. ISO/IEC 9126-1
- Indicators may be used both to estimate software quality attributes and to estimate attributes of the development process. They are imprecise indirect measures of the attributes. ISO/IEC 9126-1

## See also

Glossary:

- Indicator Value

Standards:

- ISO/IEC 9126-1
- ISO/IEC 15939

## 7.163. Indicator Value

Numerical or categorical result assigned to an indicator. [ ISO/IEC 15939 ]

## See also

Glossary:

- Indicator

Standards:

- ISO/IEC 15939

## 7.164. Indirect Measure

A measure of an attribute that is derived from measures of one or more other attributes. [ ISO/IEC 14598 ]

## Notes

- An external measure of an attribute of a computing system (such as the response time to user input) is an indirect measure of attributes of the software as the measure will be influenced by attributes of the computing environment as well as attributes of the software. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Base Measure
- Derived Measure
- Direct Measure
- External Measure
- Internal Measure

Papers:

- Software Engineering Metrics: What Do They Measure And How Do We Know

Standards:



- ISO/IEC 14598
- ISO/IEC 9126-1

## 7.165. Indirect Metric

An Indirect Metric is a metric that is derived from one or more other metrics. [ IEEE 1061 ]

### See also

Glossary:

- Direct Metric
- Metric

Standards:

- IEEE 1061

## 7.166. Information

An information processing, knowledge concerning objects, such as facts, events, things, processes, or ideas, including concepts, that within a certain context has a particular meaning. [ ISO/IEC 2382-1 ]

### Notes

- Although information will necessarily have a representation form to make it communicable, it is the interpretation of this representation (the meaning) that is relevant in the first place. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Information Analysis

Standards:

- ISO/IEC 2382-1
- ISO/IEC/IEEE 24765

## 7.167. Information Analysis

A systematic investigation of information and its flow in a real or planned system. [ ISO/IEC 2382-1 ]

### See also

Glossary:

- Information

Standards:

- ISO/IEC 2382-1

## 7.168. Information Management

In an information processing system, the functions of controlling the acquisition, analysis, retention, retrieval, and distribution of information. [ ISO/IEC 2382-1 ]

### See also

Glossary:

→ Information

Standards:

→ ISO/IEC 2382-1

## 7.169. Information Need

Insight necessary to manage objectives, goals, risks, and problems. [ ISO/IEC 15939 ]

### See also

→ ISO/IEC 15939

## 7.170. Information Product

One or more indicators and their associated interpretations that address an information need. [ ISO/IEC 15939, ISO/IEC 25000 ]

### Example

→ A comparison of a measured defect rate to planned defect rate along with an assessment of whether or not the difference indicates a problem. [ ISO/IEC 15939 ]

### See also

Glossary:

→ Indicator

→ Information

Standards:

→ ISO/IEC 15939

→ ISO/IEC 25000

## 7.171. Inspection

A static analysis technique that relies on visual examination of development products to detect errors, violations of development standards, and other problems. [ ISO/IEC/IEEE 24765 ]

## Other Definitions

Inspection [ IEEE 1490 ]: Examining or measuring to verify whether an activity, component, product, result, or service conforms to specified requirements.

## Notes

- Inspections are peer examinations led by impartial facilitators who are trained in inspection techniques. Determination of remedial or investigative action for an anomaly is a mandatory element of a software inspection, although the solution should not be determined in the inspection meeting. Types include code inspection; design inspection. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- IEEE 1490
- ISO/IEC/IEEE 24765

## 7.172. Installability

The capability of the software product to be installed in a specified environment. [ ISO/IEC 9126-1 ]

## Notes

- If the software is to be installed by an end user, installability can affect the resulting suitability and operability. [ ISO/IEC 9126-1 ]

## See also

- ISO/IEC 9126-1

## 7.173. Installation Manual

A document that provides the information necessary to install a system or component, set initial parameters, and prepare the system or component for operational use. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Document
- Maintenance Manual
- Operator Manual
- Support Manual
- User Manual

Standards:

- ISO/IEC/IEEE 24765

## 7.174. Integration

The process of combining software components, hardware components, or both into an overall system. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.175. Integration Test

The progressive linking and testing of programs or modules in order to ensure their proper functioning in the complete system. [ ISO/IEC 2382 ]

### See also

Glossary:

→ Integration

→ Testing

Standards:

→ ISO/IEC 2382

## 7.176. Integrity

The degree to which a system or component prevents unauthorized access to, or modification of, computer programs or data. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.177. Interface Testing

Testing conducted to evaluate whether systems or components pass data and control correctly to one another. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Integration Test

→ System Testing

→ Testing

→ Unit Test

Standards:

→ ISO/IEC/IEEE 24765

## 7.178. Intermediate Software Product

A product of the software development process that is used as input to another stage of the software development process. [ ISO/IEC 14598, ISO/IEC 9126-1, ISO/IEC 25000 ]

### Notes

- Example: static and dynamic models, other documents and source code. [ ISO/IEC/IEEE 24765 ]
- In some cases an intermediate product may also be an end product. [ ISO/IEC 9126-1 ]

### See also

Glossary:

- Software Product

Standards:

- ISO/IEC 9126-1
- ISO/IEC 14598
- ISO/IEC/IEEE 24765
- ISO/IEC 25000

## 7.179. Internal Attribute

A measurable property of an entity which can be derived purely in terms of the entity itself. [ ISO/IEC 14598, ISO/IEC/IEEE 24765 ]

### Notes

- Internal attributes are those that relate to the internal organization of the software and its development. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- External Attribute

Standards:

- ISO/IEC 14598
- ISO/IEC/IEEE 24765

## 7.180. Internal Measure

A measure of the product itself, either direct or indirect. [ ISO/IEC 14598, ISO/IEC 9126-1, ISO/IEC/IEEE 24765 ]

### Notes

- An external measure of an attribute of a computing system (such as the response time to user input) is an indirect measure of attributes of the software as the measure will be influenced by attributes of the computing environment as well as attributes of the software. [ ISO/IEC 9126-1 ]

- The number of lines of code, complexity measures, the number of faults found in a walk through and the Fog Index are all internal measures made on the product itself. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Direct Measure
- External Measure
- Indirect Measure
- Measure

Standards:

- ISO/IEC 14598
- ISO/IEC 9126-1
- ISO/IEC/IEEE 24765

## 7.181. Internal Quality

The totality of attributes of a product that determine its ability to satisfy stated and implied needs when used under specified conditions. [ ISO/IEC 9126-1, ISO/IEC/IEEE 24765 ]

### Notes

- Internal quality is the totality of characteristics of the software product from an internal view. Internal quality is measured and evaluated against the internal quality requirements. Details of software product quality can be improved during code implementation, reviewing and testing, but the fundamental nature of the software product quality represented by internal quality remains unchanged unless redesigned. [ ISO/IEC 9126-1 ]
- The term "internal quality", used in ISO/IEC 14598 to contrast with "external quality", has essentially the same meaning as "quality" in ISO 8402. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- External Quality
- Quality in Use

Standards:

- ISO/IEC 9126
- ISO/IEC 9126-1
- ISO/IEC 9126-3
- ISO/IEC 14598
- ISO/IEC/IEEE 24765

## 7.182. Internal Software Quality

Capability of a set of static attributes of a software product to satisfy stated and implied needs when the software product is used under specified conditions. [ ISO/IEC 25000 ]

## Examples

- The number of lines of code, complexity measures and the number of faults found in a walkthrough are all internal software quality measures made on the product itself. [ ISO/IEC/IEEE 24765 ]

## Notes

- Static attributes include those that relate to the software architecture, structure and its components. Static attributes can be verified by review, inspection and/or automated tools. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- External Software Quality

Standards:

- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.183. Interoperability

The capability of the software product to interact with one or more specified systems. [ ISO/IEC 9126-1 ]

## Notes

- Interoperability is used in place of compatibility in order to avoid possible ambiguity with replaceability. [ ISO/IEC 9126-1 ]

## See also

- ISO/IEC 9126-1

## 7.184. Interoperability Testing

Testing conducted to ensure that a modified system retains the capability of exchanging information with systems of different types, and of using that information. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.185. Interval Scale

Scale in which the measurement values have equal distances corresponding to equal quantities of the attribute. [ ISO/IEC/IEEE 24765 ]

## Notes

→ Example: Cyclomatic complexity has the minimum value of one, but each increment represents an additional path. The value of zero is not possible. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Scale

Standards:

→ ISO/IEC/IEEE 24765

## 7.186. Item

An entity such as a part, component, subsystem, equipment or system that can be individually considered. An item may consist of hardware, software or both. [ ISO/IEC 15026 ]

## See also

Standards:

→ ISO/IEC 15026

## 7.187. Iteration

1. The process of performing a sequence of steps repeatedly.
2. A single execution of the sequence of steps. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.188. Key Practices

The infrastructures and activities that contribute most to the effective implementation and institutionalization of a key process area. [ CMMi ]

## Notes

In the CMMi process, each key process area is described in terms of the key practices that contribute to satisfying its goals. The key practices describe the infrastructure and activities that contribute most to the effective implementation and institutionalization of the key process area.

Each key practice consists of a single sentence, often followed by a more detailed description, which may include examples and elaboration. These



key practices, also referred to as the top-level key practices, state the fundamental policies, procedures, and activities for the key process area.

The components of the detailed description are frequently referred to as sub-practices.

The key practices describe "what" is to be done, but they should not be interpreted as mandating "how" the goals should be achieved. Alternative practices may accomplish the goals of the key process area. The key practices should be interpreted rationally to judge whether the goals of the key

process area are effectively, although perhaps differently, achieved.

## See also

- CMMi
- Key Process Area

## 7.189. Key Process Area

A cluster of related activities that, when performed collectively, achieve a set of goals considered important for establishing process capability. [ CMMi ]

## Notes

The key process areas have been defined to reside at a single maturity level. They are the areas identified by the SEI [<http://www.sei.cmu.edu>] to be the principal building blocks to help determine the software process capability of an organization and understand the improvements needed to advance to higher maturity levels.

- The Level 2 key process areas in the CMMi are Requirements Management, Software Project Planning, Software Project Tracking and Oversight, Software Subcontract Management, Software Quality Assurance, and Software Configuration Management.
- The Level 3 key process areas in the CMMi are Organization Process Focus, Organization Process Definition, Training Program, Integrated Software Management, Software Product Engineering, Intergroup Coordination, and Peer Reviews.
- The Level 4 key process areas are Quantitative Process Management and Software Quality Management.
- The Level 5 key process areas are Defect Prevention, Technology Change Management, and Process Change Management.

## See also

- CMMi
- Key Practices

## 7.190. Knowledge Base

A database that contains inference rules and information about human experience and expertise in a domain. [ ISO/IEC 2382-1 ]

## See also

Standards:

- ISO/IEC 2382-1

## 7.191. Learnability

The capability of the software product to enable the user to learn its application. [ ISO/IEC 9126-1 ]

### Notes

→ The internal attributes correspond to suitability for learning as defined in ISO 9241-10. [ ISO/IEC 9126-1 ]

### See also

Standards:

→ ISO/IEC 9126-1

## 7.192. Lessons Learned

The learning gained from the process of performing the project. Lessons learned may be identified at any point. Also considered a project record, to be included in the lessons learned knowledge base. [ IEEE 1490 ]

### See also

Glossary:

→ Knowledge Base

Standards:

→ IEEE 1490

## 7.193. Level of Performance

The degree to which the needs are satisfied, represented by a specific set of values for the quality characteristics. [ ISO/IEC 9126-1 ]

### See also

Glossary:

→ Performance

→ Performance Indicator

Standards:

→ ISO/IEC 9126-1

## 7.194. Life Cycle

Evolution of a system, product, service, project or other human-made entity from conception through retirement. [ ISO/IEC 12207, ISO/IEC 15288 ]

### Other Definitions

Life Cycle [ IEEE 1220 ]: The system or product evolution initiated by a perceived stakeholder need through the disposal of the products.

## See also

Glossary:

→ Life Cycle Model

Standards:

→ IEEE 1220

→ ISO/IEC 12207

→ ISO/IEC 15288

## 7.195. Life Cycle Model

Framework of processes and activities concerned with the life cycle that may be organized into stages, which also acts as a common reference for communication and understanding. [ ISO/IEC 12207, ISO/IEC 15288 ]

## See also

Glossary:

→ Life Cycle

Standards:

→ ISO/IEC 12207

→ ISO/IEC 15288

## 7.196. Maintainability

The capability of the software product to be modified. [ ISO/IEC 9126-1, ISO/IEC 14764 ]

## Other Definitions

Maintainability [ ISO/IEC/IEEE 24765 ]: The ease with which a software system or component can be modified to change or add capabilities, correct faults or defects, improve performance or other attributes, or adapt to a changed environment.

Maintainability [ ISO/IEC/IEEE 24765 ]: The average effort required to locate and fix a software failure.

Maintainability [ IEEE 982 ]: Speed and ease with which a program can be corrected or changed.

## Notes

→ Modifications may include corrections, improvements or adaptation of the software to changes in environment, and in requirements and functional specifications. [ ISO/IEC 9126-1

## See also

Glossary:

→ Extendability

→ Flexibility

- Maintainer
- Maintenance

Standards:

- IEEE 982
- ISO/IEC 9126-1
- ISO/IEC 14764
- ISO/IEC/IEEE 24765

## 7.197. Maintainability Compliance

The capability of the software product to adhere to standards or conventions relating to maintainability. [ ISO/IEC 9126-1 ]

### See also

Glossary:

- Maintainability

Standards:

- ISO/IEC 9126-1

## 7.198. Maintainer

Individual or organization that performs maintenance activities. [ ISO/IEC 25000 ]

### Other Definitions

Maintainer [ ISO/IEC 9126-1, ISO/IEC 12207, ISO/IEC 14598 ]: An organisation that performs maintenance activities.

### See also

Glossary:

- Maintainability
- Maintenance

Standards:

- ISO/IEC 9126-1
- ISO/IEC 12207
- ISO/IEC 14598
- ISO/IEC 25000

## 7.199. Maintenance

The process of modifying a software system or component after delivery to correct faults, improve performance or other attributes, or adapt to a changed environment. [ IEEE 610.12, ISO/IEC/IEEE 24765 ]

## Other Definitions

Software Maintenance [ ISO/IEC 14764 ]: The totality of activities required to provide cost-effective support to a software system.

## Notes

- Maintenance activities include <sup>5</sup>:
- \* Perfective maintenance - Changes which improve the system in some way without changing its functionality;
- \* Adaptive maintenance - Maintenance which is required because of changes in the environment of a program;
- \* Corrective maintenance - The correction of previously undiscovered system errors.
- Maintainability is defined as the effort to perform maintenance tasks, the impact domain of the maintenance actions, and the error rate caused by those actions. <sup>6</sup>
- Pre-delivery activities include planning for post-delivery operations, supportability, and logistics determination. Post-delivery activities include software modification, training, and operating a help desk. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Maintainability
- Maintainer
- Maintenance Manual

Standards:

- IEEE 610.12
- ISO/IEC 14764
- ISO/IEC/IEEE 24765

## 7.200. Maintenance Manual

A software engineering project-deliverable document that enables a system's maintenance personnel (rather than users) to maintain the system. [ ISO/IEC/IEEE 24765 ]

## Notes

- Maintenance Manual is synonym for Support Manual. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Document

---

<sup>5</sup>Ian Sommerville, "Software Engineering". Addison-Wesley, 1996.

<sup>6</sup>Harry M. Sneed & Agnes Kaposi. "A study on the effect of reengineering on maintainability". In Proceedings of the International Conference on Software Maintenance 1990, pages 91-99. IEEE, Computer Society Press 1990.

- Installation Manual
- Operator Manual
- Support Manual
- User Manual

Standards:

- ISO/IEC/IEEE 24765

## 7.201. Maturity

The capability of the software product to avoid failure as a result of faults in the software. [ ISO/IEC 9126-1 ]

### See also

Standards:

- ISO/IEC 9126-1

## 7.202. Measurable Concept

Abstract relationship between attributes of entities and information needs. [ ISO/IEC 15939 ]

### See also

- ISO/IEC 15939

## 7.203. Measurand

Particular quantity subject to measurement. [ ISO/IEC 14143-3, ISO/IEC/IEEE 24765 ]

### Notes

- Example of operand: vapor pressure of a given sample of water at 20 °C. [ ISO/IEC/IEEE 24765 ]
- The specification of a measurand may require statements about quantities such as time, temperature and pressure. [ ISO/IEC 99 ]

### See also

Standards:

- ISO/IEC 99
- ISO/IEC 14143-3
- ISO/IEC/IEEE 24765

## 7.204. Measure

Variable to which a value is assigned as the result of measurement. [ ISO/IEC 15939, ISO/IEC 25000 ]

### Other Definition

Measure (verb) [ ISO/IEC 14598, ISO/IEC 15939 ]: To make a measurement.

Measure [ IEEE 1061 ]: A way to ascertain or appraise value by comparing it to a norm.

Measure (verb) [ IEEE 1061 ]: To apply a metric.

Measure [ ISO/IEC 14598 ]: The number or category assigned to an attribute of an entity by making a measurement.

Measure [ IEEE 982 ]: The number or symbol assigned to an entity by a mapping from the empirical world to the formal, relational world in order to characterize an attribute.

Measure [ IEEE 982 ]: The act or process of measuring.

## Notes

- The term "measures" is used to refer collectively to base measures, derived measures, and indicators. [ ISO/IEC 15939 ]

## See also

Glossary:

- Base Measure
- Derived Measure
- Direct Measure
- Indicator
- Indirect Measure
- Measurement
- Metric

Papers:

- Software Engineering Metrics: What Do They Measure And How Do We Know

Standards:

- IEEE 982
- IEEE 1061
- ISO/IEC 14598
- ISO/IEC 15939
- ISO/IEC 25000

## 7.205. Measurement

Set of operations having the object of determining a value of a measure. [ ISO/IEC 25000 ]

### Other Definitions

Measurement [ ISO/IEC 99, ISO/IEC 15939 ]: Set of operations having the object of determining a value of a measure.

Measurement [ IEEE 1061 ]: Act or process of assigning a number or category to an entity to describe an attribute of that entity.

Measurement [ ISO/IEC 19759 ]: The assignment of numbers to objects in a systematic way to represent properties of the object.

Measurement [ ISO/IEC 9126-1, ISO/IEC 14598 ]: The use of a metric to assign a value (which may be a number or category) from a scale to an attribute of an entity.

Measurement [ ISO/IEC 19759 ]: the assignment of values and labels to aspects of software engineering (products, processes, and resources) and the models that are derived from them, whether these models are developed using statistical, expert knowledge or other techniques.

## Notes

- Measurement can be qualitative when using categories. For example, some important attributes of software products, e.g. the language of a source program (ADA, C, COBOL, etc.) are qualitative categories. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Measure

Standards:

- IEEE 1061
- ISO/IEC 99
- ISO/IEC 9126-1
- ISO/IEC 14598
- ISO/IEC 15939
- ISO/IEC 19759
- ISO/IEC 25000

## 7.206. Measurement Analyst

Individual or organisation that is responsible for the planning, performance, evaluation, and improvement of measurement. [ ISO/IEC 15939 ]

### See also

- ISO/IEC 15939

## 7.207. Measurement Experience Base

Data store that contains the evaluation of the information products and the measurement process as well as any lessons learned during the measurement process. [ ISO/IEC 15939 ]

### See also

- ISO/IEC 15939

## 7.208. Measurement Function



Algorithm or calculation performed to combine two or more base measures. [ ISO/IEC 15939, ISO/IEC 25000 ]

## Notes

- A function is an algorithm or calculation performed to combine two or more base measures. The scale and unit of the derived measure depend on the scales and units of the base measures from which it is composed as well as how they are combined by the function. [ ISO/IEC 15939 ]

## See also

Glossary:

- Measure
- Measurement

Standards:

- ISO/IEC 15939
- ISO/IEC 25000

## 7.209. Measurement Method

Logical sequence of operations, described generically, used in quantifying an attribute with respect to a specified scale. [ ISO/IEC 99, ISO/IEC 15939, ISO/IEC 25000 ]

## Notes

- The type of measurement method depends on the nature of the operations used to quantify an attribute. Two types may be distinguished:
  - \* subjective — quantification involving human judgement,
  - \* objective — quantification based on numerical rules. [ ISO/IEC 15939 ]

## See also

Glossary:

- Attribute

Standards:

- ISO/IEC 99
- ISO/IEC 15939
- ISO/IEC 25000

## 7.210. Measurement Procedure

Set of operations, described specifically, used in the performance of a particular measurement according to a given method. [ ISO/IEC 99, ISO/IEC 15939, ISO/IEC 25000 ]

## See also

Glossary:

→ Measurement Method

Standards:

→ ISO/IEC 99

→ ISO/IEC 15939

→ ISO/IEC 25000

## 7.211. Measurement Process

The process for establishing, planning, performing and evaluating software measurement within an overall project or organisational measurement structure. [ ISO/IEC 15939 ]

See also

→ ISO/IEC 15939

## 7.212. Measurement Process Owner

Individual or organisation responsible for the measurement process. [ ISO/IEC 15939 ]

See also

Glossary:

→ Measurement Process

Standards:

→ ISO/IEC 15939

## 7.213. Measurement Sponsor

Individual or organisation that authorises and supports the establishment of the measurement process. [ ISO/IEC 15939 ]

See also

Glossary:

→ Measurement Process

Standards:

→ ISO/IEC 15939

## 7.214. Measurement User

Individual or organisation that uses the information products. [ ISO/IEC 15939 ]

See also

Glossary:

→ Information Product

Standards:

→ ISO/IEC 15939

## 7.215. Metric

The defined measurement method and the measurement scale. [ ISO/IEC 14598, ISO/IEC 9126-1 ]

### Notes

→ Metrics can be internal or external, and direct or indirect. [ ISO/IEC 9126-1 ]

→ Metrics include methods for categorising qualitative data. [ ISO/IEC 9126-1 ]

### See also

Glossary:

→ Direct Measure

→ External Measure

→ Indirect Measure

→ Internal Measure

→ Measure

→ Measurement Method

→ Scale

Standards:

→ ISO/IEC 9126-1

→ ISO/IEC 14598

## 7.216. Milestone

A significant point or event in the project. [ IEEE 1490 ]

### Other Definitions

Milestone [ IEEE 1058 ]: A scheduled event used to measure progress.

### Notes

→ Major milestones for software projects may include an acquirer or managerial sign-off, baselining of a specification, completion of system integration, and product delivery. Minor milestones might include baselining of a software module or completion of a chapter of the user manual

### See also

Glossary:

→ Base Measure

- Decision Criteria
- Derived Measure
- Measurement Function

Standards:

- ISO/IEC 15939

## 7.217. Mock Object

Temporary dummy objects created to aid testing until the real objects become available. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.218. Model

A semantically closed abstraction of a system or a complete description of a system from a particular perspective. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Model [ IEEE 1233 ]: A representation of a real world process, device, or concept.

Model [ ISO/IEC 15474 ]: A related collection of instances of meta-objects, representing (describing or prescribing) an information system, or parts thereof, such as a software product.

### See also

Standards:

- IEEE 1233
- ISO/IEC 15474
- ISO/IEC/IEEE 24765

## 7.219. Modifiability

The ease with which a system can be changed without introducing defects. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Flexibility
- Maintainability

Standards:

→ ISO/IEC/IEEE 24765

## 7.220. Modifiable

Structured and has a style such that changes can be made completely, consistently, and correctly while retaining the structure. [ ISO/IEC 12207 ]

### See also

Standards:

→ ISO/IEC 12207

## 7.221. Modularity

The degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Modularity [ ISO/IEC/IEEE 24765 ]: Software attributes that provide a structure of highly independent components.

Modularity [ ISO/IEC/IEEE 24765 ]: The extent to which a routine or module is like a black box

### See also

Glossary:

→ Cohesion

→ Coupling

→ Module

Standards:

→ ISO/IEC/IEEE 24765

## 7.222. Module

A program unit that is discrete and identifiable with respect to compiling, combining with other units, and loading. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Module [ ISO/IEC/IEEE 24765 ]:

1. A logically separable part of a program.
2. A set of source code files under version control that can be manipulated together as one.
3. A collection of both data and the routines that act on it.

## Notes

- The terms 'module', 'component,' and 'unit' are often used interchangeably or defined to be sub-elements of one another in different ways depending upon the context. The relationship of these terms is not yet standardized.

## See also

Glossary:

- Component
- Modularity

Standards:

- ISO/IEC/IEEE 24765

## 7.223. Moke Object

Temporary dummy objects created to aid testing until the real objects become available. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.224. Multidimensional Analysis

Multidimensional analysis is a measurement function that weights different base measures to give a more relevant insight of the final goal of the measure.

It was primarily developed by Kaner and Bond in Software Engineering Metrics: What Do They Measure And How Do We Know.

## See also

- Software Engineering Metrics: What Do They Measure And How Do We Know

## 7.225. Network

An arrangement of nodes and interconnecting branches. [ ISO/IEC 2382-1 ]

## See also

Standards:

- ISO/IEC 2382

## 7.226. Nonfunctional Requirement

A software requirement that describes not what the software will do but how the software will do it. [ ISO/IEC/IEEE 24765 ]

### Notes

- Software performance requirements, software external interface requirements, software design constraints, and software quality attributes. Nonfunctional requirements are sometimes difficult to test, so they are usually evaluated subjectively. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Functional Requirement
- Requirement

Standards:

- ISO/IEC/IEEE 24765

## 7.227. Nontechnical Requirement

Requirement affecting product and service acquisition or development that is not a property of the product or service. [ ISO/IEC/IEEE 24765 ]

### Notes

- Example: numbers of products or services to be delivered; data rights for delivered COTS nondevelopmental items; delivery dates; milestones with exit criteria; work constraints associated with training, site provisions, and deployment schedules. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Requirement
- Technical Requirement

Standards:

- ISO/IEC/IEEE 24765

## 7.228. Object

An encapsulation of data and services that manipulate that data. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Object [ ISO/IEC/IEEE 24765 ]: A specific entity that exists in a program at runtime in object-oriented programming.

Object [ ISO/IEC/IEEE 24765 ]: Pertaining to the outcome of an assembly or compilation process.

Object [ IEEE 1320 ]: A member of an object set and an instance of an object type.

## See also

Glossary:

→ Object Model

Standards:

→ IEEE 1320

→ ISO/IEC/IEEE 24765

## 7.229. Object Model

An integrated abstraction that treats all activities as performed by collaborating objects and encompassing both the data and the operations that can be performed against that data. [ ISO/IEC 12207 ]

## Notes

→ An object model captures both the meanings of the knowledge and actions of objects behind the abstraction of responsibility. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

→ ISO/IEC 12207

→ ISO/IEC/IEEE 24765

## 7.230. Object Oriented Design

A software development technique in which a system or component is expressed in terms of objects and connections between those objects. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Object

→ Object Model

Standards:

→ ISO/IEC/IEEE 24765

## 7.231. Observation

Instance of applying a measurement procedure to produce a value for a base measure. [ ISO/IEC 15939, ISO/IEC 25000 ]

## See also

Standards:



- ISO/IEC 15939
- ISO/IEC 25000

## 7.232. Observation Period

The time interval, where the measurement procedure is observed for collecting (logging) measurement results for rating or validation, consisting of the rating interval and the supplementary run. [ ISO/IEC 14756 ]

### See also

Standards:

- ISO/IEC 14756

## 7.233. Operability

The capability of the software product to enable the user to operate and control it. [ ISO/IEC 9126-1 ]

### Notes

- Aspects of suitability, changeability, adaptability and installability may affect operability. [ ISO/IEC 9126-1 ]
- Operability corresponds to controllability, error tolerance and conformity with user expectations as defined in ISO 9241-10. [ ISO/IEC 9126-1 ]
- For a system which is operated by a user, the combination of functionality, reliability, usability and efficiency can be measured externally by quality in use. [ ISO/IEC 9126-1 ]

### See also

Standards:

- ISO/IEC 9126-1
- ISO 9241-10

## 7.234. Operand

A variable, constant, or function upon which an operation is to be performed. [ ISO/IEC/IEEE 24765 ]

### Notes

- Example: in the expression  $A = B + 3$ , B and 3 are the operands. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO/IEC/IEEE 24765

## 7.235. Operational Testing

Testing conducted to evaluate a system or component in its operational environment. [ ISO/IEC 15504 ]

## See also

Glossary:

- Acceptance Testing
- Development Testing
- Qualification Testing
- Testing

Standards:

- IEEE 829
- ISO/IEC 15504

## 7.236. Operator

Individual or organisation that operates the system. [ ISO/IEC 12207, ISO/IEC 15939, ISO/IEC 25000 ]

### Other Definitions

Operator [ ISO/IEC/IEEE 24765 ]: A mathematical or logical symbol that represents an action to be performed in an operation.

Operator [ ISO/IEC 12207, ISO/IEC 15288 ]: Entity that performs the operation of a system.

Operator [ IEEE 1220 ]: An individual or an organization that contributes to the functionality of a system and draws on knowledge, skills, and procedures to contribute the function.

### Notes

- The role of operator and the role of user may be vested, simultaneously or sequentially, in the same individual or organization. An individual operator combined with knowledge, skills and procedures may be considered as an element of the system. In the context of this specific definition, the term entity means an individual or an organization. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Operand
- Operator Manual
- User

Standards:

- IEEE 1220
- ISO/IEC 12207
- ISO/IEC 15939
- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.237. Operator Manual

A document that provides the information necessary to initiate and operate a system or component. [ ISO/IEC/IEEE 24765 ]

### Notes

- Typically described are procedures for preparation, operation, monitoring, and recovery. An operator manual is distinguished from a user manual when a distinction is made between those who operate a computer system (mounting tapes, etc) and those who use the system for its intended purpose. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Document
- Installation Manual
- Maintenance Manual
- Operator
- Support Manual
- User Manual

Standards:

- ISO/IEC/IEEE 24765

## 7.238. Optional Attribute

An attribute that may have no value for an instance. [ IEEE 1320 ]

### Notes

- Typically described are procedures for preparation, operation, monitoring, and recovery. An operator manual is distinguished from a user manual when a distinction is made between those who operate a computer system (mounting tapes, etc) and those who use the system for its intended purpose. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Attribute

Standards:

- IEEE 1320

## 7.239. Optional Requirement

Requirement of a normative document that must be fulfilled in order to comply with a particular option permitted by that document. [ ISO/IEC 14143 ]

## Notes

- Typically described are procedures for preparation, operation, monitoring, and recovery. An operator manual is distinguished from a user manual when a distinction is made between those who operate a computer system (mounting tapes, etc) and those who use the system for its intended purpose. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Requirement

Standards:

- ISO/IEC 14143

## 7.240. Organisational Unit

The part of an organisation that is the subject of measurement. [ ISO/IEC 15504-9, ISO/IEC 15939 ]

## Notes

- An organisational unit deploys one or more processes that operate within a coherent set of business goals. [ ISO/IEC 15939 ]

## See also

Standards:

- ISO/IEC 15504
- ISO/IEC 15939

## 7.241. Path

In software engineering, a sequence of instructions that may be performed in the execution of a computer program. [ ISO/IEC/IEEE 24765 ]

## Other Definitions

Path [ ISO/IEC/IEEE 24765 ]: In file access, a hierarchical sequence of directory and subdirectory names specifying the storage location of a file.

## See also

Standards:

- ISO/IEC/IEEE 24765

## 7.242. Path Analysis

Analysis of a computer program to identify all possible paths through the program, to detect incomplete paths, or to discover portions of the program that are not on any path. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Path
- Path Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.243. Path Testing

Testing designed to execute all or selected paths through a computer program. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Branch Testing
- Path
- Path Analysis
- Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.244. Pathological Coupling

A type of coupling in which one software module affects or depends upon the internal implementation of another. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Content Coupling
- Control Coupling
- Coupling
- Data Coupling
- Hybrid Coupling

Standards:

- ISO/IEC/IEEE 24765

## 7.245. Peer Review

A review of a software work product, following defined procedures, by peers of the producers of the product for the purpose of identifying defects and improvements. [ CMMi ]

## Other Definitions

Peer Review [ ISO/IEC/IEEE 24765 ]: Review of work products performed by peers during development of the work products to identify defects for removal.

## See also

Glossary:

→ Inspection

Standards:

→ CMMi

→ ISO/IEC/IEEE 24765

## 7.246. Performance

The degree to which a system or component accomplishes its designated functions within given constraints, such as speed, accuracy, or memory usage. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Level of Performance

→ Performance Indicator

→ Performance Testing

→ Process Performance

Standards:

→ ISO/IEC/IEEE 24765

## 7.247. Performance Indicator

An assessment indicator that supports the judgment of the process performance of a specific process. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Indicator

→ Performance

Standards:

→ ISO/IEC/IEEE 24765

## 7.248. Performance Testing

Testing conducted to evaluate the compliance of a system or component with specified performance requirements. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Functional Testing
- Performance
- Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.249. Pilot Project

A project designed to test a preliminary version of an information processing system under actual but limited operating conditions and which will then be used to test the definitive version of the system. [ ISO/IEC 2382 ]

### See also

Standards:

- ISO/IEC 2382

## 7.250. Portability

The capability of the software product to be transferred from one environment to another. [ ISO/IEC 9126-1 ]

### Other Definitions

Portability [ ISO/IEC/IEEE 24765 ]: The ease with which a system or component can be transferred from one hardware or software environment to another.

Portability [ ISO/IEC 2382 ]: The capability of a program to be executed on various types of data processing systems without converting the program to a different language and with little or no modification.

### Notes

- The environment may include organisational, hardware or software environment. [ ISO/IEC 9126-1 ]

### See also

- ISO/IEC 9126-1

## 7.251. Portability Compliance

The capability of the software product to adhere to standards or conventions relating to portability. [ ISO/IEC 9126-1 ]

## See also

Glossary:

→ Portability

Standards:

→ ISO/IEC 9126-1

## 7.252. Practice

An activity that contributes to the purpose or outcomes of a process or enhances the capability of a process. [ ISO/IEC 15504 ]

### Other Definitions

Practice [ ISO/IEC/IEEE 24765 ]: Requirements employed to prescribe a disciplined uniform approach to the software development process.

Practice [ IEEE 1490 ]: A specific type of professional or management activity that contributes to the execution of a process and that may employ one or more techniques and tools.

## See also

Glossary:

→ Key Practices

Standards:

→ IEEE 1490

→ ISO/IEC 15504

→ ISO/IEC/IEEE 24765

## 7.253. Precision

The degree of exactness or discrimination with which a quantity is stated. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Example: a precision of 2 decimal places versus a precision of 5 decimal places. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Accuracy

Standards:

→ ISO/IEC/IEEE 24765



## 7.254. Predictive Metric

A metric applied during development and used to predict the values of a software quality factor. [ IEEE 1061 ]

### See also

Glossary:

→ Metric

Standards:

→ IEEE 1061

## 7.255. Procedure

Ordered series of steps that specify how to perform a task. [ ISO/IEC 26514 ]

### Other Definitions

Procedure [ ISO/IEC 19770 ]: Specified way to carry out an activity or process.

Procedure [ ISO/IEC/IEEE 24765 ]: A portion of a computer program that is named and that performs a specific action.

Procedure [ ISO/IEC/IEEE 24765 ]: A routine that does not return a value.

### See also

Glossary:

→ Action

→ Step

→ Process

Standards:

→ ISO/IEC 19770

→ ISO/IEC 26514

→ ISO/IEC/IEEE 24765

## 7.256. Process

System of activities, which use resources to transform inputs into outputs. [ 25000 ]

### Other Definitions

Process [ ISO/IEC 15504-9, ISO/IEC 15939 ]: Set of interrelated activities that transform inputs into outputs.

Process [ ISO/IEC 2382 ]: Predetermined course of events defined by its purpose or by its effect, achieved under given conditions.

Process (verb) [ ISO/IEC/IEEE 24765 ]: To perform operations on data.

Process [ ISO/IEC 15414 ]: A collection of steps taking place in a prescribed manner and leading to an objective.

Process [ ISO/IEC 2382 ]: In data processing, the predetermined course of events that occur during the execution of all or part of a program.

## Notes

- In [ISO 9000:2005] the term "activities" covers use of resources. A process may have multiple starting points and multiple end points. The prescribed manner may be a partially ordered sequence. A process specification can be a workflow specification. An enterprise specification may define types of processes and may define process templates. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC 2382
- ISO/IEC 15504
- ISO/IEC 15939
- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.257. Process Assessment

A disciplined evaluation of an organizational unit's processes against a Process Assessment Model. [ ISO/IEC 15504 ]

## See also

Glossary:

- Process
- Process Assessment Model

Standards:

- ISO/IEC 15504

## 7.258. Process Assessment Model

A model suitable for the purpose of assessing process capability, based on one or more process reference models. [ ISO/IEC 15504 ]

## See also

Glossary:

- Process
- Process Assessment

Standards:

- ISO/IEC 15504

## 7.259. Process Capability

A characterization of the ability of a process to meet current or projected business goals. [ ISO/IEC 15504 ]

### See also

Glossary:

- Process
- Process Capability Determination

Standards:

- ISO/IEC 15504

## 7.260. Process Capability Determination

A systematic assessment and analysis of selected processes within an organization against a target capability, carried out with the aim of identifying the strengths, weaknesses and risks associated with deploying the processes to meet a particular specified requirement. [ ISO/IEC 15504 ]

### See also

Glossary:

- Process
- Process Capability

Standards:

- ISO/IEC 15504

## 7.261. Process Capability Level

A point on the six-point ordinal scale (of process capability) that represents the capability of the process; each level builds on the capability of the level below. [ ISO/IEC 15504 ]

### See also

Glossary:

- Process
- Process Capability

Standards:

- ISO/IEC 15504

## 7.262. Process Context

The set of factors, documented in the assessment input, that influence the judgment, comprehension and comparability of process attribute ratings. [ ISO/IEC 15504 ]

## See also

Glossary:

→ Process

Standards:

→ ISO/IEC 15504

## 7.263. Process Improvement

Actions taken to change an organization's processes so that they more effectively and/or efficiently meet the organization's business goals. [ ISO/IEC 15504 ]

## See also

Glossary:

→ Process

Standards:

→ ISO/IEC 15504

## 7.264. Process Improvement Objective

Set of target characteristics established to guide the effort to improve an existing process in a specific, measurable way, either in terms of resultant product or service characteristics, such as quality, performance, and conformance to standards, or in the way in which the process is executed, such as elimination of redundant process steps, combination of process steps, and improvement of cycle time. [ ISO/IEC 15504 ]

## See also

Glossary:

→ Process

→ Process Improvement

Standards:

→ ISO/IEC 15504

## 7.265. Process Improvement Program

The strategies, policies, goals, responsibilities and activities concerned with the achievement of specified improvement goals. [ ISO/IEC 15504 ]

## Notes

→ A process improvement program can span more than one complete cycle of process improvement. [ ISO/IEC 15504 ]

## See also

Glossary:

- Process
- Process Improvement

Standards:

- ISO/IEC 15504

## 7.266. Process Improvement Project

A subset of the Process Improvement Program that forms a coherent set of actions to achieve a specific improvement. [ ISO/IEC 15504 ]

## See also

Glossary:

- Process
- Process Improvement Program

Standards:

- ISO/IEC 15504

## 7.267. Process Metric

A metric used to measure characteristics of the methods, techniques, and tools employed in developing, implementing, and maintaining the software system. [ IEEE 1061 ]

## See also

Glossary:

- Process
- Metric

Standards:

- IEEE 1061

## 7.268. Process Outcome

An observable result of a process. [ ISO/IEC 15504 ]

## Other Definitions

Process Outcome [ ISO/IEC 12207, ISO/IEC 15288 ]: Observable result of the successful achievement of the process purpose.

## Notes

- An outcome is an artifact, a significant change of state or the meeting of specified constraints. An outcome statement describes one of the following: production of an artifact; a significant change in state; meeting of specified constraints, e.g., requirements, goals. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Process

Standards:

- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC 15504
- ISO/IEC/IEEE 24765

## 7.269. Process Performance

The extent to which the execution of a process achieves its purpose. [ ISO/IEC 15504 ]

## See also

Glossary:

- Performance
- Performance Indicator
- Process

Standards:

- ISO/IEC 15504

## 7.270. Process Purpose

High-level objective of performing the process and the likely outcomes of effective implementation of the process. [ ISO/IEC 15504, ISO/IEC 15288 ]

## Notes

- The implementation of the process should provide tangible benefits to the stakeholders. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Process

Standards:

- ISO/IEC 15288

- ISO/IEC 15504
- ISO/IEC/IEEE 24765

## 7.271. Product

An artifact that is produced, is quantifiable, and can be either an end item in itself or a component item. [ IEEE 1490 ]

### Other Definitions

Product [ ISO/IEC 26514 ]: Complete set of software and documentation.

Product [ IEEE 1074 ]: Output of the software development activities (e.g., document, code, or model).

Product [ ISO/IEC 15939 ]: Result of a process.

Software Product [ ISO/IEC 9126, ISO/IEC 12207, ISO/IEC 15939 ]: Set of computer programs, procedures, and associated documentation and data.

### Notes

- In ISO 9000 there are four agreed generic product categories:
- \* hardware (e.g., engine mechanical part);
- \* software (e.g., computer program);
- \* services (e.g., transport); and
- \* processed materials (e.g., lubricant).

:Hardware and processed materials are generally tangible products, while software or services are generally intangible. Most products comprise elements belonging to different generic product categories. Whether the product is then called hardware, processed material, software, or service depends on the dominant element. [ ISO/IEC/IEEE 24765 ]

- Products include intermediate products, and products intended for users such as developers and maintainers. [ ISO/IEC 9126 ]

### See also

Glossary:

- Work Product

Standards:

- IEEE 1074
- IEEE 1490
- ISO/IEC 9126
- ISO/IEC 12207
- ISO/IEC 15939
- ISO/IEC 15939
- ISO/IEC 26514

## 7.272. Product Line

Group of products or services sharing a common, managed set of features that satisfy specific needs of a selected market or mission. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Product
- Software Product

Standards:

- ISO/IEC/IEEE 24765

## 7.273. Product Metric

A metric used to measure the characteristics of any intermediate or final product of the software development process. [ IEEE 1061 ]

### See also

Glossary:

- Product
- Metric
- Software Product

Standards:

- IEEE 1061

## 7.274. Productivity

The capability of the software product to enable users to expend appropriate amounts of resources in relation to the effectiveness achieved in a specified context of use. [ ISO/IEC 9126-1 ]

### Notes

- Relevant resources can include time to complete the task, the user's effort, materials or the financial cost of usage. [ ISO/IEC 9126-1 ]

### See also

- ISO/IEC 9126-1

## 7.275. Programmer Manual

A document that provides the information necessary to develop or modify software for a given computer system. [ ISO/IEC/IEEE 24765 ]



## See also

Glossary:

- Document
- Installation Manual
- Maintenance Manual
- Operator Manual
- User Manual

Standards:

- ISO/IEC/IEEE 24765

## 7.276. Project

Endeavor with defined start and finish dates undertaken to create a product or service in accordance with specified resources and requirements. [ ISO/IEC 15288, ISO/IEC 15939 ]

### Other Definitions

Project [ ISO/IEC 2382 ]: An undertaking with pre-specified objectives, magnitude and duration.

Project [ IEEE 1490 ]: A temporary endeavor undertaken to create a unique product, service, or result.

### Notes

- A project may be viewed as a unique process comprising coordinated and controlled activities and may be composed of activities from the Project Processes and Technical Processes. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- IEEE 1490
- ISO/IEC 2382
- ISO/IEC 15288
- ISO/IEC 15939
- ISO/IEC/IEEE 24765

## 7.277. Project Management

The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. [ IEEE 1490 ]

### Other Definitions

Project Management [ ISO/IEC 2382 ]: The activities concerned with project planning and project control.

## See also

Glossary:

→ Project

Standards:

→ IEEE 1490

→ ISO/IEC 2382

## 7.278. Project Phase

A collection of logically related project activities, usually culminating in the completion of a major deliverable. [ IEEE 1490 ]

### Notes

→ Project phases are mainly completed sequentially, but can overlap in some project situations. A project phase is a component of a project life cycle. A project phase is not a project management process group. [ IEEE 1490 ]

### See also

Glossary:

→ Project

Standards:

→ IEEE 1490

## 7.279. Prototype

Model or preliminary implementation of a piece of software suitable for the evaluation of system design, performance or production potential, or for the better understanding of the software requirements. [ ISO/IEC 15910 ]

### Other Definitions

Prototype [ ISO/IEC/IEEE 24765 ]: A preliminary type, form, or instance of a system that serves as a model for later stages or for the final, complete version of the system.

### Notes

→ A prototype is used to get feedback from users for improving and specifying a complex human interface, for feasibility studies, or for identifying requirements. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Project Phase

Standards:

→ ISO/IEC 15910

→ ISO/IEC/IEEE 24765

## 7.280. Qualification

Process of demonstrating whether an entity is capable of fulfilling specified requirements. [ ISO/IEC 12207, ISO/IEC 15288 ]

### Other Definitions

Qualification [ ISO/IEC/IEEE 24765 ]: The process of determining whether a system or component is suitable for operational use.

### See also

Standards:

- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC/IEEE 24765

## 7.281. Qualification Testing

Testing, conducted by the developer and witnessed by the acquirer (as appropriate), to demonstrate that a software product meets its specifications and is ready for use in its target environment or integration with its containing system. [ ISO/IEC 12207 ]

### Other Definitions

Qualification Testing [ IEEE 829 ]: Testing conducted to determine whether a system or component is suitable for operational use.

### See also

Glossary:

- Acceptance Testing
- Development Testing
- Operational Testing
- Testing

Standards:

- IEEE 829
- ISO/IEC 12207

## 7.282. Quality

The totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs. [ ISO 8402, ISO/IEC 9126-1 ]

### Other Definitions

Quality [ IEEE 829 ]: The degree to which a system, component, or process meets specified requirements.

Quality [ ISO/IEC/IEEE 24765 ]: Ability of a product,service, system, component, or process to meet customer or user needs, expectations, or requirements.

Quality [ IEEE 1490 ]: The degree to which a set of inherent characteristics fulfils requirements.

Quality [ IEEE 829 ]: The degree to which a system, component, or process meets customer or user needs or expectations.

## Notes

- In a contractual environment, or in a regulated environment, such as the nuclear safety field, needs are specified, whereas in other environments, implied needs should be identified and defined. [ ISO 8402 ]
- In ISO/IEC 14598 the relevant entity is a software product. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Quality Assurance
- Software Quality

Standards:

- IEEE 829
- IEEE 1490
- ISO 8402
- ISO/IEC 9126-1
- ISO/IEC 14598
- ISO/IEC/IEEE 24765

## 7.283. Quality Assurance

The planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfil requirements for quality. [ ISO/IEC 12207 ]

### Other Definitions

Quality Assurance [ IEEE 610.12, ISO/IEC/IEEE 24765 ]: A planned and systematic pattern of all actions necessary to provide adequate confidence that an item or product conforms to established technical requirements.

Quality Assurance [ IEEE 610.12, ISO/IEC/IEEE 24765 ]: A set of activities designed to evaluate the process by which products are developed or manufactured.

Quality Assurance [ ISO/IEC 15288 ]: Part of quality management focused on providing confidence that quality requirements will be fulfilled.

## Notes

- There are both internal and external purposes for quality assurance: within an organization, quality assurance provides confidence to management; in contractual situations, quality assurance provides confidence to the customer or others. Some quality control and quality assurance actions are interrelated.

Unless requirements for quality fully reflect the needs of the user, quality assurance may not provide adequate confidence. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Quality
- Quality Control
- Quality Management

Standards:

- IEEE 610.12
- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC/IEEE 24765

## 7.284. Quality Control

A set of activities designed to evaluate the quality of developed or manufactured products. [ IEEE 610.12 ]

### Notes

- This term has no standardized meaning in software engineering at this time. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Quality
- Quality Assurance

Standards:

- IEEE 610.12
- ISO/IEC/IEEE 24765

## 7.285. Quality Evaluation

Systematic examination of the extent to which an entity is capable of fulfilling specified requirements. [ ISO 8402, ISO/IEC 9126-1, ISO/IEC 14598 ]

### Notes

- The requirements may be formally specified, as when a product is developed for a specific user under a contract, or specified by the development organisation, as when a product is developed for unspecified users, such as consumer software, or the requirements may be more general, as when a user evaluates products for comparison and selection purpose. [ ISO/IEC 9126-1 ]

## See also

Glossary:

→ Quality

Standards:

→ ISO 8402

→ ISO/IEC 9126-1

→ ISO/IEC 14598

## 7.286. Quality Factor

A management-oriented attribute of software that contributes to its quality. [ IEEE 1061 ]

### See also

Glossary:

→ Direct Metric

Standards:

→ IEEE 1061

## 7.287. Quality Management

Coordinated activities to direct and control an organization with regard to quality. [ ISO/IEC 19759 ]

### See also

Glossary:

→ Quality

Standards:

→ ISO/IEC 19759

## 7.288. Quality Measure Element

Base measure or derived measure that is used for constructing software quality measures. [ ISO/IEC 25000 ]

### Notes

→ The software quality characteristics or sub-characteristics of the entity are derived afterwards by calculating a software quality measure. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Quality

Standards:

→ ISO/IEC 25000

- ISO/IEC 25021
- ISO/IEC/IEEE 24765

## 7.289. Quality Metric

a quantitative measure of the degree to which an item possesses a given quality attribute. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Quality Metric [ ISO/IEC/IEEE 24765 ]: A function whose inputs are software data and whose output is a single numerical value that can be interpreted as the degree to which the software possesses a given quality attribute.

### See also

Glossary:

- Quality

Standards:

- ISO/IEC/IEEE 24765

## 7.290. Quality Model

Defined set of characteristics, and of relationships between them, which provides a framework for specifying quality requirements and evaluating quality. [ ISO/IEC 25000 ]

### Other Definitions

Quality Model [ ISO/IEC 9126-1, ISO/IEC 14598-1 ]: The set of characteristics and the relationships between them which provide the basis for specifying quality requirements and evaluating quality.

### See also

Glossary:

- Quality

Standards:

- ISO/IEC 9126
- ISO/IEC 14598
- ISO/IEC 25000

## 7.291. Quality in Use

The capability of the software product to enable specified users to achieve specified goals with effectiveness, productivity, safety and satisfaction in specified contexts of use. [ ISO/IEC 9126-1, ISO/IEC/IEEE 24765, ISO/IEC 25000 ]

## Notes

- Quality in use is the user's view of the quality of an environment containing software, and is measured from the results of using the software in the environment, rather than properties of the software itself. [ ISO/IEC 9126-1 ]
- This definition of quality in use is similar to the definition of usability in ISO 9241-11. In ISO/IEC 14598 the term usability is used to refer to the software quality characteristic described in ISO/IEC 9126-1. [ ISO/IEC 9126-1 ]
- The definition of quality in use in ISO/IEC 14598-1 does not currently include the new characteristic of safety. [ ISO/IEC 9126-1 ]
- Usability is defined in ISO 9241-11 in a similar way to the definition of quality in use in this part of ISO/IEC 9126. Quality in use may be influenced by any of the quality characteristics, and is thus broader than usability, which is defined in this part of ISO/IEC 9126 in terms of understandability, learnability, operability, attractiveness and compliance. [ ISO/IEC 9126-1 ]
- Before the product is released, quality in use can be specified and measured in a test environment for the intended users, goals and contexts of use. Once in use, it can be measured for actual users, goals and contexts of use. The actual needs of users may not be the same as those anticipated in requirements, so actual quality in use may be different from quality in use measured earlier in a test environment. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Internal Quality
- External Quality

Standards:

- ISO/IEC 9126-1
- ISO/IEC 9126-4
- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.292. Rating

The action of mapping the measured value to the appropriate rating level. Used to determine the rating level associated with the software for a specific quality characteristic. [ ISO/IEC 9126-1, ISO/IEC 14598-1, ISO/IEC 25000 ]

## Notes

- Used to determine the rating level associated with the software for a specific quality characteristic. Rating and rating levels can be applied to characteristics other than quality characteristics. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Rating Level

Standards:



- ISO/IEC 9126
- ISO/IEC 14598
- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.293. Rating Level

A scale point on an ordinal scale which is used to categorise a measurement scale. [ ISO/IEC 9126-1, ISO/IEC 14598, ISO/IEC 25000 ]

### Notes

- The rating level enables software to be classified (rated) in accordance with the stated or implied needs. [ ISO/IEC 9126-1 ]
- Appropriate rating levels may be associated with the different views of quality i.e. Users', Managers' or Developers'. [ ISO/IEC 9126-1 ]

### See also

Glossary:

- Rating
- Scale

Standards:

- ISO/IEC 9126
- ISO/IEC 14598
- ISO/IEC 25000

## 7.294. Readability

The ease with which a system's source code can be read and understood, especially at the detailed, statement level. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO/IEC/IEEE 24765

## 7.295. Recoverability

The capability of the software product to re-establish a specified level of performance and recover the data directly affected in the case of a failure. [ ISO/IEC 9126-1 ]

### Notes

- Following a failure, a software product will sometimes be down for a certain period of time, the length of which is assessed by its recoverability. [ ISO/IEC 9126-1 ]
- Availability is the capability of the software product to be in a state to perform a required function at a given point in time, under stated conditions of use. Externally, availability can be assessed by the proportion of

total time during which the software product is in an up state. Availability is therefore a combination of maturity (which governs the frequency of failure), fault tolerance and recoverability (which governs the length of down time following each failure). For this reason it has not been included as a separate sub-characteristic. [ ISO/IEC 9126-1 ]

### See also

Glossary:

→ Availability

Standards:

→ ISO/IEC 9126-1

## 7.296. Recovery

The restoration of a system, program, database, or other system resource to a state in which it can perform required functions. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.297. Reengineering

The examination and alteration of software to reconstitute it in a new form, including the subsequent implementation of the new form. [ ISO/IEC 19759 ]

### See also

Glossary:

→ Process

Standards:

→ ISO/IEC 19759

## 7.298. Regression Testing

Selective retesting of a system or component to verify that modifications have not caused unintended effects and that the system or component still complies with its specified requirements. [ ISO/IEC 90003 ]

### Other Definitions

Regression Testing [ ISO/IEC 90003 ]: Testing required to determine that a change to a system component has not adversely affected functionality, reliability or performance and has not introduced additional defects.

### See also

Glossary:

→ Testing

Standards:

→ ISO/IEC 90003

## 7.299. Release

Collection of new and/or changed configuration items which are tested and introduced into the live environment together. [ ISO/IEC 20000 ]

### Other Definitions

Release [ ISO/IEC/IEEE 24765 ]: A software version that is made formally available to a wider community.

Release [ IEEE 829, ISO/IEC 12207 ]: Particular version of a configuration item that is made available for a specific purpose.

Release [ IEEE 829 ]: The formal notification and distribution of an approved version.

### Notes

→ Release management includes defining acceptable quality levels for release, authority to authorize the release, and release procedures. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Process

Standards:

→ IEEE 829

→ ISO/IEC 12207

→ ISO/IEC 20000

→ ISO/IEC/IEEE 24765

## 7.300. Reliability

The capability of the software product to maintain a specified level of performance in cases of software faults or of infringement of its specified interface. [ ISO/IEC 9126-1 ]

### Other Definitions

Reliability [ ISO/IEC/IEEE 24765 ]: The ability of a system or component to perform its required functions under stated conditions for a specified period of time.

Software Reliability [ ISO/IEC/IEEE 24765 ]: The probability<sup>7</sup> that software will not cause the failure of a system for a specified time under specified conditions.

---

<sup>7</sup>The probability is a function of the inputs to and use of the system as well as a function of the existence of faults in the software. The inputs to the system determine whether existing faults, if any, are encountered.

## Notes

- ISO/IEC 9126-1 provides the exact same definition for reliability and Fault Tolerance.
- Wear or ageing does not occur in software. Limitations in reliability are due to faults in requirements, design, and implementation. Failures due to these faults depend on the way the software product is used and the program options selected rather than on elapsed time. [ ISO/IEC 9126-1 ]
- The definition of reliability in ISO/IEC 2382-14:1997 is "The ability of functional unit to perform a required function...". In ISO/IEC 9126-1, functionality is only one of the characteristics of software quality. Therefore, the definition of reliability has been broadened to "maintain a specified level of performance..." instead of "...perform a required function". [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Fault
- Fault Tolerance

Standards:

- ISO/IEC 9126-1

## 7.301. Reliability Compliance

The capability of the software product to adhere to standards, conventions or regulations relating to reliability. [ ISO/IEC 9126-1 ]

## See also

Glossary:

- Reliability

Standards:

- ISO/IEC 9126-1

## 7.302. Repeatability of Results of Measurements

Closeness of the agreement between the results of successive measurements of the same measurand carried out under the same conditions of measurement. [ ISO/IEC 14143 ]

## Notes

- These conditions are called repeatability conditions. Repeatability conditions include the same measurement procedure, the same observer, the same measuring instrument, used under the same conditions; the same location; repetition over a short period of time. Repeatability may be expressed quantitatively in terms of the dispersion characteristics of the results. [ ISO/IEC 99 ]

## See also

Glossary:

- Measurement

→ Reproducibility of Results of Measurements

Standards:

→ ISO/IEC 99

→ ISO/IEC 14143

### 7.303. Replaceability

The capability of the software product to be used in place of another specified software product for the same purpose in the same environment. [ ISO/IEC 9126-1 ]

#### Notes

→ For example, the replaceability of a new version of a software product is important to the user when upgrading. [ ISO/IEC 9126-1 ]

→ Replaceability is used in place of compatibility in order to avoid possible ambiguity with interoperability. [ ISO/IEC 9126-1 ]

→ Replaceability may include attributes of both installability and adaptability. The concept has been introduced as a sub-characteristic of its own because of its importance. [ ISO/IEC 9126-1 ]

#### See also

Standards:

→ ISO/IEC 9126-1

### 7.304. Reproducibility of Results of Measurements

Closeness of the agreement between the results of measurements of the same measurand carried out under changed conditions of measurement. [ ISO/IEC 14143 ]

#### Notes

→ A valid statement of reproducibility requires specification of the conditions changed. The changed conditions may include the principle of measurement; method of measurement; observer; measuring instrument; reference standard; location; conditions of use; time. Reproducibility may be expressed quantitatively in terms of the dispersion characteristics of the results. Results are here usually understood to be corrected results. [ ISO/IEC 99 ]

#### See also

Glossary:

→ Measurement

→ Repeatability of Results of Measurements

Standards:

→ ISO/IEC 99

→ ISO/IEC 14143

## 7.305. Request For Change

Form or screen used to record details of a request for a change to any configuration item within a service or infrastructure. [ ISO/IEC 20000 ]

### See also

Standards:

→ ISO/IEC 20000

## 7.306. Request For Information

A type of procurement document whereby the buyer requests a potential seller to provide various pieces of information related to a product or service or seller capability. [ IEEE 1490 ]

### See also

Standards:

→ IEEE 1490

## 7.307. Request For Proposal

A document used by the acquirer as a means to announce intention to potential bidders to acquire a specified system, product, or service. [ ISO/IEC 15288 ]

### Other Definitions

Request for Proposal [ IEEE 1362 ]: A request for services, research, or a product prepared by a customer and delivered to prospective developers with the expectation that prospective developers will respond with their proposed cost, schedule, and development approach.

Request for Proposal [ IEEE 1490 ]: A type of procurement document used to request proposals from prospective sellers of products or services. In some application areas, it may have a narrower or more specific meaning.

Request for Proposal [ ISO/IEC/IEEE 24765 ]: A collection of formal documents that includes a description of the desired form of response from a potential supplier, the relevant statement of work for the supplier, and required provisions in the supplier agreement.

### See also

Standards:

→ IEEE 1362

→ IEEE 1490

→ ISO/IEC 15288

→ ISO/IEC/IEEE 24765

## 7.308. Requirement

A condition or capability that must be met or possessed by a system, system component, product, or service to satisfy an agreement, standard, specification, or other formally imposed documents. [ ISO/IEC/IEEE 24765 ]

## Other Definitions

Requirement [ ISO/IEC/IEEE 24765 ]: A condition or capability needed by a user to solve a problem or achieve an objective.

Requirement [ IEEE 1490 ]: A condition or capability that must be met or possessed by a system, product, service, result, or component to satisfy a contract, standard, specification, or other formally imposed document. Requirements include the quantified and documented needs, wants, and expectations of the sponsor, customer, and other stakeholders.

Software Requirement [ ISO/IEC/IEEE 24765 ]: A software capability needed by a user to solve a problem to achieve an objective.

Software Requirement [ ISO/IEC/IEEE 24765 ]: A software capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed document.

## Notes

- There are design requirement, functional requirement, implementation requirement, interface requirement, performance requirement, physical requirement. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Functional Requirement
- Nonfunctional Requirement
- Nontechnical Requirement
- Optional Requirement
- Technical Requirement

Standards:

- IEEE 1490
- ISO/IEC/IEEE 24765

## 7.309. Requirements Analysis

The process of studying user needs to arrive at a definition of system, hardware, or software requirements. [ ISO/IEC/IEEE 24765 ]

## Other Definitions

Requirements Analysis [ ISO/IEC/IEEE 24765 ]: The process of studying and refining system, hardware, or software requirements.

Requirements Analysis [ ISO/IEC 2382 ]: A systematic investigation of user requirements to arrive at a definition of a system.

Requirements Analysis [ ISO/IEC/IEEE 24765 ]: Determination of product- or service-specific performance and functional characteristics based on analyses of customer needs, expectations, and constraints; operational concept; projected utilization environments for people, products, services, and processes; and measures of effectiveness

### See also

Glossary:

→ Requirement

Standards:

→ ISO/IEC 2382

→ ISO/IEC/IEEE 24765

## 7.310. Requirements Derivation

The changing or translation of a requirement through analysis into a form that is suitable for low-level analysis or design. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Requirement

Standards:

→ ISO/IEC/IEEE 24765

## 7.311. Requirements Document

Document containing any combination of requirements or regulations to be met by a COTS software product. [ ISO/IEC 25051 ]

### Example

→ A technical or ergonomic standard, a requirements list (or model requirements specification) from a group (e.g. a market sector, technical or user association), a law or a decree. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Document

→ Requirement

Standards:

→ ISO/IEC 25051

→ ISO/IEC/IEEE 24765



## 7.312. Requirements Engineering

The science and discipline concerned with analyzing and documenting requirements. [ ISO/IEC/IEEE 24765 ]

### Notes

→ It comprises needs analysis, requirements analysis, and requirements specification. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Requirement
- Requirements Analysis
- Requirements Specification

Standards:

- ISO/IEC/IEEE 24765

## 7.313. Requirements Partitioning

The separation or decomposing of a top-level requirement or design into successively lower-level detailed requirements or design. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Requirements Decomposition is a synonym for Requirements Partitioning. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO/IEC/IEEE 24765

## 7.314. Requirements Review

A process or meeting during which the requirements for a system, hardware item, or software item are presented to project personnel, managers, users, customers, or other interested parties for comment or approval. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Types of Requirements Review include system requirements review, software requirements review. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Requirement

Standards:

→ ISO/IEC/IEEE 24765

## 7.315. Requirements Specification

A document that specifies the requirements for a system or component. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Typically included are functional requirements, performance requirements, interface requirements, design requirements, and development standards. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Requirement
- Requirements Document

Standards:

- ISO/IEC/IEEE 24765

## 7.316. Requirements Traceability

Discernible association between a requirement and related requirements, implementations, and verifications. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Requirements Traceability [ ISO/IEC/IEEE 24765 ]: the identification and documentation of the derivation path (upward) and allocation/ flow-down path

(downward) of requirements in the requirements hierarchy.

### See also

Glossary:

- Requirement

Standards:

- ISO/IEC/IEEE 24765

## 7.317. Requirements Traceability Matrix

A table that links requirements to their origin and traces them throughout the project life cycle. [ IEEE 1490 ]

### See also

Glossary:

- Requirement
- Requirements Traceability

Standards:

→ IEEE 1490

## 7.318. Resource

Skilled human resources (specific disciplines either individually or in crews or teams), equipment, services, supplies, commodities, materiel, budgets, or funds. [ IEEE 1490 ]

### Other Definitions

Resource [ ISO/IEC 12207, ISO/IEC 15288 ]: Asset that is utilized or consumed during the execution of a process.

Resource [ ISO/IEC 15414 ]: A role (with respect to that action) in which the enterprise object fulfilling the role is essential to the action, requires allocation, or may become unavailable.

Resource [ ISO/IEC 15414 ]: An enterprise object which is essential to some behavior and which requires allocation or may become unavailable.

### Example

→ Diverse entities such as funding, personnel, facilities, capital equipment, tools, and utilities such as power, water, fuel and communication infrastructures. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Allocation of a resource may constrain other behaviors for which that resource is essential. Resources may be reusable, renewable or consumable. A consumable resource may become unavailable after some amount of use or after some amount of time (in case a duration or expiry has been specified for the resource). [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC 15414
- ISO/IEC/IEEE 24765

## 7.319. Resource Utilisation

The capability of the software product to use appropriate amounts and types of resources when the software performs its function under stated conditions. [ ISO/IEC 9126-1 ]

### Notes

→ Human resources are included as part of productivity. [ ISO/IEC 9126-1 ]

### See also

- ISO/IEC 9126-1

## 7.320. Result

An output from performing project management processes and activities. Results include outcomes (e.g., integrated systems, revised process, restructured organization, tests, trained personnel, etc.) and documents (e.g., policies, plans, studies, procedures, specifications, reports, etc.). [ IEEE 1490 ]

### Notes

- May include values as well as status information indicating that exceptional conditions were raised in attempting to perform the requested service. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Deliverable
- Product

Standards:

- IEEE 1490
- ISO/IEC/IEEE 24765

## 7.321. Retirement

Withdrawal of active support by the operation and maintenance organization, partial or total replacement by a new system, or installation of an upgraded system. [ ISO/IEC 12207, ISO/IEC 15288 ]

### Other Definitions

Retirement [ ISO/IEC/IEEE 24765 ]: Removal of support from an operational system or component.

Retirement [ ISO/IEC/IEEE 24765 ]: Permanent removal of a system or component from its operational environment.

### See also

Standards:

- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC/IEEE 24765

## 7.322. Reverse Engineering

Determining what existing software will do and how it is constructed (to make intelligent changes). [ ISO/IEC/IEEE 24765 ]

### Notes

Reverse Engineering [ ISO/IEC/IEEE 24765 ]: Software engineering approach that derives a system's design or requirements from its code.

## See also

Standards:

→ ISO/IEC/IEEE 24765

## 7.323. Risk

An uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives. [ IEEE 1490 ]

### Other Definitions

Risk [ IEEE 829 ]: The combination of the probability of an abnormal event or failure and the consequence(s) of that event or failure to a system's components, operators, users, or environment.

Risk [ ISO/IEC 15026 ]: A function of the probability of occurrence of a given threat and the potential adverse consequences of that threat's occurrence.

Risk [ IEEE 829 ]: The combination of the probability of occurrence and the consequences of a given future undesirable event.

### Notes

→ Generally used only when there is at least the possibility of negative consequences. In some situations, risk arises from the possibility of deviation from the expected outcome or event. Risk can be associated with software, systems, products, and projects. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Risk Acceptance

→ Risk Analysis

Standards:

→ IEEE 829

→ IEEE 1490

→ ISO/IEC/IEEE 24765

## 7.324. Risk Acceptance

Acknowledgment of a risk factor's existence along with a decision to accept the consequences if the corresponding problem occurs. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Risk Acceptance [ IEEE 1490 ]: A risk response planning technique that indicates that the project team has decided not to change the project management plan to deal with a risk, or is unable to identify any other suitable response strategy.

## Notes

→ Risk acceptance depends on risk criteria. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Risk

Standards:

→ IEEE 1490

→ ISO/IEC/IEEE 24765

## 7.325. Risk Analysis

The process of examining identified risk factors for probability of occurrence, potential loss, and potential risk-handling strategies. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Risk

Standards:

→ ISO/IEC/IEEE 24765

## 7.326. Robustness

The degree to which a system or component can function correctly in the presence of invalid inputs or stressful environmental conditions. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Fault Tolerance

Standards:

→ ISO/IEC/IEEE 24765

## 7.327. Role

The participation of an entity in a relationship. [ ISO/IEC 15474-1 ]

## Other Definitions

Role [ IEEE 1490 ]: A defined function to be performed by a project team member, such as testing, filing, inspecting, coding.

## Notes

- Each instance of a role has a minimum and maximum cardinality, and may be attributed. The direction of the role indicates how to read the name of the role. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Actor

Standards:

- IEEE 1490
- ISO/IEC 15474
- ISO/IEC/IEEE 24765

## 7.328. Routine

A subprogram that is called by other programs and subprograms. [ ISO/IEC/IEEE 24765 ]

## Other Definitions

Risk [ ISO/IEC/IEEE 24765 ]: A function or procedure invocable for a single purpose.

Risk [ ISO/IEC 2382 ]: A program, or part of a program, that may have some general or frequent use.

## Notes

- The terms 'routine,' 'subprogram,' and 'subroutine' are defined and used differently in different programming languages. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Function

Standards:

- ISO/IEC 2382
- ISO/IEC/IEEE 24765

## 7.329. Run

In software engineering, a single, usually continuous, execution of a computer program. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC/IEEE 24765

## 7.330. Safety

The capability of the software product to achieve acceptable levels of risk of harm to people, business, software, property or the environment in a specified context of use. [ ISO/IEC 9126-1 ]

### Other Definitions

Safety [ ISO/IEC/IEEE 24765, ISO/IEC 15026 ]: The expectation that a system does not, under defined conditions, lead to a state in which human life, health, property, or the environment is endangered.

### Notes

- Risks are usually a result of deficiencies in the functionality (including security), reliability, usability or maintainability. [ ISO/IEC 9126-1 ]

### See also

Standards:

- ISO/IEC 9126-1
- ISO/IEC/IEEE 24765
- ISO/IEC 15026

## 7.331. Satisfaction

The capability of the software product to satisfy users in a specified context of use. [ ISO/IEC 9126-1 ]

### Notes

- Satisfaction is the user's response to interaction with the product, and includes attitudes towards use of the product. [ ISO/IEC 9126-1 ]

### See also

- ISO/IEC 9126-1

## 7.332. Scale

Ordered set of values, continuous or discrete, or a set of categories to which the attribute is mapped. [ ISO/IEC 99, ISO/IEC 15939, ISO/IEC 25000 ]

### Other Definitions

Scale [ ISO/IEC/IEEE 24765 ]: A set of values with defined properties.

### Notes

- The type of scale depends on the nature of the relationship between values on the scale. Four types of scales are commonly defined:

:: Nominal: The measurement values are categorical. For example, the classification of defects by their type does not imply order among the categories.



; Ordinal: The measurement values are rankings. For example, the assignment of defects to a severity level is a ranking.

; Interval: The measurement values have equal distances corresponding to equal quantities of the attribute. For example, cyclomatic complexity has the minimum value of one, but each increment represents an additional path. The value of zero is not possible.

; Ratio: The measurement values have equal distances corresponding to equal quantities of the attribute where the value of zero corresponds to none of the attribute. For example, the size of a software component in terms of LOC is a ratio scale because the value of zero corresponds to no lines of code and each additional increments represents equal amounts of code.

: These are just examples of the types of scales. Roberts<sup>8</sup> defines more types of scales. [ ISO/IEC 15939 ]

→ The type of scale depends on the nature of the relationship between values on the scale. Metrics using nominal or ordinal scales produce qualitative data, and metrics using interval and ratio scales produce quantitative data. [ ISO/IEC/IEEE 24765 ]

## Example

→ A nominal scale which corresponds to a set of categories; an ordinal scale which corresponds to an ordered set of scale points; an interval scale which corresponds to an ordered scale with equidistant scale points; and a ratio scale which not only has equidistant scale point but also possess an absolute zero. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC 99
- ISO/IEC 15939
- ISO/IEC/IEEE 24765

## 7.333. Security

The capability of the software product to protect information and data so that unauthorised persons or systems cannot read or modify them and authorised persons or systems are not denied access to them. [ ISO/IEC 12207, ISO/IEC 9126-1 ]

## Other Definitions

Security [ ISO/IEC 15026 ]: The protection of system items from accidental or malicious access, use, modification, destruction, or disclosure.

Security [ ISO/IEC 15288 ]: All aspects related to defining, achieving, and maintaining confidentiality, integrity, availability, non-repudiation, accountability, authenticity, and reliability of a system.

## Notes

- This also applies to data in transmission. [ ISO/IEC 9126-1 ]
- Safety is defined as a characteristic of quality in use, as it does not relate to software alone, but to a whole system. [ ISO/IEC 9126-1 ]

---

<sup>8</sup>F. Roberts. "Measurement Theory with Applications to Decision Making, Utility, and the Social Sciences". Addison-Wesley, 1979

→ Security also pertains to personnel, data, communications, and the physical protection of computer installations. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Safety

Standards:

- ISO/IEC 12207
- ISO/IEC 15026
- ISO/IEC 15288
- ISO/IEC 9126-1
- ISO/IEC/IEEE 24765

## 7.334. Service

Performance of activities, work, or duties associated with a product. [ ISO/IEC 12207, ISO/IEC 15939 ]

### Other Definitions

Software Service [ ISO/IEC 12207, ISO/IEC 15939 ]: Performance of activities, work, or duties connected with a software product, such as its development, maintenance, and operation.

## See also

Standards:

- ISO/IEC 12207
- ISO/IEC 15939

## 7.335. Service Level Agreement

Written agreement between a service provider and a customer that documents services and agreed service levels. [ ISO/IEC 20000 ]

## See also

Standards:

- ISO/IEC 20000

## 7.336. Simplicity

The degree to which a system or component has a design and implementation that is straightforward and easy to understand. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Simplicity [ ISO/IEC/IEEE 24765 ]: Software attributes that provide implementation of functions in the most understandable manner.

## See also

Glossary:

→ Complexity

Standards:

→ ISO/IEC/IEEE 24765

## 7.337. Software

All or part of the programs, procedures, rules, and associated documentation of an information processing system. [ ISO/IEC 2382, ISO/IEC 9126-1 ]

### Other Definitions

Software [ IEEE 829 ]: Computer programs, procedures, and possibly associated documentation and data pertaining to the operation of a computer system.

Software [ ISO/IEC 26514 ]: Program or set of programs used to run a computer.

### Example

→ Command files, job control language. [ ISO/IEC/IEEE 24765 ]

### Notes

→ Software is an intellectual creation that is independent of the medium on which it is recorded. [ ISO/IEC 9126-1 ]

→ Includes firmware, documentation, data, and execution control statements. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Software Product

Standards:

→ IEEE 829

→ ISO/IEC 2382

→ ISO/IEC 9126

## 7.338. Software Asset Management

Effective management, control and protection of software assets within an organization. [ ISO/IEC 19770 ]

## See also

Glossary:

→ SAM

Standards:

→ ISO/IEC 19770

## 7.339. Software Development Process

The process by which user needs are translated into a software product. [ ISO/IEC/IEEE 24765 ]

### Notes

→ The process involves translating user needs into software requirements, transforming the software requirements into design, implementing the design in code, testing the code, and sometimes, installing and checking out the software for operational use. These activities may overlap or be performed iteratively. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Software Life Cycle

Standards:

→ ISO/IEC/IEEE 24765

## 7.340. Software Engineering

The systematic application of scientific and technological knowledge, methods, and experience to the design, implementation, testing, and documentation of software. [ ISO/IEC 2382 ]

### Other Definitions

Software Engineering [ ISO/IEC/IEEE 24765 ]: the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software.

### See also

Standards:

→ ISO/IEC 2382

→ ISO/IEC/IEEE 24765

## 7.341. Software Item

Identifiable part of a software product. [ ISO/IEC 90003 ]

### Other Definitions

Software Item [ ISO/IEC/IEEE 24765 ]: An aggregation of software, such as a computer program or database, that satisfies an end use function and is designated for specification, qualification testing, interfacing, configuration management, or other purposes.

Software Item [ ISO/IEC 12207 ]: Source code, object code, control code, control data, or a collection of these items.

## See also

Glossary:

→ Software Configuration Item

Standards:

→ ISO/IEC 12207

→ ISO/IEC 90003

→ ISO/IEC/IEEE 24765

## 7.342. Software Life Cycle

The period of time that begins when a software product is conceived and ends when the software is no longer available for use. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Software Life Cycle [ IEEE 1074 ]: The project-specific sequence of activities that is created by mapping the activities of this standard onto a

selected software life cycle model (SLCM).

Software Life Cycle [ IEEE 1362 ]: The system or product cycle initiated by a user need or a perceived customer need and terminated by discontinued use of the product.

## See also

Glossary:

→ Software Development Process

Standards:

→ IEEE 1074

→ IEEE 1362

→ ISO/IEC/IEEE 24765

## 7.343. Software Product Evaluation

Technical operation that consists of producing an assessment of one or more characteristics of a software product according to a specified procedure. [ ISO/IEC 25000 ]

### Notes

→ This definition can be compared to that of testing in ISO/IEC Guide 2. However, the term evaluation is preferred in order to avoid confusion with the notion of testing widely accepted in the field of software engineering. Software product evaluation is not necessarily conformity testing (as defined in ISO/IEC Guide 2) in the context of a certification scheme. However, conformity testing can be part of an evaluation. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.344. Software Quality

Capability of a software product to satisfy stated and implied needs when used under specified conditions. [ ISO/IEC 25000 ]

### Notes

- This definition differs from the ISO 9000:2000 quality definition mainly because the software quality definition refers to the satisfaction of stated and implied needs, while the ISO 9000 quality definition refers to the satisfaction of requirements. In SQuaRE standards software quality has the same meaning as software product quality. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Software Quality Characteristic
- Software Quality Evaluation

Standards:

- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.345. Software Quality Characteristic

Category of software quality attributes that bears on software quality. [ ISO/IEC 25000 ]

### Notes

- Software quality characteristics may be refined into multiple levels of sub-characteristics and finally into software quality attributes. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Software Quality

Standards:

- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.346. Software Quality Evaluation

Systematic examination of the extent to which a software product is capable of satisfying stated and implied needs. [ ISO/IEC 25000 ]

## See also

Glossary:

- Software Product Evaluation
- Software Quality

Standards:

- ISO/IEC 25000

## 7.347. Software Quality Measure

Measure of internal software quality, external software quality or software quality in use. IEEE 1490 ]

## Notes

- Internal software quality, external software quality and software quality in use are described in the quality model in ISO/IEC 9126-1 [ ISO/IEC 25010, ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- External Quality
- Internal Quality
- Measure
- Quality in Use

Standards:

- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.348. Software Repository

A software library providing permanent, archival storage for software and related documentation. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC/IEEE 24765

## 7.349. Software Unit

Separately compilable piece of code. [ ISO/IEC 12207 ]

## Other Definitions

Software Unit [ ISO/IEC 12207 ]: The lowest element in one or more software components.

### See also

Standards:

→ ISO/IEC 12207

## 7.350. Source Code

Computer instructions and data definitions expressed in a form suitable for input to an assembler, compiler, or other translator. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

→ Product

Standards:

→ ISO/IEC/IEEE 24765

## 7.351. Specification

A document that specifies, in a complete, precise, verifiable manner, the requirements, design, behavior, or other characteristics of a system, component, product, result, or service and, often, the procedures for determining whether these provisions have been satisfied. [ IEEE 1490 ]

## Other Definitions

Specification [ ISO/IEC 2382 ]: A detailed formulation, in document form, which provides a definitive description of a system for the purpose of developing or validating the system.

Specification [ IEEE 1220 ]: A document that fully describes a design element or its interfaces in terms of requirements (functional, performance, constraints, and design characteristics) and the qualification conditions and procedures for each requirement.

### See also

Glossary:

→ Requirement

Standards:

→ IEEE 1220

→ IEEE 1490

→ ISO/IEC 2382

## 7.352. Stability



The capability of the software product to avoid unexpected effects from modifications of the software. [ ISO/IEC 9126-1 ]

### See also

→ ISO/IEC 9126-1

## 7.353. Stage

Period within the life cycle of an entity that relates to the state of its description or realization. [ ISO/IEC 12207, ISO/IEC 15288 ]

### Notes

→ Stages relate to major progress and achievement milestones of the system through its life cycle. Stages may be overlapping. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

→ ISO/IEC 12207

→ ISO/IEC 15288

## 7.354. Stakeholder

Individual or organisation that sponsors measurement, provides data, is a user of the measurement results or otherwise participates in the measurement process. [ ISO/IEC 15939 ]

### Other Definitions

Stakeholder [ ISO/IEC 12207, ISO/IEC 15288, ISO/IEC 15939 ]: Individual or organization having a right, share, claim, or interest in a system or in its possession of characteristics that meet their needs and expectations.

Stakeholder [ IEEE 1490 ]: Person or organization (e.g. customer, sponsor, performing organization, or the public) that is actively involved in the project, or whose

interests may be positively or negatively affected by execution or completion of the project. A stakeholder may also exert influence over the project and its deliverables.

### Examples

→ End users, end user organizations, supporters, developers, producers, trainers, maintainers, disposers, acquirers, supplier organizations and regulatory bodies. [ ISO/IEC/IEEE 24765 ]

### Notes

→ The decision-maker is also a stakeholder. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- IEEE 1490
- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC 15939

## 7.355. Standard

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/IEEE 24765 ]

### Other Definitions

Standard [ IEEE 1490 ]: A document that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

### See also

Standards:

- IEEE 1490
- ISO/IEC/IEEE 24765

## 7.356. Standard Process

The set of definitions of the basic processes that guide all processes in an organization. [ ISO/IEC 15504 ]

### Notes

- These process definitions cover the fundamental process elements (and their relationships to each other) that must be incorporated into the defined processes that are implemented in projects across the organization. A standard process establishes consistent activities across the organization and is desirable for long-term stability and improvement. The organization's set of standard processes describes the fundamental process elements that will be part of the projects' defined processes. It also describes the relationships (for example, ordering and interfaces) between these process elements. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Process

Standards:

- ISO/IEC 15504
- ISO/IEC/IEEE 24765

## 7.357. Statement

In a programming language, a meaningful expression that defines data, specifies program actions, or directs the assembler or compiler. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Statement Testing

Standards:

→ ISO/IEC/IEEE 24765

## 7.358. Statement Testing

Testing designed to execute each statement of a computer program. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Branch Testing

→ Path Testing

→ Statement

→ Testing

Standards:

→ ISO/IEC/IEEE 24765

## 7.359. Statement of Work

Document used by the acquirer to describe and specify the tasks to be performed under the contract. [ ISO/IEC 12207 ]

## Other Definitions

Statement of Work [ IEEE 1490 ]: A narrative description of products, services, or results to be supplied.

## See also

Standards:

→ IEEE 1490

→ ISO/IEC 12207

## 7.360. Static Analysis

The process of evaluating a system or component based on its form, structure, content, or documentation. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Dynamic Analysis

Standards:

→ ISO/IEC/IEEE 24765

## 7.361. Statistical Process Control

Statistically based analysis of a process and measures of process performance, which identify common and special causes of variation in process performance and maintain process performance within limits. [ ISO/IEC/IEEE 24765 ]

### Notes

""Statistical Process Control"" is an effective method of monitoring a process through the use of control charts. In general, if a process exceeds the limits, we assume that it's out of control and the project team should search for special causes to deal with it. There are many kinds of charts, such as the  $\bar{x}$  chart and r-chart, etc.

=== The c-chart ===

The c-chart plots the number of defects in a process. If  $C_i$  denotes the number of defects obtained in the  $i$ th observation, the c-chart plots the data points at the height  $C_1, C_2 \dots C_n$ . The c-chart also has a center line (CL) at height  $\bar{C}$  (the average of  $C_i$ ) and the following  $3\sigma$  lines:

Upper Control Limit:  $UCL = \bar{C} + 3\sqrt{\bar{C}}$

Lower Control Limit:  $LCL = \bar{C} - 3\sqrt{\bar{C}}$

If LCL is negative, it is set to zero. The c-chart assumes the Poisson distribution of defects and is thus approximative.

Use of SPC in software engineering is still under debate. One major issue is that formal SPC requires data to be independent variables from homogeneous sources of variation. As exposed in Software Engineering Metrics: What Do They Measure And How Do We Know, software engineering data is often affected by many variations sources. Furthermore, software engineering is domain-specific (requirements may vary from one domain to another) and limits may vary.

### See also

Glossary:

- Process
- Process Performance

Papers:

- Monitoring Software Quality Evolution for Defects
- Software Engineering Metrics: What Do They Measure And How Do We Know

Standards:

- ISO/IEC/IEEE 24765

## 7.362. Step

One element (numbered list item) in a procedure that tells a user to perform an action (or actions). [ ISO/IEC 26514 ]

## Other Definitions

Step [ ISO/IEC 15414 ]: An abstraction of an action, used in a process, that may leave unspecified objects that participate in that action.

## Notes

→ A step contains one or more actions. Responses by the software are not considered to be steps. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Action
- Procedure
- Process

Standards:

- ISO/IEC 15414
- ISO/IEC 26514
- ISO/IEC/IEEE 24765

## 7.363. Stress Testing

Testing conducted to evaluate a system or component at or beyond the limits of its specified requirements. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Testing

Standards:

- ISO/IEC/IEEE 24765

## 7.364. Structural Testing

Testing that takes into account the internal mechanism of a system or component. Syn: glass-box testing, white-box testing. [ ISO/IEC/IEEE 24765 ]

## Notes

→ Types include branch testing, path testing, statement testing. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

→ Functional Testing

→ Testing

Standards:

→ ISO/IEC/IEEE 24765

## 7.365. Stub

A skeletal or special-purpose implementation of a software module, used to develop or test a module that calls or is otherwise dependent on it. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Stub [ ISO/IEC/IEEE 24765 ]: A computer program statement substituting for the body of a software module that is or will be defined elsewhere.

Stub [ ISO/IEC/IEEE 24765 ]: Scaffolding code written for the purpose of exercising higher-level code before the lower-level routines that will ultimately be used are available.

### See also

Glossary:

→ Mock Object

→ Testing

Standards:

→ IEEE 1362

→ ISO/IEC 9126

→ ISO/IEC 12207

→ ISO/IEC 15939

## 7.366. Suitability

The capability of the software product to provide an appropriate set of functions for specified tasks and user objectives. [ ISO/IEC 9126-1 ]

### Notes

→ Examples of appropriateness are task-oriented composition of functions from constituent sub-functions, and capacities of tables. [ ISO/IEC 9126-1 ]

→ Suitability corresponds to "suitability for the task" in ISO 9241-10. [ ISO/IEC 9126-1 ]

→ Suitability also affects operability. [ ISO/IEC 9126-1 ]

### See also

Standards:

→ ISO/IEC 9126-1

→ ISO 9241-10

## 7.367. Supplier

Organisation that enters into an agreement with the acquirer for the supply of a system, software product or software service under the terms of that agreement. [ ISO/IEC 9126, ISO/IEC 12207, ISO/IEC 15939 ]

### Notes

- The term "supplier" is synonymous with "contractor", "producer", "seller", or "vendor". [ ISO/IEC 15939 ]
- The acquirer may designate a part of its organisation as supplier. [ ISO/IEC 15939 ]

### See also

Glossary:

- Acquirer

Standards:

- ISO/IEC 9126
- ISO/IEC 12207
- ISO/IEC 15939

## 7.368. Support

The set of activities necessary to ensure that an operational system or component fulfills its original requirements and any subsequent modifications to those requirements. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Software Support [ ISO 9127 ]: The act of maintaining the software and its associated documentation in a functional state.

### Examples

- Software or hardware maintenance, user training. [ ISO/IEC/IEEE 24765 ]

### Notes

- Software support may be given by the manufacturer, marketing organization, supplier or other organization. In special contractually-agreed cases, consumers may be permitted to maintain or enhance the software themselves. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO 9127
- ISO/IEC/IEEE 24765

## 7.369. Support Manual

A document that provides the information necessary to service and maintain an operational system or component throughout its life cycle. [ ISO/IEC/IEEE 24765 ]

## Notes

→ Support Manual is synonym for Maintenance Manual. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Document
- Installation Manual
- Maintenance Manual
- Operator Manual
- User Manual

Standards:

- ISO/IEC/IEEE 24765

## 7.370. System

Integrated composite that consists of one or more of the processes, hardware, software, facilities and people, that provides a capability to satisfy a stated need or objective. [ ISO/IEC 9126, ISO/IEC 12207, ISO/IEC 15939 ]

## Other Definitions

Software System [ IEEE 1362 ]: A software-intensive system for which software is the only component to be developed or modified.

## See also

Standards:

- IEEE 1362
- ISO/IEC 9126
- ISO/IEC 12207
- ISO/IEC 15939

## 7.371. System Testing

Testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements. [ IEEE 829 ]

## See also

Glossary:

- Integration Test
- Testing
- Unit Test



Standards:

→ IEEE 829

## 7.372. Task

The activities required to achieve a goal. [ ISO/IEC 9126 ]

### Other Definitions

Task [ ISO/IEC 12207, ISO/IEC 15288 ]: Required, recommended, or permissible action, intended to contribute to the achievement of one or more outcomes of a process.

Task [ ISO/IEC/IEEE 24765 ]: In software design, a [[Software Component|software component that can operate in parallel with other software components.

Task [ ISO/IEC/IEEE 24765 ]: A concurrent object with its own thread of control.

Task [ ISO/IEC/IEEE 24765 ]: A sequence of instructions treated as a basic unit of work by the supervisory program of an operating system.

Task [ IEEE 829 ]: Smallest unit of work subject to management accountability; a well-defined work assignment for one or more project members.

### Notes

→ Related tasks are usually grouped to form activities. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Activity
- Procedure
- Process

Standards:

- IEEE 829
- ISO/IEC 9126
- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC/IEEE 24765

## 7.373. Technical Requirement

Requirements relating to the technology and environment, for the development, maintenance, support and execution of the software. [ ISO/IEC/IEEE 24765 ]

### Examples

→ Programming language, testing tools, operating systems, database technology and user interface technologies. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Nontechnical Requirement
- Requirement

Standards:

- ISO/IEC/IEEE 24765

## 7.374. Technique

Methods and skills required to carry out a specific activity. [ ISO/IEC 25001, ISO/IEC 12207, ISO/IEC 15939 ]

### Other Definitions

Technique [ ISO/IEC/IEEE 24765 ]: Technical or managerial procedure that aids in the evaluation and improvement of the software development process.

Technique [ IEEE 1490 ]: A defined systematic procedure employed by a human resource to perform an activity to produce a product or result or deliver a service, and that may employ one or more tools.

## See also

Standards:

- IEEE 1490
- ISO/IEC 25001
- ISO/IEC/IEEE 24765

## 7.375. Test

An activity in which a system or component is executed under specified conditions, the results are observed or recorded, and an evaluation is made of some aspect of the system or component. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Test [ IEEE 829 ]: A set of one or more test cases and procedures.

## See also

Glossary:

- Test Case
- Testing

Standards:

- IEEE 1362
- ISO/IEC 9126
- ISO/IEC 12207
- ISO/IEC 15939

## 7.376. Test Case

A set of inputs, execution preconditions, and expected outcomes developed for a particular objective to exercise a particular program path or to verify compliance with a specific requirement. [ IEEE 1012, SIGIST ]

### Other Definitions

Test Case [ IEEE 610.12 ]: A documented instruction for the tester that specifies how a function or a combination of functions shall or should be tested. A test case includes detailed information on the following issues:

- the test objective;
- the functions to be tested;
- the testing environment and other conditions;
- the test data;
- the procedure;
- the expected behaviour of the system.

### See also

Glossary:

- Requirement
- Test Case Suite
- Testing

Standards:

- IEEE 1012
- IEEE 610.12
- SIGIST

## 7.377. Test Case Suite

A collection of one or more test cases for the software under test. [ SIGIST ]

### See also

- SIGIST

## 7.378. Test Coverage

Extent to which the test cases test the requirements for the system or software product. [ ISO/IEC 12207 ]

### Other Definitions

Test Coverage [ ISO/IEC/IEEE 24765 ]: The degree to which a given test or set of tests addresses all specified requirements for a given system or component.

### See also

Glossary:

- Branch Coverage
- Code Coverage
- Requirement
- Test
- Testing
- Test Case

Standards:

- ISO/IEC 12207
- ISO/IEC/IEEE 24765

## 7.379. Test Documentation

Collection of the documentation inherent to the testing activities. [ ISO/IEC 25051 ]

### Other Definitions

Test Documentation [ ISO/IEC/IEEE 24765 ]: Documentation describing plans for, or results of, the testing of a system or component.

### See also

Glossary:

- Documentation
- Testing

Standards:

- ISO/IEC 25051
- ISO/IEC/IEEE 24765

## 7.380. Test Environment

Hardware and software configuration necessary to conduct the test case. [ ISO/IEC 25051 ]

### See also

Glossary:

- Test Case
- Testing

Standards:

- ISO/IEC 25051

## 7.381. Test Objective

Identified set of software features to be measured under specified conditions by comparing actual behavior with the required behavior. [ ISO/IEC 25051, ISO/IEC 25062 ]

## See also

Glossary:

→ Testing

Standards:

→ ISO/IEC 25051

→ ISO/IEC 25062

## 7.382. Test Plan

A document describing the scope, approach, resources, and schedule of intended test activities. [ IEEE 1012, ISO/IEC 12207, ISO/IEC 15939 ]

### Other Definitions

Test Plan [ IEEE 1012 ]: A document that describes the technical and management approach to be followed for testing a system or component.

Test Plan [ ISO/IEC 2382 ]: A plan that establishes detailed requirements, criteria, general methodology, responsibilities, and general planning for test and evaluation of a system.

### Notes

→ It identifies test items, the features to be tested, the testing tasks, who will do each task, and any risks requiring contingency planning. Typical contents identify the items to be tested, tasks to be performed, responsibilities, schedules, and required resources for the testing activity. [ 24765 ]

## See also

Glossary:

→ Testing

Standards:

→ IEEE 1012

→ ISO/IEC 2382

## 7.383. Test Procedure

Detailed instructions for the setup, execution, and evaluation of results for a given test case. [ IEEE 1012 ]

### Other Definitions

Test Procedure [ IEEE 1012 ]: Documentation that specifies a sequence of actions for the execution of a test.

## See also

Glossary:

→ Testing

Standards:

→ IEEE 1012

## 7.384. Testability

The capability of the software product to enable modified software to be validated. [ ISO/IEC 9126-1 ]

### Other Definitions

Testability [ ISO/IEC 12207 ]: Extent to which an objective and feasible test can be designed to determine whether a requirement is met.

Testability [ IEEE 1233 ]: The degree to which a requirement is stated in terms that permit establishment of test criteria and performance of tests to determine whether those criteria have been met.

Testability [ ISO/IEC/IEEE 24765 ]:

1. The degree to which a system can be unit tested and system tested.
2. The effort required to test software.
3. The degree to which a system or component facilitates the establishment of test criteria and the performance of tests to determine whether those criteria have been met.

### See also

Glossary:

- Branch Coverage
- Code Coverage
- Test Coverage
- Testing

Standards:

- IEEE 1233
- ISO/IEC 9126-1
- ISO/IEC 12207
- ISO/IEC/IEEE 24765

## 7.385. Testing

Activity in which a system or component is executed under specified conditions, the results are observed or recorded, and an evaluation is made of some aspect of the system or component. [ IEEE 829 ]

### Other Definitions

Software Testing [ ISO/IEC 19759 ]: The dynamic verification of the behavior of a program on a finite set of test cases, suitably selected from the usually infinite executions domain, against the expected behavior.

### See also

Glossary:

- Acceptance Testing
- Branch Testing
- Development Testing
- Interface Testing
- Interoperability Testing
- Functional Testing
- Operational Testing
- Path Testing
- Performance Testing
- Regression Testing
- Qualification Testing
- Statement Testing
- Stress Testing
- Structural Testing
- System Testing
- Testing Description

Standards:

- IEEE 829
- ISO/IEC 19759

## 7.386. Testing Description

Description of the test execution conditions (i.e. test procedure). [ ISO/IEC 25051, ISO/IEC 25062 ]

### See also

Glossary:

- Testing

Standards:

- ISO/IEC 25051
- ISO/IEC 25062

## 7.387. Time Behaviour

The capability of the software product to provide appropriate response and processing times and throughput rates when performing its function, under stated conditions. [ ISO/IEC 9126-1 ]

### See also

- ISO/IEC 9126-1

## 7.388. Tool

A software product that provides support for software and system life cycle processes. [ ISO/IEC 15474 ]

## Other Definitions

Tool [ IEEE 1490 ]: Something tangible, such as a template or software program, used in performing an activity to produce a product or result.

## Notes

- Particularly, but not exclusively, a modeling tool. Also, tool is used as a short form for software tool, and more specifically for CASE tool. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- IEEE 1490
- ISO/IEC 15474
- ISO/IEC/IEEE 24765

## 7.389. Total Quality Management

A holistic approach to quality improvement in all life-cycle phases. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:

- ISO/IEC/IEEE 24765

## 7.390. Traceability

The degree to which a relationship can be established between two or more products of the development process, especially products having a predecessor-successor or master-subordinate relationship to one another. [ IEEE 1233 ]

## Other Definitions

Traceability [ IEEE 1362 ]: The identification and documentation of derivation paths (upward) and allocation or flowdown paths (downward) of work products in the work product hierarchy.

Traceability [ ISO/IEC/IEEE 24765 ]: The degree to which each element in a software development product establishes its reason for existing.

Traceability [ ISO/IEC/IEEE 24765 ]: Discernible association among two or more logical entities, such as requirements, system elements, verifications, or tasks.

## Notes

- The degree to which the requirements and design of a given system element match; the degree to which each element in a bubble chart references the requirement that it satisfies. [ ISO/IEC/IEEE 24765 ]

## See also

Standards:



- IEEE 1233
- IEEE 1362
- 24765

## 7.391. Traceable

Having components whose origin can be determined. [ ISO/IEC 12207 ]

### See also

Glossary:

- Traceability

Standards:

- ISO/IEC 12207

## 7.392. Trunk

The software's main line of development; the main starting point of most branches. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Branch
- Configuration Management

Standards:

- ISO/IEC/IEEE 24765

## 7.393. Understandability

The capability of the software product to enable the user to understand whether the software is suitable, and how it can be used for particular tasks and conditions of use. [ ISO/IEC 9126-1 ]

### Other Definitions

Understandability [ ISO/IEC/IEEE 24765 ]: The ease with which a system can be comprehended at both the system-organizational and detailed-statement levels.

### Notes

- This will depend on the documentation and initial impressions given by the software. [ ISO/IEC 9126-1 ]
- Understandability has to do with the system's coherence at a more general level than readability does.[ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO/IEC 9126-1
- ISO/IEC/IEEE 24765

## 7.394. Unit Test

Testing of individual routines and modules by the developer or an independent tester. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

Unit Test [ ISO/IEC 2382 ]: A test of individual programs or modules in order to ensure that there are no analysis or programming errors.

Unit Test [ ISO/IEC/IEEE 24765 ]: A test of individual hardware or software units or groups of related units.

### See also

Glossary:

- Test
- Testing

Standards:

- ISO/IEC 2382
- ISO/IEC/IEEE 24765

## 7.395. Unit of Measurement

Particular quantity, defined and adopted by convention, with which other quantities of the same kind are compared in order to express their magnitude relative to that quantity. [ ISO/IEC 99, ISO/IEC 15939, ISO/IEC 25000 ]

### Notes

- Units of measurement have conventionally assigned names and symbols. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Measurement

Standards:

- ISO/IEC 99
- ISO/IEC 15939
- ISO/IEC 25000
- ISO/IEC/IEEE 24765

## 7.396. Usability

The capability of the software product to be understood, learned, used and attractive to the user, when used under specified conditions. [ ISO/IEC 9126-1 ]

## Other Definitions

Usability [ ISO/IEC/IEEE 24765 ]: The ease with which a user can learn to operate, prepare inputs for, and interpret outputs of a system or component.

Usability [ ISO/IEC 25062 ]: The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

## Notes

- Some aspects of functionality, reliability and efficiency will also affect usability, but for the purposes of ISO/IEC 9126 they are not classified as usability. [ ISO/IEC 9126-1 ]
- Users may include operators, end users and indirect users who are under the influence of or dependent on the use of the software. Usability should address all of the different user environments that the software may affect, which may include preparation for usage and evaluation of results. [ ISO/IEC 9126-1 ]
- This term has been deliberately redefined to more properly convey its meaning in the software reuse context. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Understandability

Standards:

- ISO/IEC 9126
- ISO/IEC 9126-1
- ISO/IEC 25062
- ISO/IEC/IEEE 24765

## 7.397. Usability Compliance

The capability of the software product to adhere to standards, conventions, style guides or regulations relating to usability. [ ISO/IEC 9126-1 ]

## See also

- ISO/IEC 9126-1

## 7.398. User

Individual or organisation that uses the system to perform a specific function. [ ISO/IEC 12207, ISO/IEC 15939 ]

## Other Definitions

User [ ISO/IEC 9126 ]: An individual that uses the software product to perform a specific function.

User [ ISO/IEC 26514 ]: Person who performs one or more tasks with software; a member of a specific audience.

User [ ISO/IEC 25062 ]: Person who interacts with the product.

User [ IEEE 1362 ]: Individual or organization who uses a software-intensive system in daily work activities or recreational pursuits.

User [ ISO/IEC 15288, ISO/IEC 15939 ]: Individual or group that benefits from a system during its utilization.

User [ ISO/IEC 14143, ISO/IEC 29881 ]: Any person or thing that communicates or interacts with the software at any time.

## Notes

- Users may include operators, recipients of the results of the software, or developers or maintainers of software. [ ISO/IEC 9126-1 ]
- The user may perform other roles such as acquirer or maintainer. The role of user and the role of operator may be vested, simultaneously or sequentially, in the same individual or organization. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Developer

Standards:

- IEEE 1362
- ISO/IEC 9126
- ISO/IEC 12207
- ISO/IEC 14143
- ISO/IEC 15288
- ISO/IEC 15939
- ISO/IEC 25062
- ISO/IEC 26514
- ISO/IEC 29881
- ISO/IEC/IEEE 24765

## 7.399. User Documentation

Documentation for users of a system, including a system description and procedures for using the system to obtain desired results. [ ISO/IEC/IEEE 24765 ]

## Other Definitions

User Documentation [ ISO/IEC 26514 ]: Information to describe, explain, or instruct how to use software.

## See also

Glossary:

- Documentation
- User

Standards:

- ISO/IEC 26514
- ISO/IEC/IEEE 24765

## 7.400. User Manual

A document that presents the information necessary to employ a system or component to obtain desired results. [ ISO/IEC/IEEE 24765 ]

### Other Definitions

User Manual [ ISO/IEC 2382 ]: A document that describes how to use a functional unit, and that may include description of the rights and responsibilities of the user, the owner, and the supplier of the unit.

### Notes

- Typically described are system or component capabilities, limitations, options, permitted inputs, expected outputs, possible error messages, and special instructions. A user manual is distinguished from an operator manual when a distinction is made between those who operate a computer system (mounting tapes, etc.) and those who use the system for its intended purpose. [ ISO/IEC/IEEE 24765 ]

### See also

Glossary:

- Document
- Installation Manual
- Maintenance Manual
- Operator Manual
- Support Manual
- User Documentation

Standards:

- ISO/IEC 2382
- ISO/IEC/IEEE 24765

## 7.401. Validation

Determination of the correctness of the products of software development with respect to the user needs and requirements. [ SIGIST ]

### Other Definitions

Validation [ ISO 8402, ISO/IEC 9126-1 ]: Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

Validation [ ISO/IEC 15288 ]: Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled.

Validation [ IEEE 1012 ]: The process of providing evidence that the software and its associated products satisfy system requirements allocated to software at the end of each life cycle activity, solve the right problem, and satisfy intended use and user needs.

Validation [ ISO/IEC 12207 ]: In a life cycle context, the set of activities ensuring and gaining confidence that a system is able to accomplish its intended use, goals and objectives.

Validation [ IEEE 1233 ]: The process of evaluating a system or component during or at the end of the development process to determine whether a system or component satisfies specified requirements.

Validation [ IEEE 1490 ]: The assurance that a product, service, or system meets the needs of the customer and other identified stakeholders. It often involves acceptance and suitability with external customers.

## Notes

- In design and development, validation concerns the process of examining a product to determine conformity with user needs. [ ISO/IEC 9126-1 ]
- Validation is normally performed on the final product under defined operating conditions. It may be necessary in earlier stages. [ ISO/IEC 9126-1 ]
- "Validated" is used to designate the corresponding status. [ ISO/IEC 9126-1 ]
- Multiple validations may be carried out if there are different intended uses. [ ISO/IEC 9126-1 ]
- Validation demonstrates that the system can be used by the users for their specific tasks. "Validated" is used to designate the corresponding status. [ISO 9000:2005] In design and development, validation concerns the process of examining a product to determine conformity with user needs. Validation is normally performed on the final product under defined operating conditions. It may be necessary in earlier stages. Multiple validations may be carried out if there are different intended uses. [ ISO/IEC/IEEE 24765 ]

## See also

Glossary:

- Verification

Standards:

- IEEE 1012
- IEEE 1233
- IEEE 1490
- ISO 8402
- ISO/IEC 9126
- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC/IEEE 24765
- SIGIST

## 7.402. Value

Number or category assigned to an attribute of an entity by making a measurement. [ ISO/IEC 25000 ]

## Other Definitions

Value [ ISO/IEC 15939 ]: Numerical or categorical result assigned to a base measure, derived measure, or indicator. [ ISO/IEC 15939 ]

## See also

Glossary:

- Base Measure
- Derived Measure
- Indicator
- Measurement

Standards:

- ISO/IEC 15939
- ISO/IEC 25000

## 7.403. Verification

Confirmation, through the provision of objective evidence, that specified requirements have been fulfilled. [ ISO/IEC 12207, ISO/IEC 15288, ISO/IEC 25000 ]

### Other Definitions

Verification [ IEEE 1012, SIGIST ]: The process of evaluating a system or component to determine whether the products of a given development phase satisfy the conditions imposed at the start of that phase.

Verification [ ISO 8402, ISO/IEC 9126 ]: Confirmation by examination and provision of objective evidence that specified requirements have been fulfilled.

Verification [ ISO/IEC/IEEE 24765 ]: Formal proof of program correctness.

Verification [ IEEE 1490 ]: The evaluation of whether or not a product, service, or system complies with a regulation, requirement, specification, or imposed condition. It is often an internal process.

Verification [ IEEE 829 ]: Process of providing objective evidence that the software and its associated products comply with requirements (e.g., for correctness, completeness, consistency, and accuracy) for all life cycle activities during each life cycle process (acquisition, supply, development, operation, and maintenance), satisfy standards, practices, and conventions during life cycle processes, and successfully complete each life cycle activity and satisfy all the criteria for initiating succeeding life cycle activities (e.g., building the software correctly).

### Notes

- "Verified" is used to designate the corresponding status. In design and development, verification concerns the process of examining the result of a given activity to determine conformity with the stated requirement for that activity. [ ISO/IEC 9126 ]

## See also

Glossary:

- Validation

Standards:

- IEEE 829

- IEEE 1012
- IEEE 1490
- ISO 8402
- ISO/IEC 9126
- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC 25000
- ISO/IEC/IEEE 24765
- SIGIST

## 7.404. Version

Identified instance of an item. [ ISO/IEC 12207 ]

### Other Definitions

Version [ ISO/IEC/IEEE 24765 ]: An initial release or re- release of a computer software configuration item, associated with a complete compilation or recompilation of the computer software configuration item.

Version [ ISO/IEC/IEEE 24765 ]: An initial release or complete re- release of a document, as opposed to a revision resulting from issuing change pages to a previous release.

Version [ ISO/IEC/IEEE 24765 ]: An operational software product that differs from similar products in terms of capability, environmental requirements, and configuration.

Version [ ISO/IEC/IEEE 24765 ]: An identifiable instance of a specific file or release of a complete system.

### Notes

- Modification to a version of a software product resulting in a new version requires configuration management action. [ ISO/IEC/IEEE 24765 ]

### See also

Standards:

- ISO/IEC 12207
- ISO/IEC/IEEE 24765

## 7.405. Work Breakdown Structure

A deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables. It organizes and defines the total scope of the project. [ IEEE 1490 ]

### See also

Standards:

- IEEE 1490



## 7.406. Work Product

An artifact associated with the execution of a process. [ ISO/IEC 15504 ]

### Other Definitions

Work Product [ IEEE 1058 ]: A tangible item produced during the process of developing or modifying software.

### See also

Glossary:

→ Product

Standards:

→ IEEE 1058

## 8. Standards

### 8.1. CMMi

CMMi stands for "Capability Maturity Model Integration".

CMMi is a process developed by the Carnegie Mellon Software Engineering Institute.

#### Structure

800px

#### See also

Standards:

→ Team Software Process

External Links:

→ The official SEI CMMi web page: [www.sei.cmu.edu/cmimi/](http://www.sei.cmu.edu/cmimi/) [<http://www.sei.cmu.edu/cmimi/>].

### 8.2. DOD-STD-2167A

Military Standard - Defense System Software Development

DOD-STD-2167A.

#### See also

→ The wikipedia article for the DOD-STD-2167: <http://en.wikipedia.org/wiki/DOD-STD-2167A>

### 8.3. IEC 61508

International Standard IEC 61508

Functional safety of electrical / electronic / programmable electronic safety related systems

Year: 1998, 2000, 2002, 2010

#### Contents

Part 1: General requirements

Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems

Part 3: Software Requirements

Part 4: Definitions and abbreviations

Part 5: Examples of methods for the determination of safety integrity levels

Part 6: Guidelines on the application of IEC 61508-2 and IEC 61508-3

Part 7: Overview on techniques and measures

## See also

- IEC 61508-3.
- IEC 61508-7.

## 8.4. IEC 61508-3

International Standard IEC 61508-3

Functional safety of electrical / electronic / programmable electronic safety related systems

Part 3: Software requirements

Year: 1998

## See also

- IEC 61508
- IEC 61508-7

## 8.5. IEC 61508-7

International Standard IEC 61508-7

Functional safety of electrical / electronic / programmable electronic safety related systems

Part 7: Overview on techniques and measures

Year: 2000

## See also

- IEC 61508
- IEC 61508-3

## 8.6. IEEE 1012

International Standard IEEE 1012

IEEE Standard for Software Verification and Validation

Year: 1986

This standard has been superseded.

## Access

Online IEEE Catalog: <http://standards.ieee.org/findstds/standard/1012-1998.html>

## 8.7. IEEE 1058

International Standard IEEE 1058

IEEE Standard for Software Project Management Plans

Year: 1998

### Access

Online IEEE Catalog: <http://standards.ieee.org/findstds/standard/1058-1998.html>

## 8.8. IEEE 1061

International Standard IEEE 1061

Standard for a Software Quality Metrics Methodology

Year: 1998

### Access

Online IEEE Catalog: <http://standards.ieee.org/findstds/standard/1061-1998.html>

## 8.9. IEEE 1074

International Standard IEEE 1074

IEEE Standard for Developing Software Life Cycle Processes

Year: 1997

This standard has been superseded.

### Access

Online IEEE Catalog: <http://standards.ieee.org/findstds/standard/1074-1997.html>

## 8.10. IEEE 1220

International Standard IEEE 1220-2005

1220-2005 - IEEE Standard for Application and Management of the Systems Engineering Process

Year: 2005

### Access

Online IEEE Catalog: <http://standards.ieee.org/findstds/standard/1220-2005.html>

## 8.11. IEEE 1233

International Standard IEEE 1233

IEEE Guide for Developing System Requirements Specifications

Year: 1996

## Access

Online IEEE Catalog: <http://standards.ieee.org/findstds/standard/1233-1996.html>

## 8.12. IEEE 1320

International Standard IEEE 1320.2

IEEE Standard for Conceptual Modeling Language - Syntax and Semantics for IDEF1X97 (IDEFobject)

Years: 1998

## Access

Online IEEE Catalog:

→ <http://standards.ieee.org/findstds/standard/1320.2-1998.html>

## 8.13. IEEE 1362

International Standard IEEE 1362

IEEE Guide for Information Technology - System Definition - Concept of Operations (ConOps) Document

Year: 1998

## Access

Online IEEE Catalog: <http://standards.ieee.org/findstds/standard/1362-1998.html>

## 8.14. IEEE 1490

International Standard IEEE 1490

IEEE Guide Adoption of PMI Standard - A Guide to the Project Management Body of Knowledge

Year: 2003

This standard has been withdrawn.

## Access

Online IEEE Catalog: <http://standards.ieee.org/findstds/standard/1490-2003.html>

## 8.15. IEEE 610.12

International Standard IEEE 610.12

Standard Glossary of Software Engineering Terminology

Year: 1990

## Access

Online IEEE Catalog: <http://standards.ieee.org/findstds/standard/610.12-1990.html>

## 8.16. IEEE 829

International Standard IEEE 829

IEEE Standard for Software Test Documentation

Year: 1983.

This standard has been superseded.

## Access

Online IEEE catalog:

→ <http://standards.ieee.org/findstds/standard/829-1983.html>

## 8.17. IEEE 830

International Standard IEEE 830

IEEE Recommended Practice for Software Requirements Specifications

Year: 1998.

## Access

Online IEEE catalog:

→ <http://standards.ieee.org/findstds/standard/830-1998.html>

## 8.18. IEEE 982

International Standard IEEE 982

IEEE Standard Dictionary of Measures to Produce Reliable Software

Year: 1988.

## Access

Online IEEE catalog:

→ <http://standards.ieee.org/findstds/standard/982.1-1988.html>

## 8.19. ISO 5806

International Standard ISO 5806

Information processing -- Specification of single-hit decision tables

Year: 1984

## Access

Online ISO Catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=11954](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=11954)

## 8.20. ISO 8402

Quality management and quality assurance - Vocabulary

Year: 1994

## 8.21. ISO 9001

International Standard ISO 9001.

Quality systems - Model for quality assurance in design, development, production, installation and servicing

Year: 1994, 2000, 2008.

## Access

Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=46486](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=46486)

## 8.22. ISO 9127

International Standard ISO 9127

Information processing systems -- User documentation and cover information for consumer software packages

Year: 1988.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16723](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16723)

## 8.23. ISO 9241

International Standard ISO 9241

Ergonomic requirements for office work with visual display terminals (VDTs)

Years: 1992-2011.

## Contents / Access

The following parts link to the online ISO catalog:

- Part 1: General introduction [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=21922](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=21922)]
- Part 2: Guidance on task requirements [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16874](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16874)]
- Part 4: Keyboard requirements [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16876](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16876)]
- Part 5: Workstation layout and postural requirements [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16877](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16877)]
- Part 6: Guidance on the work environment [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16878](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16878)]
- Part 9: Requirements for non-keyboard input devices [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=30030](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=30030)]
- Part 11: Guidance on usability [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16883](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16883)]
- Part 12: Presentation of information [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16884](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16884)]
- Part 13: User guidance [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16885](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16885)]
- Part 14: Menu dialogues [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16886](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16886)]
- Part 15: Command dialogues [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16887](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16887)]
- Part 16: Direct manipulation dialogues [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16888](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16888)]
- Part 17: Form filling dialogues [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16889](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16889)]
- Part 20: Accessibility guidelines for information/communication technology (ICT) equipment and services [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=40727](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40727)]
- Part 100: Introduction to standards related to software ergonomics [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=52712](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=52712)]
- Part 110: Dialogue principles [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=38009](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38009)]
- Part 129: Guidance on software individualization [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=50014](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=50014)]
- Part 151: Guidance on World Wide Web user interfaces [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=37031](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=37031)]
- Part 171: Guidance on software accessibility [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=39080](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=39080)]
- Part 210: Human-centred design for interactive systems [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=52075](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=52075)]
- Part 300: Introduction to electronic visual display requirements [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=40096](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40096)]
- Part 302: Terminology for electronic visual displays [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=40097](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40097)]
- Part 303: Requirements for electronic visual displays [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=40098](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40098)]
- Part 304: User performance test methods for electronic visual displays [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=40099](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40099)]



- Part 305: Optical laboratory test methods for electronic visual displays [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=40100](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40100)]
- Part 306: Field assessment methods for electronic visual displays [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=40101](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40101)]
- Part 307: Analysis and compliance test methods for electronic visual displays [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=40102](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40102)]
- Part 308: Surface-conduction electron-emitter displays (SED) [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=44843](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=44843)]
- Part 309: Organic light-emitting diode (OLED) displays [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=51308](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=51308)]
- Part 310: Visibility, aesthetics and ergonomics of pixel defects [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=54117](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=54117)]
- Part 400: Principles and requirements for physical input devices [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=38896](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38896)]
- Part 410: Design criteria for physical input devices [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=38899](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38899)]
- Part 420: Selection of physical input devices [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=52938](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=52938)]
- Part 910: Framework for tactile and haptic interaction [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=51097](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=51097)]
- Part 920: Guidance on tactile and haptic interactions [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=42904](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=42904)]

## See also

- ISO 9241-10
- ISO 9241-11

## 8.24. ISO 9241-10

International Standard ISO 9241-10

Ergonomic requirements for office work with visual display terminals (VDTs)

Part 10: Dialogue principles

Year: 1996.

This standard is withdrawn, and revised by ISO 9241-110:2006

## Access

Online ISO Catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16882](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16882)

## See also

- ISO 9241

## 8.25. ISO 9241-11

International Standard ISO 9241-11

Ergonomic requirements for office work with visual display terminals (VDTs)

Part 11: Guidance on usability

Year: 1998.

## Contents

Extract from [www.ansi.org](http://www.ansi.org) [<http://webstore.ansi.org/RecordDetail.aspx?sku=ISO+9241-11%3a1998&source=google&adgroup=iso8&keyword=ISO%209241-11&gclid=CjixjPD8jKoCFcEJtAodkmmDyQ>]:

ISO 9241-11 defines usability and explains how to identify the information which is necessary to take into account when specifying or evaluating usability of a visual display terminal in terms of measures of user performance and satisfaction. Guidance is given on how to describe the context of use of the product (hardware, software or service) and the relevant measures of usability in an explicit way. The guidance is given in the form of general principles and techniques, rather than in the form of requirements to use specific methods.

The guidance in ISO 9241-11 can be used in procurement, design, development, evaluation, and communication of information about usability. ISO 9241-11 includes guidance on how the usability of a product can be specified and evaluated. It applies both to products intended for general application and products being acquired for or being developed within a specific organization.

ISO 9241-11 also explains how measures of user performance and satisfaction can be used to measure how any component of a work system affects the whole work system in use. The guidance includes procedures for measuring usability but does not detail all the activities to be undertaken. Specification of detailed user-based methods of measurement is beyond the scope of ISO 9241-11, but further information can be found in Annex B and the bibliography in Annex E.

ISO 9241-11 applies to office work with visual display terminals. It can also apply in other situations where a user is interacting with a product to achieve goals. ISO 9241 parts 12 to 17 provide conditional recommendations which are applicable in specific contexts of use. The guidance in this Part of ISO 9241 can be used in conjunction with ISO 9241 Parts 12 to 17 in order to help identify the applicability of individual recommendations.

ISO 9241-11 focuses on usability and does not provide comprehensive coverage of all objectives of ergonomic design referred to in ISO 6385. However, design for usability will contribute positively to ergonomic objectives, such as the reduction of possible adverse effects of use on human health, safety and performance.

ISO 9241-11 does not cover the processes of system development. Human-centred design processes for interactive systems are described in ISO 13407.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=16883](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=16883)

## See also

→ ISO 9241

## 8.26. ISO/IEC 12119

Information technology - Software packages - Quality requirements and testing

Year: 1994

## 8.27. ISO/IEC 12207

International Standard ISO/IEC 12207

Information technology -- Software lifecycle processes

Year: 1995, 2008.

### Access

Online ISO/IEC Catalog: [http://www.iso.org/iso/catalogue\\_detail.htm?csnumber=43447](http://www.iso.org/iso/catalogue_detail.htm?csnumber=43447)

## 8.28. ISO/IEC 14143

International Standard ISO/IEC 14143

Information technology -- Software measurement -- Functional size measurement

### Contents

- Part 1: Definition of concepts
- Part 2: Conformity evaluation of software size measurement methods to ISO/IEC 14143-1:1998
- Part 3: Verification of functional size measurement methods
- Part 4: Reference model
- Part 5: Determination of functional domains for use with functional size measurement
- Part 6: Guide for use of ISO/IEC 14143 series and related International Standards

### See also

Standards:

- ISO/IEC 14143-1
- ISO/IEC 14143-3

## 8.29. ISO/IEC 14143-1

International Standard ISO/IEC 14143-1

Information technology -- Software measurement -- Functional size measurement

Part 1: Definition of concepts

Years: 1998, 2007.

### Access

Online ISO catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=38931](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38931)

## See also

Standards:

- ISO/IEC 14143
- ISO/IEC 14143-3

## 8.30. ISO/IEC 14143-3

International Standard ISO/IEC 14143-1

Information technology -- Software measurement -- Functional size measurement

Part 3: Verification of functional size measurement methods

Year: 2003.

## Access

Online ISO catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=31918](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=31918)

## See also

Standards:

- ISO/IEC 14143
- ISO/IEC 14143-1

## 8.31. ISO/IEC 14598

International Standard ISO/IEC 14598.

Information technology -- Software product evaluation

## Contents / Access

Online ISO/IEC catalog:

- Part 1: General overview [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24902](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24902)]
- Part 2: Planning and management [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24903](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24903)]
- Part 3: Process for developers [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24904](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24904)]
- Part 4: Process for acquirers [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24905](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24905)]
- Part 5: Process for evaluators [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24906](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24906)]
- Part 6: Documentation of evaluation modules [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24907](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24907)]

## See also

- ISO/IEC 14598-1
- ISO/IEC 14598-2
- ISO/IEC 14598-3
- ISO/IEC 14598-4
- ISO/IEC 14598-5
- ISO/IEC 14598-6

## 8.32. ISO/IEC 14598-1

International Standard ISO/IEC 14598-1

Information technology - Software product evaluation

Part 1: General overview

Year: 1999

This standard is revised by the ISO/IEC 25040:2011 standard.

### Access

Online ISO catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24902](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24902)

## See also

- ISO/IEC 14598
- ISO/IEC 14598-2
- ISO/IEC 14598-3
- ISO/IEC 14598-4
- ISO/IEC 14598-5
- ISO/IEC 14598-6

## 8.33. ISO/IEC 14598-2

International Standard ISO/IEC 14598-2

Information technology - Software product evaluation

Part 2: Planning and management

Year: 2000.

This standard is revised by the ISO/IEC 25001:2007 standard.

### Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24903](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24903)

### See also

- ISO/IEC 14598
- ISO/IEC 14598-1
- ISO/IEC 14598-3
- ISO/IEC 14598-4
- ISO/IEC 14598-5
- ISO/IEC 14598-6

## 8.34. ISO/IEC 14598-3

International Standard ISO/IEC 14598-3

Information technology - Software product evaluation

Part 3: Process for developers

Year: 2000.

### Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24904](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24904)

### See also

- ISO/IEC 14598
- ISO/IEC 14598-1
- ISO/IEC 14598-2
- ISO/IEC 14598-4
- ISO/IEC 14598-5
- ISO/IEC 14598-6

## 8.35. ISO/IEC 14598-4

International Standard ISO/IEC 14598-4

Information technology - Software product evaluation

Part 4: Process for acquirers

Year: 1999.

### Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24905](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24905)

## See also

- ISO/IEC 14598
- ISO/IEC 14598-1
- ISO/IEC 14598-2
- ISO/IEC 14598-3
- ISO/IEC 14598-5
- ISO/IEC 14598-6

## 8.36. ISO/IEC 14598-5

International Standard ISO/IEC 14598-5

Information technology - Software product evaluation

Part 5: Process for evaluators

Year: 1998

### Access

Online ISO catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24906](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24906)

## See also

- ISO/IEC 14598
- ISO/IEC 14598-1
- ISO/IEC 14598-2
- ISO/IEC 14598-3
- ISO/IEC 14598-4
- ISO/IEC 14598-6

## 8.37. ISO/IEC 14598-6

International Standard ISO/IEC 14598-6

Information technology - Software product evaluation

Part 6: Documentation of evaluation modules

Year: 2001.

This standard is revised by the ISO/IEC DIS 25041 standard.

### Access

Online ISO catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=24907](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=24907)

## See also

- ISO/IEC 14598
- ISO/IEC 14598-1
- ISO/IEC 14598-2
- ISO/IEC 14598-3
- ISO/IEC 14598-4
- ISO/IEC 14598-5

## 8.38. ISO/IEC 14756

International Standard ISO/IEC 14756

Information technology -- Measurement and rating of performance of computer-based software systems

Year: 1999

### Access

Online IEEE Catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=25492](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=25492)

## 8.39. ISO/IEC 14764

International Standard ISO/IEC 14764

Software Engineering -- Software Life Cycle Processes -- Maintenance

Years: 1999, 2006.

### Access

Online IEEE Catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=39064](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=39064)

## 8.40. ISO/IEC 15026

International Standard ISO/IEC 15026

Information technology -- System and software integrity levels

Year: 1998, 2010, 2011.

### Access

Online ISO Catalog:

- Part 1: Concepts and vocabulary [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=50520](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=50520)]
- Part 2: Assurance case [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=52926](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=52926)]



## See also

- ISO/IEC 15026-1
- ISO/IEC 15026-2

## 8.41. ISO/IEC 15026-1

International Standard ISO/IEC 15026-1

Systems and software engineering -- Systems and software assurance -- Part 1: Concepts and vocabulary

Year: 2010.

## See also

- ISO/IEC 15026
- ISO/IEC 15026-2

## 8.42. ISO/IEC 15026-2

International Standard ISO/IEC 15026-2

Systems and software engineering -- Systems and software assurance -- Part 2: Assurance case

Year: 2011.

## See also

- ISO/IEC 15026
- ISO/IEC 15026-1

## 8.43. ISO/IEC 15288

International Standard ISO/IEC 15288.

Systems and software engineering -- System life cycle processes

Years: 2002.

## Access

Online ISO catalog:

- [http://www.iso.org/iso/catalogue\\_detail?csnumber=43564](http://www.iso.org/iso/catalogue_detail?csnumber=43564)

## See also

Standards:

- ISO/IEC 12207

External Links:

- ISO/IEC 15288 association home page: <http://www.15288.com>

## 8.44. ISO/IEC 15289

International Standard ISO/IEC 15289.

Systems and software engineering -- Content of systems and software life cycle process information products (Documentation)

Year: 2006.

This standard is revised by the ISO/IEC/IEEE 15289 standard.

### Access

Online ISO catalog:

→ [http://www.iso.org/iso/catalogue\\_detail?csnumber=43790](http://www.iso.org/iso/catalogue_detail?csnumber=43790)

### See also

Standards:

- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC/IEEE 15289

## 8.45. ISO/IEC 15414

International Standard ISO/IEC 15414

Information technology -- Open distributed processing -- Reference model -- Enterprise language

Years: 2002, 2006.

### Access

Online IEEE Catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=43767](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=43767)

## 8.46. ISO/IEC 15474

International Standard ISO/IEC 15474

Information technology -- CDIF framework

### Contents

- Part 1: Overview
- Part 2: Modelling and extensibility

### See also

- ISO/IEC 15474-1
- ISO/IEC 15474-2

## 8.47. ISO/IEC 15474-1

International Standard 15474-1

Information technology -- CDIF framework

Part 1: Overview

Year: 2002.

### Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=27825](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=27825)

### See also

Standards:

→ ISO/IEC 15474

→ ISO/IEC 15474-2

## 8.48. ISO/IEC 15474-2

International Standard 15474-2

Information technology -- CDIF framework

Part 2: Modelling and extensibility

Year: 2002.

### Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=29029](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=29029)

### See also

Standards:

→ ISO/IEC 15474

→ ISO/IEC 15474-1

## 8.49. ISO/IEC 15504

International Standard ISO/IEC 15504.

Information technology - Software Process Assessment

Also known as SPICE -- Software Process Improvement and Capability dEtermination.

Years: 1998, 2003, 2004, 2008.

## Contents

- Part 1: Concepts and vocabulary
- Part 2: Performing an assessment
- Part 3: Guidance on performing an assessment
- Part 4: Guidance on use for process improvement and process capability determination
- Part 5: An exemplar Process Assessment Model
- Part 6: An exemplar system life cycle process assessment model
- Part 7: Assessment of organizational maturity

## See also

Standards:

- ISO/IEC 15504-1
- ISO/IEC 15504-2
- ISO/IEC 15504-3
- ISO/IEC 15504-4
- ISO/IEC 15504-5
- ISO/IEC 15504-6
- ISO/IEC 15504-7

External Links:

- SPICE User Group home page: <http://www.spiceusergroup.org>

## 8.50. ISO/IEC 15504-1

International Standard ISO/IEC 15504.

Information technology - Software Process Assessment

Part 1: Concepts and vocabulary

Year: 1998, 2004.

This standard revises the ISO/IEC TR 15504-1:1998 and ISO/IEC TR 15504-9:1998 standards.

## Access

Online ISO catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=38932](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38932)

## See also

Standards:

- ISO/IEC 15504
- ISO/IEC 15504-2
- ISO/IEC 15504-3
- ISO/IEC 15504-4
- ISO/IEC 15504-5
- ISO/IEC 15504-6
- ISO/IEC 15504-7

## 8.51. ISO/IEC 15504-2

International Standard ISO/IEC 15504.

Information technology - Software Process Assessment

Part 2: Performing an assessment

Year: 1998, 2003.

This standard revises the ISO/IEC TR 15504-2:1998 and ISO/IEC TR 15504-3:1998 standards.

### Access

Online ISO catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=37458](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=37458)

### See also

Standards:

- ISO/IEC 15504
- ISO/IEC 15504-1
- ISO/IEC 15504-3
- ISO/IEC 15504-4
- ISO/IEC 15504-5
- ISO/IEC 15504-6
- ISO/IEC 15504-7

## 8.52. ISO/IEC 15504-3

International Standard ISO/IEC 15504.

Information technology - Software Process Assessment

Part 3: Guidance on performing an assessment

Year: 1998, 2004.

This standard revises the ISO/IEC TR 15504-4:1998 and ISO/IEC TR 15504-6:1998 standards.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=37454](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=37454)

## See also

Standards:

- ISO/IEC 15504
- ISO/IEC 15504-1
- ISO/IEC 15504-2
- ISO/IEC 15504-4
- ISO/IEC 15504-5
- ISO/IEC 15504-6
- ISO/IEC 15504-7

## 8.53. ISO/IEC 15504-4

International Standard ISO/IEC 15504.

Information technology - Software Process Assessment

Part 4: Guidance on use for process improvement and process capability determination

Year: 1998, 2004.

This standard revises the ISO/IEC TR 15504-7:1998 and ISO/IEC TR 15504-8:1998 standards.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=37462](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=37462)

## See also

Standards:

- ISO/IEC 15504
- ISO/IEC 15504-1
- ISO/IEC 15504-2
- ISO/IEC 15504-3
- ISO/IEC 15504-5
- ISO/IEC 15504-6
- ISO/IEC 15504-7

## 8.54. ISO/IEC 15504-5

International Standard ISO/IEC 15504.

Information technology - Software Process Assessment

Part 5: An exemplar Process Assessment Model

Year: 1998, 2006.

This standard revises the ISO/IEC TR 15504-5:1998 standard.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=37462](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=37462)

## See also

Standards:

- ISO/IEC 15504
- ISO/IEC 15504-1
- ISO/IEC 15504-2
- ISO/IEC 15504-3
- ISO/IEC 15504-4
- ISO/IEC 15504-6
- ISO/IEC 15504-7

## 8.55. ISO/IEC 15504-6

International Standard ISO/IEC 15504.

Information technology - Software Process Assessment

Part 6: An exemplar system life cycle process assessment model

Year: 1998, 2008.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=43446](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=43446)

## See also

Standards:

- ISO/IEC 15504
- ISO/IEC 15504-1
- ISO/IEC 15504-2
- ISO/IEC 15504-3
- ISO/IEC 15504-4

→ ISO/IEC 15504-5

→ ISO/IEC 15504-7

## 8.56. ISO/IEC 15504-7

International Standard ISO/IEC 15504.

Information technology - Software Process Assessment

Part 7: Assessment of organizational maturity

Year: 1998, 2008.

### Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=50519](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=50519)

### See also

Standards:

→ ISO/IEC 15504

→ ISO/IEC 15504-1

→ ISO/IEC 15504-2

→ ISO/IEC 15504-3

→ ISO/IEC 15504-4

→ ISO/IEC 15504-5

→ ISO/IEC 15504-6

## 8.57. ISO/IEC 15846

International Standard ISO/IEC 15846

Information technology -- Software life cycle processes -- Configuration Management

Year: 1998.

This standard has been withdrawn.

### Access

Online ISO Catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=30516](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=30516)

### See also

Standards:

→ ISO/IEC 12207



## 8.58. ISO/IEC 15910

International Standard ISO/IEC 15910.

Information technology -- Software user documentation process

Year:1999.

This standard is revised by the ISO/IEC 26512:2011 standard.

### Notes

Extract from [www.techstreet.com](http://www.techstreet.com) [[http://www.techstreet.com/cgi-bin/detail?doc\\_no=iso\\_iec|15910\\_1999&product\\_id=862851](http://www.techstreet.com/cgi-bin/detail?doc_no=iso_iec|15910_1999&product_id=862851)]:

This International Standard specifies the minimum process for creating all forms of user documentation for software which has a user interface. Such forms of documentation include printed documentation (e.g. user manuals and quick-reference cards), on-line documentation, help text and on-line documentation systems.

This International Standard conforms with ISO/IEC 12207:1995, Information technology Software life cycle processes, as an implementation of the user documentation part of 6.1: Documentation.

If effectively applied, this International Standard will support the development of documentation which meets the needs of the users.

This International Standard is intended for use by anyone who produces or buys user documentation.

This International Standard is applicable to not only printed documentation, but also help screens, the help delivery system, and the on-line text and delivery system.

This International Standard is intended for use in a two-party situation and may be equally applied where the two parties are from the same organization. The situation may range from an informal agreement up to a legally binding contract. This International Standard may be used by a single party as self-imposed tasks.

## 8.59. ISO/IEC 15939

International Standard ISO/IEC 15939

Software engineering - Software measurement process

Year: 2002, 2007.

### Access

Online ISO Catalog:

→ ISO/IEC 15939:2007 [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=44344](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=44344)]

### See also

## 8.60. ISO/IEC 19759

International Standard ISO/IEC 19759

Software Engineering -- Guide to the Software Engineering Body of Knowledge (SWEBOK)

Year: 2005.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=33897](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=33897)

## See also

External Links:

→ The Official SWEBOK webpage: <http://www.computer.org/portal/web/swebok>

## 8.61. ISO/IEC 19770

International Standard ISO/IEC 19770

Information technology -- Software asset management

### Contents

→ Part 1: Processes

→ Part 2: Software identification tag

### See also

Standards:

→ ISO/IEC 19770-1

→ ISO/IEC 19770-2

External Links:

→ The SAM standard Working Group website: <http://www.19770.org>

## 8.62. ISO/IEC 19770-1

International Standard ISO/IEC 19770-1

Information technology -- Software asset management

Part 1: Processes

Year: 2006.

### Access

Online ISO catalog:

→ [http://www.iso.org/iso/catalogue\\_detail?csnumber=33908](http://www.iso.org/iso/catalogue_detail?csnumber=33908)

## See also

- ISO/IEC 19770
- ISO/IEC 19770-2

## 8.63. ISO/IEC 19770-2

International Standard ISO/IEC 19770-2

Information technology -- Software asset management

Part 2: Software identification tag

Year: 2009.

## Access

Online ISO catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=53670](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=53670)

## See also

- ISO/IEC 19770
- ISO/IEC 19770-1

## 8.64. ISO/IEC 20000

International Standard ISO/IEC 20000

Information technology -- Service management

## Contents/Access

This list links to the online ISO catalog:

- Part 1: Specification [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=51986](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=51986)]
- Part 2: Code of practice [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=41333](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=41333)]
- Part 3: Guidance on scope definition and applicability of ISO/IEC 20000-1 [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=51235](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=51235)]
- Part 4: Process reference model [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=50624](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=50624)]
- Part 5: Exemplar implementation plan for ISO/IEC 20000-1 [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=51988](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=51988)]

## 8.65. ISO/IEC 2382

International Standard ISO/IEC 2382

Information processing systems -- Vocabulary

## Contents

- Part 1: Quality Model [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7229](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7229)]
- Part 2: Arithmetic and logic operations [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7230](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7230)]
- Part 3: Equipment technology [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7232](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7232)]
- Part 4: Organization of data [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=27922](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=27922)]
- Part 5: Representation of data [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=30851](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=30851)]
- Part 6: Preparation and handling of data [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7238](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7238)]
- Part 7: Computer programming [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7241](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7241)]
- Part 8: Security [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7243](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7243)]
- Part 9: Data communication [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=20929](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=20929)]
- Part 10: Operating techniques and facilities [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7247](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7247)]
- Part 12: Peripheral equipment [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7251](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7251)]
- Part 13: Computer graphics [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7253](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7253)]
- Part 14: Reliability, maintainability and availability [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7255](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7255)]
- Part 15: Programming languages [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7257](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7257)]
- Part 16: Information theory [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7259](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7259)]
- Part 17: Databases [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=30853](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=30853)]
- Part 18: Distributed data processing [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=26734](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26734)]
- Part 19: Analog computing [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7263](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7263)]
- Part 20: System development [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7264](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7264)]
- Part 21: Interfaces between process computer systems and technical processes [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7265](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7265)]
- Part 23: Text processing [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7267](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7267)]
- Part 24: Computer-integrated manufacturing [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7268](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7268)]

- Part 25: Local area networks [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7269](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7269)]
- Part 26: Open systems interconnection [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7270](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7270)]
- Part 27: Office automation [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7271](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7271)]
- Part 28: Artificial intelligence -- Basic concepts and expert systems [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7272](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7272)]
- Part 29: Artificial intelligence -- Speech recognition and synthesis [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7273](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7273)]
- Part 31: Artificial intelligence -- Machine learning [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=21845](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=21845)]
- Part 32: Electronic Mail [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=21846](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=21846)]
- Part 34: Artificial intelligence -- Neural networks [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=21848](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=21848)]
- Part 36: Learning, education and training [[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=46152](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=46152)]

### See also

- ISO/IEC 2382-1

## 8.66. ISO/IEC 2382-1

International Standard ISO/IEC 2382

Information technology - Vocabulary

Part 1: Fundamental terms

Year: 1993.

### Access

Online ISO Catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=7229](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=7229)

### See also

Standards:

- ISO/IEC 2382

## 8.67. ISO/IEC 25000

International Standard ISO/IEC 25000

Software Engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Guide to SQuaRE.

year: 2005.

This series of standards revises the ISO/IEC 9126 and ISO/IEC 14598 series.

## Access

→ Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35683](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35683)

## See also

- ISO/IEC 9126
- ISO/IEC 14598
- ISO/IEC SQuaRE

## 8.68. ISO/IEC 25001

International Standard ISO/IEC 25001

Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Planning and management

year: 2007.

This standard revises the ISO/IEC 14598-2.

## Access

→ Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35724](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35724)

## See also

Standards:

- ISO/IEC 9126
- ISO/IEC 14598
- ISO/IEC SQuaRE

## 8.69. ISO/IEC 25010

International Standard ISO/IEC 25010

Systems and software engineering -- Systems and software Quality Requirements and Evaluation (SQuaRE) -- System and software quality models

year: 2011.

## Access

→ Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35733](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35733)

## See also

- ISO/IEC 9126

→ ISO/IEC 25000

## 8.70. ISO/IEC 25012

International Standard ISO/IEC 25012

Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Data quality model

year: 2008.

### Access

→ Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35736](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35736)

### See also

- ISO/IEC 9126
- ISO/IEC 25010
- ISO/IEC SQuaRE

## 8.71. ISO/IEC 25020

International Standard ISO/IEC 25020

Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Measurement reference model and guide

Year: 2007.

### Access

→ Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35744](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35744)

### See also

- ISO/IEC 25010
- ISO/IEC 25030
- ISO/IEC 25040
- ISO/IEC SQuaRE

## 8.72. ISO/IEC 25021

International Standard ISO/IEC 25021

Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Quality measure elements

Year: 2007.

## Access

- Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35745](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35745)

## See also

- ISO/IEC 9126
- ISO/IEC 25030
- ISO/IEC 25040
- ISO/IEC SQuaRE

## 8.73. ISO/IEC 25030

International Standard ISO/IEC 25030

Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Quality requirements

year: 2007.

## Access

- Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35765](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35765)

## See also

- ISO/IEC 9126-1
- ISO/IEC 25010
- ISO/IEC SQuaRE

## 8.74. ISO/IEC 25040

International Standard ISO/IEC 25040

Systems and software engineering -- Systems and software Quality Requirements and Evaluation (SQuaRE) -- Evaluation process

year: 2011.

This standard revises the ISO/IEC 14598-1 standard.

## Access

- Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35765](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35765)

## See also

- ISO/IEC 9126
- ISO/IEC 14598



→ ISO/IEC SQuaRE

## 8.75. ISO/IEC 25045

International Standard ISO/IEC 25045

Systems and software engineering -- Systems and software Quality Requirements and Evaluation (SQuaRE)  
-- Evaluation module for recoverability

Year: 2010.

### Access

→ Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35683](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35683)

### See also

→ ISO/IEC SQuaRE

## 8.76. ISO/IEC 25051

International Standard ISO/IEC 25000

Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Requirements for quality of Commercial Off-The-Shelf (COTS) software product and instructions for testing

year: 2006, 2007.

This standard revises the ISO/IEC 12119 standard.

### Access

→ Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=37457](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=37457)

### See also

Glossary:

→ COTS

Standards:

→ ISO/IEC 9126

→ ISO/IEC 14598

→ ISO/IEC SQuaRE

## 8.77. ISO/IEC 25060

International Standard ISO/IEC 25060

Systems and software engineering -- Systems and software product Quality Requirements and Evaluation (SQuaRE) -- Common Industry Format (CIF) for usability: General framework for usability-related information

Year: 2010.

## Access

→ Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=35786](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35786)

## See also

→ ISO/IEC 9126  
→ ISO/IEC SQuaRE

## 8.78. ISO/IEC 25062

International Standard ISO/IEC 25062

Software engineering -- Software product Quality Requirements and Evaluation (SQuaRE) -- Common Industry Format (CIF) for usability test reports

Year: 2006.

## Access

→ Online ISO catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=43046](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=43046)

## See also

→ ISO/IEC SQuaRE

## 8.79. ISO/IEC 26514

International Standard ISO/IEC 26514

Systems and software engineering -- Requirements for designers and developers of user documentation

Year: 2008

## Access

Online IEEE Catalog: [http://www.iso.org/iso/catalogue\\_detail?csnumber=43073](http://www.iso.org/iso/catalogue_detail?csnumber=43073)

## 8.80. ISO/IEC 29881

International Standard ISO/IEC/IEEE 29881

Information Technology — Software and Systems Engineering

Year: 2008, 2010

## Access

Online IEEE Catalog: [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=56418](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=56418)

## 8.81. ISO/IEC 90003

International Standard ISO/IEC 90003

Software engineering -- Guidelines for the application of ISO 9001:2000 to computer software

Year: 2004

### Access

Online IEEE Catalog: [http://www.iso.org/iso/catalogue\\_detail?csnumber=35867](http://www.iso.org/iso/catalogue_detail?csnumber=35867)

## 8.82. ISO/IEC 9126

International Standard ISO/IEC 9126

Software engineering -- Product quality

Years: 1991, 2001

This standard is revised by ISO/IEC 25010:2011.

### Contents

- Part 1: Quality Model
- Part 2: External metrics
- Part 3: Internal metrics
- Part 4: Quality in use metrics

### Structure

800px

### See also

- ISO/IEC 9126-1
- ISO/IEC 9126-2
- ISO/IEC 9126-3
- ISO/IEC 9126-4
- ISO/IEC 25000
- ISO/IEC 25010

## 8.83. ISO/IEC 9126-1

International Standard ISO/IEC 9126-1

Software engineering -- Product quality

Part 1: Quality Model

Years: 1991, 2001.

This standard is revised by ISO/IEC 25010:2011.

## Access

Online ISO Catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_ics/catalogue\\_detail\\_ics.htm?csnumber=22749](http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=22749)

## See also

- ISO 9001
- ISO/IEC 9126
- ISO/IEC 9126-2
- ISO/IEC 9126-3
- ISO/IEC 9126-4
- ISO/IEC 12207
- ISO/IEC 15504
- ISO/IEC 14598

## 8.84. ISO/IEC 9126-2

International Standard ISO/IEC 9126-2

Software engineering -- Product quality

Part 2: External metrics

Years: 1991, 2001.

This standard is revised by ISO/IEC 25010:2011.

## Access

Online ISO Catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=22750](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=22750)

## See also

- ISO/IEC 9126
- ISO/IEC 9126-1
- ISO/IEC 9126-3
- ISO/IEC 9126-4

## 8.85. ISO/IEC 9126-3

International Standard ISO/IEC 9126-3

Software engineering -- Product quality

Part 3: Internal metrics

Years: 1991, 2001.

This standard is revised by ISO/IEC 25010:2011.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=22891](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=22891)

## See also

- ISO/IEC 9126
- ISO/IEC 9126-1
- ISO/IEC 9126-2
- ISO/IEC 9126-4

## 8.86. ISO/IEC 9126-4

International Standard ISO/IEC 9126-4

Software engineering -- Product quality

Part 4: Quality in use metrics

Years: 1991, 2001, 2004.

This standard is revised by ISO/IEC 25010:2011.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=39752](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=39752)

## See also

- ISO/IEC 9126
- ISO/IEC 9126-1
- ISO/IEC 9126-2
- ISO/IEC 9126-3

## 8.87. ISO/IEC 9294

International Standard ISO/IEC 9294

Information technology -- Guidelines for the management of software documentation

Years: 1990, 2005.

## Access

Online ISO catalog:

→ [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=37460](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=37460)

## See also

Glossary:

- Document
- Documentation

## 8.88. ISO/IEC 99

International Standard ISO/IEC 99

International vocabulary of metrology -- Basic and general concepts and associated terms

Years: 1993, 2007.

## See also

- The Joint Committee for Guides in Metrology [<http://www.iso.org/sites/JCGM/JCGM-introduction.htm>] has an online version of a document presenting the main points of the ISO/IEC 99: [http://www.iso.org/sites/JCGM/VIM/JCGM\\_200e.html](http://www.iso.org/sites/JCGM/VIM/JCGM_200e.html) .

## 8.89. ISO/IEC SQuaRE

International Standard ISO/IEC SQuaRE

Systems and software Quality Requirements and Evaluation (SQuaRE)

SQuaRE is a series of International Standards (25000-25099) edited by the ISO/IEC organisation and related to Systems and Software Quality.

It is composed of the following ISO/IEC standards:

- ISO/IEC 25000 -- Guide to SQuaRE
- ISO/IEC 25001 -- Planning and management
- ISO/IEC 25010 -- System and software quality models
- ISO/IEC 25012 -- Data quality model
- ISO/IEC 25020 -- Measurement reference model and guide
- ISO/IEC 25021 -- Quality measure elements
- ISO/IEC 25030 -- Quality requirements
- ISO/IEC 25040 -- Evaluation process
- ISO/IEC 25045 -- Evaluation module for recoverability
- ISO/IEC 25051 -- Requirements for quality of Commercial Off-The-Shelf (COTS) software product and instructions for testing
- ISO/IEC 25060 -- Common Industry Format (CIF) for usability: General framework for usability-related information
- ISO/IEC 25062 -- Common Industry Format (CIF) for usability test reports

They are meant to replace older standards addressing the same topics, mainly (but not only) ISO/IEC 9126 and ISO/IEC 14598.

## Structure

800px

## See also

- ISO/IEC 9126
- ISO/IEC 14598
- ISO/IEC 25000
- ISO/IEC 25001
- ISO/IEC 25010
- ISO/IEC 25012
- ISO/IEC 25020
- ISO/IEC 25021
- ISO/IEC 25030
- ISO/IEC 25040
- ISO/IEC 25045
- ISO/IEC 25051
- ISO/IEC 25060
- ISO/IEC 25062

## 8.90. ISO/IEC/IEEE 15289

International Standard ISO/IEC/IEEE 15289.

Systems and software engineering -- Content of life-cycle information products (documentation)

Years: 2006, 2011.

This standard revises the ISO/IEC 15289 standard.

## Access

Online ISO catalog:

- [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_ics/catalogue\\_detail\\_ics.htm?csnumber=54388](http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=54388)

## See also

Standards:

- ISO/IEC 12207
- ISO/IEC 15288
- ISO/IEC 15289
- ISO/IEC 20000

## 8.91. ISO/IEC/IEEE 24765

International Standard ISO/IEC/IEEE 24765

Systems and software engineering — Vocabulary

First edition: 2010-12-15

### Access

Online IEEE Catalog: [http://www.iso.org/iso/catalogue\\_detail.htm?csnumber=50518](http://www.iso.org/iso/catalogue_detail.htm?csnumber=50518)

## 8.92. RTCA/EUROCAE

Software Considerations in Airborne Systems and Equipments Certification

Requirements and Technical Concepts for Aviation - RTCA SC167/DO-178B

European Organization for Civil Aviation Electronics - EUROCAE ED-12B

## 8.93. SIGIST

Glossary of terms used in Software testing

British Computer Society - Specialist Interest Group In Software Testing

## 8.94. Team Software Process

Team Software Process is a process developed by the Carnegie-Mellon Software Engineering Institute.

The Team Software Process (TSP) helps engineering teams develop and deliver high-quality software-intensive systems within planned cost and schedule commitments. TSP integrates software engineering, estimating, planning and tracking, quality management, and self-directed teaming concepts into a defined process and measurement framework. TSP was designed to be easily integrated with an organization's existing practices, and complements CMMI.

= See also =

→ CMMi

→ The official SEI website for TSP: [www.sei.cmu.edu/tsp/](http://www.sei.cmu.edu/tsp/) [<http://www.sei.cmu.edu/tsp/>].



## Index

### Symbols

'when others' in exception handler, 4

### A

Acceptance Testing, 92  
Accessibility, 92  
Accuracy, 92  
Accuracy of Measurement, 93  
Acquirer, 93  
Action, 94  
Activity, 94  
Actor, 95  
Adaptability, 95  
Agreement, 96  
Analysability, 96  
Analysis Model, 96  
AND operators, 21  
Andthen Operators, 21, 30  
Architecture, 96  
Arithmetic Operators, 44  
Assignment in Boolean, 7  
Assignment Operators, 28  
Assignment without Comparison, 7  
Attractiveness, 97  
Attribute, 97  
Availability, 98

### B

Backward goto, 3, 7  
Baseline, 99  
Base Measure, 98  
baseName, 85  
Blank Lines, 40, 45  
BLOCK Clause, 13  
Branch, 99  
Branch Coverage, 100  
Branch Testing, 100  
Break in Loop, 31  
Break in Switch, 31  
Budget, 101  
Build, 101

### C

Call Graph, 101  
CALL Statements, 43  
Call to exit, 31  
Capability Maturity Model, 102  
Case Blocks, 21, 31  
Case Labels, 31  
Case statements, 20  
Catch Statements, 39

Certification, 102  
Certification Criteria, 102  
Changeability, 104  
changeable, 86  
Change Control Board, 103  
Change Control System, 103  
Change Management, 103  
Close file once, 12  
Close open file, 13  
CMMi, 253  
Code, 104  
Code before first case, 7  
Code Coverage, 105  
Code Freeze, 105  
Code in Uppercase, 8  
Code Review, 105  
Code Verification, 105  
Coding, 106  
Co-existence, 104  
Cohesion, 106  
Column 7 for \* and D Only, 8  
Comment Lines, 40, 45  
Commercial-Off-The-Shelf (COTS), 107  
Commit, 107  
Commitment, 107  
Comparison Operators, 28  
Compatibility, 108  
Complexity, 108  
Component, 109  
COMPUTE instead of ADD, 9  
COMPUTE instead of SUBTRACT, 9  
Conciseness, 109  
Condition, 110  
Conditions, 44  
Configuration, 110  
Configuration Control, 111  
Configuration Item, 111  
Configuration Management, 112  
Configuration Management System, 112  
Conflict, 113  
Conformance, 113  
Connectivity, 114  
Consistency, 114  
Constant Data, 36  
Constant Properties, 38  
Constants, 24  
Constraint, 114  
Content Coupling, 115  
Context of Use, 115  
Continue Statements, 30  
Contract, 116

Control Coupling, 116  
Control Flow, 116  
Control Flow Diagram, 117  
Convention, 117  
Correctability, 117  
Correctness, 117  
Coupling, 118  
Coverage, 118  
Criteria, 119  
Criticality, 119  
Customer, 120  
Custom Software, 120  
Cyclomatic Complexity, 19, 28

## D

Data, 121  
Database, 124  
Data Coupling, 121  
Data Declarations, 44  
Data Flow, 122  
Data Flow Diagram, 122  
Data Management, 122  
Data Model, 123  
Data Processing, 123  
Data Provider, 123

- AntiC, 57
- Automotive Coverage Import, 57
- Automotive Tag Import, 57
- BullseyeCoverage Code Coverage Analyzer, 58
- Cantata, 60
- CheckStyle, 61
- CheckStyle (plugin), 61
- CheckStyle for SQALE (plugin), 62
- Cobertura, 62
- CodeSonar, 62
- Compiler, 63
- Configuration Checker, 78
- Coverity, 63
- CPD, 58
- CPD (plugin), 58
- Cppcheck, 59
- Cppcheck (plugin), 59
- CPPTest, 60
- Csv Coverage Import, 79
- CSV Findings, 79
- Csv Tag Import, 79
- Csv Test Results Import, 80
- FindBugs, 64
- FindBugs (plugin), 64
- Function Relaxer, 65
- FxCop, 65
- GCov, 65
- GNATcheck, 66

GNATCompiler, 66  
JaCoCo, 67  
JUnit, 66  
Klocwork, 67  
MemUsage, 68  
MISRA Rule Checking using PC-lint, 69  
MISRA Rule Checking with QAC, 72  
NCover, 68  
Oracle PLSQL compiler Warning checker, 69  
OSLC, 80  
pep8, 81  
pep8 (plugin), 81  
PMD, 70  
PMD (plugin), 70  
Polyspace, 70  
Polyspace (plugin), 71  
Polyspace MISRA, 71  
pylint, 81  
pylint (plugin), 82  
Qac\_8\_2, 82  
Rational Logiscope, 68  
ReqIF, 73  
SQL Code Guard, 73  
Squan Sources, 74  
Squore Import, 76  
Squore Virtual Project, 76  
StyleCop, 77  
StyleCop (plugin), 77  
Tessy, 78  
Unit Test Code Coverage from Rational Test RealTime, 73  
VectorCAST 6.3, 78

Data Providers

- Csv, 82
- csv\_findings, 82
- CsvPerl, 82
- ExcelMetrics, 82
- FindingsPerl, 82
- Frameworks, 82
- Generic, 82
- GenericPerl, 82

Data Store, 124  
Data Type, 124  
Data Used, 44  
Decision Criteria, 125  
Declared functions, 24  
Declare operators, 23  
Decoupling, 125  
defaultValue, 86  
Defect, 125  
Degree of Confidence, 126  
Deliverable, 126  
Delivery, 127

Dependability, 127  
Deployment, 127  
Depth of Descendant Tree, 32  
Depth of Inheritance Tree, 32, 32  
Derived Measure, 127  
Derived types, 23  
Design, 128  
Design Pattern, 129  
Developer, 129  
Development, 129  
Development Testing, 130  
Direct Measure, 130  
Direct Metric, 131  
displayType, 86  
Distinct Operands, 41, 46  
Distinct Operators, 41, 46  
Document, 131  
Documentation, 132  
DOD-STD-2167A, 253  
Do While Statements, 29  
Dynamic Analysis, 133

## E

Earned Value, 133  
Effectiveness, 133  
Efficiency, 133  
Efficiency Compliance, 134  
Effort, 134  
ELSE Clauses, 20, 43  
Empty line after EXIT, 8  
Empty line after SECTION, 9  
Empty lines around DIVISION, 8  
Encapsulation, 135  
End User, 135  
Entity, 135  
Entry Point, 136  
Entry Statements, 27  
Environment, 136  
Error, 137  
Error Tolerance, 137  
EVALUATE Statements, 42  
Evaluation, 138  
Evaluation Activity, 138  
Evaluation Group, 138  
Evaluation Method, 139  
Evaluation Module, 139  
Evaluation Technology, 140  
Evaluation Tool, 140  
Exception handlers, 22  
Exceptions, 24  
Exception When blocks, 22  
Executable Statements, 41  
Execute, 140

Execution Efficiency, 141  
Execution Time, 141  
Exit, 141  
Exit Label, 3  
Exit statements, 22  
EXIT Statements, 41  
Exit when, 4  
Expandability, 142  
Extendability, 142  
External Attribute, 142  
External Measure, 142  
External Quality, 143  
External Software Quality, 144

## F

Facility, 144  
Failure, 144  
Failure Rate, 145  
Fallthrough, 7  
Fault, 146  
Fault Tolerance, 146  
Feasibility, 147  
Feature, 147  
Feature Freeze, 147  
File Declarations, 44  
Files Used, 44  
Finite State Machine, 148  
Flexibility, 148  
For Statements, 20, 29  
Frozen Branch, 148  
Function, 148  
Functional Analysis, 149  
Functionality, 150  
Functionality Compliance, 151  
Functional Requirement, 149  
Functional Size, 150  
Functional Testing, 150  
Functional Unit, 150

## G

Generality, 151  
Generic object, 27  
Generic Practice, 151  
Glossary, 152  
Goal, 152  
GOTO Statements, 22, 42  
Granularity, 152

## H

hide, 86  
Historical Information, 152  
Hybrid Coupling, 152

**I**

- IEC 61508, 253
- IEC 61508-3, 254
- IEC 61508-7, 254
- IEEE 1012, 254
- IEEE 1058, 254
- IEEE 1061, 255
- IEEE 1074, 255
- IEEE 1220, 255
- IEEE 1233, 255
- IEEE 1320, 256
- IEEE 1362, 256
- IEEE 1490, 256
- IEEE 610.12, 256
- IEEE 829, 257
- IEEE 830, 257
- IEEE 982, 257
- IF Statements, 20, 42
- image, 85
- Impact Analysis, 153
- Implementation, 153
- Implied Needs, 154
- Incremental Development, 154
- Indicator, 154
- Indicator Value, 155
- Indirect Measure, 155
- Indirect Metric, 156
- Information, 156
- Information Analysis, 156
- Information Management, 157
- Information Need, 157
- Information Product, 157
- Inspection, 157
- Installability, 158
- Installation Manual, 158
- Integration, 158
- Integration Test, 159
- Integrity, 159
- Interface Testing, 159
- Intermediate Software Product, 160
- Internal Attribute, 160
- Internal Data, 36
- Internal Measure, 160
- Internal Methods, 34
- Internal Properties, 37
- Internal Quality, 161
- Internal Software Quality, 161
- Interoperability, 162
- Interoperability Testing, 162
- Interval Scale, 162
- ISO/IEC/IEEE 15289, 290
- ISO/IEC/IEEE 24765, 290
- ISO/IEC 12119, 261
- ISO/IEC 12207, 262
- ISO/IEC 14143, 262
- ISO/IEC 14143-1, 262
- ISO/IEC 14143-3, 263
- ISO/IEC 14598, 263
- ISO/IEC 14598-1, 264
- ISO/IEC 14598-2, 264
- ISO/IEC 14598-3, 265
- ISO/IEC 14598-4, 265
- ISO/IEC 14598-5, 266
- ISO/IEC 14598-6, 266
- ISO/IEC 14756, 267
- ISO/IEC 14764, 267
- ISO/IEC 15026, 267
- ISO/IEC 15026-1, 268
- ISO/IEC 15026-2, 268
- ISO/IEC 15288, 268
- ISO/IEC 15289, 269
- ISO/IEC 15414, 269
- ISO/IEC 15474, 269
- ISO/IEC 15474-1, 270
- ISO/IEC 15474-2, 270
- ISO/IEC 15504, 270
- ISO/IEC 15504-1, 271
- ISO/IEC 15504-2, 272
- ISO/IEC 15504-3, 272
- ISO/IEC 15504-4, 273
- ISO/IEC 15504-5, 273
- ISO/IEC 15504-6, 274
- ISO/IEC 15504-7, 275
- ISO/IEC 15846, 275
- ISO/IEC 15910, 276
- ISO/IEC 15939, 276
- ISO/IEC 19759, 276
- ISO/IEC 19770, 277
- ISO/IEC 19770-1, 277
- ISO/IEC 19770-2, 278
- ISO/IEC 20000, 278
- ISO/IEC 2382, 278
- ISO/IEC 2382-1, 280
- ISO/IEC 25000, 280
- ISO/IEC 25001, 281
- ISO/IEC 25010, 281
- ISO/IEC 25012, 282
- ISO/IEC 25020, 282
- ISO/IEC 25021, 282
- ISO/IEC 25030, 283
- ISO/IEC 25040, 283
- ISO/IEC 25045, 284
- ISO/IEC 25051, 284
- ISO/IEC 25060, 284
- ISO/IEC 25062, 285
- ISO/IEC 26514, 285

ISO/IEC 29881, 285  
ISO/IEC 90003, 286  
ISO/IEC 9126, 286  
ISO/IEC 9126-1, 286  
ISO/IEC 9126-2, 287  
ISO/IEC 9126-3, 287  
ISO/IEC 9126-4, 288  
ISO/IEC 9294, 288  
ISO/IEC 99, 289  
ISO/IEC SQuaRE, 289  
ISO 5806, 257  
ISO 8402, 258  
ISO 9001, 258  
ISO 9127, 258  
ISO 9241, 258  
ISO 9241-10, 260  
ISO 9241-11, 260  
Item, 163  
Iteration, 163

## K

key, 86, 86, 86  
Key Practices, 163  
Key Process Area, 164  
Knowledge Base, 164

## L

Label out a switch, 6  
Label Statements, 22  
Learnability, 165  
Lessons Learned, 165  
Level of Performance, 165  
Life Cycle, 165  
Life Cycle Model, 166  
Line Count, 40, 45  
Loop name, 4  
Loop Statements, 20, 30

## M

Maintainability, 166  
Maintainability Compliance, 167  
Maintainer, 167  
Maintenance, 167  
Maintenance Manual, 168  
Maturity, 169  
Maximum Nested Structures, 19, 41, 46  
Measurable Concept, 169  
Measurand, 169  
Measure, 169  
Measurement, 170  
Measurement Analyst, 171  
Measurement Experience Base, 171  
Measurement Function, 171

Measurement Method, 172  
Measurement Procedure, 172  
Measurement Process, 173  
Measurement Process Owner, 173  
Measurement Sponsor, 173  
Measurement User, 173  
Methods without Accessibility, 34  
Metric, 174  
Milestone, 174  
Missing Break, 6  
Missing Default, 6  
Missing END-EVALUATE, 10  
Missing END-IF, 9  
Mock Object, 175  
Model, 175  
Modifiability, 175  
Modifiable, 176  
Modularity, 176  
Module, 176  
Moke Object, 177  
Multidimensional Analysis, 177  
Multiple break, 5  
multipleChoice, 86  
Multiple Exit in loop, 5  
Multiple exits, 4, 5  
Multiple Inheritance Indicator, 32

## N

needSources, 85  
Network, 177  
No Abort, 3  
No ACCEPT under CICS, 15  
No ALTER, 11  
No Backward Goto, 10  
No case in switch, 6  
No CLOSE under CICS, 15  
No Compound statement, 5  
No Conditional GOTO, 9  
No DEBUG MODE, 12  
No Delay, 4  
No DELETE under CICS, 15  
No DISPLAY CONSOLE under CICS, 16  
No DISPLAY SYSPUNCH under CICS, 16  
No FD under CICS, 18  
No FILE CONTROL under CICS, 15  
No FILE SECTION under CICS, 15  
No final else, 3, 6  
No Homonymous, 11  
No INITIALIZE, 13  
No INPUT-OUTPUT under CICS, 18  
No I-O CONTROL under CICS, 18  
No MERGE under CICS, 14  
No more than 3 nested IF, 11

No MOVE CORRESPONDING, 11  
Non-Cyclic Paths, 19, 28  
Nonfunctional Requirement, 178  
Nontechnical Requirement, 178  
No OPEN under CICS, 16  
No procedural COPY, 10  
No READ under CICS, 16  
No RELEASE under CICS, 14  
No RENAMES, 11  
No RERUN under CICS, 16  
No RETURN under CICS, 14  
No REWRITE under CICS, 17  
No SD under CICS, 18  
No SORT under, 14  
No START under CICS, 17  
No STOP under CICS, 17  
No USE under CICS, 15  
No Variables S9(9), 12  
No WRITE under CICS, 17  
Number of Ancestors, 32  
Number of Attributes, 35  
Number of attributes, 47  
Number Of Children, 33  
Number of Classes, 32  
Number of comment blocks, 47  
Number of data without accessibility, 36  
Number of Descendants, 33  
Number of Files, 39, 45  
Number of Functions, 27  
Number of Method Implemented, 33  
Number of Methods, 33  
Number of paragraphs, 39  
Number of Parameters, 19, 29  
Number of Sections, 39  
Number of text blocks, 47  
Number of XML elements, 46

## O

Object, 178  
Object Model, 179  
Object Oriented Design, 179  
Observation, 179  
Observation Period, 180  
Open file once, 12  
Operability, 180  
Operand, 180  
Operand Occurrences, 40, 46  
Operational Testing, 180  
Operator, 181  
Operator Manual, 182  
Operator Occurrences, 40, 46  
option, 86  
Optional Attribute, 182

Optional Requirement, 182  
Or else operators, 21, 30  
Organisational Unit, 183  
OR operators, 21

## P

Parameter order, 4  
Path, 183  
Path Analysis, 183  
Pathological Coupling, 184  
Path Testing, 184  
Peer Review, 184  
Performance, 185  
Performance Indicator, 185  
Performance Testing, 185  
PERFORM Statements, 42  
Perform with no THRU, 9  
Pilot Project, 186  
Portability, 186  
Portability Compliance, 186  
Practice, 187  
Precision, 187  
Predictive Metric, 188  
Private constant, 26  
Private data, 35  
Private exceptions, 27  
Private functions/Procedures, 27  
Private Methods, 34  
Private Properties, 37  
Private types, 26  
Private variables, 26  
Procedure, 188  
Process, 188  
Process Assessment, 189  
Process Assessment Model, 189  
Process Capability, 190  
Process Capability Determination, 190  
Process Capability Level, 190  
Process Context, 190  
Process Improvement, 191  
Process Improvement Objective, 191  
Process Improvement Program, 191  
Process Improvement Project, 192  
Process Metric, 192  
Process Outcome, 192  
Process Performance, 193  
Process Purpose, 193  
Product, 194  
Productivity, 195  
Product Line, 195  
Product Metric, 195  
Programmer Manual, 195  
Project, 196

- Project Management, 196
  - Project Phase, 197
  - projectStatusOnFailure, 85
  - projectStatusOnWarning, 86
  - Properties, 36
  - Properties with Get, 38
  - Properties without Accessibility, 38
  - Properties with Set, 38
  - Protected Data, 36
  - Protected Internal Data, 35
  - Protected Internal Methods, 34
  - Protected Internal Properties, 37
  - Protected Methods, 34
  - Protected objects, 25
  - Protected Properties, 37
  - Prototype, 197
  - Public constants, 26
  - Public Data, 35
  - Public exceptions, 26
  - Public functions, 26
  - Public Methods, 34
  - Public Properties, 37
  - Public types, 25
  - Public variables, 25
- Q**
- Qualification, 198
  - Qualification Testing, 198
  - Quality, 198
  - Quality Assurance, 199
  - Quality Control, 200
  - Quality Evaluation, 200
  - Quality Factor, 201
  - Quality in Use, 202
  - Quality Management, 201
  - Quality Measure Element, 201
  - Quality Metric, 202
  - Quality Model, 202
- R**
- Raise statements, 22
  - Rating, 203
  - Rating Level, 204
  - Readability, 204
  - READ-WRITE Instruction, 13
  - Recoverability, 204
  - Recovery, 205
  - Reengineering, 205
  - Regression Testing, 205
  - Release, 206
  - Reliability, 206
  - Reliability Compliance, 207
  - Renamed objects, 24
  - Repeatability of Results of Measurements, 207
  - Replaceability, 208
  - Repository Connector
    - ClearCase, 49
    - CVS, 48
    - Git, 51
    - Perforce, 50
    - PTC Integrity, 51
    - SVN, 54
    - Synergy, 53
    - TFS, 52
  - Repository Connectors
    - Folder Path, 48
    - Multiple Source Nodes, 55
    - Zip Upload, 48
  - Reproducibility of Results of Measurements, 208
  - Request For Change, 209
  - Request For Information, 209
  - Request For Proposal, 209
  - required, 86
  - Requirement, 209
  - Requirements Analysis, 210
  - Requirements Derivation, 211
  - Requirements Document, 211
  - Requirements Engineering, 212
  - Requirements Partitioning, 212
  - Requirements Review, 212
  - Requirements Specification, 213
  - Requirements Traceability, 213
  - Requirements Traceability Matrix, 213
  - Resource, 214
  - Resource Utilisation, 214
  - Result, 215
  - Retirement, 215
  - Return Statements, 19, 29
  - Reverse Engineering, 215
  - Risk, 216
  - Risk Acceptance, 216
  - Risk Analysis, 217
  - Risky Empty Statement, 8
  - Robustness, 217
  - Role, 217
  - Routine, 218
  - RTCA/EUROCAE, 291
  - Run, 218
- S**
- Safety, 219
  - Satisfaction, 219
  - Scale, 219
  - Security, 220
  - Separate functions/procedures, 24
  - Separate packages, 24

Separate tasks, 25  
Service, 221  
Service Level Agreement, 221  
SIGIST, 291  
Simplicity, 221  
Single ENTRY, 17  
Single GOBACK, 10  
Software, 222  
Software Asset Management, 222  
Software Development Process, 223  
Software Engineering, 223  
Software Item, 223  
Software Life Cycle, 224  
Software Product Evaluation, 224  
Software Quality, 225  
Software Quality Characteristic, 225  
Software Quality Evaluation, 225  
Software Quality Measure, 226  
Software Repository, 226  
Software Unit, 226  
Source Code, 227  
Source Lines Of Code, 40, 45  
Special Operators, 28  
Specification, 227  
Stability, 227  
Stage, 228  
Stakeholder, 228  
Standard, 229  
Standard Label, 14  
Standard Operators, 28  
Standard Process, 229  
Statement, 229  
Statement of Work, 230  
Statement Testing, 230  
Static Analysis, 230  
Static Data, 36  
Static Methods, 35  
Static Properties, 38  
Statistical Process Control, 231  
Step, 231  
STOP Statements, 42  
Stress Testing, 232  
Structural Testing, 232  
Stub, 233  
style, 86  
Subtypes, 23  
Suitability, 233  
Supplier, 234  
Support, 234  
Support Manual, 234  
Switch Statements, 30  
System, 235  
System Testing, 235

**T**

tag, 86  
tags, 85  
Task, 236  
Team Software Process, 291  
Technical Requirement, 236  
Technique, 237  
Ternary operators, 30  
Test, 237  
Testability, 241  
Test Case, 238  
Test Case Suite, 238  
Test Coverage, 238  
Test Documentation, 239  
Test Environment, 239  
Testing, 241  
Testing Description, 242  
Test Objective, 239  
Test Plan, 240  
Test Procedure, 240  
Throw Statements, 38  
Time Behaviour, 242  
TIMES Clauses, 43  
Tool, 242  
Total Quality Management, 243  
Traceability, 243  
Traceable, 244  
Trunk, 244  
Try Statements, 39  
type, 86  
Types, 23

**U**

Understandability, 244  
Unit of Measurement, 245  
Unit Test, 245  
UNTIL Clauses, 43  
Usability, 245  
Usability Compliance, 246  
Use CALL, 17  
Use COMP for OCCURS, 11  
Use FILE STATUS, 13  
Use of continue, 5  
Use of goto, 3, 7  
User, 246  
User Documentation, 247  
User Manual, 248  
Use SYNCHRONIZED, 12  
Use WHEN OTHER, 13

**V**

Validation, 248



value, 86  
Value, 249  
Variable declaration format, 10  
Variables, 23  
VARYING Clauses, 42  
Verification, 250  
Version, 251

## **W**

Weighted Method per Class, 33  
WHEN Clauses, 43  
While Statements, 20, 29  
With statements, 25  
Work Breakdown Structure, 251  
Work Product, 252