

ISO/IEC 18045:2022-08 (E)

Information security, cybersecurity and privacy protection - Evaluation criteria for IT security - Methodology for IT security evaluation

Contents

	Page
LIST OF FIGURES	ix
LIST OF TABLES	x
FOREWORD	xi
INTRODUCTION	xii
1 SCOPE	1
2 NORMATIVE REFERENCES	1
3 TERMS AND DEFINITIONS	1
4 ABBREVIATED TERMS	4
5 TERMINOLOGY	4
6 VERB USAGE	4
7 GENERAL EVALUATION GUIDANCE.....	5
8 RELATIONSHIP BETWEEN THE ISO/IEC 15408 SERIES AND ISO/IEC 18045 STRUCTURES.....	5
9 EVALUATION PROCESS AND RELATED TASKS	5
9.1 GENERAL	5
9.2 EVALUATION PROCESS OVERVIEW	6
9.2.1 Objectives.....	6
9.2.2 Responsibilities of the roles	6
9.2.3 Relationship of roles	6
9.2.4 General evaluation model	7
9.2.5 Evaluator verdicts.....	7
9.3 EVALUATION INPUT TASK.....	9
9.3.1 Objectives.....	9
9.3.2 Application notes.....	9
9.3.3 Management of evaluation evidence sub-task.....	10
9.4 EVALUATION SUB-ACTIVITIES.....	10
9.5 EVALUATION OUTPUT TASK	10
9.5.1 Objectives.....	10
9.5.2 Management of evaluation outputs.....	11
9.5.3 Application notes.....	11
9.5.4 Write OR sub-task.....	11
9.5.5 Write ETR sub-task.....	11
10 CLASS APE: PROTECTION PROFILE EVALUATION.....	19
10.1 GENERAL	19
10.2 RE-USING THE EVALUATION RESULTS OF CERTIFIED PPS	19
10.3 PP INTRODUCTION (APE_INT)	20
10.3.1 Evaluation of sub-activity (APE_INT.1).....	20
10.4 CONFORMANCE CLAIMS (APE_CCL).....	21
10.4.1 Evaluation of sub-activity (APE_CCL.1).....	21
10.5 SECURITY PROBLEM DEFINITION (APE_SPD).....	31
10.5.1 Evaluation of sub-activity (APE_SPD.1)	31
10.6 SECURITY OBJECTIVES (APE_OBJ).....	32
10.6.1 Evaluation of sub-activity (APE_OBJ.1).....	32
10.6.2 Evaluation of sub-activity (APE_OBJ.2).....	33
10.7 EXTENDED COMPONENTS DEFINITION (APE_ECD).....	36
10.7.1 Evaluation of sub-activity (APE_ECD.1).....	36

10.8	SECURITY REQUIREMENTS (APE_REQ)	40
10.8.1	<i>Evaluation of sub-activity (APE_REQ.1)</i>	40
10.8.2	<i>Evaluation of sub-activity (APE_REQ.2)</i>	45
11	CLASS ACE: PROTECTION PROFILE CONFIGURATION EVALUATION	49
11.1	GENERAL	49
11.2	PP-MODULE INTRODUCTION (ACE_INT)	51
11.2.1	<i>Evaluation of sub-activity (ACE_INT.1)</i>	51
11.3	PP-MODULE CONFORMANCE CLAIMS (ACE_CCL)	53
11.3.1	<i>Evaluation of sub-activity (ACE_CCL.1)</i>	53
11.4	PP-MODULE SECURITY PROBLEM DEFINITION (ACE_SPD)	58
11.4.1	<i>Evaluation of sub-activity (ACE_SPD.1)</i>	58
11.5	PP-MODULE SECURITY OBJECTIVES (ACE_OBJ)	59
11.5.1	<i>Evaluation of sub-activity (ACE_OBJ.1)</i>	59
11.5.2	<i>Evaluation of sub-activity (ACE_OBJ.2)</i>	60
11.6	PP-MODULE EXTENDED COMPONENTS DEFINITION (ACE_ECD)	63
11.6.1	<i>Evaluation of sub-activity (ACE_ECD.1)</i>	63
11.7	PP-MODULE SECURITY REQUIREMENTS (ACE_REQ)	67
11.7.1	<i>Evaluation of sub-activity (ACE_REQ.1)</i>	67
11.7.2	<i>Evaluation of sub-activity (ACE_REQ.2)</i>	72
11.8	PP-MODULE CONSISTENCY (ACE_MCO)	76
11.8.1	<i>Evaluation of sub-activity (ACE_MCO.1)</i>	76
11.9	PP-CONFIGURATION CONSISTENCY (ACE_CCO)	79
11.9.1	<i>Evaluation of sub-activity (ACE_CCO.1)</i>	79
12	CLASS ASE: SECURITY TARGET EVALUATION	87
12.1	GENERAL	87
12.2	APPLICATION NOTES	87
12.2.1	<i>Re-using the evaluation results of certified PPs</i>	87
12.3	ST INTRODUCTION (ASE_INT)	88
12.3.1	<i>Evaluation of sub-activity (ASE_INT.1)</i>	88
12.4	CONFORMANCE CLAIMS (ASE_CCL)	91
12.4.1	<i>Evaluation of sub-activity (ASE_CCL.1)</i>	91
12.5	SECURITY PROBLEM DEFINITION (ASE_SPD)	105
12.5.1	<i>Evaluation of sub-activity (ASE_SPD.1)</i>	105
12.6	SECURITY OBJECTIVES (ASE_OBJ)	106
12.6.1	<i>Evaluation of sub-activity (ASE_OBJ.1)</i>	106
12.6.2	<i>Evaluation of sub-activity (ASE_OBJ.2)</i>	107
12.7	EXTENDED COMPONENTS DEFINITION (ASE_ECD)	109
12.7.1	<i>Evaluation of sub-activity (ASE_ECD.1)</i>	109
12.8	SECURITY REQUIREMENTS (ASE_REQ)	113
12.8.1	<i>Evaluation of sub-activity (ASE_REQ.1)</i>	113
12.8.2	<i>Evaluation of sub-activity (ASE_REQ.2)</i>	119
12.9	TOE SUMMARY SPECIFICATION (ASE_TSS)	124
12.9.1	<i>Evaluation of sub-activity (ASE_TSS.1)</i>	124
12.9.2	<i>Evaluation of sub-activity (ASE_TSS.2)</i>	125
12.10	CONSISTENCY OF COMPOSITE PRODUCT SECURITY TARGET (ASE_COMP)	127
12.10.1	<i>General</i>	127
12.10.2	<i>Evaluation of sub-activity (ASE_COMP.1)</i>	127
13	CLASS ADV: DEVELOPMENT	132
13.1	GENERAL	132
13.2	APPLICATION NOTES	132
13.3	SECURITY ARCHITECTURE (ADV_ARC)	133
13.3.1	<i>Evaluation of sub-activity (ADV_ARC.1)</i>	133
13.4	FUNCTIONAL SPECIFICATION (ADV_FSP)	137
13.4.1	<i>Evaluation of sub-activity (ADV_FSP.1)</i>	137
13.4.2	<i>Evaluation of sub-activity (ADV_FSP.2)</i>	140

13.4.3	Evaluation of sub-activity (ADV_FSP.3)	145
13.4.4	Evaluation of sub-activity (ADV_FSP.4)	150
13.4.5	Evaluation of sub-activity (ADV_FSP.5)	155
13.4.6	Evaluation of sub-activity (ADV_FSP.6)	161
13.5	IMPLEMENTATION REPRESENTATION (ADV_IMP)	161
13.5.1	Evaluation of sub-activity (ADV_IMP.1)	161
13.5.2	Evaluation of sub-activity (ADV_IMP.2)	164
13.6	TSF INTERNALS (ADV_INT)	166
13.6.1	Evaluation of sub-activity (ADV_INT.1)	166
13.6.2	Evaluation of sub-activity (ADV_INT.2)	169
13.6.3	Evaluation of sub-activity (ADV_INT.3)	171
13.7	FORMAL TSF MODEL (ADV_SPM)	173
13.7.1	Evaluation of sub-activity (ADV_SPM.1)	173
13.8	TOE DESIGN (ADV_TDS)	180
13.8.1	Evaluation of sub-activity (ADV_TDS.1)	180
13.8.2	Evaluation of sub-activity (ADV_TDS.2)	183
13.8.3	Evaluation of sub-activity (ADV_TDS.3)	188
13.8.4	Evaluation of sub-activity (ADV_TDS.4)	197
13.8.5	Evaluation of sub-activity (ADV_TDS.5)	206
13.8.6	Evaluation of sub-activity (ADV_TDS.6)	213
13.9	COMPOSITE DESIGN COMPLIANCE (ADV_COMP)	214
13.9.1	General	214
13.9.2	Evaluation of sub-activity (ADV_COMP.1)	214
14	CLASS AGD: GUIDANCE DOCUMENTS	216
14.1	GENERAL	216
14.2	APPLICATION NOTES	216
14.3	OPERATIONAL USER GUIDANCE (AGD_OPE)	216
14.3.1	Evaluation of sub-activity (AGD_OPE.1)	216
14.4	PREPARATIVE PROCEDURES (AGD_PRE)	219
14.4.1	Evaluation of sub-activity (AGD_PRE.1)	219
15	CLASS ALC: LIFE-CYCLE SUPPORT	221
15.1	GENERAL	221
15.2	CM CAPABILITIES (ALC_CMC)	222
15.2.1	Evaluation of sub-activity (ALC_CMC.1)	222
15.2.2	Evaluation of sub-activity (ALC_CMC.2)	223
15.2.3	Evaluation of sub-activity (ALC_CMC.3)	224
15.2.4	Evaluation of sub-activity (ALC_CMC.4)	228
15.2.5	Evaluation of sub-activity (ALC_CMC.5)	233
15.3	CM SCOPE (ALC_CMS)	240
15.3.1	Evaluation of sub-activity (ALC_CMS.1)	240
15.3.2	Evaluation of sub-activity (ALC_CMS.2)	241
15.3.3	Evaluation of sub-activity (ALC_CMS.3)	242
15.3.4	Evaluation of sub-activity (ALC_CMS.4)	243
15.3.5	Evaluation of sub-activity (ALC_CMS.5)	244
15.4	DELIVERY (ALC_DEL)	245
15.4.1	Evaluation of sub-activity (ALC_DEL.1)	245
15.5	DEVELOPMENT SECURITY (ALC_DVS)	247
15.5.1	Evaluation of sub-activity (ALC_DVS.1)	247
15.5.2	Evaluation of sub-activity (ALC_DVS.2)	249
15.6	FLAW REMEDIATION (ALC_FLR)	252
15.6.1	Evaluation of sub-activity (ALC_FLR.1)	252
15.6.2	Evaluation of sub-activity (ALC_FLR.2)	254
15.6.3	Evaluation of sub-activity (ALC_FLR.3)	257
15.7	LIFE-CYCLE DEFINITION (ALC_LCD)	262
15.7.1	Evaluation of sub-activity (ALC_LCD.1)	262
15.7.2	Evaluation of sub-activity (ALC_LCD.2)	263

15.8	TOE DEVELOPMENT ARTIFACTS (ALC_TDA).....	265
15.8.1	<i>Evaluation of sub-activity (ALC_TDA.1)</i>	265
15.8.2	<i>Evaluation of sub-activity (ALC_TDA.2)</i>	268
15.8.3	<i>Evaluation of sub-activity (ALC_TDA.3)</i>	272
15.9	TOOLS AND TECHNIQUES (ALC_TAT).....	276
15.9.1	<i>Evaluation of sub-activity (ALC_TAT.1)</i>	276
15.9.2	<i>Evaluation of sub-activity (ALC_TAT.2)</i>	278
15.9.3	<i>Evaluation of sub-activity (ALC_TAT.3)</i>	281
15.10	INTEGRATION OF COMPOSITION PARTS AND CONSISTENCY CHECK OF DELIVERY PROCEDURES (ALC_COMP).....	284
15.10.1	<i>General</i>	284
15.10.2	<i>Evaluation of sub-activity (ALC_COMP.1)</i>	284
16	CLASS ATE: TESTS.....	286
16.1	GENERAL.....	286
16.2	APPLICATION NOTES.....	287
16.2.1	<i>Understanding the expected behaviour of the TOE</i>	287
16.2.2	<i>Testing vs. alternate approaches to verify the expected behaviour of functionality</i>	288
16.2.3	<i>Verifying the adequacy of tests</i>	288
16.3	COVERAGE (ATE_COV).....	288
16.3.1	<i>Evaluation of sub-activity (ATE_COV.1)</i>	288
16.3.2	<i>Evaluation of sub-activity (ATE_COV.2)</i>	289
16.3.3	<i>Evaluation of sub-activity (ATE_COV.3)</i>	291
16.4	DEPTH (ATE_DPT).....	293
16.4.1	<i>Evaluation of sub-activity (ATE_DPT.1)</i>	293
16.4.2	<i>Evaluation of sub-activity (ATE_DPT.2)</i>	295
16.4.3	<i>Evaluation of sub-activity (ATE_DPT.3)</i>	298
16.4.4	<i>Evaluation of sub-activity (ATE_DPT.4)</i>	300
16.5	FUNCTIONAL TESTS (ATE_FUN).....	300
16.5.1	<i>Evaluation of sub-activity (ATE_FUN.1)</i>	300
16.5.2	<i>Evaluation of sub-activity (ATE_FUN.2)</i>	303
16.6	INDEPENDENT TESTING (ATE_IND).....	307
16.6.1	<i>Evaluation of sub-activity (ATE_IND.1)</i>	307
16.6.2	<i>Evaluation of sub-activity (ATE_IND.2)</i>	311
16.6.3	<i>Evaluation of sub-activity (ATE_IND.3)</i>	316
16.7	COMPOSITE FUNCTIONAL TESTING (ATE_COMP).....	316
16.7.1	<i>General</i>	316
16.7.2	<i>Evaluation of sub-activity (ATE_COMP.1)</i>	316
17	CLASS AVA: VULNERABILITY ASSESSMENT.....	317
17.1	GENERAL.....	317
17.2	VULNERABILITY ANALYSIS (AVA_VAN).....	318
17.2.1	<i>Evaluation of sub-activity (AVA_VAN.1)</i>	318
17.2.2	<i>Evaluation of sub-activity (AVA_VAN.2)</i>	323
17.2.3	<i>Evaluation of sub-activity (AVA_VAN.3)</i>	329
17.2.4	<i>Evaluation of sub-activity (AVA_VAN.4)</i>	337
17.2.5	<i>Evaluation of sub-activity (AVA_VAN.5)</i>	345
17.3	COMPOSITE VULNERABILITY ASSESSMENT (AVA_COMP).....	352
17.3.1	<i>General</i>	352
17.3.2	<i>Evaluation of sub-activity (AVA_COMP.1)</i>	352
18	CLASS ACO: COMPOSITION.....	354
18.1	GENERAL.....	354
18.2	APPLICATION NOTES.....	354
18.3	COMPOSITION RATIONALE (ACO_COR).....	355
18.3.1	<i>Evaluation of sub-activity (ACO_COR.1)</i>	355
18.4	DEVELOPMENT EVIDENCE (ACO_DEV).....	362
18.4.1	<i>Evaluation of sub-activity (ACO_DEV.1)</i>	362
18.4.2	<i>Evaluation of sub-activity (ACO_DEV.2)</i>	363

18.4.3	<i>Evaluation of sub-activity (ACO_DEV.3)</i>	365
18.5	RELIANCE OF DEPENDENT COMPONENT (ACO_REL).....	368
18.5.1	<i>Evaluation of sub-activity (ACO_REL.1)</i>	368
18.5.2	<i>Evaluation of sub-activity (ACO_REL.2)</i>	370
18.6	COMPOSED TOE TESTING (ACO_CTT).....	372
18.6.1	<i>Evaluation of sub-activity (ACO_CTT.1)</i>	372
18.6.2	<i>Evaluation of sub-activity (ACO_CTT.2)</i>	375
18.7	COMPOSITION VULNERABILITY ANALYSIS (ACO_VUL).....	378
18.7.1	<i>Evaluation of sub-activity (ACO_VUL.1)</i>	378
18.7.2	<i>Application notes</i>	378
18.7.3	<i>Evaluation of sub-activity (ACO_VUL.2)</i>	381
18.7.4	<i>Evaluation of sub-activity (ACO_VUL.3)</i>	384
ANNEX A (INFORMATIVE) GENERAL EVALUATION GUIDANCE		389
A.1	OBJECTIVES	389
A.2	SAMPLING	389
A.3	DEPENDENCIES	391
A.3.1	GENERAL	391
A.3.2	DEPENDENCIES BETWEEN ACTIVITIES	391
A.3.3	DEPENDENCIES BETWEEN SUB-ACTIVITIES	391
A.3.4	DEPENDENCIES BETWEEN ACTIONS	391
A.4	SITE VISITS	391
A.4.1	GENERAL	391
A.4.2	GENERAL APPROACH	392
A.5	ORIENTATION GUIDE FOR THE PREPARATION OF THE CHECKLIST	393
A.5.1	ASPECTS OF CONFIGURATION MANAGEMENT	393
A.5.2	ASPECTS OF DEVELOPMENT SECURITY	393
A.5.3	EXAMPLE OF A CHECKLIST	394
A.6	SCHEME RESPONSIBILITIES	397
ANNEX B (INFORMATIVE) VULNERABILITY ASSESSMENT (AVA)		399
B.1	WHAT IS VULNERABILITY ANALYSIS	399
B.2	EVALUATOR CONSTRUCTION OF A VULNERABILITY ANALYSIS	399
B.3	GENERIC VULNERABILITY GUIDANCE	400
B.3.1	BYPASSING	400
B.3.2	TAMPERING	402
B.3.3	DIRECT ATTACKS	405
B.3.4	MONITORING	405
B.3.5	MISUSE	406
B.4	IDENTIFICATION OF POTENTIAL VULNERABILITIES	407
B.4.1	ENCOUNTERED	407
B.4.2	ANALYSIS	408
B.4.2.1	GENERAL	408
B.4.2.2	UNSTRUCTURED ANALYSIS	408

B.4.2.3	FOCUSED	408
B.4.2.4	METHODICAL	409
B.5	WHEN ATTACK POTENTIAL IS USED	410
B.5.1	DEVELOPER	410
B.5.2	EVALUATOR	410
B.6	CALCULATING ATTACK POTENTIAL	411
B.6.1	APPLICATION OF ATTACK POTENTIAL	411
B.6.1.1	GENERAL	411
B.6.1.2	TREATMENT OF MOTIVATION	411
B.6.2	CHARACTERISING ATTACK POTENTIAL	412
B.6.2.1	GENERAL	412
B.6.2.2	DETERMINING THE ATTACK POTENTIAL	412
B.6.2.3	FACTORS TO BE CONSIDERED	412
B.6.2.4	CALCULATION OF ATTACK POTENTIAL	415
B.7	EXAMPLE CALCULATION FOR DIRECT ATTACK	418
	ANNEX C (INFORMATIVE) EVALUATION TECHNIQUES AND TOOLS	420
C.1	SEMIFORMAL AND FORMAL METHODS	420
C.1.1	GENERAL	420
C.1.2	DESCRIPTION OF STYLES	420
C.1.2.1	INFORMAL STYLE	421
C.1.2.2	SEMIFORMAL STYLE	422
C.1.2.3	FORMAL STYLE	423

List of figures

FIGURE 1 — MAPPING OF THE ISO/IEC 15408 SERIES AND ISO/IEC 18045 STRUCTURES.....	5
FIGURE 2 — GENERIC EVALUATION MODEL.....	7
FIGURE 3 — EXAMPLE OF THE VERDICT ASSIGNMENT RULE.....	8
FIGURE 4 — ETR INFORMATION CONTENT FOR A PP EVALUATION.....	12
FIGURE 5 — ETR INFORMATION CONTENT FOR A PP-CONFIGURATION EVALUATION.....	14
FIGURE 6 — ETR INFORMATION CONTENT FOR A TOE EVALUATION.....	17
FIGURE 7 — RELATIONSHIP BETWEEN PPS AND PP-MODULES IN A PP-CONFIGURATION.....	50
FIGURE 8 — EXAMPLE OF EXACT CONFORMANCE RELATIONSHIPS BETWEEN AN ST AND PPS.....	94

List of tables

TABLE 1 — ASE_COMP.....	127
TABLE 2 — ADV_COMP.....	214
TABLE 3 — ALC_COMP.....	284
TABLE 4 — ATE_COMP.....	316
TABLE 5 — AVA_COMP.....	352
TABLE A.1 — EXAMPLE OF A CHECKLIST AT EAL 4 (EXTRACT).....	395
TABLE B.1 — VULNERABILITY TESTING AND ATTACK POTENTIAL.....	410
TABLE B.2 — CALCULATION OF ATTACK POTENTIAL.....	415
TABLE B.3 — RATING OF VULNERABILITIES AND TOE RESISTANCE.....	417