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Information technology — Security techniques — Testing cryptographic modules in their operational environment

Technologies de l'information — Techniques de sécurité — Test de modules cryptographiques dans leur environnement d'exploitation



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Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Abbreviated terms	5
5 Document organization	5
6 Context of operational testing	6
7 Cryptographic modules	7
7.1 General	7
7.2 Types of cryptographic modules	7
7.2.1 General	7
7.2.2 Software module	8
7.2.3 Firmware module	8
7.2.4 Hardware module	8
7.2.5 Hybrid software module	8
7.2.6 Hybrid firmware module	8
7.3 Cryptographic module application environments	8
7.4 Security products with cryptographic modules	9
7.5 Security requirements for cryptographic modules	10
7.5.1 General	10
7.5.2 Security Level 1	10
7.5.3 Security Level 2	11
7.5.4 Security Level 3	11
7.5.5 Security Level 4	12
7.6 Life-cycle assurance of cryptographic modules	12
7.7 Cryptographic module security policy	12
7.7.1 General	12
7.7.2 Cryptographic module specification	13
7.7.3 Cryptographic module interfaces	13
7.7.4 Roles, services, and authentication	13
7.7.5 Software/firmware security	13
7.7.6 Operational environment	14
7.7.7 Physical security	14
7.7.8 Non-invasive security	14
7.7.9 Sensitive security parameters management	14
7.7.10 Self-tests	14
7.7.11 Life-cycle assurance	15
7.7.12 Mitigation of other attacks	15
7.8 Intended purpose of validated cryptographic modules	15
8 The application environment	16
8.1 Organizational security	16
8.2 Architecture of the application environment	16
9 The operational environment	17
9.1 Security requirements related to cryptographic modules for their operational environment	17
9.1.1 General	17
9.1.2 Entropy sources	17
9.1.3 Audit mechanism	17
9.1.4 Physically unclonable function	17
9.2 Security assumptions for the operational environment	17

9.2.1	General.....	17
9.2.2	Security Level 1.....	18
9.2.3	Security Level 2.....	18
9.2.4	Security Level 3.....	19
9.2.5	Security Level 4.....	20
10	How to select cryptographic modules.....	21
10.1	General.....	21
10.2	Use policy.....	21
10.3	Cryptographic module assurance.....	23
10.4	Interoperability.....	23
10.5	Selection of security rating for SSP protection.....	23
11	Principles for operational testing.....	23
11.1	General.....	23
11.2	Assumptions.....	24
11.3	Operational testing activities.....	24
11.4	Competence for operational testers.....	25
11.5	Use of validated evidence.....	25
11.6	Documentation.....	25
11.7	Operational testing procedure.....	26
12	Recommendations for operational testing.....	26
12.1	General.....	26
12.2	Recommendations for assessing the installation, configuration, and operation of the cryptographic module.....	26
12.2.1	General.....	26
12.2.2	Assessing installation of the cryptographic module.....	27
12.2.3	Assessing the configuration of the cryptographic module.....	27
12.2.4	Assessing the correct operation of the cryptographic module.....	29
12.3	Recommendations for inspecting a key management system.....	29
12.4	Recommendations for inspecting the security requirements of authentication credentials.....	30
12.5	Recommendations for assessing the availability of cryptographic modules.....	31
12.6	Recommendations for identifying potential residual vulnerabilities of cryptographic modules.....	31
12.7	Checking for the organization's security policies.....	32
13	Reporting the results of operational testing.....	33
Annex A (informative) Examples of validated cryptographic modules lists.....		34
Annex B (informative) Checklist for operational testing of cryptographic modules.....		35
Bibliography.....		39

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 27, *IT Security techniques*.

Introduction

In information technology, there is an ever-increasing need to use cryptographic mechanisms such as the protection of data against unauthorized disclosure or manipulation, for entity authentication and for non-repudiation. The security and reliability of such mechanisms are directly dependent on the cryptographic modules in which they are implemented. Cryptographic modules are utilized within a security system to protect sensitive information in their application environment.

The purpose of this document is to describe the recommendations and checklists which help in the selection of cryptographic modules for deployment in a diversity of application environments. This document is helpful for a user and operational tester to verify correct deployment in the application environment.

Operational tests are performed to determine the suitability and proper usage of a cryptographic module in its application environment.

Cryptographic modules and their application environments are generally complex. When cryptographic modules are deployed in an operational environment, a minor error or mistake can affect the security of the whole operational and application environment. It is important to perform operational tests to ensure the proper usage of a cryptographic module in their operational environment. This document identifies the operational tests by providing:

- recommendations to perform a secure assessment of the cryptographic module installation, configuration and operation;
- recommendations for inspecting the key management system, protection of authentication credentials, and public and critical security parameters in the operational environment;
- recommendations for identifying cryptographic module vulnerabilities;
- checklists for the cryptographic algorithm policy, security guidance and regulation, security manage requirements, security level for each of the 11 requirement areas, the strength of the security function, etc.; and
- inspection recommendations to determine that the cryptographic module's deployment satisfies the security requirements.

When the operational testing is performed by using this document, access to the text of ISO/IEC 19790 and ISO/IEC 24759 can be required.

Information technology — Security techniques — Testing cryptographic modules in their operational environment

1 Scope

This document provides recommendations and checklists which can be used to support the specification and operational testing of cryptographic modules in their operational environment within an organization's security system.

The cryptographic modules have four security levels which ISO/IEC 19790 defines to provide for a wide spectrum of data sensitivity (e.g. low-value administrative data, million-dollar funds transfers, life-protecting data, personal identity information, and sensitive information used by government) and a diversity of application environments (e.g. a guarded facility, an office, removable media, and a completely unprotected location).

This document includes:

- a) recommendations to perform secure assessing for cryptographic module installation, configuration and operation;
- b) recommendations to inspecting the key management system, protection of authentication credentials, and public and critical security parameters in the operational environment;
- c) recommendations for identifying cryptographic module vulnerabilities;
- d) checklists for the cryptographic algorithm policy, security guidance and regulation, security manage requirements, security level for each of the 11 requirement areas, the strength of the security function, etc.; and
- e) recommendations to determine that the cryptographic module's deployment satisfies the security requirements of the organization.

This document assumes that the cryptographic module has been validated as conformant with ISO/IEC 19790.

It can be used by an operational tester along with other recommendations if needed.

This document is limited to the security related to the cryptographic module. It does not include assessing the security of the operational or application environment. It does not define techniques for the identification, assessment and acceptance of the organization's operational risk.

The organization's accreditation, deployment and operation processes, shown in [Figure 1](#), is not included to the scope of this document.

This document addresses operational testers who perform the operational testing for the cryptographic modules in their operational environment authorizing officials of cryptographic modules.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 19790:2012, *Information technology — Security techniques — Security requirements for cryptographic modules*

ISO/IEC 24759, *Information technology — Security techniques — Test requirements for cryptographic modules*