

This is a preview of "ISO/IEC TS 19249:2017...". [Click here to purchase the full version from the ANSI store.](#)

First edition  
2017-10

---

---

## **Information technology — Security techniques — Catalogue of architectural and design principles for secure products, systems and applications**

*Technologies de l'information — Techniques de sécurité — Catalogue des principes architecturaux et conceptuels pour la sécurisation des produits, systèmes et applications*



Reference number  
ISO/IEC TS 19249:2017(E)

© ISO/IEC 2017



**COPYRIGHT PROTECTED DOCUMENT**

© ISO/IEC 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

This is a preview of "ISO/IEC TS 19249:201...". Click here to purchase the full version from the ANSI store.

## Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Architectural principles for secure products, systems and applications</b> .....	<b>2</b>
4.1 General.....	2
4.2 Domain separation.....	3
4.2.1 General.....	3
4.2.2 Principles for defining domain structures.....	3
4.2.3 Principles for defining inter-domain communication.....	3
4.2.4 Security policies that may be enforced using domain separation.....	4
4.2.5 Examples.....	4
4.2.6 Considerations for evaluation.....	4
4.3 Layering.....	5
4.3.1 General.....	5
4.3.2 Principles for defining layers.....	5
4.3.3 Principles for Interfaces exposed by a layer.....	5
4.3.4 Security policies that may be enforced using layering.....	5
4.3.5 Examples.....	6
4.3.6 Considerations for evaluation.....	6
4.4 Encapsulation.....	6
4.4.1 General.....	6
4.4.2 Principles for defining encapsulation.....	7
4.4.3 Security policies that may be enforced using encapsulation.....	7
4.4.4 Examples.....	7
4.4.5 Considerations for evaluation.....	7
4.5 Redundancy.....	7
4.5.1 General.....	7
4.5.2 Principles for defining redundant elements.....	8
4.5.3 Principles for keeping consistency between redundant elements.....	8
4.5.4 Security policies that may be enforced using redundancy.....	8
4.5.5 Examples.....	8
4.5.6 Considerations for evaluation.....	9
4.6 Virtualization.....	10
4.6.1 General.....	10
4.6.2 Principles for defining virtualization.....	10
4.6.3 Security policies that may be enforced using virtualization.....	10
4.6.4 Examples.....	11
4.6.5 Considerations for evaluation.....	11
<b>5 Design principles</b> .....	<b>11</b>
5.1 General.....	11
5.2 List of design principles for security.....	12
5.2.1 Least privilege.....	12
5.2.2 Attack surface minimization.....	13
5.2.3 Centralized parameter validation.....	15
5.2.4 Centralized general security services.....	17
5.2.5 Preparing for error and exception handling.....	18
5.3 Using the design principles when designing a secure system or application.....	20
5.3.1 General.....	20
5.3.2 Least privilege.....	20
5.3.3 Attack surface minimization.....	20

This is a preview of "ISO/IEC TS 19249:201...". [Click here to purchase the full version from the ANSI store.](#)

5.3.4	Centralized parameter validation .....	20
5.3.5	Centralized security services .....	20
5.3.6	Preparing for error and exception handling .....	21
<b>6</b>	<b>Evaluation activities for the architectural principles .....</b>	<b>21</b>
6.1	General .....	21
6.2	Domain separation .....	22
6.3	Layering .....	23
6.4	Encapsulation .....	23
6.5	Redundancy .....	24
6.6	Virtualization .....	25
	<b>Bibliography .....</b>	<b>26</b>

This is a preview of "ISO/IEC TS 19249:201...". Click here to purchase the full version from the ANSI store.

## 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://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

This document describes architectural and design principles that may be used in the development of secure products, systems and applications.

Each principle is described in a structured way, characterizing the principle itself, describing how it can be used, how it can support security, how it may help in the security assessment of the product, system or application, as well as its dependency on other principles described in this document.

Examples are provided for each principle on how it may be implemented, how it may contribute to security properties and functions and what other aspects have to be taken into account in the example provided to also address non-security related requirements like usability and performance.

A guideline is provided linking this to security evaluations performed using ISO/IEC 15408 (all parts) and ISO/IEC 18045 and addresses both developers and evaluators of secure products, systems and applications.