
**Information technology — Security
techniques — Network security —**

**Part 1:
Overview and concepts**

*Technologies de l'information — Techniques de sécurité — Sécurité
de réseau —*

Partie 1: Vue d'ensemble et concepts



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2015, 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

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols and abbreviated terms	6
5 Structure	8
6 Overview	10
6.1 Background	10
6.2 Network security planning and management	11
7 Identifying risks and preparing to identify security controls	13
7.1 Introduction	13
7.2 Information on current and/or planned networking	13
7.2.1 Security requirements in corporate information security policy	13
7.2.2 Information on current/planned networking	14
7.3 Information security risks and potential control areas	18
8 Supporting controls	21
8.1 Introduction	21
8.2 Management of network security	21
8.2.1 Background	21
8.2.2 Network security management activities	21
8.2.3 Network security roles and responsibilities	23
8.2.4 Network monitoring	24
8.2.5 Evaluating network security	25
8.3 Technical vulnerability management	25
8.4 Identification and authentication	25
8.5 Network audit logging and monitoring	26
8.6 Intrusion detection and prevention	27
8.7 Protection against malicious code	28
8.8 Cryptographic based services	28
8.9 Business continuity management	29
9 Guidelines for the design and implementation of network security	30
9.1 Background	30
9.2 Network technical security architecture/design	30
10 Reference network scenarios – Risks, design, techniques and control issues	32
10.1 Introduction	32
10.2 Internet access services for employees	33
10.3 Enhanced collaboration services	33
10.4 Business to business services	33
10.5 Business to customer services	34
10.6 Outsourced services	34
10.7 Network segmentation	34
10.8 Mobile communication	34
10.9 Networking support for travelling users	35
10.10 Networking support for home and small business offices	35
11 ‘Technology’ topics — Risks, design techniques and control issues	35
12 Develop and test security solution	36
13 Operate security solution	36

14	Monitor and review solution implementation	37
Annex A	(informative) Cross-references between ISO/IEC 27001/27002 network security related controls and ISO/IEC 27033-1 clauses/subclauses	38
Annex B	(informative) Example template for a SecOPs document	42
Bibliography	47

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).

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).

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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 27, *Security techniques*.

This second edition cancels and replaces the first edition (ISO/IEC 27033-1:2009), which have been technically revised.

ISO/IEC 27033 consists of the following parts, under the general title *Information technology — Security techniques — Network security*:

- *Part 1: Overview and concepts*
- *Part 2: Guidelines for the design and implementation of network security*
- *Part 3: Reference networking scenarios — Threats, design techniques and control issues*
- *Part 4: Securing communications between networks using security gateways*
- *Part 5: Securing communications across networks using Virtual Private Networks (VPNs)*
- *Part 6: Securing wireless IP network access*

Introduction

In today’s world, the majority of both commercial and government organizations have their information systems connected by networks (see [Figure 1](#)), with the network connections being one or more of the following:

- within the organization,
- between different organizations,
- between the organization and the general public.

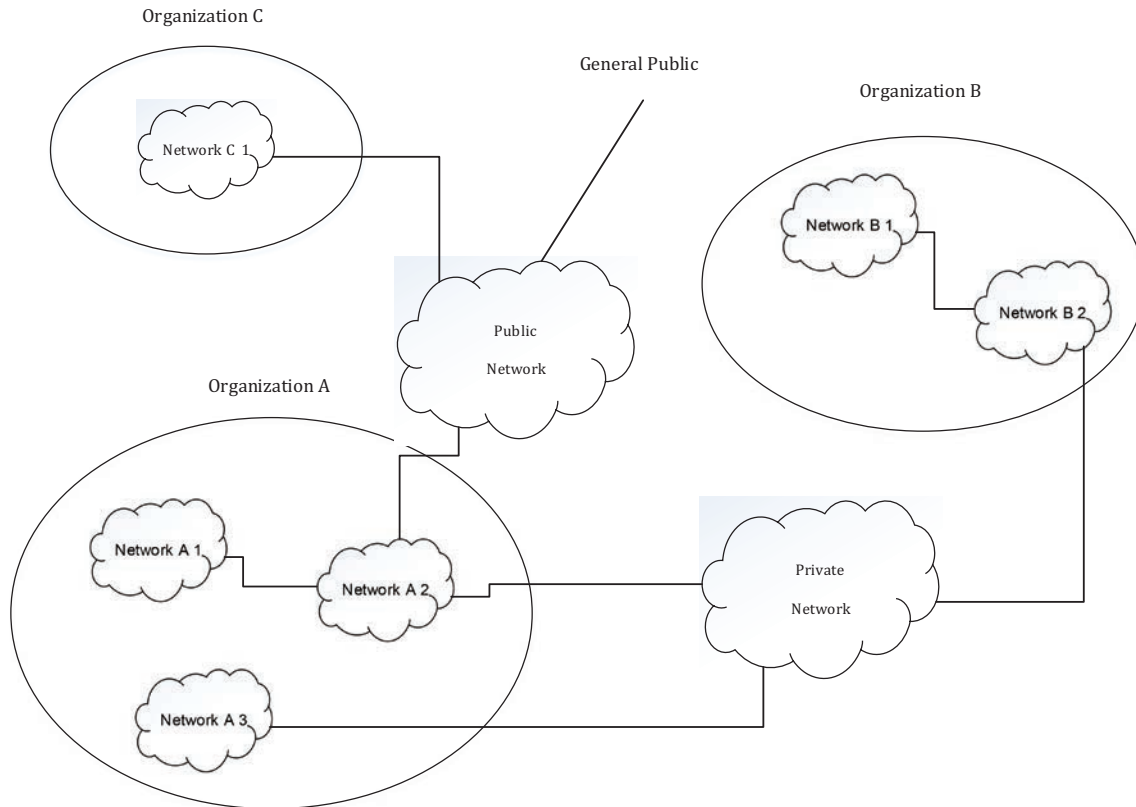


Figure 1 — Broad types of network connection

Further, with the rapid developments in publicly available network technology (in particular with the Internet) offering significant business opportunities, organizations are increasingly conducting electronic business on a global scale and providing online public services. The opportunities include the provision of lower cost data communications, using the Internet simply as a global connection medium, through to more sophisticated services provided by Internet service providers (ISPs). This can mean the use of relatively low cost local attachment points at each end of a circuit to full scale online electronic trading and service delivery systems, using web-based applications and services. Additionally, the new technology (including the integration of data, voice and video) increases the opportunities for remote working (also known as “teleworking” or “telecommuting”) that enable personnel to operate away from their homework base for significant periods of time. They are able to keep in contact through the use of remote facilities to access organization and community networks and related business support information and services.

However, whilst this environment does facilitate significant business benefits, there are new security risks to be managed. With organizations relying heavily on the use of information and associated networks to conduct their business, the loss of confidentiality, integrity, and availability of information and services could have significant adverse impacts on business operations. Thus, there is a major

requirement to properly protect networks and their related information systems and information. In other words: *implementing and maintaining adequate network security is absolutely critical to the success of any organization's business operations.*

In this context, the telecommunications and information technology industries are seeking cost-effective comprehensive security solutions, aimed at protecting networks against malicious attacks and inadvertent incorrect actions, and meeting the business requirements for confidentiality, integrity, and availability of information and services. Securing a network is also essential for maintaining the accuracy of billing or usage information as appropriate. Security capabilities in products are crucial to overall network security (including applications and services). However, as more products are combined to provide total solutions, the interoperability, or the lack thereof, will define the success of the solution. Security must not only be a thread of concern for each product or service, but must be developed in a manner that promotes the interweaving of security capabilities in the overall security solution.

The purpose of this International Standard is to provide detailed guidance on the security aspects of the management, operation and use of information system networks, and their inter-connections. Those individuals within an organization that are responsible for information security in general, and network security in particular, should be able to adapt the material in this International Standard to meet their specific requirements. Its main objectives are as follows.

- ISO/IEC 27033-1, to define and describe the concepts associated with, and provide management guidance on, network security. This includes the provision of an overview of network security and related definitions, and guidance on how to identify and analyse network security risks and then define network security requirements. It also introduces how to achieve good quality technical security architectures, and the risk, design and control aspects associated with typical network scenarios and network “technology” areas (which are dealt with in detail in subsequent parts of ISO/IEC 27033).
- ISO/IEC 27033-2, to define how organizations should achieve quality network technical security architectures, designs and implementations that will ensure network security appropriate to their business environments, using a consistent approach to the planning, design and implementation of network security, as relevant, aided by the use of models/frameworks (in this context, a model/framework is used to outline a representation or description showing the structure and high level workings of a type of technical security architecture/design), and is relevant to all personnel who are involved in the planning, design and implementation of the architectural aspects of network security (for example network architects and designers, network managers, and network security officers).
- ISO/IEC 27033-3, to define the specific risks, design techniques and control issues associated with typical network scenarios. It is relevant to all personnel who are involved in the planning, design and implementation of the architectural aspects of network security (for example, network architects and designers, network managers, and network security officers).
- ISO/IEC 27033-4, to define the specific risks, design techniques and control issues for securing information flows between networks using security gateways. It is relevant to all personnel who are involved in the detailed planning, design and implementation of security gateways (for example, network architects and designers, network managers, and network security officers).
- ISO/IEC 27033-5, to define the specific risks, design techniques and control issues for securing connections that are established using Virtual Private Networks (VPNs). It is relevant to all personnel who are involved in the detailed planning, design and implementation of VPN security (for example, network architects and designers, network managers, and network security officers).
- ISO/IEC 27033-6, to define the specific risks, design techniques and control issues for securing IP wireless networks. It is relevant to all personnel who are involved in the detailed planning, design and implementation of security for wireless networks (for example, network architects and designers, network managers, and network security officers).

It is emphasized that this International Standard provides further detailed implementation guidance on the network security controls that are described at a basic standardized level in ISO/IEC 27002.