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Information technology — Security techniques — Selection, deployment and operations of intrusion detection and prevention systems (IDPS)

Technologies de l'information — Techniques de sécurité — Sélection, déploiement et opérations des systèmes de détection et prévention d'intrusion

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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 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 first edition of ISO/IEC 27039 cancels and replaces ISO/IEC 18043:2006, which has been technically revised.

This corrected version of ISO/IEC 27039:2015 incorporates the following corrections.

The title of this document has been corrected with the addition of the words 'and prevention'.

Legal notice

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Introduction

Organizations should not only know when, if, and how an intrusion of their network, system, or application occurs. They also should know what vulnerability was exploited and what safeguards or appropriate risk treatment options (i.e. risk modification, risk retention, risk avoidance, risk sharing) should be implemented to prevent similar intrusions in the future. Organizations should also recognize and deter cyber-based intrusions. This requires an analysis of host and network traffic and/or audit trails for attack signatures or specific patterns that usually indicate malicious or suspicious intent. In the mid-1990s, organizations began to use intrusion detection and prevention systems (IDPS) to fulfil these needs. The general use of IDPS continues to expand with a wider range of IDPS products being made available to satisfy an increasing level of organizational demands for advanced intrusion detection capability.

In order for an organization to derive the maximum benefits from IDPS, the process of IDPS selection, deployment, and operations should be carefully planned and implemented by properly trained and experienced personnel. In the case where this process is achieved, then IDPS products can assist an organization in obtaining intrusion information and can serve as an important security device within the overall information and communications technology (ICT) infrastructure.

This International Standard provides guidelines for effective IDPS selection, deployment, and operation, as well as fundamental knowledge about IDPS. It is also applicable to those organizations that are considering outsourcing their intrusion detection capabilities. Information about outsourcing service level agreements can be found in the IT service management (ITSM) processes based on ISO/IEC 20000 Series.

This International Standard is intended to be helpful to:

a) An organization in satisfying the following requirements of ISO/IEC 27001:

   — The organization shall implement procedures and other controls capable of enabling prompt detection of and response to security incidents;

   — The organization shall execute monitoring and review procedures and other controls to properly identify attempted and successful security breaches and incidents.

b) An organization in implementing controls that meet the following security objectives of ISO/IEC 27002:

   — To detect unauthorized information processing activities;

   — Systems should be monitored and information security events should be recorded. Operator logs and fault logging should be used to ensure information system problems are identified;

   — An organization should comply with all relevant legal requirements applicable to its monitoring and logging activities;

   — System monitoring should be used to check the effectiveness of controls adopted and to verify conformity to an access policy model.

An organization should recognize that deploying IDPS is not a sole and/or exhaustive solution to satisfy or meet the above-cited requirements. Furthermore, this International Standard is not intended as criteria for any kind of conformity assessments, e.g., information security management system (ISMS) certification, IDPS services or products certification.

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Information technology — Security techniques — Selection, deployment and operations of intrusion detection and prevention systems (IDPS)

1 Scope

This International Standard provides guidelines to assist organizations in preparing to deploy intrusion detection and prevention systems (IDPS). In particular, it addresses the selection, deployment, and operations of IDPS. It also provides background information from which these guidelines are derived.

2 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 27000 and the following apply.

2.1
attack
attempts to destroy, expose, alter, or disable information systems and/or information within it or otherwise breach the security policy

2.2
attack signature
sequence of computing activities or alterations that are used to execute an attack and which are also used by an IDPS to discover that an attack has occurred and often is determined by the examination of network traffic or host logs

Note 1 to entry: This can also be referred to as an attack pattern.

2.3
attestation
variant of public-key encryption that lets IDPS software programs and devices authenticate their identity to remote parties

Note 1 to entry: See *remote attestation* (2.23).

2.4
bridge
network equipment that transparently connects a local area network (LAN) at OSI layer 2 to another LAN that uses the same protocol

2.5
cryptographic hash value
mathematical value that is assigned to a file and used to “test” the file at a later date to verify that the data contained in the file has not been maliciously changed

2.6
denial-of-service
DoS
unauthorized access to a system resource or the delaying of system operations and functions, with resultant loss of availability to authorized users

[SOURCE: ISO/IEC 27033-1:2009]

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2.7
distributed denial-of-service attack
DDoS
unauthorized access to a system resource or the delaying of system operations and functions in the way of compromising multiple systems to flood the bandwidth or resources of the targeted system, with resultant loss of availability to authorized users

2.8
demilitarized zone
DMZ
logical and physical network space between the perimeter router and the exterior firewall

Note 1 to entry: The DMZ can be between networks and under close observation but does not have to be so.

Note 2 to entry: They are generally unsecured areas containing bastion hosts that provide public services.

2.9
exploit
defined way to breach the security of information systems through vulnerability

2.10
firewall
type of barrier placed between network environments — consisting of a dedicated device or a composite of several components and techniques — through which all traffic from one network environment traverses to another, and vice versa, and only authorized traffic as defined by the local security policy is allowed to pass

[SOURCE: ISO/IEC 27033-1:2009]

2.11
false positive
IDPS alert when there is no attack

2.12
false negative
no IDPS alert when there is an attack

2.13
honeypot
generic term for a decoy system used to deceive, distract, divert, and encourage the attacker to spend time on information that appears to be very valuable, but actually is fabricated and would not be of interest to a legitimate user

2.14
host
addressable system or computer in TCP/IP-based networks like the Internet

2.15
intruder
individual who is conducting, or has conducted, an intrusion or attack against a victim's host, site, network, or organization

2.16
intrusion
unauthorized access to a network or a network-connected system, that is, deliberate or accidental unauthorized access to information systems, to include malicious activity against information systems, or unauthorized use of resources within information systems

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2.17
intrusion detection
formal process of detecting intrusions, generally characterized by gathering knowledge about abnormal usage patterns, as well as what, how, and which vulnerability has been exploited to include how and when it occurred

2.18
intrusion detection system
IDS
information systems used to identify that an intrusion has been attempted, is occurring, or has occurred

2.19
intrusion prevention system
IPS
variant on intrusion detection systems that are specifically designed to provide an active response capability

2.20
intrusion detection and prevention system
IDPS
intrusion detection systems (IDPS) and intrusion prevention systems (IPS) software applications or appliances that monitor systems for malicious activities, where IDS focus is to only alert on the discovery of such activity while IPS have the potent to prevent some intrusions upon detection

Note 1 to entry: IPS is deployed actively in the network if attack prevention is desired. If deployed in passive mode, it will not offer such functionality and effectively function as a regular IDS by providing alerts only.

2.21
penetration
unauthorized act of bypassing the security mechanisms of information systems

2.22
provisioning
process of loading the correct software, security policy, and configuration data for information technology (IT) devices

2.23
remote attestation
processes of using digital certificates to ensure the identity, as well as the hardware and software configuration, of IDPS and to securely transmit this information to a trusted operations centre

2.24
response
incident response or intrusion response
action taken to protect and restore the normal operational conditions of information systems and the information stored in it when an attack or intrusion occurs

2.25
router
network device that is used to establish and control the flow of data between different networks, by selecting paths or routes based upon routing protocol mechanisms and algorithms

Note 1 to entry: The networks can themselves be based on different protocols.

Note 2 to entry: The routing information is kept in a routing table.

[SOURCE: ISO/IEC 27033-1:2009]

2.26
server
computer system or program that provides services to other computers

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2.27
Service Level Agreement
SLA
document that defines the technical support or business performance objectives including measures for performance and consequences for failure the provider of a service can provide its clients

2.28
sensor
component/agent of IDPS which collects event data from information systems or a network under observation

Note 1 to entry: Also referred to as a monitor.

2.29
subnet
segment of a network that shares a common address component

2.30
switch
device which provides connectivity between network connectivity devices by means of internal distribution mechanisms, with the switching technology typically implemented at layer 2 or layer 3 of the OSI reference model

Note 1 to entry: Switches are distinct from other local area network interconnection devices (e.g. a hub) as the technology used in switches sets up connections on a point-to-point basis.

[SOURCE: ISO/IEC 27033-1:2009]

2.31
test access port
TAP
typically passive devices that do not install any overhead on the network packet but also increase the level of the security as they make the data collection interface invisible to the network, where a switch can still maintain layer 2 information about the port

Note 1 to entry: A TAP also gives the functionality of multiple ports so network issues can be debugged without losing the IDPS capability.

2.32
trojan horse
malicious program that masquerades as a benign application

2.33
virus
type of malware which is software designed with malicious intent containing features or capabilities that can potentially cause harm, directly or indirectly, to the user and/or the user's system

2.34
virtual private network
VPN
restricted-use logical computer network that is constructed from the system resources of a physical network by using encryption and/or by tunnelling links of the virtual network across the real network

[SOURCE: ISO/IEC 18028-3:2005]

2.35
vulnerability
weakness of an asset or control that can be exploited by one or more threats

[SOURCE: ISO/IEC 27000:2012]

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