



BSI Standards Publication

Health informatics - Device interoperability

Part 40101: Foundational - Cybersecurity - Processes for vulnerability assessment

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National foreword

This British Standard is the UK implementation of EN ISO/IEEE 11073-40101:2022. It is identical to ISO/IEEE 11073-40101:2022.

The UK participation in its preparation was entrusted to Technical Committee IST/35, Health informatics.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Amendments/corrigenda issued since publication

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English Version

Health informatics - Device interoperability - Part 40101: Foundational - Cybersecurity - Processes for vulnerability assessment (ISO/IEEE 11073-40101:2022)

Informatique de santé - Interopérabilité des dispositifs
- Partie 40101: Fondamentaux - Cybersécurité -
Processus pour l'évaluation de la vulnérabilité
(ISO/IEEE 11073-40101:2022)

Medizinische Informatik - Geräteinteroperabilität - Teil
40101: Grundlagen - Cybersicherheit - Prozess zur
Schwachstellenanalyse (ISO/IEEE 11073-40101:2022)

This European Standard was approved by CEN on 13 March 2022.

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European foreword

This document (EN ISO/IEEE 11073-40101:2022) has been prepared by Technical Committee ISO/TC 215 "Health informatics" in collaboration with Technical Committee CEN/TC 251 "Health informatics" the secretariat of which is held by NEN.

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ISO/IEEE 11073-40101 was prepared by the IEEE 11073 Standards Committee of the IEEE Engineering in Medicine and Biology Society (as IEEE Std 11073-40101-2020) and drafted in accordance with its editorial rules. It was adopted, under the "fast-track procedure" defined in the Partner Standards Development Organization cooperation agreement between ISO and IEEE, by Technical Committee ISO/TC 215, *Health informatics*.

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Health informatics—Device interoperability

Part 40101: Foundational—Cybersecurity— Processes for vulnerability assessment

Developed by the

IEEE 11073 Standards Committee
of the
IEEE Engineering in Medicine and Biology Society

Approved 24 September 2020

IEEE SA Standards Board

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Abstract: For Personal Health Devices (PHDs) and Point-of-Care Devices (PoCDs), an iterative, systematic, scalable, and auditable approach to identification of cybersecurity vulnerabilities and estimation of risk is defined by this standard. The standard presents one approach to iterative vulnerability assessment that uses the Spoofing, Tampering, Repudiation, Information Disclosure, Denial of Service, and Elevation of Privilege (STRIDE) classification scheme and the embedded Common Vulnerability Scoring System (eCVSS). The assessment includes system context, system decomposition, pre-mitigation scoring, mitigation, and post-mitigation scoring and iterates until the remaining vulnerabilities are reduced to an acceptable level of risk.

Keywords: cybersecurity, embedded Common Vulnerability Scoring System, IEEE 11073-40101™, medical device communication, Personal Health Devices, Point-of-Care Devices, STRIDE, vulnerability assessment

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Introduction

This introduction is not part of IEEE Std 11073-40101-2020, Health informatics—Device interoperability—Part 40101: Foundational—Cybersecurity—Processes for vulnerability assessment.

Users of Personal Health Devices (PHDs) and Point-of-Care Devices (PoCDs) have implicit expectations on convenience, connectivity, accessibility, and security of data. For example, they expect to connect PHDs/PoCDs to their mobile devices and dashboards, view the data in the cloud, and easily share the information with clinicians or care providers. In some cases, the users themselves are taking action to build connections between PHDs/PoCDs, mobile devices, and the cloud to create the desired system. While many manufacturers are working on solving PHD/PoCD connectivity challenges with proprietary solutions, no standardized approach exists to provide secure plug-and-play interoperability.

The ISO/IEEE 11073 PHDs/PoCDs family of standards, Bluetooth Special Interest Group profiles and services specifications, and the Continua Design Guidelines (PCHAlliance [B7]) were developed to specifically address plug-and-play interoperability of PHDs/PoCDs (e.g., physical activity monitor, physiological monitor, pulse oximeter, sleep apnoea breathing therapy equipment, ventilator, insulin delivery device, infusion pump, continuous glucose monitor). In this context, the following terms have specific meanings:

- *Interoperability* is the ability of client components to communicate and share data with service components in an unambiguous and predictable manner as well as to understand and use the information that is exchanged (PCHAlliance [B7]).
- *Plug and play* are all the user has to do to make a connection—the systems automatically detect, configure, and communicate without any other human interaction (ISO/IEEE 11073-10201 [B5]).¹

Within the context of *secure* plug-and-play interoperability, cybersecurity is the process and capability of preventing unauthorized access or modification, misuse, denial of use, or the unauthorized use of information that is stored on, accessed from, or transferred to and from a PHD/PoCD. This standard describes the process part of cybersecurity for transport-independent applications and information profiles of PHDs/PoCDs. These profiles define data exchange, data representation, and terminology for communication between agents (e.g., pulse oximeters, sleep apnoea breathing therapy equipment) and connected devices (e.g., health appliances, set top boxes, cell phones, personal computers, monitoring cockpits, critical care dashboards).

For PHDs/PoCDs, this standard defines an iterative, systematic, scalable, and auditable approach to identification of cybersecurity vulnerabilities and estimation of risk. This standard presents one approach to iterative vulnerability assessment that uses the Spoofing, Tampering, Repudiation, Information Disclosure, Denial of Service, and Elevation of Privilege (STRIDE) classification scheme and the embedded Common Vulnerability Scoring System (eCVSS). The assessment includes system context, system decomposition, pre-mitigation scoring, mitigation, and post-mitigation scoring and iterates until the remaining vulnerabilities are reduced to an acceptable level of risk.

¹ The numbers in brackets correspond to the numbers of the bibliography in Annex A.

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