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CYBER; Cyber Security for Consumer Internet of Things: Baseline Requirements

Táto norma obsahuje anglickú verziu európskej normy.
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## CYBER;
## Cyber Security for Consumer Internet of Things:
## Baseline Requirements

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# Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Cyber Security (CYBER).

| **National transposition dates** | |
|---|---|
| Date of adoption of this EN: | 19 June 2020 |
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# Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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# Introduction

As more devices in the home connect to the Internet, the cyber security of the Internet of Things (IoT) becomes a growing concern. People entrust their personal data to an increasing number of online devices and services. Products and appliances that have traditionally been offline are now connected and need to be designed to withstand cyber threats.

The present document brings together widely considered good practice in security for Internet-connected consumer devices in a set of high-level outcome-focused provisions. The objective of the present document is to support all parties involved in the development and manufacturing of consumer IoT with guidance on securing their products.

The provisions are primarily outcome-focused, rather than prescriptive, giving organizations the flexibility to innovate and implement security solutions appropriate for their products.

The present document is not intended to solve all security challenges associated with consumer IoT. It also does not focus on protecting against attacks that are prolonged/sophisticated or that require sustained physical access to the device. Rather, the focus is on the technical controls and organizational policies that matter most in addressing the most significant and widespread security shortcomings. Overall, a baseline level of security is considered; this is intended to protect against elementary attacks on fundamental design weaknesses (such as the use of easily guessable passwords).

The present document provides a set of baseline provisions applicable to all consumer IoT devices. It is intended to be complemented by other standards defining more specific provisions and fully testable and/or verifiable requirements for specific devices which, together with the present document, will facilitate the development of assurance schemes.

Many consumer IoT devices and their associated services process and store personal data, the present document can help in ensuring that these are compliant with the General Data Protection Regulation (GDPR) [i.7]. Security by design is an important principle that is endorsed by the present document.

ETSI TS 103 701 [i.19] provides guidance on how to assess and assure IoT products against provisions within the present document.

The provisions in the present document have been developed following a review of published standards, recommendations and guidance on IoT security and privacy, including: ETSI TR 103 305-3 [i.1], ETSI TR 103 309 [i.2], ENISA Baseline Security Recommendations [i.8], UK Department for Digital, Culture, Media and Sport (DCMS) Secure by Design Report [i.9], IoT Security Foundation Compliance Framework [i.10], GSMA IoT Security Guidelines and Assessment [i.11], ETSI TR 103 533 [i.12], DIN SPEC 27072 [i.20] and OWASP Internet of Things [i.23].

NOTE: Mappings of the landscape of IoT security standards, recommendations and guidance are available in ENISA Baseline Security Recommendations for IoT - Interactive Tool [i.15] and in Copper Horse Mapping Security & Privacy in the Internet of Things [i.14].

As consumer IoT products become increasingly secure, it is envisioned that future revisions of the present document will mandate provisions that are currently recommendations in the present document.

# 1 Scope

The present document specifies high-level security and data protection provisions for consumer IoT devices that are connected to network infrastructure (such as the Internet or home network) and their interactions with associated services. The associated services are out of scope. A non-exhaustive list of examples of consumer IoT devices includes:

- connected children's toys and baby monitors;
- connected smoke detectors, door locks and window sensors;
- IoT gateways, base stations and hubs to which multiple devices connect;
- smart cameras, TVs and speakers;
- wearable health trackers;
- connected home automation and alarm systems, especially their gateways and hubs;
- connected appliances, such as washing machines and fridges; and
- smart home assistants.

Moreover, the present document addresses security considerations specific to constrained devices.

EXAMPLE: Window contact sensors, flood sensors and energy switches are typically constrained devices.

The present document provides basic guidance through examples and explanatory text for organizations involved in the development and manufacturing of consumer IoT on how to implement those provisions. Table B.1 provides a schema for the reader to give information about the implementation of the provisions.

Devices that are not consumer IoT devices, for example those that are primarily intended to be used in manufacturing, healthcare or other industrial applications, are not in scope of the present document.

The present document has been developed primarily to help protect consumers, however, other users of consumer IoT equally benefit from the implementation of the provisions set out here.

Annex A (informative) of the present document has been included to provide context to clauses 4, 5 and 6 (normative). Annex A contains examples of device and reference architectures and an example model of device states including data storage for each state.

# 2 References

## 2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference/.

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The following referenced documents are necessary for the application of the present document.

Not applicable.

## 2.2 Informative references

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TR 103 305-3: "CYBER; Critical Security Controls for Effective Cyber Defence; Part 3: Service Sector Implementations".

[i.2] ETSI TR 103 309: "CYBER; Secure by Default - platform security technology".

[i.3] NIST Special Publication 800-63B: "Digital Identity Guidelines - Authentication and Lifecycle Management".

NOTE: Available at https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-63b.pdf.

[i.4] ISO/IEC 29147: "Information technology - Security techniques - Vulnerability Disclosure".

NOTE: Available at https://www.iso.org/standard/45170.html.

[i.5] OASIS: "CSAF Common Vulnerability Reporting Framework (CVRF)".

NOTE: Available at http://docs.oasis-open.org/csaf/csaf-cvrf/v1.2/csaf-cvrf-v1.2.html.

[i.6] ETSI TR 103 331: "CYBER; Structured threat information sharing".

[i.7] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

[i.8] ENISA: "Baseline Security Recommendations for IoT in the context of Critical Information Infrastructures", November 2017, ISBN: 978-92-9204-236-3, doi: 10.2824/03228.

NOTE: Available at https://op.europa.eu/en/publication-detail/-/publication/c37f8196-d96f-11e7-a506-01aa75ed71a1/language-en/format-PDF/source-117211901.

[i.9] UK Department for Digital, Culture, Media and Sport: "Secure by Design: Improving the cyber security of consumer Internet of Things Report", March 2018.

NOTE: Available at https://www.gov.uk/government/collections/secure-by-design.

[i.10] IoT Security Foundation: "IoT Security Compliance Framework", Release 2 December 2018.

NOTE: Available at https://www.iotsecurityfoundation.org/wp-content/uploads/2018/12/IoTSF-IoT-Security-Compliance-Framework-Release-2.0-December-2018.pdf.

[i.11] GSMA: "GSMA IoT Security Guidelines and Assessment".

NOTE: Available at https://www.gsma.com/iot/iot-security/iot-security-guidelines/.

[i.12] ETSI TR 103 533: "SmartM2M; Security; Standards Landscape and best practices".

[i.13] Commission Notice: The "Blue Guide" on the implementation of EU products rules 2016 (Text with EEA relevance), 2016/C 272/01.

NOTE: Available in the Official Journal of the European Union, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=OJ:C:2016:272:TOC.

[i.14] Copper Horse: "Mapping Security & Privacy in the Internet of Things".

NOTE: Available at https://iotsecuritymapping.uk/.

[i.15] ENISA: "Baseline Security Recommendations for IoT - Interactive Tool".

NOTE: Available at https://www.enisa.europa.eu/topics/iot-and-smart-infrastructures/iot/baseline-security-recommendations-for-iot-interactive-tool.

[i.16] IoT Security Foundation: "Understanding the Contemporary Use of Vulnerability Disclosure in Consumer Internet of Things Product Companies".

NOTE: Available at https://www.iotsecurityfoundation.org/wp-content/uploads/2018/11/Vulnerability-Disclosure-Design-v4.pdf.

[i.17] F-Secure: "IoT threats: Explosion of 'smart' devices filling up homes leads to increasing risks".

NOTE: Available at https://blog.f-secure.com/iot-threats/.

[i.18] W3C: "Web of Things at W3C".

NOTE: Available at https://www.w3.org/WoT/.

[i.19] ETSI TS 103 701: "CYBER; Cybersecurity assessment for consumer IoT products".

NOTE: It is under development.

[i.20] DIN SPEC 27072: "Information Technology - IoT capable devices - Minimum requirements for Information security".

[i.21] GSMA: "Coordinated Vulnerability Disclosure (CVD) Programme".

NOTE: Available at https://www.gsma.com/security/gsma-coordinated-vulnerability-disclosure-programme/.

[i.22] IoT Security Foundation: "Vulnerability Disclosure - Best Practice Guidelines".

NOTE: Available at https://www.iotsecurityfoundation.org/wp-content/uploads/2017/12/Vulnerability-Disclosure_WG4_2017.pdf.

[i.23] OWASP Internet of Things (IoT) Top 10 2018.

NOTE: Available at https://www.owasp.org/index.php/OWASP_Internet_of_Things_Project#tab=IoT_Top_10.

[i.24] IEEE 802.15.4™-2015: "IEEE Standard for Low-Rate Wireless Networks".

NOTE: Available at https://standards.ieee.org/content/ieee-standards/en/standard/802_15_4-2015.html.

[i.25] ETSI TS 102 221: "Smart Cards; UICC-Terminal interface; Physical and logical characteristics".

[i.26] GSMA: "SGP.22 Technical Specification v2.2.1".

[i.27] ISO/IEC 27005:2018: "Information technology - Security techniques - Information security risk management".

NOTE: Available at https://www.iso.org/standard/75281.html.

[i.28] Microsoft® Corporation: "The STRIDE Threat Model".

NOTE: Available at https://msdn.microsoft.com/en-us/library/ee823878(v=cs.20).aspx.

[i.29] ETSI TR 121 905: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Vocabulary for 3GPP Specifications (3GPP TR 21.905)".