

# **Mapping of IoT security publications to the Code of Practice for Enterprise Connected Device Security**

**Version 2.0**

# Table of Contents

Introduction.....	2
References .....	3
List of Abbreviations .....	5
Methodology.....	6
Mapping and Rating .....	6
Publication Selection .....	6
Mapping Results.....	7

# Introduction

The present document was created by Accenture on behalf of the Department for Science, Innovation and Technology (in the following: DSIT).

The present document provides an updated mapping of selected publications to the principles as defined in the “Code of Practice for Enterprise Connected Device Security” (Previously NCSC Device Security Principles, in the following: the CoP principles), which was part of the “Device Security Guidance”, published by the National Cyber Security Centre in June 2021 [1].

As the CoP principles focus on so-called “enterprise-connected” devices, which are defined as “devices that interact with, process or hold an organization’s data” [2], the present document mainly covers IoT-related aspects with a focus on enterprise use cases.

# References

- [1] [Device Security Guidance](#). National Cyber Security Centre. 2021.
- [2] Code of Practice for Enterprise Connected Device Security. Department for Science, Innovation and Technology. 2025.
- [3] [IEC 62443-4-2 - Security for industrial automation and control systems - Part 4-2: Technical security requirements for IACS components](#). International Electrotechnical Commission (IEC). 2019.
- [4] [Internet of Things \(IoT\) Security and Privacy Recommendations](#). Broadband Internet Technical Advisory Group (BITAG). 2016.
- [5] [Matter Specification Version 1.0](#). Connectivity Standards Alliance (CSA). 2022.  
Updated by: [Matter Specification Version 1.4](#). 2024.
- [6] [NISTIR 8259A - IoT Device Cybersecurity Capability Core Baseline](#). National Institute of Standards and Technology (NIST). 2020.
- [7] [NISTIR 8228 - Considerations for Managing Internet of Things \(IoT\) Cybersecurity and Privacy Risks](#). National Institute of Standards and Technology (NIST). 2021.
- [8] [NISTIR 8425 - Profile of the IoT Core Baseline for Consumer IoT Products](#). National Institute of Standards and Technology (NIST). 2022.
- [9] [CLP.13 v2.2 - IoT Security Guidelines Endpoint Ecosystem Version 2.2](#). GSM Association (GSMA). 2020.
- [10] [Baseline Security Recommendations for IoT](#). European Union Agency for Cybersecurity (ENISA). 2017.
- [11] [Cyber Hygiene Best Practices](#). National Electrical Manufacturers Association (NEMA). 2018.
- [12] [IoT Security Assurance Framework Release 3.0 Nov 2021](#). IoT Security Foundation (IoTSF). 2021.
- [13] [IoT Security & Privacy Trust Framework v2.5](#). Internet Society (ISOC/OTA). 2017.
- [14] [Industrial Internet of Things Volume G4: Security Framework](#). Industrial IoT Consortium (IIC). 2016.
- [15] [EN 303 645 - V2.1.1 - CYBER: Cyber Security for Consumer Internet of Things: Baseline Requirements](#). European Telecommunications Standards Institute (ETSI). 2020.  
Updated by: [EN 303 645 - V3.1.3 - CYBER: Cyber Security for Consumer Internet of Things: Baseline Requirements](#). 2024.

- [16] [\*NIST SP-800-213A - IoT Device Cybersecurity Guidance for the Federal Government: IoT Device Cybersecurity Requirement Catalog\*](#). National Institute of Standards and Technology (NIST). 2021.
- [17] [\*EN 18031 Part 1 \(final draft\): Internet connected radio equipment\*](#). CEN/CENELEC. 2024.
- [18] [\*EN 18031 Part 2 \(final draft\): radio equipment processing data, namely Internet connected radio equipment, childcare radio equipment, toys radio equipment and wearable radio equipment\*](#). CEN/CENELEC. 2024.
- [19] [\*EN 18031 Part 3 \(final draft\): Internet connected radio equipment processing virtual money or monetary value\*](#). CEN/CENELEC. 2024.
- [20] *GUIDANCE ON THE APPLICATION OF THE HARMONISED STANDARDS SERIES EN 18031:2024 IN SUPPORT OF COMMISSION DELEGATED REGULATION 2022/30*. European Commission. 2025.

# List of Abbreviations

<b>CCSC</b>	<b>Common Component Security Constraints</b>
<b>CoP</b>	Code of Practice
<b>CR</b>	Component Requirement
<b>CS</b>	Cybersecurity State Awareness
<b>DC</b>	Device Configuration
<b>SIT</b>	Department for Science, Innovation and Technology
<b>DI</b>	Device Identification
<b>DP</b>	Data Protection
<b>DS</b>	Device Security
<b>EC</b>	European Commission
<b>EDR</b>	Embedded Device Requirements
<b>EN</b>	European Norm
<b>HDR</b>	Host Device Requirements
<b>IoT</b>	Internet of Things
<b>LA</b>	Logical Access to Interfaces
<b>NDR</b>	Network Device Requirements
<b>OTA</b>	Over-The-Air
<b>RED</b>	Radio Equipment Directive
<b>SU</b>	Software Update
<b>H</b>	High Overlap
<b>M</b>	Medium Overlap

# Methodology

## Mapping and Rating

As the researched publications might just cover a subset of the CoP principles, a mapping was created between them. The content of each publication is compared to each chapter of the CoP principles and a mapping was created if their respective topics match.

Further, a similarity rating was performed for each created mapping. The rating should provide a better understanding of which of the publications might be of higher interest – it is based on the similarity between the researched document and the subsections of the CoP principles. A related publications has a “high overlap” (H) if the wording is similar, and at most two subsections of the CoP principles cannot be mapped to that publication. Results that are categorized to have a “medium overlap” (M) have at least a matching rate of half of the subsections.

*Note: The wording of the researched publications might not necessarily be equal to the wording of the CoP principles.*

## Publication Selection

Selection of related publications in the IoT security topic was performed in two steps: In a first step, standardisation organizations and their respective committees and work groups were researched for relevant contributions to the overall IoT topic. Secondly, the publications of those have been searched for concrete publications that cover any IoT device security standards, guidelines, recommendations, or frameworks.

*Note: Except for the EN 18031 standards, non-accessible publications, i.e. paywalls or member-restricted documents, are not included in the research.*

# Mapping Results

The following table shows the mapping results in form of a mapping between the CoP principles and the referenced sections of the researched publications, including the matching rating in the rightmost column.

Table 1: Mapping of related publications to the Code of Practice for Enterprise Connected Device Security

Reference			CoP principle	Overlap
IEC 62443-4-2 [3]	Section 13.5	EDR 3.10 - Support for updates	1. Provide updates, securely	M
	Section 14.5	HDR 3.10 - Support for updates		
	Section 5.3	CR <sup>1</sup> 1.1 - Human user identification and authentication	2. Support appropriate authentication	M
	Section 7.3	CR 3.1 - Communication integrity	3. Protect data at rest and data in transit	H
	Section 8.3	CR 4.1 - Information confidentiality		
	Section 8.5	CR 4.3 - Use of cryptography	4. Maintain device integrity	H
	Section 7.16	CR 3.15 - Integrity of the boot process		
	Section 13.6	EDR 3.11 - Physical tamper resistance and detection		
BITAG Report [4]	Section 15.8	NDR 3.11 - Physical tamper resistance and detection	5. Ensure transparency of device health	M
	Section 4.2	CCSC 1 - Support of essential functions		
	Section 10.4	CR 6.2 - Continuous monitoring	10. Provide security logging, alerting and monitoring capabilities	M
	Section 11.5	CR 7.3 - Control system backup	11. Enable recovery to a known good state	H
	Section 4	Many Devices Do Not Follow Security and Privacy Best Practices	1. Provide updates, securely	H
	Section 7.1	IoT Devices Should Use Best Current Software Practices		
	Section 5.1	Insecure Network Communications	2. Support appropriate authentication	H
	Section 7.1	IoT Devices Should Use Best Current Software Practices		
	Section 7.2	IoT Devices Should Follow Security & Cryptography Best Practices	3. Protect data at rest and data in transit	H
	Section 7	Recommendations	4. Maintain device integrity	M
	Section 5.3	Susceptibility to Malware Infection and Other Abuse	6. Permit only trusted software	M
	Section 7.3	IoT Devices Should Be Restrictive Rather Than Permissive in Communicating		

<sup>1</sup> Please note, that CR means Component Requirement.

Reference			CoP principle	Overlap
	Section 7.10	The IoT Supply Chain Should Play Their Part In Addressing IoT Security and Privacy Issues	11. Enable recovery to a known good state	H
CSA Matter Standard 1.4 [5]	Section 13.5	Firmware	1. Provide updates, securely	M
	Section 11.19	Over-the-Air (OTA) Software Update		
	Section 13.6	Security Best Practices		
	Section 13.6	Security Best Practices	2. Support appropriate authentication	M
	Section 13.6	Security Best Practices	3. Protect data at rest and data in transit	M
	Section 13.3	Commissioning	4. Maintain device integrity	H
	Section 13.5	Firmware		
NISTIR 8259A [6]	Section 13.6	Security Best Practices		
	Section 13.7	Threats and Countermeasures		
	Section 13.6.2	Commissioning and Administration	7. Minimise the privilege and reach of applications	M
	Section 13.6.4	Manufacturing	8. Constrain the use of all device interfaces	M
	Section 13.4.	Factory Reset	11. Enable recovery to a known good state	M
	Page 9: Software Update		1. Provide updates, securely	M
	Page 7: Data Protection		3. Protect data at rest and data in transit	H
NISTIR 8228 [7]	Page 6: Device Configuration		4. Maintain device integrity	M
	Page 8: Logical Access to Interfaces		8. Constrain the use of all device interfaces	M
	Page 6: Device Configuration		9. Allow robust device management	H
	Expectation 5: Vulnerability Management			
	Expectation 6: Vulnerability Management			
NISTIR 8228 [7]	Expectation 8: Access Management		1. Provide updates, securely	M
	Expectation 9: Access Management			
	Expectation 10: Access Management			
	Expectation 11: Access Management			
	Expectation 12: Access Management			
	Expectation 13: Access Management			
	Expectation 24: PII Processing			
NISTIR 8228 [7]	Expectation 25: Permissions Management			
	Expectation 25: Information Flow Management			
	Expectation 19: Data Protection			
NISTIR 8228 [7]	Expectation 20: Data Protection			
	Expectation 21: Data Protection			
	Expectation 19: Data Protection		3. Protect data at rest and data in transit	M

Reference		CoP principle	Overlap
	Expectation 14: Access Management	4. Maintain device integrity	M
	Expectation 12: Access Management	7. Minimize the privilege and reach of applications	M
	Expectation 15: Incident Detection Expectation 16: Incident Detection	10. Provide security logging, alerting and monitoring capabilities	M
NIST IR 8425 [8]	Page 9: Software Updates	1. Provide updates, securely	M
	Page 7: Data Protection	3. Protect data at rest and data in transit	M
	Page 8: Interface Access Control	7. Minimize the privilege and reach of applications	M
	Page 8: Interface Access Control	8. Constrain the use of all device interfaces	M
	Page 6: Product Configuration	9. Allow robust device management	H
	Page 6: Product Configuration	11. Enable recovery to a known good state	M
GSMA CLP 13 [9]	Section 7.5 Over the Air Application Updates	1. Provide updates, securely	M
	Section 7.6 Improperly Engineered or Unimplemented Mutual Authentication	2. Support appropriate authentication	M
	Section 6.19 Endpoint Communications Security Section 6.20 Authenticating an Endpoint Identity	3. Protect data at rest and data in transit	H
	Section 5.2 How should I Secure the Endpoint Identity? Section 5.6 How do I Disallow Tampering of Firmware and Software?	4. Maintain device integrity	M
	Section 7.9 Enforce a Separation of Duties in the Application Architecture	7. Minimise the privilege and reach of applications	M
	Section 6.13 Logging and Diagnostics	10. Provide security logging, alerting and monitoring capabilities	H
NISA Security Recommendations [10]	Section 4.3 Technical Measures (GP-TM-05, GP-TM-06, GP-TM-18, GP-TM-19)	1. Provide updates, securely	M
	Section 4.2 Organisational, People and Process measures (GP-OP-04) Section 4.3 Technical Measures (GP-TM-02, GP-TM-04, GP-TM-14, GP-TM-24, GP-TM-32, GP-TM-34, GP-TM-35, GP-TM-39, GP-TM-40)	3. Protect data at rest and data in transit	H
	Section 4.3 Technical Measures (GP-TM-55, GP-TM-56)	5. Ensure transparency of device health	M

Reference			CoP principle	Overlap
	Section 4.3	Technical Measures (GP-TM-08, GP-TM-09, GP-TM-21, GP-TM-22, GP-TM-25, GP-TM-27, GP-TM-29, GP-TM-33, GP-TM-42, GP-TM-44, GP-TM-45)	8. Constrain the use of all device interfaces	M
	Section 4.3	Technical Measures (GP-TM-06)	9. Allow robust device management	M
NEMA [11]	Principle 3: Monitoring Devices and Systems		5. Ensure transparency of device health	M
	Principle 1: Segmenting Networks Principle 4: User Management Principle 5: Hardening Devices		8. Constrain the use of all device interfaces	M
IoTSE IoT Security Assurance Framework [12]	Section 2.4.5	Device Software (2.4.5.1, 2.4.5.2, 2.4.5.3, 2.4.5.4, 2.4.5.8)	1. Provide updates, securely	M
	Section 2.4.6	Device Operating System (2.4.6.1)		
	Section 2.4.6	Device Operating System (2.4.6.5)	3. Protect data at rest and data in transit	M
	Section 2.4.7	Device Wired and Wireless Interfaces		
	Section 2.4.8	Authentication and Authorization (2.4.8.8, 2.4.8.16)		
	Section 2.4.9	Encryption and Key Management for Hardware		
	Section 2.4.12	Data Protection and Privacy (2.4.12.2)		
	Section 2.4.16	Device Ownership Transfer (2.4.16.1, 2.4.16.2)		
	Section 2.4.8	Authentication and Authorization (2.4.8.17)	4. Maintain device integrity	M
	Section 2.4.15	Configuration		
	Section 2.4.7	Device Wired and Wireless Interfaces	5. Ensure transparency of device health	M
	Section 2.4.5	Device Software (2.4.5.1)	6. Permit only trusted software	M
	Section 2.4.4	Device Hardware & Physical Security (2.4.4.5, 2.4.4.9)	8. Constrain the use of all device interfaces	H
	Section 2.4.5	Device Software (2.4.5.5)		
	Section 2.4.6	Device Operating System (2.4.6.3, 2.4.6.4)		
	Section 2.4.7	Device Wired and Wireless Interfaces		
	Section 2.4.8	Authentication and Authorization		

Reference		CoP principle	Overlap
	Section 2.4.8 Authentication and Authorization (2.4.8.17) Section 2.4.15 Configuration	9. Allow robust device management	M
ISOC/OTA [13]	Security Principle: 1, 6 and 8	1. Provide updates, securely	M
	Security Principle: 2 User Access & Credentials: 17 Privacy, Disclosures & Transparency: 33	3. Protect data at rest and data in transit	M
	Privacy, Disclosures & Transparency: 26	11. Enable recovery to a known good state	M
IIC Security Framework [14]	Section 7.3 Endpoint Protection Section 11.5.1 Secure Software Patching and Firmware Update	1. Provide updates, securely	M
	Section 7.3 Endpoint Protection Section 7.4 Communications and Connectivity Protection Section 7.6 Security Configuration and Management Section 7.7 Data Protection Section 8.8 Endpoint Data Protection Section 8.11 Cryptography Techniques for Endpoint Protection Section 8.13 Resource-Constrained Device Considerations Section 9.1 Cryptographic Protection of Communications & Connectivity Section 10.4 Security Data Protection Section 11.9 Configuration and Management Data Protection	3. Protect data at rest and data in transit	M
	Section 7.3 Endpoint Protection Section 7.6 Security Configuration and Management Section 8.10 Endpoint Configuration and Management	4. Maintain device integrity	H
	Section 7.3 Endpoint Protection Section 7.5 Security Monitoring and Analysis Section 7.7 Data Protection Section 8.9 Endpoint Monitoring and Analysis Section 10.3 Capturing and Storing Data for Analysis Section 10.4 Security Data Protection	5. Ensure transparency of device health	H

Reference			CoP principle	Overlap
	Section 7.3 Section 7.6 Section 8.10 Section 11.7.1 Enrolment Phase	Endpoint Protection Security Configuration and Management Endpoint Configuration and Management	9. Allow robust device management	H
	Section 10.3	Capturing and Storing Data for Analysis	10. Provide security logging, alerting and monitoring capabilities	H
EN 303 645 [15]	Provision 5.3	Keep software updated	1. Provide updates, securely	H
	Provision 5.1-1 Provision 5.1-2		2. Support appropriate authentication	H
	Provision 5.5 Provision 5.11	Communicate securely Make it easy for users to delete user data	3. Protect data at rest and data in transit	M
	Provision 5.6-8 Provision 5.7-1		4. Maintain device integrity	H
	Provision 5.7	Ensure Software Integrity	5. Ensure transparency of device health	H
	Provision 5.6 Provision 5.7-2	Minimize exposed attack surfaces	7. Minimise the privilege and reach of applications	M
	Provision 5.5 Provision 5.6	Communicate securely Minimize exposed attack surfaces	8. Constrain the use of all device interfaces	M
	Provision 5.6 Provision 5.12	Minimize exposed attack surfaces Make installation and maintenance of devices easy	9. Allow robust device management	M
	Provision 5.10	Examine system telemetry data	10. Provide security logging, alerting and monitoring capabilities	M
	Provision 5.7 Provision 5.12	Ensure Software Integrity Make installation and maintenance of devices easy	11. Enable recovery to a known good state	M
NIST SP-800-213A [16]	DC-CTL DP-CRY DP-STX SU-APP SU-UPD	Device Configuration Control Cryptographic Capabilities and Support Secure Transmission Update Application Support Update Capabilities	1. Provide updates, securely	H

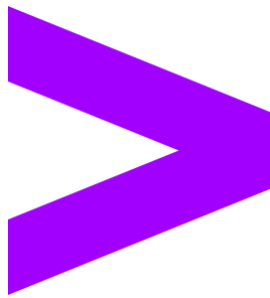
Reference			CoP principle	Overlap
	DC-PRV	Logical Access Privilege Configuration	2. Support appropriate authentication	H
	DI-DAS	Device Authentication Support		
	DI-IMS	Identifier Management Support		
	DP-CRY	Cryptographic Capabilities and Support		
	DP-KEY	Cryptographic Key Management		
	DS-COM	Secure Communication		
	LA-ACF	Authentication Configuration		
	LA-AIM	Authentication and Identity Management		
	LA-AUN	Authentication Support		
	LA-AUZ	Authorization Support	3. Protect data at rest and data in transit	H
	LA-XCN	External Connections		
	DP-CRY	Cryptographic Capabilities and Support	4. Maintain device integrity	H
	DP-KEY	Cryptographic Key Management		
	DP-STO	Secure Storage		
	DP-STX	Secure Transmission		
	DS-COM	Secure Communication		
	CS-AUP	Audit Support and Protection	5. Ensure transparency of device health	H
	CS-AWR	State Awareness Support		
	DS-DIN	Device Integrity		
	DS-EXE	Secure Execution		
	DS-RSC	Secure Resource Usage		
	SU-UPD	Update Capabilities	6. Permit only trusted software	H
	CS-AUP	Audit Support and Protection	7. Minimize the privilege and reach of applications	H
	CS-AWR	State Awareness Support		
	DS-DIN	Device Integrity		
	LA-LDU	Limitations on Device Usage	8. Constrain the use of all device interfaces	M
	LA-ROL	Role Support and Management		
	DS-EXE	Secure Execution	9. Allow robust device management	M
	DS-RSC	Secure Resource Usage		
	LA-ROL	Role Support and Management		
	DC-INT	Interface Configuration		
	DI-AID	Actions Based on Device Identity		
	DI-IMS	Identifier Management Support		
	DS-OPS	Secure Device Operation		
	LA-IFC	Interface Control		
	DC-AUT	Authentication and Authorization Configuration		
	DC-CTL	Device Configuration Control		
	DI-AID	Actions Based on Device Identity		
	DS-DIN	Device Integrity		
	DS-ONB	Secure Network Onboarding Support		
	LA-IFC	Interface Control		

Reference			CoP principle	Overlap
	CS-AEI CS-AUP CS-EIM CS-EVR CS-LCT CS-LSR CS-RDL CS-SRT DS-COM	Access to Event Information Audit Support and Protection Event Identification and Monitoring Event Response Logging Capture and Trigger Support Audit Log Storage and Retention Support of Required Data Support for Reliable Time Secure Communication	10. Provide security logging, alerting and monitoring capabilities	H
	CS-EVR DP-STO	Event Response Secure Storage	11. Enable recovery to a known good state	M
EN 18031 Parts 1-3 [17][18][19]	Req. SUM-2 (Parts 1, 2, 3) Req. SUM-3 (Parts 1, 2, 3) Req. CRY-1 (Parts 1, 2, 3)		1. Provide updates, securely	M
	Req. ACM-2 (Parts 1, 2, 3) Req. AUM-1-1 (Parts 1, 2, 3) Req. AUM-1-2 (Parts 1, 2, 3) Req. AUM-2 (Part 1) Req. AUM-2-1 (Parts 2, 3) Req. AUM-3 (Parts 1, 2, 3) Req. AUM-4 (Parts 1, 2, 3) Req. AUM-5-1 (Parts 1, 2, 3) [RED-restricted, see footnote 2] Req. AUM-5-2 (Parts 1, 2, 3) [RED-restricted, see footnote 2] Req. AUM-6 (Parts 1, 2, 3) Req. CCK-2 (Parts 1, 2, 3) Req. CCK-3 (Parts 1, 2, 3) Req. CRY-1 (Parts 1, 2, 3)		2. Support appropriate authentication	H
	Req. SSM-1 (Parts 1, 2, 3) Req. SSM-3 (Parts 1, 2, 3) Req. SCM-1 (Parts 1, 2, 3) Req. SCM-2 (Parts 1, 2, 3) Req. SCM-3 (Parts 1, 2, 3) Req. SCM-4 (Parts 1, 2, 3) Req. CCK-3 (Parts 1, 2, 3) Req. CRY-1 (Parts 1, 2, 3) Req. DLM-1 (Part 2)		3. Protect data at rest and data in transit	H
	Req. SUM-2 (Parts 1, 2) Req. SUM-2 (Part 3) [RED-restricted, see footnote 3] Req. SSM-1 (Parts 1, 2, 3) Req. GEC-8 (Part 3)		4. Maintain device integrity	H
	Req. ACM-2 (Parts 1, 2, 3)		7. Minimize the privilege and reach of applications	M

<sup>2</sup> As per EC Guidance on the application of the EN 18031 standards [20]: “This harmonised standard does not confer a presumption of conformity with Article 3(3), first subparagraph, point (d), (e) and (f), of Directive 2014/53/EU if, by applying its clauses 6.2.5.1 and 6.2.5.2, the user is allowed not to set and use any password.”

<sup>3</sup> As per EC Guidance on the application of the EN 18031 standards [20]: “As regards the assessment criteria set out in clause 6.3.2.4 of this harmonised standard, this harmonised standard does not confer a presumption of conformity with the essential requirement set out in Article 3(3), first subparagraph, point (f), of Directive 2014/53/EU.”

Reference		CoP principle	Overlap
	Req. GEC-3 (Parts 1, 2, 3) Req. GEC-4 (Parts 1, 2, 3) Req. GEC-5 (Parts 1, 2, 3)	8. Constrain the use of all device interfaces	H
	Req. NMM-1 (Part 1) Req. LGM-1 (Parts 2, 3) Req. LGM-4 (Parts 2, 3) Req. UNM-1 (Part 2)	10. Provide security logging, alerting and monitoring capabilities	M



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