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Internet of Things (IoT) - Guidance on IoT application to home healthcare

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Internet of Things (IoT) - Guidance on IoT application to home healthcare

FOREWORD

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ISO/IEC TR 30123 has been prepared by subcommittee 41: Internet of Things and Digital Twin, of ISO/IEC joint technical committee 1: Information technology. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
JTC1-SC41/549/DTR	JTC1-SC41/582/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1, and the ISO/IEC Directives, JTC 1 Supplement available at http://www.iec.ch/members_experts/refdocs and http://www.iso.org/directives.

INTRODUCTION

As healthcare extends beyond traditional clinical settings into the home, IoT technologies present unprecedented opportunities to enhance the quality of care, improve access to medical services, and increase healthcare delivery efficiency. Home healthcare IoT constitutes a specialized application of these technologies, intended to address the distinct requirements and challenges associated with delivering healthcare in residential environments, including real-time health monitoring, data security and privacy protection, remote diagnostics and treatment, emergency response capabilities, and seamless integration with existing healthcare systems. It includes a wide range of interconnected devices, systems, and services that monitor health, support therapeutic interventions, and facilitate communication between patients, caregivers, and healthcare providers.

1 Scope

This document provides guidance on applying IoT technologies to home healthcare systems, taking into account the specific characteristics.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 20924:2024, *Internet of Things (IoT) and digital twin — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 20924:2024 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/
– ISO Online browsing platform: available at https://www.iso.org/obp

3.1
home healthcare IoT
infrastructure of interconnected entities, people, systems, and information resources along with services, that applies IoT technologies to home healthcare systems to monitor, support, and enhance healthcare delivery in the home environment

4 Symbols and abbreviated terms

AI	artificial intelligence
API	application programming interface
ASD	application and service domain
BSS	business support system
CPAP	continuous positive airway pressure
ECG	electrocardiogram
GDPR	General Data Protection Regulation
HIPAA	the Health Insurance Portability and Accountability Act
IoT	Internet of Things
OMD	operations and management domain
OSS	operational support system
PED	physical entity domain
RAID	resource access interchange domain
SCD	sensing and control domain
SDO	super data object
UD	user domain

5 Characteristics of home healthcare IoT

5.1 General

Home healthcare IoT extends general IoT principles through adaptations and enhancements. This extension is governed by three fundamental principles.

a) Effectiveness: The ability to achieve intended healthcare outcomes and improve the quality of care in home healthcare.

b) Safety: The capability to operate without causing harm to care recipients, caregivers, or the environment, including the protection of health information.

c) Interoperability: The ability of diverse devices, systems and services to exchange and use information seamlessly within the home healthcare system and with external healthcare systems.

These principles form the foundation for the key characteristics that are more important in home healthcare IoT than general IoT applications. [1], [2], ITU T.H810:2019 [3].

While home healthcare IoT builds on general IoT principles, it involves adaptations and enhancements to address the critical nature of healthcare delivery, the sensitivity of health information, and the varied needs of care recipients in home settings.

Clause 5 identifies twelve key characteristics of home healthcare IoT, which are examined in the context of effectiveness, safety and interoperability, distinguishing them from their general IoT counterparts.

Table 1 presents the general characteristics of IoT systems defined in ISO/IEC 30141:2024 [4] in the categories of IoT system trustworthiness, IoT system architecture, and IoT system functional characteristics. The key characteristics that are related to the three fundamental principles of home healthcare IoT are highlighted in bold.

Table 1 – Characteristics of general IoT systems and key characteristics of home healthcare IoT

Categories	Related characteristics[a]
IoT system trustworthiness characteristics	Availability
	Confidentiality
	Integrity
	Protection of personally identifiable information
	Reliability
	Resilience
	Safety
IoT system architecture characteristics	Composability
	Functional and management capability separation
	Heterogeneity
	Legacy support
	Modularity
	Network connectivity
	Scalability
	Shareability
	Unique identification
	Well-defined components