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INTERNATIONAL STANDARD

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Internet of things (IoT) – Data exchange platform for IoT services – Part 2: Transport interoperability between nodal points



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Part 2: Transport interoperability between nodal points

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ISO/IEC 30161-2 has been prepared by subcommittee 41: Internet of Things and Digital Twin, of ISO/IEC joint technical committee 1: Information technology. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
JTC1-SC41/326/FDIS	JTC1-SC41/336/RVD

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 International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1, available at www.iec.ch/members_experts/refdocs.

A list of all parts in the ISO/IEC 30161 series, published under the general title *Internet of Things (IoT) – Data exchange platform for IoT services*, can be found on the IEC and ISO websites.

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INTRODUCTION

ISO/IEC 30161-1:2020 specifies the requirements of an Internet of Things (IoT) data exchange platform (IoT DEP), which transfers IoT data to and from various IoT devices with small delay. The IoT DEP provides the following functions: abstraction of communication networks and lightweight transfer of IoT traffic. However, ISO/IEC 30161-1:2020 specifies only the concept and structure of the platform for IoT data exchange between an IoT device and an IoT-user through an IoT DEP. Therefore, it is essential to take into account that IoT devices and IoT-users are connected to each other through multiple nodal points, when a large number of IoT devices and IoT-users is included in the IoT system and is deployed over a wide geographical area.

This document focuses on the transport interoperability among nodal points in an IoT system. The transport interoperability among nodal points enables data exchange among nodal points in an IoT system with small overheads or data acquisition with low latency. Requirements for efficient transfer of IoT data among nodal points are specified. Functional blocks on a nodal point for the transport interoperability between nodal points in the IoT DEP are specified.

The transport interoperability among nodal points is realized by an IoT DEP network consisting of multiple nodal points. The transfer of IoT data among nodal points is not affected by a communication protocol in the transport layer. A nodal point has routing function and forwarding function to realize the transport interoperability.

INTERNET OF THINGS (IoT) – DATA EXCHANGE PLATFORM FOR IoT SERVICES –

Part 2: Transport interoperability between nodal points

1 Scope

This part of ISO/IEC 30161 specifies the following items for the transport interoperability between nodal points in the IoT data exchange platform (IoT DEP):

– requirements;
– functional blocks;
– operation mechanism.

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 30161-1:2020, *Internet of Things (IoT) – Data exchange platform for IoT services – Part 1: General requirements and architecture*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology 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
IoT data
bit strings exchanged among IoT DEP functions

3.2
IoT data exchange platform
IoT DEP
set of functional blocks that provide an abstraction of IoT data blocks and exchange of IoT data with other entities

Note 1 to entry: For example, in a huge number of sensors across various networks, IoT DEP reduces traffic volumes and exchanges IoT data with other entities. Functional blocks of IoT DEP are implemented at endpoints and nodal points in IoT networks. These functional blocks cooperate as a platform.

[SOURCE: ISO/IEC 30161-1:2020, 3.1]

3.3
IoT DEP network
network which consists of multiple nodal points

3.4
IoT service
service which exchanges data among endpoints in an IoT system

3.5
IoT system
system providing functionalities of IoT

Note 1 to entry: An IoT system can include, but not be limited to, IoT devices, IoT gateways, sensors, and actuators.

[SOURCE: ISO/IEC 20924:2021 [1], 3.2.9]

3.6
nodal point
point that investigates routing information specified in communication protocols and relays data blocks according to such information

[SOURCE: ISO/IEC 30161-1:2020, 3.2]

4 Abbreviated terms

CAC	communication access control
IoT	Internet of Things
IoT DEP	IoT data exchange platform
IP	internet protocol
OSI	open systems interconnection
QoS	quality of service

5 Overview

ISO/IEC 30161-1:2020 specifies an IoT data exchange platform (IoT DEP), which transfers IoT data to and from various IoT devices with small delay. Such various IoT devices are described in ISO/IEC TR 22417 [2][1]. The IoT DEP suppresses processing time delay (i.e. overhead due to DNS, IP routing based on a location) and reduces traffic volume by eliminating complicated protocols used by existing communication infrastructures (e.g. the Internet). ISO/IEC 30161-1:2020 also specifies four cases of IoT DEP implementation (Cases A, B, C, and D). IoT DEP functions for Case A are implemented in an IoT-user, IoT DEP functions for Case C are implemented in an IoT gateway, and IoT DEP functions for Case D are implemented in an IoT device. Case B of an IoT DEP is specified as a component which takes on the role of a nodal point.

Figure 4 of ISO/IEC 30161-1:2020 shows the locations of IoT DEP functions in the IoT reference models of ISO/IEC 30141 [3], which indicates the relationship of IoT DEP functions among an IoT device, an IoT-user, an IoT gateway, and "Resource access and interchange sub-system" as shown in Figure 1.

When a large number of IoT devices and IoT-users is included in the IoT system and the IoT system is deployed in a wide geographical area as a horizontal approach, IoT devices and IoT-users are connected to each other through multiple nodal points in an IoT DEP network as shown in Figure 2. Note that the IoT gateway corresponds to a nodal point. IoT devices and IoT-users correspond to endpoints connected to any of the nodal points.

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1 Numbers in square brackets refer to the Bibliography.