

This is a preview of "ISO/IEC 30161:2020". Click here to purchase the full version from the ANSI store.



Edition 1.0 2020-11

INTERNATIONAL STANDARD



Internet of things (IoT) – Data exchange platform for IoT services – Part 1: General requirements and architecture





Copyright © 2020 ISO/IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about ISO/IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

This is a preview of "ISO/IEC 30161:2020". Click here to purchase the full version from the ANSI store.



Edition 1.0 2020-11

INTERNATIONAL STANDARD



Internet of things (IoT) – Data exchange platform for IoT services – Part 1: General requirements and architecture

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 35.020

ISBN 978-2-8322-8997-6

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Abbreviated terms	7
5 Overview of IoT services	7
6 Network configurations for IoT services	7
6.1 Overview of network configurations for IoT	7
6.2 Network models for an IoT DEP	9
7 Data exchange platform in IoT reference architecture.....	9
7.1 General.....	9
7.2 Position of an IoT DEP in IoT reference architecture.....	9
7.2.1 Functions of the IoT DEP.....	9
7.2.2 Positions of the IoT DEP.....	10
7.3 Operation of an IoT DEP in an IoT system	10
8 Requirements for an IoT DEP	13
8.1 General.....	13
8.2 Requirements of functional blocks.....	13
8.2.1 Definitions of functional blocks	13
8.2.2 Communication access control (CAC).....	14
8.2.3 Data control.....	16
8.2.4 Data translation	16
8.2.5 IoT control	16
8.2.6 IoT management.....	16
8.2.7 Adaptation	16
8.3 Communication protocols.....	16
8.4 Service mapping	17
9 Operations of an IoT DEP.....	17
Annex A (normative) Implementation guideline for an IoT DEP	19
A.1 General.....	19
A.2 Abstraction of lower layer in IoT DEP.....	20
A.3 Abstraction of lower layer in IoT DEP.....	21
Annex B (informative) Typical communication protocols for ICN.....	22
Annex C (informative) Applied use cases based on an IoT data exchange platform	23
C.1 General.....	23
C.2 Farm product tracking use case: Actors and information exchange	23
C.3 IoT endpoint monitoring systems.....	24
C.4 IoT-based energy management system for industrial facilities.....	24
Bibliography.....	27
Figure 1 – Overview of network configurations.....	8
Figure 2 – Service types of the network configurations	8
Figure 3 – Redefined configuration types for an IoT DEP	9
Figure 4 – Locations of IoT DEP functions in the IoT reference models.....	10

This is a preview of "ISO/IEC 30161:2020". [Click here to purchase the full version from the ANSI store.](#)

Figure 5 – Cases of an IoT DEP and relationship between IoT and other services	11
Figure 6 – Operations of the IoT DEP in Case A	11
Figure 7 – Operations of an IoT DEP in Case B	12
Figure 8 – Operations of an IoT DEP in Case C	12
Figure 9 – Operations of an IoT DEP in Case D	12
Figure 10 – Functional blocks in an IoT DEP.....	13
Figure 11 – Functional blocks in an IoT DEP.....	14
Figure 12 – Layer structures of the communication platforms	15
Figure 13 – Independence between CAC and lower layer protocols	15
Figure 14 – Co-existing architecture between IoT applications and others	15
Figure 15 – IoT DEP connections over communication protocols	16
Figure 16 – Connections between IoT users and IoT services with an IoT DEP.....	17
Figure 17 – Connections between IoT users and IoT services without an IoT DEP	17
Figure 18 – Operation of information control using an IoT DEP	18
Figure A.1 – Configuration of entity including an IoT DEP without adaptation.....	19
Figure A.2 – Configuration of entity including an IoT DEP with adaptation	19
Figure A.3 – Implementation on support of multiple access protocols in an IoT DEP	20
Figure A.4 – Implementation on support of multiple socket interfaces in an IoT DEP	20
Figure A.5 – Implementation on support of multiple socket interfaces in an IoT DEP with adaptation function	21
Figure B.1 – Types of ICN technologies	22
Figure C.1 – Diagram of farm product tracking system	23
Figure C.2 – Diagram of farm product tracking system	24
Figure C.3 – Diagram of IoT-based energy management system for industrial facilities.....	25
Figure C.4 – Extracted key blocks of Figure C.3	25
Table 1 – Relationship between functional blocks and cases of an IoT DEP.....	13

INTERNET OF THINGS (IoT) – DATA EXCHANGE PLATFORM FOR IOT SERVICES – Part 1: General requirements and architecture

FOREWORD

- 1) ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.
- 2) The formal decisions or agreements of IEC and ISO on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC and ISO National bodies.
- 3) IEC and ISO documents have the form of recommendations for international use and are accepted by IEC and ISO National bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC and ISO documents is accurate, IEC and ISO cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC and ISO National bodies undertake to apply IEC and ISO documents transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC and ISO document and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC and ISO do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC and ISO marks of conformity. IEC and ISO are not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this document.
- 7) No liability shall attach to IEC and ISO or their directors, employees, servants or agents including individual experts and members of its technical committees and IEC and ISO National bodies for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this ISO/IEC document or any other IEC and ISO documents.
- 8) Attention is drawn to the Normative references cited in this document. Use of the referenced publications is indispensable for the correct application of this document.
- 9) Attention is drawn to the possibility that some of the elements of this ISO/IEC document may be the subject of patent rights. IEC and ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 30161 was prepared by subcommittee 41: Internet of Things and related technologies, of ISO/IEC joint technical committee 1: Information technology.

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

FDIS	Report on voting
JTC1-SC41/178/FDIS	JTC1-SC41/187/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

This is a preview of "ISO/IEC 30161:2020". [Click here to purchase the full version from the ANSI store.](#)

INTRODUCTION

IoT implements various services in many fields, such as "Remote Management of Large Equipment in a Plant", "Warehouse Goods Monitoring", "IoT Endpoint (Sensors and Actuators) Monitoring Systems", etc. The IoT architecture can be categorized into vertical and horizontal approaches. For small deployments in limited areas, the vertical approach is possible. However, for large scale deployments, the horizontal approach is required, and then introducing the concept of a common platform is helpful for implementing various services. In the horizontal approach, information processing and networking are positioned as the platform. And also, the types of IoT services are increasing in different application fields. To make IoT services more creative and productive, data exchange between various IoT services needs to be supported and a common platform for data exchange is the simplest way. This document has been developed in accordance with a detailed study of a platform that supports various IoT use cases.