

INTERNATIONAL
STANDARD

ISO/IEC
29161

First edition
2016-08-01

**Information technology — Data
structure — Unique identification for
the Internet of Things**

*Technologies de l'information — Structure de données —
Identification unique pour l'Internet des Objets*

Reference number
ISO/IEC 29161:2016(E)



© ISO/IEC 2016



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms	1
5 Identification of an “entity”	2
5.1 General.....	2
5.2 Overview of the “IoT Network”.....	3
6 Unambiguous wrapper for unique identifiers in IoT applications	4
6.1 Overview.....	4
6.2 URN schemes suitable for identification in IoT systems.....	5
6.2.1 Instances of URN schemes.....	5
6.2.2 Listing of existing URN schemes referenced by this International Standard.....	6
6.3 URI usage in IoT systems.....	6
7 Use of unique identification	7
7.1 UI concept.....	7
7.2 UI encoding.....	7
Annex A (informative) URI usage with ISO/IEC JTC 1/SC 31 standards	8
Annex B (informative) OID wrappers and sensor networks	10
Annex C (informative) Identification Schemes possible to use in Networks	12
Annex D (informative) Ontology of Identification	13
Bibliography	15

Foreword

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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

Introduction

In applications of the Internet of Things (IoT), one “thing” can communicate with other “things” via the Internet. For that “thing” to communicate, it should possess an identifier of “which” it is.

The ISO/IEC 15459- series does a good job identifying how groups that have been assigned an issuing agency code can create a character-based system of unique identification.

There is no shortage of claimants to provide that identifier. Each is understandable due to its origins and the perspective from which it comes. The Internet is a network and groups such as the International Telecommunications Union (ITU) and the Internet Engineering Task Force (IETF) view this identifier as a mechanism to facilitate network routing. ITU-T X.668 | ISO/IEC 9834-9 and ITU-T X.660 | ISO/IEC 9834-1 attempt to fill this need from a network perspective. From a network perspective, it is accepted that the identification of an entity must resolve to an IP address for contacting it, whether its domain name “hangs” from an OID root using an OID resolver, or from a more general DNS node (which may end up as the same thing).

However, not everything is viewed from the perspective of the network, nor necessarily should it so be viewed. The network is a transport mechanism and the entities themselves have historic identifiers, which have their genesis from supply chain applications and identification.

Ultimately, the various forms of unique identification identified within this International Standard need to be combined in a single message in an unambiguous form. This International Standard provides a method enabling this combination in an unambiguous form.

Information technology — Data structure — Unique identification for the Internet of Things

1 Scope

This International Standard establishes a unique identification scheme for the Internet of Things (IoT), based on existing and evolving data structures. This International Standard specifies the common rules applicable for unique identification that are required to ensure full compatibility across different identities. The unique identification is a universal construct for any physical object, virtual object, or person. It is used in IoT information systems that need to track or otherwise refer to entities. It is intended for use with any IoT media.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

There are no normative references in this document.