



BSI Standards Publication

Internet of things (IoT) — Interoperability for IoT systems

Part 2: Transport interoperability

This is a preview of "BS ISO/IEC 21823-2:2020". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of ISO/IEC 21823-2:2020.

The UK participation in its preparation was entrusted to Technical Committee IOT/1, Internet of Things.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020
Published by BSI Standards Limited 2020

ISBN 978 0 580 51753 2

ICS 35.020; 35.110

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2020.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

This is a preview of "BS ISO/IEC 21823-2:2020". Click [here](#) to purchase the full version from the ANSI store.



Edition 1.0 2020-04

INTERNATIONAL STANDARD



Internet of things (IoT) – Interoperability for IoT systems – Part 2: Transport interoperability

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 35.020; 35.110

ISBN 978-2-8322-8142-0

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

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	4
1 Scope.....	5
2 Normative references	5
3 Terms and definitions	5
4 Network connectivity for transport interoperability.....	6
5 Overview	7
5.1 Network connectivity model and interfaces between IoT systems.....	7
5.2 Network connectivity model and interfaces within an IoT system.....	8
5.3 Network connectivity stack model	10
6 Requirements for network connectivity between IoT systems.....	12
6.1 Overview.....	12
6.2 Network interfaces between different IoT systems.....	13
6.2.1 Network service interface	13
6.2.2 Network protocol translation interface	13
6.2.3 Network resource interface	13
6.3 Requirements of network connectivity	13
6.3.1 General	13
6.3.2 Service-related requirement.....	13
6.3.3 Communication-related requirement	14
6.3.4 Network resource-related requirement	14
6.3.5 QoS requirement	14
6.3.6 Bandwidth requirement	15
6.3.7 Signalling requirement.....	15
6.3.8 Status monitor requirement.....	15
6.3.9 Security requirement	15
6.3.10 Time-dependent requirement.....	15
7 Requirements for network connectivity within an IoT system.....	15
7.1 Overview.....	15
7.2 Network elements for supporting network connectivity	16
7.2.1 Network service interface	16
7.2.2 Network protocol translation interface	17
7.2.3 Network resource interface	17
7.3 Gateways for supporting network connectivity.....	17
Bibliography.....	18
Figure 1 – Facets of IoT interoperability.....	6
Figure 2 – Network connectivity model between two IoT systems.....	7
Figure 3 – Network connectivity model within an IoT system.....	9
Figure 4 – Network connectivity stack model between IoT systems.....	10
Figure 5 – Network connectivity stack model within an IoT system.....	11
Figure 6 – The connectivity between different IoT systems	12
Figure 7 – The connectivity within an IoT system	16

This is a preview of "BS ISO/IEC 21823-2:2020". Click here to purchase the full version from the ANSI store.

INTERNET OF THINGS (IoT) – INTEROPERABILITY FOR IoT SYSTEMS –

Part 2: Transport interoperability

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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.
- 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 National Committees and ISO member bodies.
- 3) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC National Committees and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or 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 National Committees and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO, IEC or ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.
- 5) ISO and IEC do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. ISO or IEC 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 publication.
- 7) No liability shall attach to IEC or ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC National Committees or ISO member 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 of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/IEC publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this ISO/IEC publication may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 21823-2 was prepared by subcommittee 41: Internet of Things and related technologies, of ISO/IEC joint technical committee 1: Information technology.

The list of all currently available parts of the ISO/IEC 21823 series, under the general title *Internet of Things (IoT) – Interoperability for IoT systems*, can be found on the IEC and ISO websites.

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

FDIS	Report on voting
JTC1-SC41/138/FDIS	JTC1-SC41/153/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 "BS ISO/IEC 21823-2:2020". [Click here to purchase the full version from the ANSI store.](#)

INTRODUCTION

Internet of Things (IoT) systems involve communications among different entities. This applies to connections between different IoT systems. It also applies to the many connections that exist within IoT systems. The various entities and their connections are described in ISO/IEC 30141.

The ISO/IEC 21823 series addresses issues that relate to interoperability of the communications between IoT systems entities, both between different IoT systems and within a single IoT system. ISO/IEC 21823-1 describes a general framework for interoperability for IoT systems. This includes a facet model for interoperability which includes five facets of interoperability: transport; syntactic; semantic; behavioural; policy. This document (ISO/IEC 21823-2) addresses the transport interoperability for IoT systems. The semantic facet of interoperability will be addressed in a future International Standard (ISO/IEC 21823-3). The potential other parts address the syntactic facet, the behavioural facet and the policy facet of interoperability.

As described in ISO/IEC 30141, IoT systems have multiple different types of networks connecting the various system entities – network connectivity, addressing the transport facet of the interoperability model, is thus of great importance in the description of interoperability for IoT systems. The different networks need to be combined to provide the necessary network connectivity between entities which are attached to each of the networks – in short, to enable those entities to be interoperable. An example are the centralized applications and services which need to receive data from remote sensors, or issue commands to remote actuators.

Network connectivity is the name given to the methods by which the various networks in an IoT system are connected to one another. This document specifies a framework and requirements for transport interoperability, in order to enable the construction of IoT systems with information exchange, peer-to-peer connectivity and seamless communication both between different IoT systems and also among entities within an IoT system.

To provide seamless communication and interaction between and within networks, it is important to solve network level interoperability issues in IoT systems. There are four types of networks in IoT systems, including user networks, service network, access network and proximity network, which are defined in ISO/IEC 30141 and used in ISO/IEC 21823-1. The relationship and interface among these networks for supporting networks interoperability need to be specified.

For this purpose, this document focuses on network connectivity, which is the precondition of interoperability in IoT systems.

This is a preview of "BS ISO/IEC 21823-2:2020". Click here to purchase the full version from the ANSI store.

INTERNET OF THINGS (IoT) – INTEROPERABILITY FOR IoT SYSTEMS –

Part 2: Transport interoperability

1 Scope

This part of IEC 21823 specifies a framework and requirements for transport interoperability, in order to enable the construction of IoT systems with information exchange, peer-to-peer connectivity and seamless communication both between different IoT systems and also among entities within an IoT system. This document specifies:

- transport interoperability interfaces and requirements between IoT systems;
- transport interoperability interfaces and requirements within an IoT system.

2 Normative references

ISO/IEC 20924, *Internet of Things (IoT) – Vocabulary*

3 Terms and definitions

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

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

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

network connectivity

ability to exchange information as bits and bytes, assuming that the information exchange infrastructure is established and the underlying networks and protocols are unambiguously defined

[SOURCE: IEC:G5:V1.01:PB:20180228. The Industrial Internet of Things Volume G5: Connectivity Framework]

3.2

transport interoperability

interoperability where information exchange uses an established communication infrastructure between the participating systems

Note 1 to entry: System means IoT system

Note 2 to entry: IoT device, IoT gateway, sensor and actuator are considered as a system.

[SOURCE: ISO/IEC 19941:2017, 3.1.3]