PD ISO/IEC TR 30148:2019

BSI Standards Publication

Internet of things (IoT) – Application of sensor network for wireless gas meters

Documents
Document Sharing Hub

Full document details: PD ISO/IEC TR 30148:2019

National foreword

This Published Document is the UK implementation of ISO/IEC TR 30148:2019.

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 2019
Published by BSI Standards Limited 2019

ISBN 978 0 539 01989 6

ICS 17.120.10; 35.110

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

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 October 2019.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: PD ISO/IEC TR 30148:2019

ISO/IEC TR 30148

Edition 1.0 2019-10

TECHNICAL REPORT

colour inside

Internet of things (IoT) – Application of sensor network for wireless gas meters

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 17.120.10; 35.110

ISBN 978-2-8322-7524-5

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

Documents
Document Sharing Hub

Full document details: PD ISO/IEC TR 30148:2019

CONTENTS

FOREWORD 4
INTRODUCTION 5
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Symbols and abbreviated terms 7
5 Network structure 8
6 Application layer protocol 9
6.1 Overview 9
6.1.1 General 9
6.1.2 AL function 9
6.1.3 AL structure 9
6.2 User application process 10
6.2.1 General 10
6.2.2 Functions of UAP 10
6.2.3 User application object 10
6.3 Device management application process 10
6.4 Application sub-layer 11
6.4.1 General 11
6.4.2 Functions of application sub-layer 11
6.4.3 Communication models 11
6.4.4 Application sub-layer communication service 14
6.4.5 Connection service 14
6.4.6 Data transmission service 20
6.5 Application sub-layer message format 22
6.5.1 General 22
6.5.2 ASL general message format 22
6.5.3 Message formats 24
Annex A (informative) Security 27
A.1 Overview 27
A.2 Security scenario analysis 27
A.3 Security services 28

Figure 1 – The structure of the wireless gas networks 8
Figure 2 – AL structure 9
Figure 3 – R/R model interaction process 12
Figure 4 – P/S model interaction process 13
Figure 5 – R/S model interaction process 13
Figure A.1 – Security framework 27

Table 1 – ASL services 14
Table 2 – Link services provided by the application layer 15
Table 3 – Parameters of the LINK. Request primitive 15

Documents
Document Sharing Hub

Full document details: PD ISO/IEC TR 30148:2019

Table 4 – Parameters of the LINK. Response primitive 16
Table 5 – Connect services provided by the application layer 16
Table 6 – Parameters of the CONNECT. Request primitive 17
Table 7 – Parameters of the CONNECT. Response primitive 18
Table 8 – Release services provided by the application layer 18
Table 9 – Parameters of the RELEASE. Response primitive 19
Table 10 – Parameters of the RELEASE. Confirm primitive 19
Table 11 – Parameters of the RELEASE. Notification primitive 20
Table 12 – Data transmission services provided by the application layer 20
Table 13 – ASLDE-DATA. Request parameters 20
Table 14 – ASLDE-DATA. Confirm parameters 21
Table 15 – DATA. Indication parameters 21
Table 16 – Application sub-layer general message format 22
Table 17 – Message control field format 22
Table 18 – Message type subfield value 22
Table 19 – Format of the security control 23
Table 20 – Security control subfield value 23
Table 21 – Value of transmission model subfields 23
Table 22 – Operation code field value 25
Table 23 – Value of command code field 25
Table 24 – Acknowledgement message 26

Documents
Document Sharing Hub

Full document details: PD ISO/IEC TR 30148:2019

INTERNET OF THINGS (IoT) – APPLICATION OF SENSOR NETWORK FOR WIRELESS GAS METERS

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.

The main task of IEC and ISO technical committees is to prepare International Standards. However, a technical committee may propose the publication of a Technical Report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

ISO/IEC TR 30148, which is a Technical Report, has been prepared by subcommittee SC 41: Internet of Things and related technologies, of ISO/IEC joint technical committee 1: Information technology.

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

Draft TR	Report on voting
JTC1-SC41/90/DTR	JTC1-SC41/104/RVDTR

Full information on the voting for the approval of this Technical Report 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.

A bilingual version of this publication may be issued at a later date.

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.

AVA Documents
Document Sharing Hub

Full document details: PD ISO/IEC TR 30148:2019

INTRODUCTION

With the improvement of wireless communication technologies and the demand for intelligent products required by home automation, factory automation and so on, wireless gas meter systems can develop in terms of safety, reliability, and convenience. Wireless gas meters can not only avoid the errors from manual meter reading and issues such as unstable signals during traditional gas meter reading, but also achieve functions such as dynamic rates, energy management, event alarm service, real-time data collection and analysis.

From the perspective of gas meter companies, the promotion of wireless gas meters is conducive to reducing labour costs and improving efficiency. From the point of view of gas meter manufacturers, the implementation of wireless gas meters will also help them to reduce costs. Consumers will readily accept the lower cost and increased convenience of wireless gas meters. So in the near future, with significant cost benefits and technical advantages, wireless gas meters will become more important in the market.

Documents
Document Sharing Hub

Full document details: PD ISO/IEC TR 30148:2019

INTERNET OF THINGS (IoT) – APPLICATION OF SENSOR NETWORK FOR WIRELESS GAS METERS

1 Scope

This document describes

– the structure of wireless gas meter networks, and
– the application protocol of wireless gas meter networks.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

3.1
access point
equipment that is used to connect each wireless gas meter to other networks

3.2
acquisitor
equipment that is used for data acquisition, data transmission, and data relay for wireless gas meters

3.3
application layer
layer that performs calculation, processing and management of data collected by the sensing layer

3.4
application sub-layer
layer that provides services for the application layer

3.5
entity
unit that connects to other units defined in the wireless gas meter networks reference architecture with a distinct set of attributes

3.6
gateway
device that is used to connect wireless gas meter networks to outside IP networks

Documents
Document Sharing Hub

Full document details: PD ISO/IEC TR 30148:2019

3.7
handheld device
portable device that is used for provisioning firmware updates and monitoring device status

3.8
message
data unit conveyed between client and server that represents a specific service request or response

3.9
user application object
information processing element for a specific process

3.10
user application process
active process that is used to implement data collection and processing at the upper layer of the application layer

3.11
wireless gas meter
instrument for recording the quantity of gas passing through a particular outlet, which exchanges data with external devices with a microprocessor and a wireless communication chip as its core

3.12
wireless gas meter system
system that is composed of remote meter reading management, payment management, accounting management, gas management and data management

4 Symbols and abbreviated terms

AL	application layer
APDU	application layer protocol data unit
ASL	application sub-layer
ASLDE	application sub-layer data entity
ASLME	application sub-layer management entity
DMAP	device management application process.
GPRS	general packet radio services
ID	identifier
MIB	management information base
PDU	protocol data unit
R/R	request/response
P/S	publisher/subscriber
R/S	report source/sink
SAP	service access point
UAP	user application process
UAO	user application object
VCR	virtual communication relationship
VCR_ID	virtual communication relationship identifier

Documents
Document Sharing Hub

Full document details: PD ISO/IEC TR 30148:2019

5 Network structure

The overall structure of the wireless gas meter networks can be divided into three levels: the underlying wireless gas meter networks, the internet/mobile networks, the data centre/application server/cloud management platform. The gateway obtains data information such as balance, valve opening and closing, and device health status, and sends to the data centre. The cloud management platform can control and manage at any time, and users query information through the application server. They are shown in Figure 1.

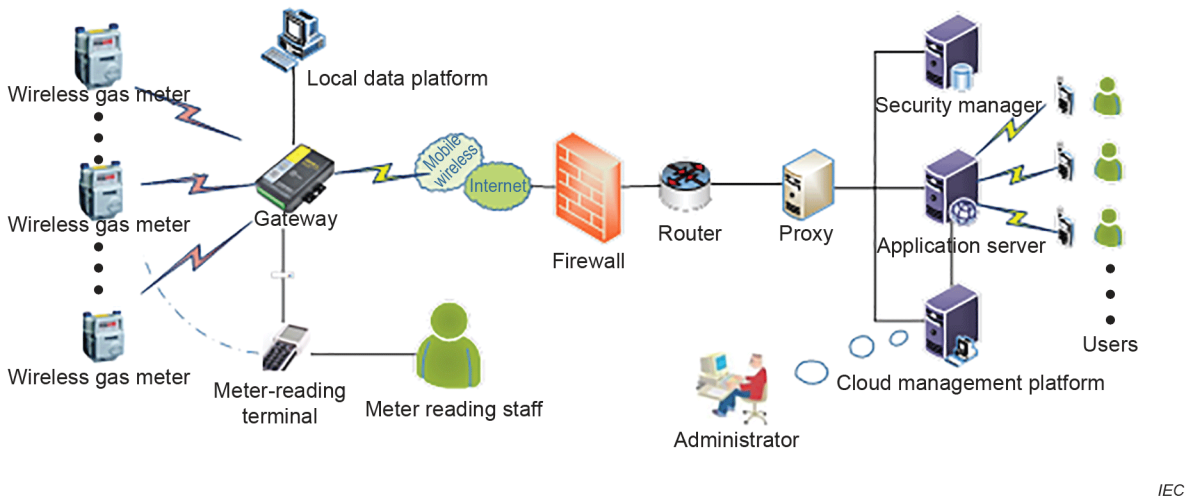

Figure 1 – The structure of the wireless gas networks

The components of the wireless gas meter networks are as follows.

a) Security manager

Application software that supervises various operational security aspects of a multi-device network (e.g. certification function), usually through interaction with wireless gas meter in the supervised device(s). See Annex A.

b) Application server

It is installed in the gas supplier or gas management centre. It is a platform for accessing the Internet and managing user applications. Users can perform business management operations such as gas meter recharging, gas meter status monitoring and gas data storage through the application.

c) Cloud management platform

It is installed in the gas supplier or gas management centre. It is a platform for controlling and managing wireless gas meters. It has functions such as equipment management, network management, network security management and time synchronization.

d) Gateway

It is installed at a place without potential explosion risks and far away from where gas is used. It is important for a gateway to be a safe distance from wireless gas meters. It can cover all gas meters to manage network nodes remotely. It can receive management and control messages from the remote management platform. The main functions are as follows: transmission and storage of wireless gas meter status information; conversion of wireless protocol to wired protocol; management of wireless gas meter; information security management for gas meter identification.

Documents
Document Sharing Hub
Full document details: PD ISO/IEC TR 30148:2019