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Information Technology — Open Connectivity Foundation (OCF) Specification —

Part 7: Wi-Fi easy setup specification

Technologies de l'information — Spécification de la Fondation pour la connectivité ouverte (Fondation OCF) —
Partie 7: Spécification de configuration facile du Wi-Fi

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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.

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 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

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) or the IEC list of patent declarations received (see patents.iec.ch).

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

For an explanation of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by the Open Connectivity Foundation (OCF) (as OCF Wi-Fi Easy Setup Specification, version 2.2.0) and drafted in accordance with its editorial rules. It was adopted, under the JTC 1 PAS procedure, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

A list of all parts in the ISO/IEC 30118 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

Introduction

This document, and all the other parts associated with this document, were developed in response to worldwide demand for smart home focused Internet of Things (IoT) devices, such as appliances, door locks, security cameras, sensors, and actuators; these to be modelled and securely controlled, locally and remotely, over an IP network.

While some inter-device communication existed, no universal language had been developed for the IoT. Device makers instead had to choose between disparate frameworks, limiting their market share, or developing across multiple ecosystems, increasing their costs. The burden then falls on end users to determine whether the products they want are compatible with the ecosystem they bought into, or find ways to integrate their devices into their network, and try to solve interoperability issues on their own.

In addition to the smart home, IoT deployments in commercial environments are hampered by a lack of security. This issue can be avoided by having a secure IoT communication framework, which this standard solves.

The goal of these documents is then to connect the next 25 billion devices for the IoT, providing secure and reliable device discovery and connectivity across multiple OSs and platforms. There are multiple proposals and forums driving different approaches, but no single solution addresses the majority of key requirements. This document and the associated parts enable industry consolidation around a common, secure, interoperable approach.

ISO/IEC 30118 consists of eighteen parts, under the general title Information technology — Open Connectivity Foundation (OCF) Specification. The parts fall into logical groupings as described herein:

- Core framework
  - Part 1: Core Specification
  - Part 2: Security Specification
  - Part 13: Onboarding Tool Specification
- Bridging framework and bridges
  - Part 3: Bridging Specification
  - Part 6: Resource to Alljoyn Interface Mapping Specification
  - Part 8: OCF Resource to oneM2M Resource Mapping Specification
  - Part 14: OCF Resource to BLE Mapping Specification
  - Part 15: OCF Resource to EnOcean Mapping Specification
  - Part 16: OCF Resource to UPlus Mapping Specification
  - Part 17: OCF Resource to Zigbee Cluster Mapping Specification
  - Part 18: OCF Resource to Z-Wave Mapping Specification

- Resource and Device models
  - Part 4: Resource Type Specification
  - Part 5: Device Specification
- Core framework extensions
  - Part 7: Wi-Fi Easy Setup Specification
  - Part 9: Core Optional Specification
- OCF Cloud
  - Part 10: Cloud API for Cloud Services Specification
  - Part 11: Device to Cloud Services Specification
  - Part 12: Cloud Security Specification

Information Technology — Open Connectivity Foundation (OCF) Specification —

Part 7:
Wi-Fi easy setup specification

1 Scope

This document defines functional extensions to the capabilities defined in ISO/IEC 30118-1 to meet the requirements of Wi-Fi Easy Setup. It specifies new Resource Types to enable the functionality and any extensions to the existing capabilities defined in ISO/IEC 30118-1.

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 30118-1 Information technology -- Open Connectivity Foundation (OCF) Specification -- Part 1: Core specification
https://www.iso.org/standard/53238.html

ISO/IEC 30118-2 Information technology -- Open Connectivity Foundation (OCF) Specification -- Part 2: Security specification
https://www.iso.org/standard/74239.html

ISO/IEC 30118-5 Information technology -- Open Connectivity Foundation (OCF) Specification -- Part 5: Smart home device specification
https://www.iso.org/standard/74242.html

IEEE 802.11, IEEE Standard for Information technology—Telecommunications and information exchange between systems Local and metropolitan area networks—Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, December 2016
https://standards.ieee.org/findstds/standard/802.11-2016.html

IETF RFC 5646, *Tags for Identifying Languages*, September 2009
https://www.rfc-editor.org/info/rfc5646

OpenAPI specification, aka *Swagger RESTful API Documentation Specification*, Version 2.0
https://github.com/OAI/OpenAPI-Specification/blob/master/versions/2.0.md

3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 30118-1 and the following apply.

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

– ISO Online browsing platform: available at https://www.iso.org/obp

– IEC Electropedia: available at http://www.electropedia.org/

3.1.1
Easy Setup
process of configuring an *Enrollee* (3.1.3) using a *Mediator* (3.1.5) by transferring of essential information to the *Enrollee* (3.1.3)

3.1.2
Easy Setup Enrollment
step during Easy Setup in which the *Enrollee* (3.1.3) is contacted by the *Mediator* (3.1.5) to configure the *Enroller's* (3.1.4) information by means of accessing *Easy Setup* (3.1.1) Resources

3.1.3
Enrollee
device that needs to be configured and connected. E.g. Air-conditioner, Printer

3.1.4
Enroller
target network entity to which the *Enrollee* (3.1.3) connects. E.g. Wi-Fi AP

3.1.5
Mediator
logical function that enables the *Enrollee* (3.1.3) to connect to the target network (i.e. *Enroller* (3.1.4))

Note 1 to Entry: The Mediator transfers configuration information to the Enrollee. E.g. Mobile Phone

3.2 Symbols and abbreviated terms

CID	Company Identifier (ID)
IE	Information Element
Soft AP	Software Enabled Access Point
TLV	type-length-value

4 Document conventions and organization

4.1 Conventions

In this document a number of terms, conditions, mechanisms, sequences, parameters, events, states, or similar terms are printed with the first letter of each word in uppercase and the rest lowercase (e.g., Network Architecture). Any lowercase uses of these words have the normal technical English meaning.

In this document, to be consistent with the IETF usages for RESTful operations, the RESTful operation words CRUDN, CREATE, RETRIVE, UPDATE, DELETE, and NOTIFY will have all letters capitalized. Any lowercase uses of these words have the normal technical English meaning.

4.2 Notation

In this document, features are described as required, recommended, allowed or DEPRECATED as follows:

Required (or shall or mandatory)(M).

– These basic features shall be implemented to comply with Core Architecture. The phrases "shall not", and "PROHIBITED" indicate behaviour that is prohibited, i.e. that if performed means the implementation is not in compliance.

Recommended (or should)(S).

– These features add functionality supported by Core Architecture and should be implemented. Recommended features take advantage of the capabilities Core Architecture, usually without imposing major increase of complexity. Notice that for compliance testing, if a recommended feature is implemented, it shall meet the specified requirements to be in compliance with these guidelines. Some recommended features could become requirements in the future. The phrase "should not" indicates behaviour that is permitted but not recommended.

Allowed (may or allowed)(O).

– These features are neither required nor recommended by Core Architecture, but if the feature is implemented, it shall meet the specified requirements to be in compliance with these guidelines.

DEPRECATED.

– Although these features are still described in this document, they should not be implemented except for backward compatibility. The occurrence of a deprecated feature during operation of an implementation compliant with the current document has no effect on the implementation's operation and does not produce any error conditions. Backward compatibility may require that a feature is implemented and functions as specified but it shall never be used by implementations compliant with this document.

Conditionally allowed (CA)

– The definition or behaviour depends on a condition. If the specified condition is met, then the definition or behaviour is allowed, otherwise it is not allowed.

Conditionally required (CR)

– The definition or behaviour depends on a condition. If the specified condition is met, then the definition or behaviour is required. Otherwise the definition or behaviour is allowed as default unless specifically defined as not allowed.

Strings that are to be taken literally are enclosed in "double quotes".

Words that are emphasized are printed in italic.

5 Overview

5.1 Introduction

This document describes a way to setup and configure a new Device, using an already configured Device or onboarding tool.

The described setup and configure mechanism is optional and other mechanisms are allowed to be used.

Specifically, this method allows the transferring of essential information to the new Device, which includes:

– Local network connection information, e.g. in case of Wi-Fi it will be Wi-Fi access point information.
– Device Configuration: Additional Device configuration information.

Easy Setup can be enhanced in future by incorporating other suitable technologies.

Annex A specifies the Resource Type definitions using the schema defined in the OpenAPI specification as the API definition language that shall be followed by a Device realizing the Resources specified in this document.

5.2 Architecture

Figure 1 shows the deployment architectural approach.

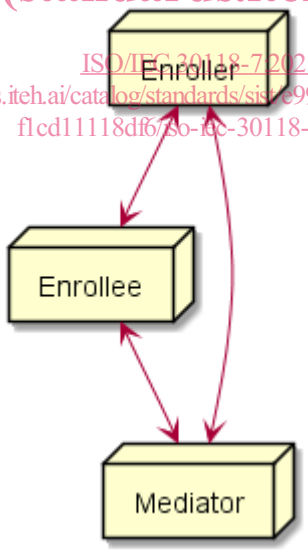

Figure 1 – Easy Setup deployment architecture

Easy Setup defines the following roles: Enrollee, Enroller, and Mediator. Please refer to clause 3 for the definitions thereof.

5.3 Example scenario

The following scenario presents a typical setup case.

The configuration information and steps taken may vary depending on the Device's type and status.

1) The Enrollee enters Easy Setup mode (when the Device is unboxed for the first time, it may be in this mode by default).

2) The Mediator discovers and connects to the Enrollee.

3) The Mediator performs Security Provisioning of the Enrollee.

4) The Mediator transmits Wi-Fi Setting Information to the Enrollee.

5) Using the information received from the Mediator, the Enrollee connects to the Enroller (Wi-Fi AP).

6 Resource model

6.1 Introduction

Devices capable of Easy Setup shall support the following Resource Types.

1) EasySetup Resource Type

2) WiFiConf Resource Type

3) DevConf Resource Type

Instances of these Resources Type (Resources) shall be excluded in the IDD for the Introspection Resource (see clause 11.4 in ISO/IEC 30118-1).

The EasySetup Resource Type is a Collection Resource and shall contain Links to instances of at least WiFiConf and DevConf. A vendor may add links to other Resource Types. The relationship between the EasySetup Resource Type and linked Resources is shown in Figure 2.

NOTE The EasySetup Resource Type supports the batch Interface ("oic.if.b") which allows for efficient data delivery with a single request rather than multiple requests to each linked Resource.

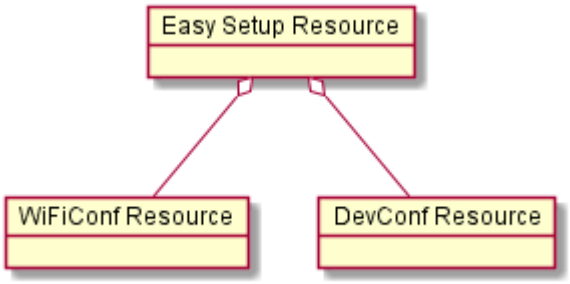

Figure 2 – Easy Setup Resource Types

6.2 EasySetup Resource

6.2.1 Overview

The EasySetup Resource stores useful information including current status of Enrollee and last error code which was produced in the process of Easy Setup.

6.2.2 Resource

The Easy Setup Resource Type is as defined in Table 1.