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OPC unified architecture – Part 7: Profiles

Architecture unifiée OPC – Partie 7: Profils

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OPC UNIFIED ARCHITECTURE –

Part 7: Profiles

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INTRODUCTION

This International Standard is a specification intended for developers of OPC UA applications. The specification is a result of an analysis and design process to develop a standard interface to facilitate the development of applications by multiple vendors that inter-operate seamlessly together.

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OPC UNIFIED ARCHITECTURE –

Part 7: Profiles

1 Scope

This part of the IEC 62541 series describes the OPC Unified Architecture *Profiles*. The *Profiles* are used to describe the functionality that an OPC UA *Server* exposes or that an OPC UA *Client* consumes. The details of the functionality are specified in other parts of IEC 62541.

Profiles are used by vendors to advertise the OPC UA capabilities of their products. The *Profiles* a product supports will typically appear on product data sheets. Buyers will use this *Profile* information to specify and purchase products that work together and meet specific application requirements. Most OPC UA applications will conform to several, but not all of the *Profiles*.

Profiles are used to segregate features with regard to testing of OPC UA Products and the nature of the testing. This includes the testing performed by the OPC Foundation provided OPC UA Compliance Test Tool and by the OPC Foundation provided Independent Certification Test Labs. This could equally as well refer to test tools provided by another organization or a test lab provided by another organization, what is important is the concept of automated tool based testing verse lab based testing. The scope of this specification includes defining functionality that can only be tested in an a lab and defining the grouping of functionality that is to be used when testing OPC UA products either in a lab or using automated tools. The definition of actual *TestCases* is not within the scope of this document, but the general categories of TestCases are within the scope of this document.

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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.

IEC/TR 62541-1, *OPC Unified Architecture – Part 1: Overview and Concepts*

IEC/TR 62541-2, *OPC Unified Architecture – Part 2: Security Model*

IEC 62541-3, *OPC unified architecture – Part 3: Address Space Model*

IEC 62541-4, *OPC unified architecture – Part 4: Services*

IEC 62541-5, *OPC unified architecure – Part 5: Information Model*

IEC 62541-6, *OPC unified architecure – Part 6: Mappings*

IEC 62541-8, *OPC unified architecture – Part 8: Data Access*

IEC 62541-9, *OPC Unified architecure – Part 9: Alarms and conditions*

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3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62541-1, IEC 62541-2, IEC 62541-3, IEC 62541-4, IEC 62541-6, IEC 62541-8 and the following apply.

3.1.1
Application
a body of code or piece of hardware that executes or implements some aspect of OPC UA

Note 1 to entry: The application could run on any machine and perform any function. The application could be software or it could be a hardware application, the only requirement is that it implements OPC UA.

3.1.2
ConformanceUnit
specific set of features that can be tested as a single entity

Note 1 to entry: A *ConformanceUnit* can cover a group of services, portions of services or information models. For additional detail see section 4.2

3.1.3
ConformanceGroup
group of conformance units that is given a name

Note 1 to entry: This grouping is only to assist in organizing *ConformanceUnits*. Typical *ConformanceGroups* include groups for each of the service sets in OPC UA and each of the Information Model specifications.

3.1.4
Facet
profile that is a subset of the *ConformanceUnits* a *Server* or *Client* may require

Note 1 to entry: *Facet* are typically combined to form full function *Profiles*. The use of the term *Facet* in the title of a *Profile* indicates that the given *Profile* is not a standalone profile.

3.1.5
ProfileCategory
a grouping of *Profiles* into major functionality groups, such as *Server* or *Clients*

Note 1 to entry: These categories help developers and users determine the type of type of *Application* that a given *Profile* would be used for. For additional details see section 4.4

3.1.6
TestCase
technical description of a set of steps required to test a particular function or information model

Note 1 to entry: *TestCases* provide sufficient details to allow a developer to implement them in code. A *TestCases* also provide a detailed summary of the expected result(s) from the execution of the implemented code and any precondition(s) that must be established before the *TestCase* can be executed.

3.1.7
TestLab
location that is designed to provide testing services

Note 1 to entry: These services include but are not limited to personal that directly perform testing, automated testing and a formal repeatable process. The OPC Foundation has provided detailed specification describing OPC UA TestLabs and the testing they are to provided (see *Compliance Part 8 UA Server*, *Compliance Part 9 UA Client*).

3.2 Abbreviations

A&C Alarms and Conditions

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A&E	Alarms and Events
API	Application Programming Interface
DA	Data Access
HA	Historical Access
HMI	Human Machine Interface
UA	Unified Architecture

4 Overview

4.1 General

The OPC Unified Architecture multipart specification describes a number of *Services* and a variety of information models. These *Services* and information models can be referred to as features of a *Server* or *Client*. *Servers* and *Clients* need to be able to describe which features they support. This part provides a grouping of these features. The individual features are grouped into *ConformanceUnits* which are further grouped into *Profiles*. Figure 1 provides an overview of the interactions between *Profiles*, *ConformanceUnits* and *TestCases*. The large arrows indicate the components that are used to construct the parent. For example a *Profile* is constructed from *Profiles* and *ConformanceUnits*. The figure also illustrates a feature of the OPC UA compliance test tool, in that it will test if a requested *Profile* passes all *ConformanceUnits*. It will also test all other *ConformanceUnits* and report any other *Profiles* that pass conformance testing. The individual *TestCases* are defined in separate documents see *Compliance Part 8 UA Server* and *Compliance Part 9 UA Client*. The *TestCases* are related back to the appropriate *ConformanceUnits* defined in this specification. This relationship is also displayed by the OPC UA Compliance Test Tool.

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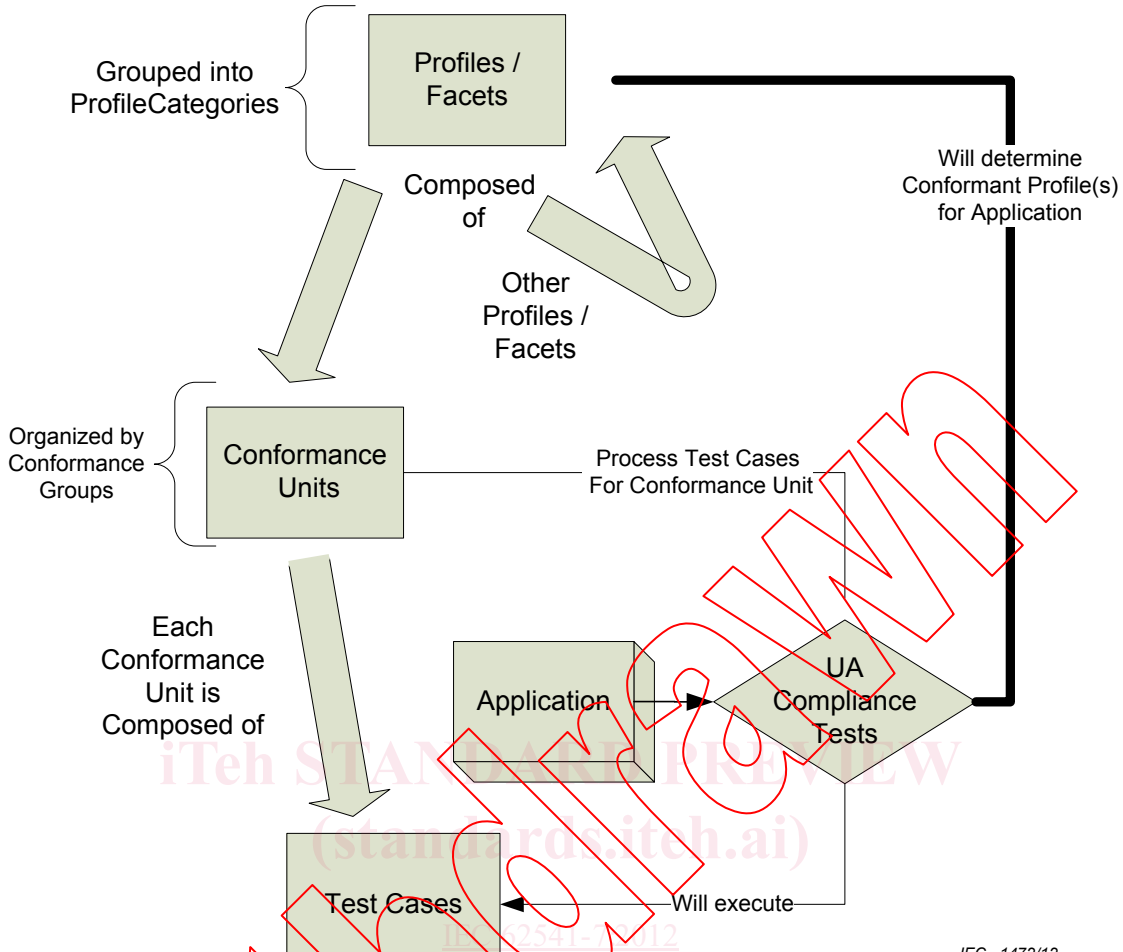

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Figure 1 – Profile – ConformanceUnit – TestCases

4.2 ConformanceUnit

Each *ConformanceUnit* represents a specific set of features (e.g. a group of services, portions of services or information models) that can be tested as a single entity. *ConformanceUnits* are the building blocks of a *Profile*. Each *ConformanceUnit* can also be used as a test category. For each *ConformanceUnit,* there would be a number of TestCases that test the functionality described by the *ConformanceUnit.* The description of a *ConformanceUnit* is intended to provide enough information to illustrate the required functionality, but in many cases to obtain a complete understanding of the *ConformanceUnit* the reader may be required to also examine the appropriate part of the OPC UA specification. Additional information regarding testing of a *ConformanceUnit* is provided in the *Compliance Part 8 UA Server* or *Compliance Part 9 UA Client* test specifications.

The same features do not appear in more than one *ConformanceUnit*.

4.3 Profiles

Profiles are named groupings of *ConformanceUnits*. The *Servers* and *Clients* in an OPC UA application will provide the names of *Profiles* that they support. The definition of *Profiles* is a dynamic activity, in that it is expected that new *Profiles* will be added in the future. A *Profile* can be defined to inherit from an existing *Profile*. The new *Profile* may add additional *ConformanceUnits.* These additional *ConformanceUnits* may add additional features that are to be tested. The additional *ConformanceUnits* may also further restrict inherited *ConformanceUnits*.