

# **TR-181**

## **Device Data Model for TR-069**

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**Table of Contents**

**EXECUTIVE SUMMARY ..... 6**

**1 PURPOSE AND SCOPE ..... 7**

    1.1 PURPOSE ..... 7

    1.2 SCOPE ..... 7

**2 REFERENCES AND TERMINOLOGY ..... 9**

    2.1 CONVENTIONS ..... 9

    2.2 REFERENCES ..... 10

    2.3 DEFINITIONS ..... 11

    2.4 ABBREVIATIONS ..... 11

**3 TECHNICAL REPORT IMPACT ..... 12**

    3.1 ENERGY EFFICIENCY ..... 12

    3.2 IPV6 ..... 12

    3.3 SECURITY ..... 12

**4 ARCHITECTURE ..... 13**

**5 PARAMETER DEFINITIONS ..... 14**

**List of Figures**

Figure 1 – Device:1 Data Model Structure ..... 8

**List of Tables**

Table 1 – Device:1 Data Model Versions ..... 14

## **Executive Summary**

TR-181 defines version 1 of the TR-069 [2] Device data model (Device:1). The Device:1 data model applies only to TR-069-enabled End Devices, and is not applicable to Internet Gateway Devices or to other Network Infrastructure Devices. TR-069-enabled Infrastructure Devices instead use the TR-098 [4] InternetGatewayDevice data model or future Device:2 data model.

The Device:1 data model defined in TR-181 consists of a set of data objects covering things like basic device information, time-of-day configuration, network interface configuration, throughput statistics, and diagnostic tests. It also defines a baseline profile that specifies a minimum level of data model support.

# 1 Purpose and Scope

## 1.1 Purpose

This Technical Report defines version 1 of the TR-069 [2] Device data model (Device:1). The Device:1 data model applies only to TR-069-enabled End Devices, and is not applicable to Internet Gateway Devices or to other Network Infrastructure Devices. TR-069-enabled Infrastructure Devices instead use the TR-098 [4] InternetGatewayDevice data model or future Device:2 data model.

## 1.2 Scope

The Device:1 data model defined in this Technical Report consists of a set of data objects covering things like basic device information, time-of-day configuration, network interface configuration, throughput statistics, and diagnostic tests. It also defines a baseline profile that specifies a minimum level of data model support.

Figure 1 illustrates the Device:1 data model structure.

- The pale blue objects are Common Objects, originally defined in TR-106 [3] but now defined in section 5 of this Technical Report.
- The green objects are performance test Components defined by TR-143 [6].
- The orange objects are general Components defined by TR-157 [8].

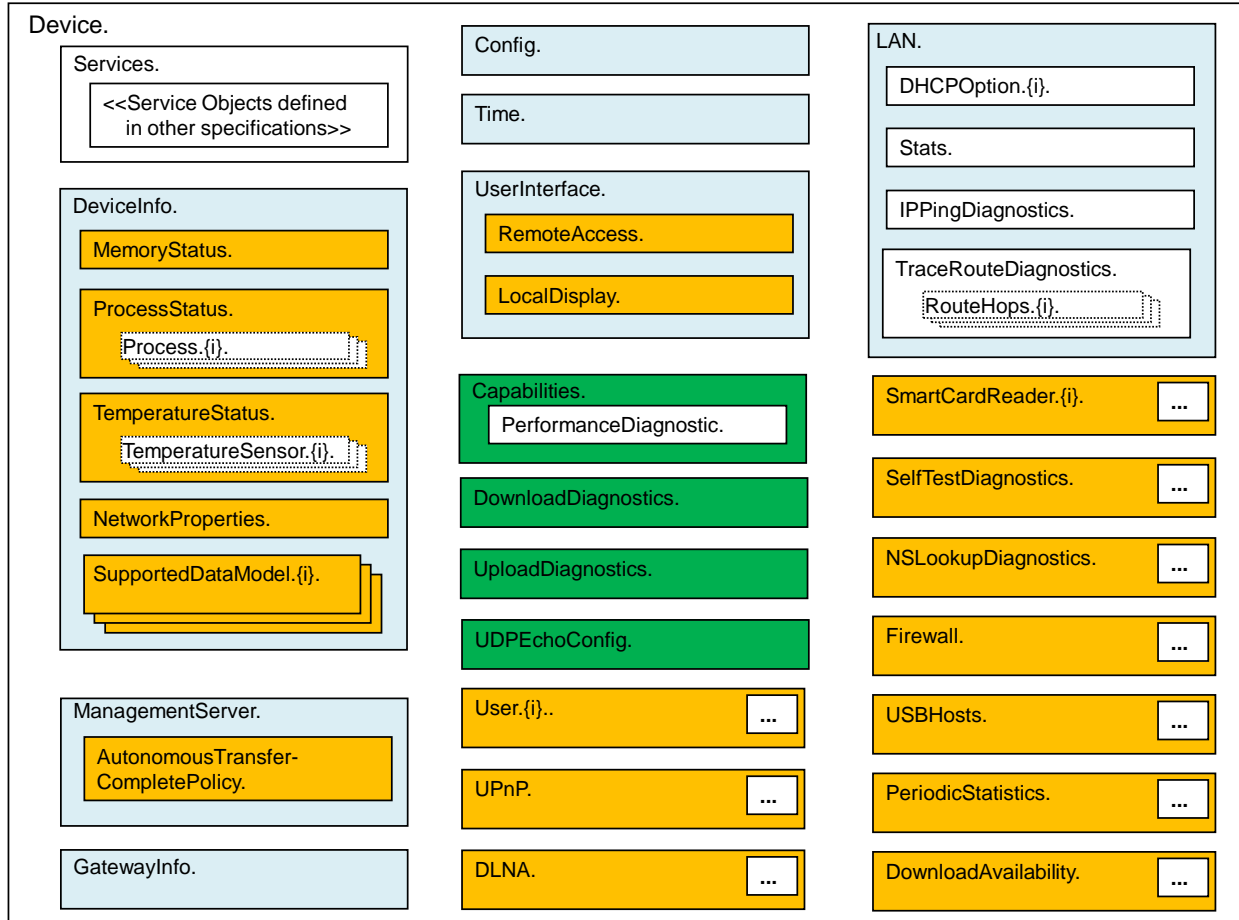


Figure 1 – Device:1 Data Model Structure



## 2 References and Terminology

### 2.1 Conventions

In this Technical Report, several words are used to signify the requirements of the specification. These words are always capitalized. More information can be found in RFC 2119 [1].

- MUST** This word, or the term “REQUIRED”, means that the definition is an absolute requirement of the specification.
- MUST NOT** This phrase means that the definition is an absolute prohibition of the specification.
- SHOULD** This word, or the adjective “RECOMMENDED”, means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications need to be understood and carefully weighed before choosing a different course.
- SHOULD NOT** This phrase, or the phrase "NOT RECOMMENDED" means that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
- MAY** This word, or the adjective “OPTIONAL”, means that this item is one of an allowed set of alternatives. An implementation that does not include this option **MUST** be prepared to inter-operate with another implementation that does include the option.

The key words “DEPRECATED” and “OBSOLETE” in this Technical Report are to be interpreted as defined in TR-106 [3].

## 2.2 References

The following references are of relevance to this Technical Report. At the time of publication, the editions indicated were valid. All references are subject to revision; users of this Technical Report are therefore encouraged to investigate the possibility of applying the most recent edition of the references listed below.

A list of currently valid Broadband Forum Technical Reports is published at [www.broadband-forum.org](http://www.broadband-forum.org).

- [1] RFC 2119, *Key words for use in RFCs to Indicate Requirement Levels*, IETF, 1997, <http://www.ietf.org/rfc/rfc2119.txt>
- [2] TR-069 Amendment 2, *CPE WAN Management Protocol*, Broadband Forum, 2007
- [3] TR-106 Amendment 4, *Data Model Template for TR-069-Enabled Devices*, Broadband Forum, 2010
- [4] TR-098 Amendment 2, *Internet Gateway Device Data Model for TR-069*, Broadband Forum, 2008
- [5] RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax*, IETF, 2005, <http://www.ietf.org/rfc/rfc3986.txt>
- [6] TR-143 Corrigendum 1, *Enabling Network Throughput Performance Tests and Statistical Monitoring*, Broadband Forum, 2008
- [7] *XML Schema Part 0: Primer Second Edition*, W3C, 2004, <http://www.w3.org/TR/xmlschema-0>
- [8] TR-157 Amendment 1, *Component Objects for CWMP*, Broadband Forum, 2009

### 2.3 Definitions

The following terminology is used throughout this Technical Report.

<b>ACS</b>	Auto-Configuration Server. This is a component in the broadband network responsible for auto-configuration of the CPE for advanced services.
<b>CPE</b>	Customer Premises Equipment; refers to any TR-069-enabled [2] device and therefore covers both Internet Gateway devices and LAN-side end devices.
<b>Common Object</b>	An object defined in this specification that can be contained either directly within the “Device” Root Object or (if the Common Object is a Secondary Common Object) within a Service Object contained within the “Services” object.
<b>Component</b>	A named collection of Objects and/or Parameters and/or Profiles that can be included anywhere within a data model.
<b>CWMP</b>	CPE WAN Management Protocol. Defined in TR-069 [2], CWMP is a communication protocol between an ACS and CPE that defines a mechanism for secure auto-configuration of a CPE and other CPE management functions in a common framework.
<b>Device</b>	Used here as a synonym for CPE.
<b>DM Instance</b>	Data Model Schema instance document. This is an XML document that conforms to the DM Schema and to any additional rules specified in or referenced by the DM Schema.
<b>DM Schema</b>	Data Model Schema. This is the XML Schema [7] that is used for defining data models for use with CWMP.
<b>Secondary Common Object</b>	A Common Object other than “ManagementServer” or “GatewayInfo”. Such objects can be contained either directly within the “Device” Root Object or within a Service Object contained within the “Services” object.

### 2.4 Abbreviations

This Technical Report uses the following abbreviations:

<b>RPC</b>	Remote Procedure Call.
<b>URI</b>	Uniform Resource Identifier [5].
<b>URL</b>	Uniform Resource Locator [5].

### **3 Technical Report Impact**

#### **3.1 Energy Efficiency**

TR-181 has no impact on Energy Efficiency.

#### **3.2 IPv6**

TR-181 has no impact on IPv6.

#### **3.3 Security**

TR-181 has no impact on Security.

## **4 Architecture**

**This section is empty because TR-106 [3] does not discuss Device:1 data model architecture.**

## 5 Parameter Definitions

The normative definition of the Device:1 data model is split between several DM Instance documents (see TR-069 [2] Annex A). Table 1 lists the data model versions and DM Instances that had been defined at the time of writing. It also indicates the corresponding Technical Reports and gives links to the associated XML and HTML files.

Note that, because new minor versions of the Device:1 data model can be defined without re-publishing this Technical Report, the table is not necessarily up-to-date. An up-to-date version of the table can always be found at <http://www.broadband-forum.org/cwmp>.

**Table 1 – Device:1 Data Model Versions**

Version	DM Instance	Technical Report	XML and HTML <sup>1</sup>
1.0	tr-106-1-0.xml	TR-106	<a href="http://broadband-forum.org/cwmp/tr-106-1-0.xml">http://broadband-forum.org/cwmp/tr-106-1-0.xml</a>
			<a href="http://broadband-forum.org/cwmp/tr-106-1-0.html">http://broadband-forum.org/cwmp/tr-106-1-0.html</a>
1.1	tr-106-1-1.xml	TR-106 Amendment 1	<a href="http://broadband-forum.org/cwmp/tr-106-1-1.xml">http://broadband-forum.org/cwmp/tr-106-1-1.xml</a>
			<a href="http://broadband-forum.org/cwmp/tr-106-1-1.html">http://broadband-forum.org/cwmp/tr-106-1-1.html</a>
			<a href="http://broadband-forum.org/cwmp/tr-106-1-1-last.html">http://broadband-forum.org/cwmp/tr-106-1-1-last.html</a>
1.2	tr-143-1-0.xml	TR-143	<a href="http://broadband-forum.org/cwmp/tr-143-1-0.xml">http://broadband-forum.org/cwmp/tr-143-1-0.xml</a>
			<a href="http://broadband-forum.org/cwmp/tr-143-1-0-dev.html">http://broadband-forum.org/cwmp/tr-143-1-0-dev.html</a>
			<a href="http://broadband-forum.org/cwmp/tr-143-1-0-dev-last.html">http://broadband-forum.org/cwmp/tr-143-1-0-dev-last.html</a>
	tr-106-1-2.xml	TR-106 Amendment 2	<a href="http://broadband-forum.org/cwmp/tr-106-1-2.xml">http://broadband-forum.org/cwmp/tr-106-1-2.xml</a>
			<a href="http://broadband-forum.org/cwmp/tr-106-1-2.html">http://broadband-forum.org/cwmp/tr-106-1-2.html</a>
<a href="http://broadband-forum.org/cwmp/tr-106-1-2-last.html">http://broadband-forum.org/cwmp/tr-106-1-2-last.html</a>			
1.3	tr-157-1-0.xml	TR-157	<a href="http://broadband-forum.org/cwmp/tr-157-1-0.xml">http://broadband-forum.org/cwmp/tr-157-1-0.xml</a>
			<a href="http://broadband-forum.org/cwmp/tr-157-1-0-dev.html">http://broadband-forum.org/cwmp/tr-157-1-0-dev.html</a>
			<a href="http://broadband-forum.org/cwmp/tr-157-1-0-dev-last.html">http://broadband-forum.org/cwmp/tr-157-1-0-dev-last.html</a>
1.4	tr-157-1-1.xml	TR-157 Amendment 1	<a href="http://broadband-forum.org/cwmp/tr-157-1-1.xml">http://broadband-forum.org/cwmp/tr-157-1-1.xml</a>
			<a href="http://broadband-forum.org/cwmp/tr-157-1-1-dev.html">http://broadband-forum.org/cwmp/tr-157-1-1-dev.html</a>
			<a href="http://broadband-forum.org/cwmp/tr-157-1-1-dev-last.html">http://broadband-forum.org/cwmp/tr-157-1-1-dev-last.html</a>
1.5	tr-181-1-0.xml	TR-181	<a href="http://broadband-forum.org/cwmp/tr-181-1-0.xml">http://broadband-forum.org/cwmp/tr-181-1-0.xml</a>
			<a href="http://broadband-forum.org/cwmp/tr-181-1-0.html">http://broadband-forum.org/cwmp/tr-181-1-0.html</a>
			<a href="http://broadband-forum.org/cwmp/tr-181-1-0-last.html">http://broadband-forum.org/cwmp/tr-181-1-0-last.html</a>

<sup>1</sup> The HTML with a name of the form tr-xxx-i-a.html, e.g. tr-181-1-0.html, lists the entire data model. The HTML with a name of the form tr-xxx-i-a-dev.html, e.g. tr-157-1-0-dev.html, lists only the Device Root Object (not the InternetGatewayDevice Root Object). The HTML with a name of the form tr-xxx-i-a-last.html, e.g. tr-181-1-0-last.html, lists only the changes since the previous version. “dev” and “last” can be combined, e.g. tr-157-1-0-dev-last.html.

End of Broadband Forum Technical Report TR-181