

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

G.9980

(11/2012)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS

Access networks – In premises networks

Remote management of customer premises equipment over broadband networks – Customer premises equipment WAN management protocol

Recommendation ITU-T G.9980



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Recommendation ITU-T G.9980

Remote management of customer premises equipment over broadband networks – Customer premises equipment WAN management protocol

Summary

Recommendation ITU-T G.9980 defines requirements for the remote management of networked devices by a service provider in a consumer's home. It provides an overview of, and the necessary normative references to, a family of technical specifications. It describes how the various technical specifications in this family are related. A glossary of the terms and definitions used in the technical specifications is included in clauses 3 and 4.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T G.9980	2012-11-23	15

Keywords

CWMP, TR-069.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Introduction

The basis of this Recommendation is the Broadband Forum CPE WAN management protocol (CWMP), commonly referred to as TR-069.

The protocol is intended for communication between a CPE and an auto-configuration server (ACS). The CPE WAN management protocol defines a mechanism that encompasses secure auto-configuration of a CPE, and also incorporates other CPE management functions into a common framework.

TR-069 specifies the generic requirements of the management protocol, and methods that can be applied to any TR-069 CPE. Other Broadband Forum technical reports (TRs) specify the managed objects, or data models, for specific types of devices or services.

The protocol may be used to manage various types of CPE, including stand-alone routers and LAN-side client devices. It is agnostic to the specific access medium utilized by the service provider, although it does depend on IP-layer connectivity having first been established by the device.

Recommendation ITU-T G.9980

Remote management of customer premises equipment over broadband networks – Customer premises equipment WAN management protocol

1 Scope

This Recommendation defines the requirements for the remote management of networked devices by a service provider in a consumer's home. It provides an overview of, and the necessary normative references to, a family of technical specifications (see Figure 1). It describes how the various technical specifications in this family are related.

CPE such as G-PON ONUs may be partially managed by OMCI, as specified in [b-ITU-T G.988]. [b-ITU-T G.988] defines options for shared management of such devices. These options, and the OMCI management of CPE, are outside the scope of this Recommendation.

The protocol is intended to provide flexibility in the connectivity model.

- The protocol allows both CPE and ACS initiated connection establishment, avoiding the need for a persistent connection to be maintained between each CPE and an ACS.
- The functional interactions between the ACS and CPE should be independent of which end initiated the establishment of the connection. In particular, even where ACS initiated connectivity is not supported, all ACS initiated transactions should be able to take place over a connection initiated by the CPE.
- The protocol allows one or more ACSs to serve a population of CPE. Each CPE can only be associated with one ACS, while each ACS may be associated with one or more service providers. However, a single physical device may present more than one logical CPE device, each of which may be associated with a different ACS.
- The protocol provides mechanisms for a CPE to discover the appropriate ACS for a given service provider.
- The protocol provides mechanisms to allow an ACS to securely identify a CPE and associate it with a user/customer.

Processes to support such association support models that incorporate user interaction as well as those that are fully automatic.

The protocol allows an ACS to control and monitor various parameters associated with a CPE. The mechanisms provided to access these parameters are designed with the following premises.

- Different CPE may have differing capability levels, implementing different subsets of optional functionality. Additionally, an ACS may manage a range of different device types delivering a range of different services. As a result, an ACS must be able to discover the capabilities of a particular CPE.
- An ACS must be able to control and monitor the current configuration of a CPE.
- Other entities besides an ACS may be able to control some parameters of a CPE's configuration (e.g., via LAN-side auto-configuration). As a result, the protocol must allow an ACS to account for external changes to a CPE's configuration. The ACS should also be able to control which configuration parameters can be controlled via means other than by the ACS.
- The protocol should allow vendor-specific parameters to be defined and accessed.

The protocol is intended to minimize implementation complexity, while providing flexibility in trading off complexity vs. functionality. The protocol incorporates a number of optional components that come into play only if specific functionality is required. The protocol incorporates existing standards where appropriate, allowing leverage of off-the-shelf implementations.

The protocol is agnostic to the underlying access network.

The protocol is also extensible. It includes mechanisms to support future extensions to the standard, as well as explicit mechanisms for vendor-specific extensions.

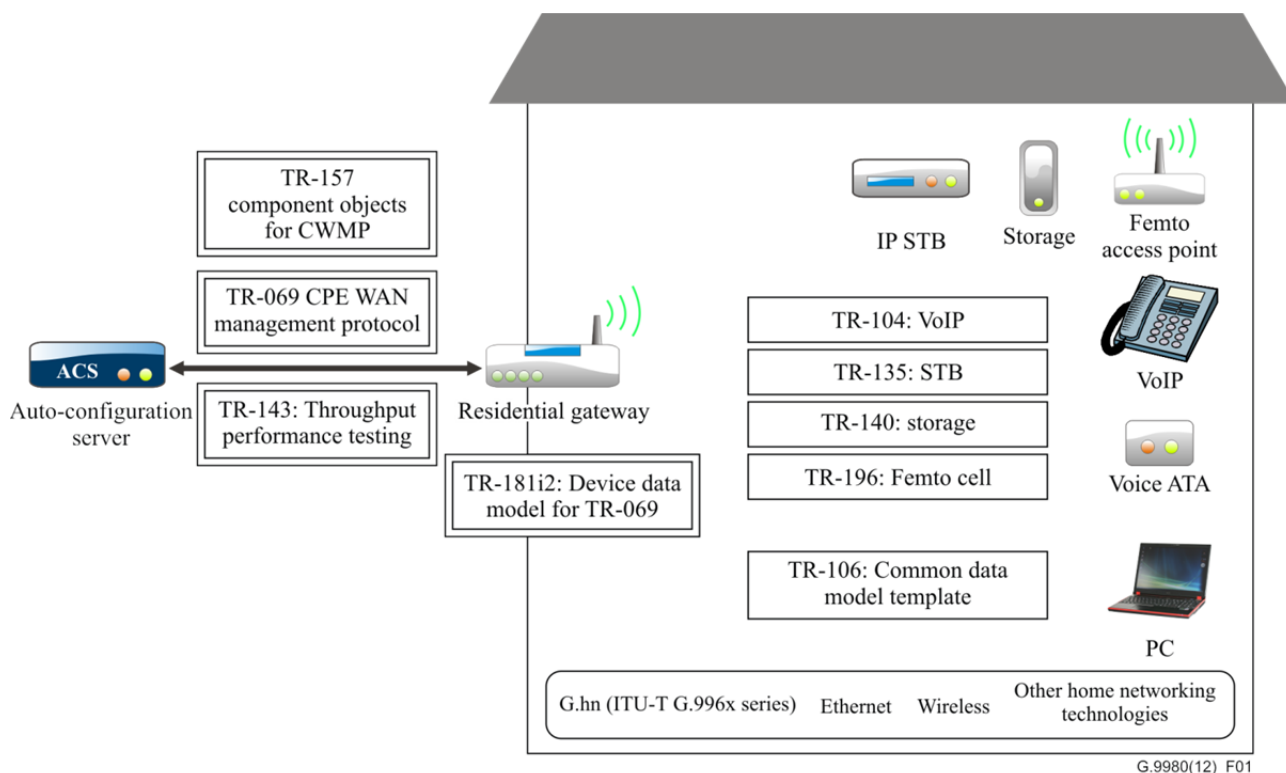


Figure 1 – CPE WAN management protocol and its related technical specifications

Any protocol describing remote configuration or software-/firmware modification of CPEs must provide the capabilities to comply with all applicable national and regional laws, regulations and policies. The implementation of mechanisms to ensure the explicit endorsement of the customer by means of opt-in permissions before remotely initiating any procedures on the CPE may be required by some specific national and regional laws, regulations and policies. Implementers and users of the described CWMP shall comply with all applicable national and regional laws, regulations and policies.

Implementers and users of all ITU-T Recommendations, including ITU-T G.9980 and the underlying techniques, shall comply with all applicable national and regional laws, regulations and policies.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [BBF TR-069] Broadband Forum TR-069 Amendment 2 (2007), *CPE WAN Management Protocol v1.1*.
<http://www.broadband-forum.org/technical/download/TR-069_Amendment-2.pdf>
- [BBF TR-104] Broadband Forum TR-104 (2005), *DSLHome Provisioning Parameters for VOIP CPE*.
<<http://www.broadband-forum.org/technical/download/TR-104.pdf>>
- [BBF TR-106] Broadband Forum TR-106 Amendment 4 (2010), *Data Model Template for TR-069-Enabled Devices*.
<http://www.broadband-forum.org/technical/download/TR-106_Amendment-4.pdf>
- [BBF TR-135] Broadband Forum TR-135 (2007), *Data Model for a TR-069 Enabled STB*.
<<http://www.broadband-forum.org/technical/download/TR-135.pdf>>
- [BBF TR-140] Broadband Forum TR-140 (2007), *TR-069 Data Model for Storage Service Enabled Devices*.
<http://www.broadband-forum.org/technical/download/TR-140_Issue1.1.pdf>
- [BBF TR-143] Broadband Forum TR-143 Corrigendum 1 (2008), *Enabling Network Throughput Performance Tests and Statistical Monitoring*.
<http://www.broadband-forum.org/technical/download/TR-143_Corrigendum-1.pdf>
- [BBF TR-157] Broadband Forum TR-157 Amendment 1 (2009), *Component Objects for CWMP*.
<http://www.broadband-forum.org/technical/download/TR-157_Amendment-1.pdf>
- [BBF TR-181 Issue 2] Broadband Forum TR-181 Issue 2 (2010), *Device Data Model for TR-069*.
<http://www.broadband-forum.org/technical/download/TR-181_Issue-2.pdf>
- [BBF TR-196] Broadband Forum TR-196 (2009), *Femto Access Point Service Data Model*.
<<http://www.broadband-forum.org/technical/download/TR-196.pdf>>

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 customer premises equipment (CPE) [b-ITU-T Y.101]: End-use system including private network elements connecting the customer applications to the access line.

3.1.2 technical report (TR): An approved technical specification of the Broadband Forum in accordance with [b-BBF01].

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 remote management: Management of CPE over a WAN by a service provider.