

CPE Wan Management Protocol (CWMP)

For all Mediatrix units

DGW 49.2.2941

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Basic CWMP Concepts

TR-069 or CPE WAN Management Protocol (CWMP)

The Technical Report 069 (TR-069), also known as CWMP, is a Broadband Forum technical specification. This protocol can be used to monitor and update the Mediatrix unit configurations and firmware. In other words, when using TR-069, the Mediatrix unit can get in contact with an Auto Configuration Server (ACS) to initiate a configuration script transfer/execution and a firmware upgrade.

The first time the Mediatrix unit is connected to the network, it will attempt to contact the Auto Configuration Server (ACS), which is the entry point for the administrator. The Mediatrix unit will obtain the URL of the ACS using either the DHCP server with option 43 or by retrieving the information directly from the Customer's Profile. Therefore, upon start-up, the Mediatrix unit will contact the ACS, which in return will send the required configuration files and initiate, if necessary, a firmware update. This automated sequence is what is referred to as zero-touch, as the Mediatrix unit is automatically configured by the ACS according to the instructions given by the administrator without manual intervention on the unit.

The administrator can determine a schedule for the Mediatrix unit to periodically contact the ACS. These contacts will allow the Mediatrix unit to:

- verify if new configurations are available,
- verify if a new firmware update is available and
- send notifications for monitoring purposes.

Monitoring is achieved by regularly sending notifications to the ACS, through the mean of "Inform" requests, which can be:

- Passive: the information is sent according to the schedule.
- Active: the information is sent immediately when a parameter status changes, regardless of the periodic schedule.

Because the Periodic Inform is initiated by the Mediatrix unit, they have no problem passing through residential or enterprise NAT and firewalls.

Furthermore, the administrator can initiate a connection to the Mediatrix unit to perform immediate maintenance or monitoring. This will only be possible if the NAT firewall has been configured to allow communications initiated by the ACS.

The TR-069 protocol can be activated on units that are already deployed with a licence key (For more details on licences refer to the [Technical Bulletin - How to activate a licence on a Mediatrix unit](#) published on the [Media5 Documentation Portal](#)). However, it can be enabled/disabled for a specific configuration via the Management interface.

TR-069 methods supported by the Mediatrix unit include:

- SetParameterValues

- GetParameterValues
- AddObject
- DeleteObject
- Download
- Reboot
- Upload
- FactoryReset

TR-104

The Technical Report 104 (TR-104) describes the data model for provisioning of a voice-over-IP (VoIP) CPE device by an Auto Configuration Server (ACS) using the mechanism defined in TR-069. Configuring the TR-104 parameters in DGW allows you to enable or disable the provisioning parameters for VoIP CPE, such as calls statistics.

- The Media5 implementation of TR-104 is limited to the SIPEndpoint profile.
- Active notifications are not supported for all objects except when explicitly mentioned. (for more details request the Supported TR-069 Methods and Parameters document from your representative).
- Only FXS lines can be managed by the TR-104 profile.
- BRI, PRI or FXO lines are not supported by the TR-104 profile.
- A single voice profile is supported, it is instantiated by default. No creation or deletion of voice profile is allowed.
- Only a subset of parameters is currently supported.
- When TR-104 is used, it is highly recommended not to use other means of configuration (since TR-104 assumes some configuration).

TR-106

Technical Report 106 (TR-106) is the Data Model Template for TR-069-Enabled Devices. The configuration of the TR-106 Network Interface parameter in DGW allows you to specify the network interface to be used for the TR-106 LAN profile to report network statistics.

- If no network interface is configured for TR-106, i.e. the field is left empty under **Management/Misc/CWMP**, the Mediatrix unit will use the network interface configured under **Management/Misc/System Management/Network Interface**.
- If the network interface configured for TR-106 is set to **All**, the Mediatrix unit will use the network interface configured for contacting the ACS in the **TR-106 Configuration** section of the **CWMP Configuration** table. The TR-106 Data Model template can only be used if **Root**

Element is set to **Device**. Refer to [Configuring the Report Network Statistics \(Through the TR-106 Data Model\)](#).

Note: This parameter can also be set via `Cwmp.RootElement`.

The TR-106 Data Model template can only be used if the **Cwmp.RootElement** parameter value is **Device**.

TR-111

Technical Report 111 (TR-111) allows the remote management of home networking devices through NAT traversal mechanisms, as defined in TR-069 Annex G (formerly in TR-111).

The TR-111 parameters defined in DGW allows the activation and configuration of a STUN server, so devices behind a NAT can be reached .

Basic Tasks

Configuring the Access to the Auto Configuration Server (ACS)

Before you start

The CPE WAN Management Protocol (CWMP) service must be started (under **System/Services**).

Steps

- 1) Go to **Management/CWMP**.
- 2) In the **CWMP Configuration** table, under the **ACS Configuration** section, set the following parameters:

- **ACS URL Config Source**
- **ACS Static URL**
- **username**
- **Password**

Note: The **username** and **Password** fields are not accessible if you have the User or Observer access right. Also, the **ACS Static URL** field is only editable if the **ACS URL Config Source** field has been configured to **Static**.

- 3) Click **Apply**.

Result

ACS Configuration	
ACS Status:	No URL configured
ACS URL:	
ACS URL Config Source:	DHCP
ACS Static URL:	
Username:	
Password:	

Configuring the CWMP Establishment (TR-069)

Before you start

The CPE WAN Management Protocol (CWMP) service must be started (under **System/Services**).

Steps

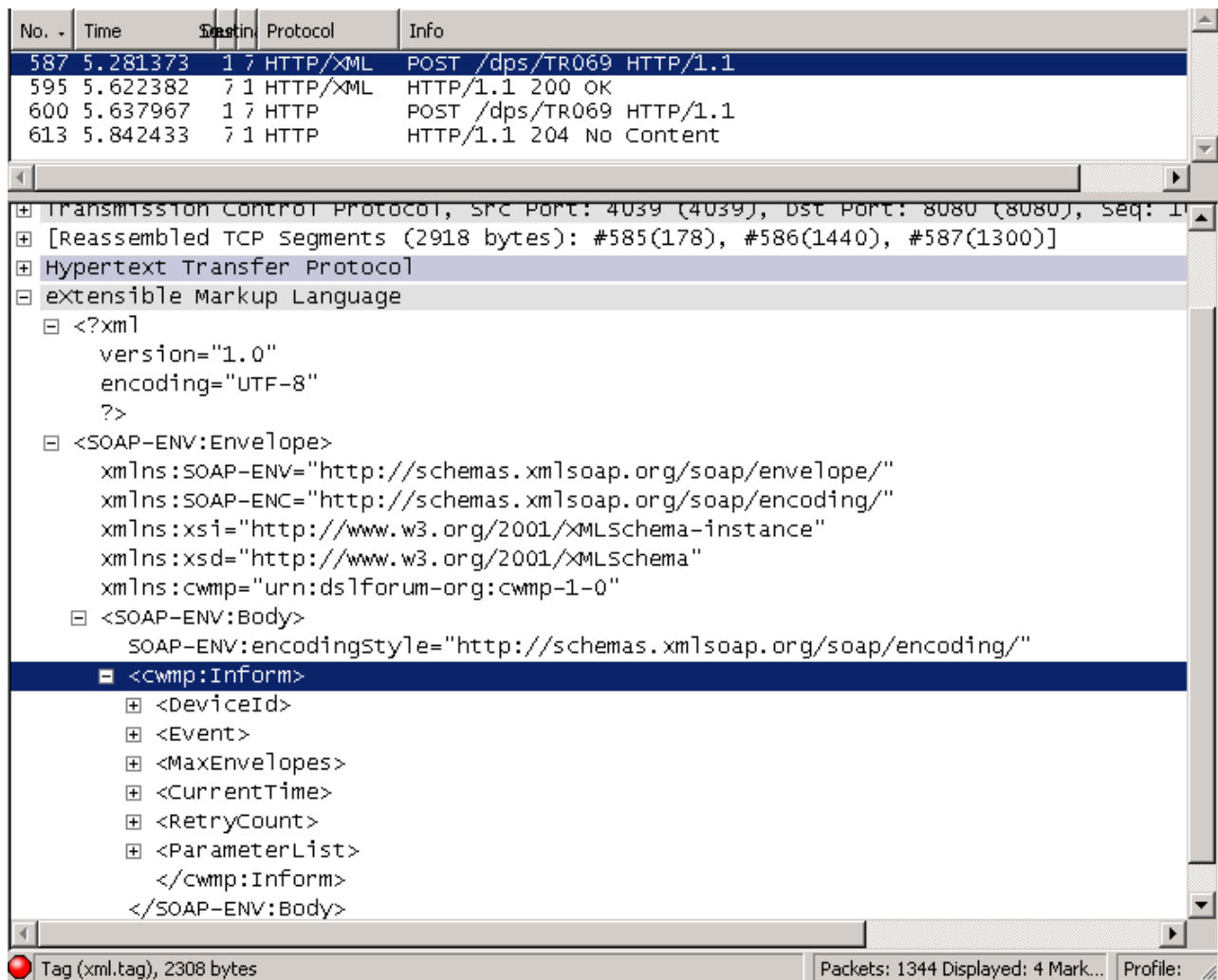
- 1) Go to **Management/CWMP**.
- 2) In the **CWMP Configuration** table, set the following parameters:
 - a) Set **Root Element** to **Device** or **Internet Gateway Device**, depending on your configuration.
 - b) Configure the **Listening Port** to reflect your configuration.
 - c) Set **ACS URL Config Source** to reflect your configuration.

Note: If you chose **Static**, configure the **ACS Static URL**. HTTP and HTTPS are supported.

- d) Under **TR-069 Configuration** section, set **Annex F** to **Enable**.
- e) If using authentication, configure **User Name** and **Password** to reflect your configuration.

Result

If everything is configured correctly, you should see a TCP connection being established between your Mediatrix unit and the TR-069 server (from now on simply ACS). After the TCP connection has been established, the unit will send its first "Inform" message to the ACS, as seen below. Note that there will be more HTTP POST messages sent to the ACS (those can be empty) until the server returns a "204 No Content" message.



Configuring VoIP Provisioning (TR-104 Data Model)

Before you start

The CPE WAN Management Protocol (CWMP) service must be started (under **System/Services**).

Steps

- 1) Go to **Management/CWMP**.
- 2) In the **CWMP Configuration** table, under the **TR-104 Configuration** section, from the drop down list, select **Enable**.
- 3) Click **Apply**.

Result

The **Device.Services.VoiceService** parameters, listed in the Tr069DataModelSupport-Functional_Specification.pdf, will be enabled.

CWMP Configuration	
General Configuration	
Root Element:	Device
Listening Port:	0
ACS Configuration	
ACS Status:	No URL configured
ACS URL:	
ACS URL Config Source:	DHCP
ACS Static URL:	
Username:	
Password:	
Periodic Inform Configuration	
Periodic Inform:	Disable
Periodic Inform Interval:	3600
Periodic Inform Time:	0001-01-01T00:00:00Z
TR-069 Configuration	
Annex F:	Disable
TR-104 Configuration	
TR-104:	Enable
TR-106 Configuration	
Network Interface:	
TR-111 Configuration	
STUN Status:	Disabled
STUN:	Disable
NAT Detected:	No
STUN Server:	

Configuring the Access to the STUN Server TR-111

Before you start

The CPE WAN Management Protocol (CWMP) service must be started (under **System/Services**).

Steps

- 1) Go to **Management/CWMP**.

- 2) In the **CWMP Configuration** table, under the **TR-111 Configuration** section, complete the fields as required.
- 3) Click **Apply**.

Result

CWMP Configuration	
General Configuration	
Root Element:	Device
Listening Port:	0
ACS Configuration	
ACS Status:	No URL configured
ACS URL:	
ACS URL Config Source:	DHCP
ACS Static URL:	
Username:	
Password:	
Periodic Inform Configuration	
Periodic Inform:	Disable
Periodic Inform Interval:	3600
Periodic Inform Time:	0001-01-01T00:00:00Z
TR-069 Configuration	
Annex F:	Disable
TR-104 Configuration	
TR-104:	Disable
TR-106 Configuration	
Network Interface:	
TR-111 Configuration	
STUN Status:	Disabled
STUN:	Enable
NAT Detected:	No
STUN Server:	Host name of IP address of STUN server

Configuring the Report Network Statistics (Through the TR-106 Data Model)

Before you start

The CPE WAN Management Protocol (CWMP) service must be started (under **System/Services**).

The TR-106 Data Model template can only be used if the **Cwmp.RootElement** parameter value is **Device**.

Steps

- 1) Go to **Management/CWMP**.
- 2) In the **CWMP Configuration** table, under the **TR-106 Configuration** section, in the **Network Interface** field indicate the network interface referred by the TR-106 LAN profile.
 - If left empty, use the network interface configured in the Hoc.ManagementInterface parameter.
 - If the Hoc.ManagementInterface parameter is set to **All**, use the network interface used for contacting the ACS.
- 3) Click **Apply**.

Result

The network statistics of the network interface are advertised to the ACS through a TR-106 Data Model.

CWMP Configuration	
General Configuration	
Root Element:	Device
Listening Port:	0
ACS Configuration	
ACS Status:	No URL configured
ACS URL:	
ACS URL Config Source:	DHCP
ACS Static URL:	
Username:	
Password:	
Periodic Inform Configuration	
Periodic Inform:	Disable
Periodic Inform Interval:	3600
Periodic Inform Time:	0001-01-01T00:00:00Z
TR-069 Configuration	
Annex F:	Disable
TR-104 Configuration	
TR-104:	Disable
TR-106 Configuration	
Network Interface:	TR-106 LAN profile network interface
TR-111 Configuration	
STUN Status:	Disabled
STUN:	Disable
NAT Detected:	No
STUN Server:	

Advanced CPE WAN Management Protocol (CWMP) Parameters

Although the services can be configured in great part in the Web browser, some aspects of the configuration can only be completed with the MIB parameters by :

- using a MIB browser
- using the CLI
- creating a configuration script containing the configuration parameters

For more details on the following parameters, refer to the [DGW Configuration Guide - Reference Guide](#) published on the [Media5 Documentation Portal](#). The Reference Guide contains all the parameters used in the DGW software with their description, default values, and interactions.

For ACS

- To set the parameter type validation when the ACS assigns a value to a parameter
Cwmp.interopParameterTypeValidation
- To set the access mode to the local log table from the ACS: **Cwmp.NlmLocalLogLogEnable**
- To define the username to authenticate an ACS making a connection request to the CPE:
Cwmp.ConnectionRequestUsername
- To define the password to authenticate an ACS making a connection request to the CPE:
Cwmp.ConnectionRequestPassword

Note: Enabling access will require significant CPU resources and impact performance of your unit when notifications are sent frequently to the local log.

For TR-069 (CWMP) establishment

- To set the HTTPS transport cipher suite configuration for TR-069 (CWMP):
Cwmp.TransportHttpsCipherSuite .
- To set the HTTPS Transport Tls Version configuration for TR-069 (CWMP):
Cwmp.TransportHTTPSTlsVersion.
- To set the level of security to use when validating the server's certificate when connecting to the ACS using HTTPS: **Cwmp.TransportCertificateValidation**

For TR-111

- To set the period range, in seconds, at which STUN Binding Requests must be sent by the unit for the purpose of maintaining the STUN connection: **Cwmp.tr111StunKeepAlivePeriod**. The current implementation does not allow a range. The minimum and maximum values must be the same.
- To set the value of the STUN username attribute to be used in Binding Requests:
Cwmp.tr111StunUsername

- To set the level of security to use when validating the server's certificate when connecting to the ACS using HTTPS: **Cwmp.TransportCertificateValidation**

For the MAC address

- To set the MAC address format: **Cwmp.InteropMacAddressFormat**.

Supported TR-069 Methods and Parameters

Data Model and Reference Guide

The Mediatix proprietary data model supports a subset of all the parameters defined on the platform. Please refer to the following documents published on the Media5 documentation portal at <https://documentation.media5corp.com>:

- [TR-069 Mediatix DataModel](#): Documents the TR-069, TR-104, and TR-106 standard data models, along with the Mediatix proprietary data model.
- [Reference Guide](#): Documents the complete set of parameters and commands from the different DGW services.

CwmpEx Special Parameters

Some parameters from the Reference Guide are not present in the Mediatix proprietary data model. To overcome this limitation, the platform supports a special set of parameters:

- **CwmpEx.Command**
- **CwmpEx.LastResult**

They are documented in the [TR-069 Mediatix DataModel](#) document.

DGW Documentation

Mediatrix devices are supplied with an exhaustive set of documentation.

Mediatrix user documentation is available on the [Media5 Documentation Portal](#).

Several types of documents were created to clearly present the information you are looking for. Our documentation includes:

- **Release notes:** Generated at each GA release, this document includes the known and solved issues of the software. It also outlines the changes and the new features the release includes.
- **Configuration notes:** These documents are created to facilitate the configuration of a specific use case. They address a configuration aspect we consider that most users will need to perform. However, in some cases, a configuration note is created after receiving a question from a customer. They provide standard step-by-step procedures detailing the values of the parameters to use. They provide a means of validation and present some conceptual information. The configuration notes are specifically created to guide the user through an aspect of the configuration.
- **Technical bulletins:** These documents are created to facilitate the configuration of a specific technical action, such as performing a firmware upgrade.
- **Hardware installation guide:** They provide the detailed procedure on how to safely and adequately install the unit. It provides information on card installation, cable connections, and how to access for the first time the Management interface.
- **User guide:** The user guide explains how to customise to your needs the configuration of the unit. Although this document is task oriented, it provides conceptual information to help the user understand the purpose and impact of each task. The User Guide will provide information such as where and how TR-069 can be configured in the Management Interface, how to set firewalls, or how to use the CLI to configure parameters that are not available in the Management Interface.
- **Reference guide:** This exhaustive document has been created for advanced users. It includes a description of all the parameters used by all the services of the Mediatrix units. You will find, for example, scripts to configure a specific parameter, notification messages sent by a service, or an action description used to create Rulesets. This document includes reference information such as a dictionary, and it does not include any step-by-step procedures.

Online Help

If you are not familiar with the meaning of the fields and buttons, click **Show Help**, located at the upper right corner of the Web page. When activated, the fields and buttons that offer online help will change to green and if you hover over them, the description will be displayed.

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