

[DKT TR-069 implementation, using TR-181 device data model](#)

Introduction

TR-069 (Technical Report 069) is a specification of the CPE WAN Management Protocol (CWMP) developed by the Broadband Forum. It allows for remote management and monitoring of user terminals, such as CPE equipment, by means of HTTP(S) sessions established between the Auto-Configuration Server (ACS) and the CPE. Every session is initiated by the CPE and comprises retrieving and setting the parameters in the device data model. This data model is a hierarchical XML structure, whose objects and elements represent the particular features and services available on the given CPE.

Being a robust and flexible solution, TR-069 may be used to manage not only residential gateways, but also numerous other varieties of network equipment, such as IPTV set-top boxes (STBs), network attached storage (NAS), power line adapters, femtocells, IP phones, and many more.

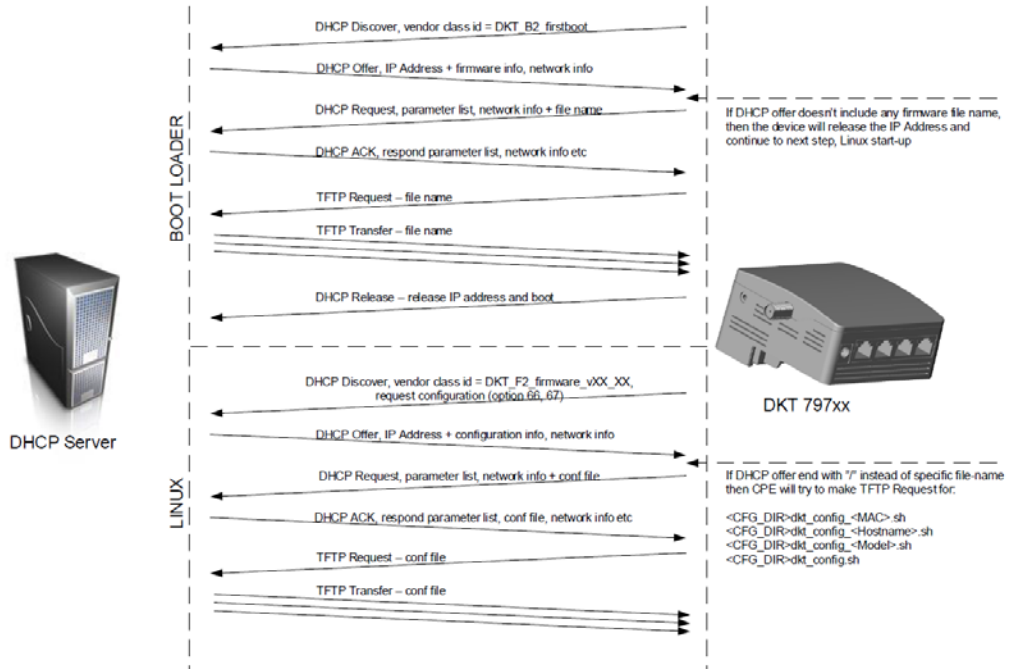
Booting Procedure

The device can be configured with a fixed URL for ACS connectivity (requires special firmware branch), or can obtain its information via DHCP option 43, as outlined in the below DHCP server example.

```
# Encapsulate option space in vendor option (43)
  vendor-option-space          tr069;
  option tr069.acs-server-url   "http://192.168.10.10:7547/";
  option tr069.provisioning-code "special-code";
  option tr069.retry-min-wait   "5";
  option tr069.retry-interval-multipl "2000";
```

The device will, if DHCP option 43 parameters are received at boot, automatically start the TR-069 application and make a register towards the ACS.

The standard boot procedure is outlined below.



If no information is received via DHCP option 43, the TR-069 application can be started manually by adding the following to the configuration script

The application can also be started from the configuration script with the commands:

```
# alternative 1
enable_tr69
# alternative 2
enable_tr69 <URL> <username> [ <password> [ <URL port> ] ]
# alternative 3
enable_tr69 <Configuration filename>
```

The first command (alternative 1) uses whatever configuration that is stored in flash /mnt/flash/saved_configuration/marm.cfg.

The second command (alternative 2) version specifies the connection request URL on the command line along with the username and password.

The last command (alternative 3) version downloads the configuration file from the TFTP server (using TFTP server information from the DHCP boot procedure) before starting the TR-069 application.

Firmware upgrade

Assuming that the device already has a firmware revision, which is TR-069 aware then if the TR-069 application receives the M Download RPC

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method, the firmware will be loaded via HTTP using the received instructions from the ACS Server.

While the download takes place, the TR-069 continues to work as normally. After the firmware has been programmed to the right places, then a TransferComplete message is sent to the ACS. When the TR-069 application receives the TransferCompleteResponse, and the session has ended, the CPE reboots.

Device Data Model

The following describes the data objects supported with the DKT COMEGA 797xx CPE series. This is a subset from the TR-181 data model <https://www.broadband-forum.org/cwmp/tr-181-2-9-0.html>

```
Device
Device.Bridging
Device.Bridging.Bridge Refresh
Device.Bridging.Bridge.1
Device.Bridging.Bridge.1.Enable true
Device.Bridging.Bridge.1.Port
Device.Bridging.Bridge.1.Port.<n>
Device.Bridging.Bridge.1.Port.<n>.Alias
Device.Bridging.Bridge.1.Port.<n>.Enable
Device.Bridging.Bridge.1.Port.<n>.LowerLayers
Device.Bridging.Bridge.1.Port.<n>.ManagementPort
Device.Bridging.Bridge.1.Port.<n>.Name
Device.Bridging.Bridge.1.Port.<n>.Stats
Device.Bridging.Bridge.1.Port.<n>.Stats.BroadcastPacketsReceived
Device.Bridging.Bridge.1.Port.<n>.Stats.BroadcastPacketsSent
Device.Bridging.Bridge.1.Port.<n>.Stats.BytesReceived
Device.Bridging.Bridge.1.Port.<n>.Stats.BytesSent
Device.Bridging.Bridge.1.Port.<n>.Stats.DiscardPacketsReceived
Device.Bridging.Bridge.1.Port.<n>.Stats.DiscardPacketsSent
Device.Bridging.Bridge.1.Port.<n>.Stats.ErrorsReceived
Device.Bridging.Bridge.1.Port.<n>.Stats.ErrorsSent
Device.Bridging.Bridge.1.Port.<n>.Stats.MulticastPacketsReceived
Device.Bridging.Bridge.1.Port.<n>.Stats.MulticastPacketsSent
Device.Bridging.Bridge.1.Port.<n>.Stats.PacketsReceived
Device.Bridging.Bridge.1.Port.<n>.Stats.PacketsSent
Device.Bridging.Bridge.1.Port.<n>.Stats.UnicastPacketsReceived
Device.Bridging.Bridge.1.Port.<n>.Stats.UnicastPacketsSent
Device.Bridging.Bridge.1.Port.<n>.Stats.UnknownProtoPacketsReceived
Device.Bridging.Bridge.1.Port.<n>.Status
Device.Bridging.Bridge.1.PortNumberOfEntries
Device.Bridging.Bridge.1.Status
Device.Bridging.BridgeNumberOfEntries
Device.Bridging.MaxBridgeEntries
Device.DeviceInfo
Device.DeviceInfo.Description
Device.DeviceInfo.HardwareVersion
Device.DeviceInfo.Manufacturer
Device.DeviceInfo.ManufacturerOUI
Device.DeviceInfo.ModelName
Device.DeviceInfo.ProvisioningCode
Device.DeviceInfo.SerialNumber
Device.DeviceInfo.SoftwareVersion
Device.DeviceInfo.UpTime
```

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Device.Ethernet
Device.Ethernet.Interface
Device.Ethernet.Interface.<n>
Device.Ethernet.Interface.<n>.Alias
Device.Ethernet.Interface.<n>.CurrentBitRate
Device.Ethernet.Interface.<n>.DuplexMode
Device.Ethernet.Interface.<n>.Enable
Device.Ethernet.Interface.<n>.MACAddress
Device.Ethernet.Interface.<n>.MaxBitRate
Device.Ethernet.Interface.<n>.Name
Device.Ethernet.Interface.<n>.Stats
Device.Ethernet.Interface.<n>.Stats.BroadcastPacketsReceived
Device.Ethernet.Interface.<n>.Stats.BroadcastPacketsSent
Device.Ethernet.Interface.<n>.Stats.BytesReceived
Device.Ethernet.Interface.<n>.Stats.BytesSent
Device.Ethernet.Interface.<n>.Stats.DiscardPacketsReceived
Device.Ethernet.Interface.<n>.Stats.DiscardPacketsSent
Device.Ethernet.Interface.<n>.Stats.ErrorsReceived
Device.Ethernet.Interface.<n>.Stats.ErrorsSent
Device.Ethernet.Interface.<n>.Stats.MulticastPacketsReceived
Device.Ethernet.Interface.<n>.Stats.MulticastPacketsSent
Device.Ethernet.Interface.<n>.Stats.PacketsReceived
Device.Ethernet.Interface.<n>.Stats.PacketsSent
Device.Ethernet.Interface.<n>.Stats.UnicastPacketsReceived
Device.Ethernet.Interface.<n>.Stats.UnicastPacketsSent
Device.Ethernet.Interface.<n>.Stats.UnknownProtoPacketsReceived
Device.Ethernet.Interface.<n>.Status
Device.Ethernet.Interface.<n>.Upstream
Device.Ethernet.InterfaceNumberOfEntries
Device.Ethernet.Link
Device.Ethernet.Link.<n>
Device.Ethernet.Link.<n>.Alias
Device.Ethernet.Link.<n>.Enable
Device.Ethernet.Link.<n>.LowerLayers Device.Ethernet.Interface.1
Device.Ethernet.Link.<n>.MACAddress
Device.Ethernet.Link.<n>.Name
Device.Ethernet.Link.<n>.Stats
Device.Ethernet.Link.<n>.Stats.BroadcastPacketsReceived
Device.Ethernet.Link.<n>.Stats.BroadcastPacketsSent
Device.Ethernet.Link.<n>.Stats.BytesReceived
Device.Ethernet.Link.<n>.Stats.BytesSent
Device.Ethernet.Link.<n>.Stats.DiscardPacketsReceived
Device.Ethernet.Link.<n>.Stats.DiscardPacketsSent
Device.Ethernet.Link.<n>.Stats.ErrorsReceived
Device.Ethernet.Link.<n>.Stats.ErrorsSent
Device.Ethernet.Link.<n>.Stats.MulticastPacketsReceived
Device.Ethernet.Link.<n>.Stats.MulticastPacketsSent
Device.Ethernet.Link.<n>.Stats.PacketsReceived
Device.Ethernet.Link.<n>.Stats.PacketsSent
Device.Ethernet.Link.<n>.Stats.UnicastPacketsReceived
Device.Ethernet.Link.<n>.Stats.UnicastPacketsSent
Device.Ethernet.Link.<n>.Stats.UnknownProtoPacketsReceived
Device.Ethernet.Link.<n>.Status
Device.Ethernet.LinkNumberOfEntries
Device.ManagementServer
Device.ManagementServer.CWMPRetryIntervalMultiplier
Device.ManagementServer.CWMPRetryMinimumWaitInterval
Device.ManagementServer.ConnectionRequestPassword
Device.ManagementServer.ConnectionRequestURL
Device.ManagementServer.ConnectionRequestUsername
Device.ManagementServer.ParameterKey
Device.ManagementServer.Password
Device.ManagementServer.PeriodicInformEnable
Device.ManagementServer.PeriodicInformInterval

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Device.ManagementServer.PeriodicInformTime
Device.ManagementServer.URL
Device.ManagementServer.UpgradesManaged
Device.ManagementServer.Username
Device.Optical
Device.Optical.Interface
Device.Optical.Interface.1
Device.Optical.Interface.1.Alias
Device.Optical.Interface.1.Enable
Device.Optical.Interface.1.Name
Device.Optical.Interface.1.OpticalSignalLevel
Device.Optical.Interface.1.Stats
Device.Optical.Interface.1.Stats.BytesReceived
Device.Optical.Interface.1.Stats.BytesSent
Device.Optical.Interface.1.Stats.ErrorsReceived
Device.Optical.Interface.1.Stats.ErrorsSent
Device.Optical.Interface.1.Stats.PacketsReceived
Device.Optical.Interface.1.Stats.PacketsSent
Device.Optical.Interface.1.Status
Device.Optical.Interface.1.TransmitOpticalLevel
Device.Optical.Interface.1.Upstream
Device.Optical.InterfaceNumberOfEntries
Device.Services
summary.hardwareVersion
summary.softwareVersion

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