

[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.

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

This method is used by the ACS to cause the CPE to download a specified file from the designated location. File type supported by the device is "1 Firmware Upgrade Image" for firmware download

DKT A/S
Fanoevvej 6
DK-4060 Kirke Saaby

Tlf +45 4646 2626
Fax +45 4646 2625
E-mail mail@dktomega.com
Web www.dktomega.com
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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 475xx series. This is a subset from the TR-181 data model <https://www.broadband-forum.org/cwmp/tr-181-2-9-0.html>

```

InternetGatewayDevice
InternetGatewayDevice.DeviceSummary
InternetGatewayDevice.DeviceInfo
InternetGatewayDevice.DeviceInfo.SpecVersion
InternetGatewayDevice.DeviceInfo.HardwareVersion
InternetGatewayDevice.DeviceInfo.SoftwareVersion
InternetGatewayDevice.DeviceInfo.Manufacturer
InternetGatewayDevice.DeviceInfo.ManufacturerOUI
InternetGatewayDevice.DeviceInfo.ModelName
InternetGatewayDevice.DeviceInfo.Description
InternetGatewayDevice.DeviceInfo.ProductClass
InternetGatewayDevice.DeviceInfo.SerialNumber
InternetGatewayDevice.DeviceInfo.ProvisioningCode
InternetGatewayDevice.DeviceInfo.UpTime
InternetGatewayDevice.DeviceInfo.MemoryStatus
InternetGatewayDevice.DeviceInfo.MemoryStatus.Total
InternetGatewayDevice.DeviceInfo.MemoryStatus.Free
InternetGatewayDevice.ManagementServer
InternetGatewayDevice.ManagementServer.EnableCWMP
InternetGatewayDevice.ManagementServer.URL
InternetGatewayDevice.ManagementServer.Username
InternetGatewayDevice.ManagementServer.PeriodicInformEnable
InternetGatewayDevice.ManagementServer.PeriodicInformInterval
InternetGatewayDevice.ManagementServer.PeriodicInformTime
InternetGatewayDevice.ManagementServer.ConnectionRequestURL
InternetGatewayDevice.ManagementServer.ConnectionRequestUsername
InternetGatewayDevice.ManagementServer.ParameterKey
InternetGatewayDevice.ManagementServer.UpgradesManaged
InternetGatewayDevice.ManagementServer.Password
InternetGatewayDevice.ManagementServer.ConnectionRequestPassword
InternetGatewayDevice.Time
InternetGatewayDevice.Time.Enable
InternetGatewayDevice.Time.NTPServer1
InternetGatewayDevice.Time.CurrentLocalTime
InternetGatewayDevice.Time.LocalTimeZoneName UTC
InternetGatewayDevice.LANDevice
InternetGatewayDevice.LANDevice.1
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceNumberOfEntries
InternetGatewayDevice.LANDevice.1.LANWLANConfigurationNumberOfEntries
InternetGatewayDevice.LANDevice.1.Hosts
InternetGatewayDevice.LANDevice.1.Hosts.HostNumberOfEntries
InternetGatewayDevice.LANDevice.1.WLANConfiguration
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.Enable
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.SSID
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.TotalAssociations
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.WMMSupported
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.MaxBitRate

```

InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.BasicDataTransmitRates
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.OperationalDataTransmitRates
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.Channel
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.AutoChannelEnable
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.BSSID
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.BeaconType
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.MACAddressControlEnabled
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.Standard
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.RegulatoryDomain
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.DeviceOperationMode
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.PossibleDataTransmitRates
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.TransmitPowerSupported
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.PossibleChannels
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.BasicAuthenticationMode
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.BasicEncryptionModes
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.WPAEncryptionModes
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.WPAAuthenticationMode
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.WMMEnable
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.Status
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.BeaconAdvertisementEnabled true
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.SSIDAdvertisementEnabled
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.IEEE802.11EncryptionModes
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.IEEE802.11AuthenticationMode
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.RadioEnabled
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.TransmitPower
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.TotalBytesSent
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.TotalBytesReceived
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.TotalPacketsSent
InternetGatewayDevice.LANDevice.1.WLANConfiguration.1.TotalPacketsReceived
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.TotalAssociations
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.Enable
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.WMMSupported
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.MaxBitRate
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.BasicDataTransmitRates
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.OperationalDataTransmitRates
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.Channel
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.AutoChannelEnable
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.SSID
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.BSSID
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.BeaconType
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.MACAddressControlEnabled
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.Standard
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.RegulatoryDomain
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.DeviceOperationMode
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.PossibleDataTransmitRates
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.TransmitPowerSupported
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.PossibleChannels
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.BasicAuthenticationMode
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.BasicEncryptionModes
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.WPAEncryptionModes
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.WPAAuthenticationMode
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.WMMEnable

InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.Status
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.BeaconAdvertisementEnabled
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.SSIDAdvertisementEnabled
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.IEEE802.11EncryptionModes
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.IEEE802.11AuthenticationMode
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.RadioEnabled
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.TransmitPower
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.TotalBytesSent
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.TotalBytesReceived
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.TotalPacketsSent
InternetGatewayDevice.LANDevice.1.WLANConfiguration.2.TotalPacketsReceived
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.Enable
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.Status
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.MACAddress
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.MACAddressControlEnabled
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.MaxBitRate
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.DuplexMode
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.Stats
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.Stats.BytesSent
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.Stats.BytesReceived
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.Stats.PacketsSent
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.Stats.PacketsReceived
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.Stats.ErrorsSent
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.1.Stats.ErrorsReceived
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.Enable
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.Status
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.MACAddress
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.MACAddressControlEnabled
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.MaxBitRate
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.DuplexMode
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.Stats
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.Stats.BytesSent
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.Stats.BytesReceived
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.Stats.PacketsSent
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.Stats.PacketsReceived
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.Stats.ErrorsSent
InternetGatewayDevice.LANDevice.1.LANEthernetInterfaceConfig.2.Stats.ErrorsReceived
InternetGatewayDevice.LANDeviceNumberOfEntries
Device
Device.DeviceInfo
Device.DeviceInfo.Manufacturer
Device.DeviceInfo.ManufacturerOUI
Device.DeviceInfo.ModelName
Device.DeviceInfo.Description

DKT A/S
Fanovej 6
DK-4060 Kirke Saaby

Tlf +45 4646 2626
Fax +45 4646 2625
E-mail mail@dktcomega.com
Web www.dktcomega.com
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Device.DeviceInfo.ProductClass
Device.DeviceInfo.SerialNumber
Device.DeviceInfo.HardwareVersion
Device.DeviceInfo.SoftwareVersion
Device.DeviceInfo.ProvisioningCode
Device.ManagementServer
Device.ManagementServer.EnableCWMP
Device.ManagementServer.URL
Device.ManagementServer.Username
Device.ManagementServer.PeriodicInformEnable
Device.ManagementServer.PeriodicInformInterval
Device.ManagementServer.PeriodicInformTime
Device.ManagementServer.ConnectionRequestURL
Device.ManagementServer.ConnectionRequestUsername
Device.ManagementServer.ParameterKey
Device.ManagementServer.UpgradesManaged
Device.ManagementServer.Password
Device.ManagementServer.ConnectionRequestPassword
Device.InterfaceStackNumberOfEntries
Device.Services
Device.Ethernet
Device.Ethernet.InterfaceNumberOfEntries
Device.Ethernet.Interface
Device.Ethernet.Interface.1
Device.Ethernet.Interface.1.Enable
Device.Ethernet.Interface.1.Status
Device.Ethernet.Interface.1.Upstream
Device.Ethernet.Interface.1.MACAddress
Device.Ethernet.Interface.1.MaxBitRate
Device.Ethernet.Interface.1.DuplexMode
Device.Ethernet.Interface.1.Stats
Device.Ethernet.Interface.1.Stats.BytesSent
Device.Ethernet.Interface.1.Stats.BytesReceived
Device.Ethernet.Interface.1.Stats.PacketsSent
Device.Ethernet.Interface.1.Stats.PacketsReceived
Device.Ethernet.Interface.2
Device.Ethernet.Interface.2.Enable
Device.Ethernet.Interface.2.Status
Device.Ethernet.Interface.2.Upstream
Device.Ethernet.Interface.2.MACAddress
Device.Ethernet.Interface.2.MaxBitRate
Device.Ethernet.Interface.2.DuplexMode
Device.Ethernet.Interface.2.Stats
Device.Ethernet.Interface.2.Stats.BytesSent
Device.Ethernet.Interface.2.Stats.BytesReceived
Device.Ethernet.Interface.2.Stats.PacketsSent
Device.Ethernet.Interface.2.Stats.PacketsReceived
Device.WiFi
Device.WiFi.RadioNumberOfEntries
Device.WiFi.SSIDNumberOfEntries
Device.WiFi.AccessPointNumberOfEntries
Device.WiFi.Radio
Device.WiFi.Radio.1
Device.WiFi.Radio.1.Enable
Device.WiFi.Radio.1.Status
Device.WiFi.Radio.1.Upstream
Device.WiFi.Radio.1.MaxBitRate
Device.WiFi.Radio.1.SupportedFrequencyBands
Device.WiFi.Radio.1.OperatingFrequencyBand
Device.WiFi.Radio.1.SupportedStandards
Device.WiFi.Radio.1.OperatingStandards
Device.WiFi.Radio.1.PossibleChannels
Device.WiFi.Radio.1.Channel
Device.WiFi.Radio.1.AutoChannelSupported

DKT A/S
Fanoevvej 6
DK-4060 Kirke Saaby

Tlf +45 4646 2626
Fax +45 4646 2625
E-mail mail@dktcomega.com
Web www.dktcomega.com
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Device.WiFi.Radio.1.AutoChannelEnable
Device.WiFi.Radio.1.OperatingChannelBandwidth
Device.WiFi.Radio.1.CurrentOperatingChannelBandwidth
Device.WiFi.Radio.1.GuardInterval
Device.WiFi.Radio.1.MCS
Device.WiFi.Radio.1.TransmitPowerSupported
Device.WiFi.Radio.1.TransmitPower
Device.WiFi.Radio.1.RegulatoryDomain
Device.WiFi.Radio.1.BeaconPeriod
Device.WiFi.Radio.1.BasicDataTransmitRates
Device.WiFi.Radio.1.OperationalDataTransmitRates
Device.WiFi.Radio.1.SupportedDataTransmitRates
Device.WiFi.Radio.2
Device.WiFi.Radio.2.Enable
Device.WiFi.Radio.2.Status
Device.WiFi.Radio.2.Upstream
Device.WiFi.Radio.2.MaxBitRate
Device.WiFi.Radio.2.SupportedFrequencyBands
Device.WiFi.Radio.2.OperatingFrequencyBand
Device.WiFi.Radio.2.SupportedStandards
Device.WiFi.Radio.2.OperatingStandards
Device.WiFi.Radio.2.PossibleChannels
Device.WiFi.Radio.2.Channel
Device.WiFi.Radio.2.AutoChannelSupported
Device.WiFi.Radio.2.AutoChannelEnable
Device.WiFi.Radio.2.OperatingChannelBandwidth
Device.WiFi.Radio.2.CurrentOperatingChannelBandwidth
Device.WiFi.Radio.2.GuardInterval
Device.WiFi.Radio.2.MCS
Device.WiFi.Radio.2.TransmitPowerSupported
Device.WiFi.Radio.2.TransmitPower
Device.WiFi.Radio.2.RegulatoryDomain
Device.WiFi.Radio.2.BeaconPeriod
Device.WiFi.Radio.2.BasicDataTransmitRates
Device.WiFi.Radio.2.OperationalDataTransmitRates
Device.WiFi.Radio.2.SupportedDataTransmitRates
Device.WiFi.SSID
Device.WiFi.SSID.1
Device.WiFi.SSID.1.Enable
Device.WiFi.SSID.1.Status
Device.WiFi.SSID.1.BSSID
Device.WiFi.SSID.1.SSID
Device.WiFi.SSID.1.Stats
Device.WiFi.SSID.1.Stats.BytesSent
Device.WiFi.SSID.1.Stats.BytesReceived
Device.WiFi.SSID.1.Stats.PacketsSent
Device.WiFi.SSID.1.Stats.PacketsReceived
Device.WiFi.SSID.2
Device.WiFi.SSID.2.Enable
Device.WiFi.SSID.2.Status
Device.WiFi.SSID.2.BSSID
Device.WiFi.SSID.2.SSID
Device.WiFi.SSID.2.Stats
Device.WiFi.SSID.2.Stats.BytesSent
Device.WiFi.SSID.2.Stats.BytesReceived
Device.WiFi.SSID.2.Stats.PacketsSent
Device.WiFi.SSID.2.Stats.PacketsReceived
Device.WiFi.AccessPoint
Device.WiFi.AccessPoint.1
Device.WiFi.AccessPoint.1.Enable
Device.WiFi.AccessPoint.1.Status
Device.WiFi.AccessPoint.1.SSIDReference
Device.WiFi.AccessPoint.1.SSIDAdvertisementEnabled
Device.WiFi.AccessPoint.1.WMMCapability

Device.WiFi.AccessPoint.1.WMMEnable
Device.WiFi.AccessPoint.1.AssociatedDeviceNumberOfEntries
Device.WiFi.AccessPoint.1.IsolationEnable
Device.WiFi.AccessPoint.1.MACAddressControlEnabled
Device.WiFi.AccessPoint.1.Security
Device.WiFi.AccessPoint.1.Security.ModesSupported
Device.WiFi.AccessPoint.1.Security.ModeEnabled
Device.WiFi.AccessPoint.1.Security.PreSharedKey
Device.WiFi.AccessPoint.2
Device.WiFi.AccessPoint.2.Enable
Device.WiFi.AccessPoint.2.Status
Device.WiFi.AccessPoint.2.SSIDReference
Device.WiFi.AccessPoint.2.SSIDAdvertisementEnabled
Device.WiFi.AccessPoint.2.WMMCapability
Device.WiFi.AccessPoint.2.WMMEnable
Device.WiFi.AccessPoint.2.AssociatedDeviceNumberOfEntries
Device.WiFi.AccessPoint.2.IsolationEnable
Device.WiFi.AccessPoint.2.MACAddressControlEnabled
Device.WiFi.AccessPoint.2.Security
Device.WiFi.AccessPoint.2.Security.ModesSupported
Device.WiFi.AccessPoint.2.Security.ModeEnabled
Device.WiFi.AccessPoint.2.Security.PreSharedKey
summary.hardwareVersion
summary.softwareVersion
summary.wlanSsid Testlab

DKT A/S
Fanoevvej 6
DK-4060 Kirke Saaby

Tlf +45 4646 2626
Fax +45 4646 2625
E-mail mail@dktomega.com
Web www.dktomega.com
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