AVM TR-064 – First Steps

Supported by AVM

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Date: 2018-08-15

Content

History

Date	Version	Changes
2010-06-17	1	Initial version
2010-06-18	2	Minor changes
2010-06-21	3	4.1 Authorization, actions GetSecurityPort and DialNumber
2010-07-09	4	Added chapter 6 Actions
2010-08-31	5	Added chapter 7 State Variables Added reference to UPnP specification
2011-02-25	6	Added chapter Transactions
2011-03-03	7	Added chapter Support for Multiple Clients and Parallel Access with transactions or multiple session IDs
2011-12-05	8	Changed chapter Authorization to Authentication Added sub chapter Content Level Authentication
2011-12-21	9	Changed examples for Content Level Authentication
2012-11-06	10	Added chapter 6.1 Actions and User Rights . Change list of action allowed without authentication in chapter 4.1 Authentication .
2012-11-07	11	LanConfigSecurity:GetInfoEx () without authentication ManagementServer:GetInfo () without authentication Layer3Forwarding:SetDefaultConnectionService () with configuration rights.
2012-12-03	12	Description of authentication for multi user configurations. X_AVM-DE_GetAnonymousLogin () X_AVM-DE_GetCurrentUser ()
2013-01-23	13	Changed chapter 4.1.1 Remarks to clarify service behaviour for unauthorized requests.
2013-03-25	14	Details for content level authentication.
2013-04-02	15	Spelling Added actions in chapter 6.1.25 Service X_AVM-DE_MyFritz .
2013-08-20	16	Added action and changed right for all actions in chapter 6.1.10 Service Hosts .
2013-08-23	17	Changed right for GetInfo in chapter 6.1.25 Service X_AVM-DE_MyFritz .
2013-08-26	18	Add action in chapter 6.1.17 Service WLANConfiguration : X_AVM-DE_GetWLANExtInfo Corrections 6.1.17 Service WLANConfiguration : X_AVM_DE_SetStickSurfEnable → X_AVM-

		DE_SetStickSurfEnable Corrections 6.1.18 Service X_VoIP : X_AVM_DE_*VoIPAccount → X_AVM-DE_*VoIPAccount X_AVM_DE_GetClient* → X_AVM-DE_GetClient* X_AVM_DE_SetClient* → X_AVM-DE_SetClient* X_AVM_DE_DeleteClient → X_AVM-DE_DeleteClient X_AVM_DE_GetClients → X_AVM-DE_GetClients X_AVM_DE_GetNumbers → X_AVM-DE_GetNumbers X_AVM_DE_GetNumberOfNumbers → X_AVM-DE_GetNumberOfNumbers
2014-05-26	19	Added actions to service Hosts in chapter 6.1.10 Service Hosts : X_AVM-DE_GetAutoWakeOnLANByMACAddress, X_AVM-DE_SetAutoWakeOnLANByMACAddress, X_AVM-DE_SetHostNameByMACAddress, X_AVM-DE_WakeOnLANByMACAddress
2015-02-06	20	Added service X_AVM-DE_Speedtest in chapter 6.1.26 Service X_AVM-DE_Speedtest .
2015-03-17	21	Added missing services and actions to chapter 6.1 Actions and User Rights . Change needed rights for many actions. Sort actions per service in alphabetical order.
2015-06-02	22	UserInterface:GetInfo change Right C => C or A Added Service: X_AVME_DE_Homeauto in chapter 6.1 Actions and User Rights
2015-06-05	23	Added New Service: X_AVME_DE_Dect in chapter 6.1 Actions and User Rights
2015-06-10	24	Added missing actions UserInterface:X_AVM_DE_GetInfo UserInterface:X_AVM_DE_SetConfig
2015-07-17	25	Added missing action Service X_AVM-DE_AppSetup: SetAppMessageReceiver
2015-08-31	26	Change rights for UserInterface:GetInfo
2015-10-01	27	Add action SetFTPServerWAN to service 6.1.19 Service X_AVM-DE_Storage .
2015-11-19	28	Corrected actions for service DeviceConfig Layer3Forwarding: Entries => Entry UserInterface: X_AVM-DE_DoPrepareCGI WANCommonInterfaceConfig: X_AVM-DE_GetOnlineMonitor WLANConfiguration: X_AVM-DE_WLANGetNightControl => X_AVM-DE_GetNightControl X_AVM-DE_OnTel: GetDeflection, GetDeflections, GetInfoByIndex, GetNumberOfDeflections X_AVM-DE_Filelink added

		X_AVM-DE_Homeplug X_AVM-DE_StorageService: SetUserConfig
2016-06-29	29	Changed required rights for action GetDDNSInfo
2017-01-09	30	Add description to chapter 4.1.2 Content Level Authentication . Change several actions in chapter 6.1 Actions and User Rights : Add - Hosts:X_AVM-DE_GetHostListPath Add - Hosts:X_AVM-DE_GetSpecificHostEntyByIP Add - WLANConfiguration:X_AVM- DE_GetSpecificAssociatedDeviceInfoByIp Add - X_AVM-DE_AppSetup:ResetEvent Add - X_AVM-DE_FileLinks:GetFileLinkListPath Add - X_AVM-DE_Storage:RequestFTPServerWAN Add - X_AVM-DE_TAM:GetList Add - X_VoIP:X_AVM-DE_GetClientByClientId Add - X_VoIP:X_AVM-DE_SetClient4 Chg - Time:GetInfo Chg - X_AVM-DE_AppSetup:GetInfo Chg - X_AVM-DE_AppSetup:RegisterApp Del - WANIPConnection:X_SetDNSServers Del – WANPPPConnection:X_SetDNSServers
2017-06-02	31	Add PhoneRight and HomeautoRight for Actions GetNumberOfDectEntries, GetGenericDectEntry, GetSpecificDectEntry
2017-06-06	32	Change rights for Actions - SetEnable - X_AVM-DE_GetWPSInfo - X_AVM-DE_SetWPSInfo in WLANConfiguration
2017-11-22	33	Add Action SetEnable in Service RemoteAccess
2018-08-15	34	Updating to state of other tr064-service documents and adding some Two-Factor-Authentication information. Changed referred IP address. Added table for required rights for the service X_AVM-DE_Auth. LanConfigSecurity:GetInfo need authentication and is removed from list in section 4.1. Add X_VoIP:X_AVM-DE_GetVoIPCommonAreaCode Add X_VoIP:X_AVM-DE_GetVoIPCommonCountryCode Add X_VoIP:X_AVM-DE_SetDelayedCallNotification Add X_VoIP:X_AVM-DE_SetVoIPCommonAreaCode Add X_VoIP:X_AVM-DE_SetVoIPCommonCountryCode Add WANDSLInterfaceConfig:X_AVM-DE_GetDSLDiagnoseInfo Add Hosts:X_AVM-DE_GetMeshListPath Add X_AVM-DE_OnTel:GetPhonebookEntryUID

		Add X_AVM-DE_OnTel:DeletePhonebookEntryUID Add X_AVM-DE_AppSetup:GetAppMessageFilter Add X_AVM-DE_AppSetup:SetAppMessageFilter Add X_AVM-DE_AppSetup:SetAppVPNwithPFS Add X_AVM-DE_Homeauto:GetInfo Add X_AVM-DE_Dect:GetDectListPath Add X_AVM-DE_Auth:GetInfo Add X_AVM-DE_Auth:GetState Add X_AVM-DE_Auth:SetConfig Add WLANConfiguration:X_AVM-DE_SetWLANGlobalEnable Del X_AVM-DE_GetGenericHostEntryExt Del X_AVM-DE_GetSpecificHostEntryExt

1 Introduction

This document gives at short overview about the TR-064 protocol implementation in AVM devices. Especially the discovery of IP addresses, ports, TR-064 devices and services. Next chapter explains the usage of the security options.

In addition some example messages between the management application and the CPE are listed to see some details.

For details please refer the TR-064 document at http://www.broadband-forum.org/technical/download/TR-064.pdf.

2 Device Discovery

To be able to communicate with a TR-064 device from AVM, the following steps have to be done.

A complete description can be found in chapter *3.2.2 SSDP Search on Start-up of CPE Management Application* in the [TR064] specification.

1. SSDP Discovery using M-SEARCH
2. Retrieval of device description file(s) using HTTP GET
   2.1 The content of the SSDP discover response message has to be parsed to get the valid URL for downloading the service description.
3. Be aware of the lease time for every announcement. If an announcement is not re-sent prior to the expire of the lease, the service discovery has to be restarted by the application.

2.1.1 Remark

In the [TR064] specification chapter *3.2.1 SSDP Advertisement on Start-up of CPE Device*, the CPE MUST send broadcast SSDP advertisement (NOTIFY) messages.

AVM devices do not do this, to avoid being shown in Microsoft Windows UPnP/ network devices list by default.

3 Service Discovery

For the individual services several separate description files can be retrieved.

The URLs are given in the central service description.

An URL can be combined by taking the IP address and the port from the SSDP discovery response message (LOCATION header) and the value in a XML tag SCPDURL.

3.1 Manual Discovery

If a TR-064 client tries to detect an AVM TR-064 service manually, the following steps can be used.

- DNS resolution of fritz.box
- HTTP GET request to http://192.168.178.1:49000/tr64desc.xml
- HTTPS GET request to https://192.168.178.1:49443/tr64desc.xml

4 Security

TR-064 offers authorization and encryption to make safe communication. Furthermore some actions with potential to be the target of fraud attacks are protected via Two-Factor-Authentication.

4.1 Authentication

In the [TR064] specification, chapter *4.2 Authentication*, the default usernames and factory default passwords are described.

AVM CPEs have the following implementation.

- If an individual username and a password is configured via WebGUI or TR-064, a configured username and password have to be used for password-protected actions.
  It is recommended to always use a configured username and password.
  The following actions do not need authorization:
  - DeviceInfo:GetSecurityPort
  - WLANConfiguration:X_SetHighFrequencyBand
  - LanConfigSecurity:X_AVM-DE_GetAnonymousLogin
- If only a password is configured via WebGUI or TR-064, a matching username is used internally.
  - It is not recommended to use only a password without a configured username.
  - If no configured username is used the following action shows which internal user is used instead:
    LanConfigSecurity:X_AVM-DE_GetCurrentUser
- If no individual password is configured, TR-064 does not require a password or username.
  The following action is protected and not available without an individual password:
  - DialNumber

The default authentication mechanism is HTTP authentication using digest (MD5 hashes). Alternatively an authentication on content level is supported.

4.1.1 Remarks

The username dslf-reset is not supported.
The TR-064 service may use HTTP status code 503 (service unavailable) instead of 401 (unauthorized) if too many unauthenticated requests from one client are made.

4.1.2 Content Level Authentication

In addition to HTTP digest authentication which is supported by many libraries another alternative authentication is available.

The Content Level Authentication is based on the idea of SOAP extension for basic and digest authentication described in [SOAPAUTH01].
The client may either use the HTTP authentication mechanisms or use the content level authentication for SOAP actions that require authorization.
To access URLs with HTTP GET or HTTP POST a TR-064 URL session ID has to be retrieved first.
The TR-064 URL session ID is part of the URLs for phone book and call list.
For further requests like:

- phone book images,
- fax messages or
- answering machine messages

the SOAP action DeviceConfig::X_AVM-DE_CreateUrlSID () has to be invoked.
See the example for the authentication in the chapter 10.7 Content Level Authentication .

The client has to insert a SOAP header in the content to initiate the content level authentication.

The server responses an initial request with content level authentication contains a nonce value, the realm and a SOAP fault with a number and a text.

The client needs the nonce value, username, realm and password to calculate the digest hash.

A client side nonce is supported as optional parameter, too.

The following calculation and example values are taken from the examples in chapter 10.7 Content Level Authentication .

Variable	Value	Remark
uid	admin	
pwd	gurkensalat	
realm	F!Box SOAP-Auth	Not writeable.
sn	F758BE72FB999CEA	
response	b4f67585f22b0af7c4615db5a18faa14	

The calculation is similar to chapter 4.3 Digest Computation in [SOAPAUTH01].
`response = MD5( concat(secret, ":", sn) )`
when only client authentication is required.
Where:

- **secret** (string) represents the hex encoding of the digest
  `secret = MD5( concat(uid, ":", realm, ":", pwd) )`
- **uid** (string) represents the User ID.
- **realm** (string) represents the Realm name.
- **pwd** (string) represents the password.
- **sn** (string) represents the nonce serving as the challenge from the server to the client.

4.2 Encryption

The TR-064 specification chapter *4.4 Encryption* describes the possibilities for encryption. To make it more easy for applications the port can be retrieved using a special SOAP action.

The service type urn:dslforum-org:service:DeviceInfo:1 offers the action GetSecurityPort where the used port value can be retrieved.

Example messages for a request and a response with the security port can be found in the examples chapter.

4.2.1 Remark

In the [TR064] specification, SSL encryption is recommended only for some SOAP actions. The support for access over an encrypted HTTPS link is not specified in details. Therefore AVM decided to use the explained action GetSecurityPort.

4.3 Two-Factor-Authentication

Some actions are protected via Two-Factor-Authentication (2FA) to prevent remote config changes. Even when credentials are known, the physical presence is needed to confirm changes on the AVM CPE device configuration. For more information see X_Auth service documentation.

5 Discovery and Communication

Base on the message flow in the [TR064] specification, the following interaction sequence is expected by the CPE.
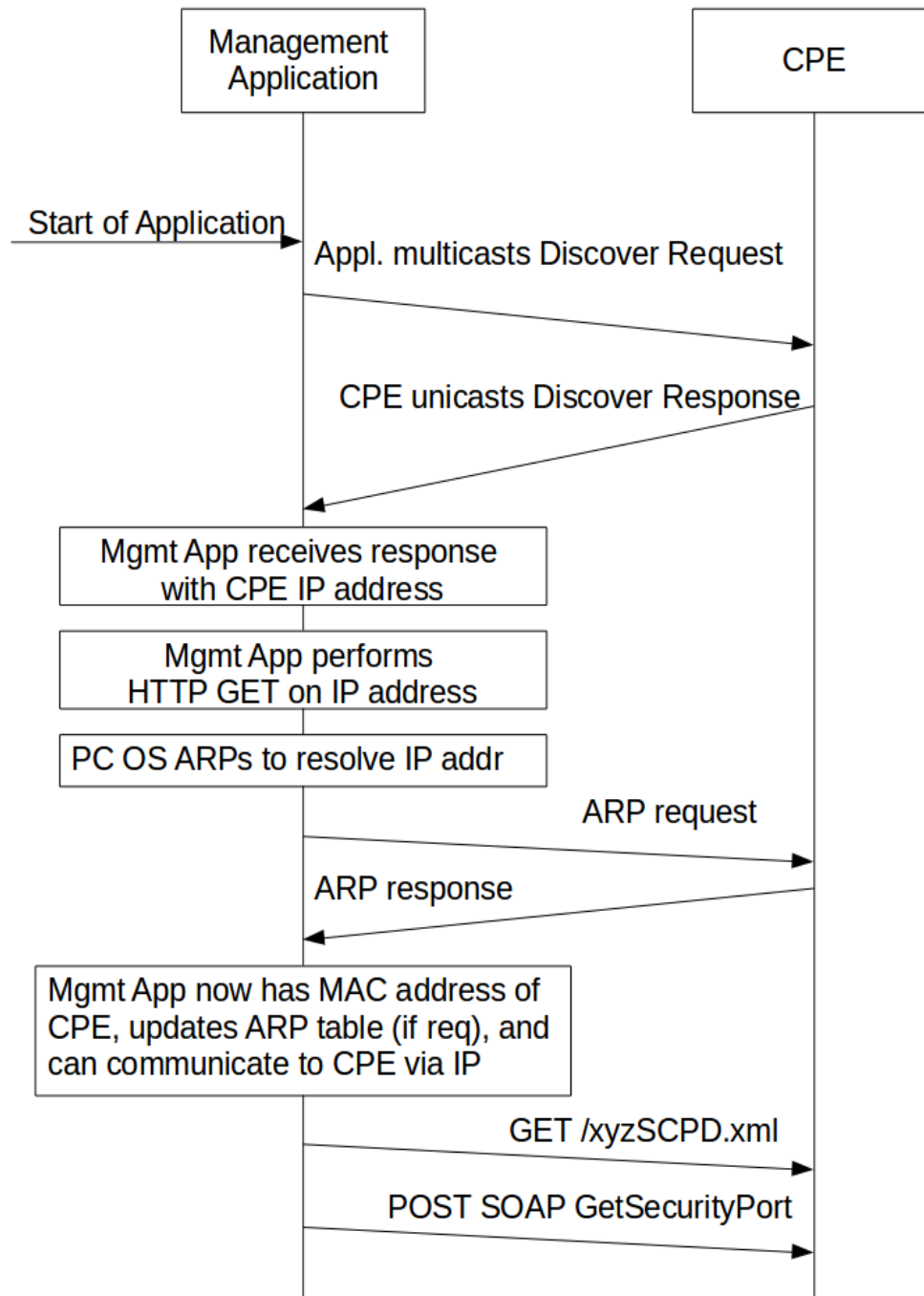

Figure 1: CPE Discovery and Communications base on the [TR064] specification

6 Actions

Actions may change in their lifetime. The names of actions are kept unchanged as long as possible, but the arguments may change if needed.

The number of arguments may differ and the meaning of a state variable may change.

To detect such a change, it is recommended to parse all SCPDXML files after attaching to a device.

In general actions return 402 if the number of arguments for an action is not as expected or an unexpected argument is used.

If an unknown action is used the returned code is 401. This return code is used for obsoleted actions, too.

6.1 Actions and User Rights

The following user rights are supported:
- no rights
- configuration
- phone contents and phone configuration
- NAS contents and NAS configuration

User rights for configuration include user rights for phone contents and phone configuration.

The user rights may be limited to LAN or granted to LAN and WAN access.

There are some more settings for user rights:
- access from LAN only with authentication
- access from LAN without authentication
- no configured user and no configured password

Every action has needed user rights. The following user rights mappings to SOAP actions shall give an overview.

C – Configuration

A – restricted configuration for applications

P – Phone contents and phone configuration

N – NAS contents and NAS configuration

H – Home automation contents and configuration

- – No rights

If a user is not authenticated, 401 ("Unauthorized") will be returned.

If a user is authenticated but has not the needed rights, 606 ("Action not authorized") will be returned. If an action needs 2FA, the status code 866 ("second factor authentication required"), 867 ("second factor authentication blocked") or 868 ("second factor authentication busy") will be returned and the 2FA procedure, as described in X_Auth service description, has to be passed.

6.1.1 Service DeviceInfo

Action	User Rights
GetDeviceLog	C
GetInfo	C

| GetSecurityPort | - |
| SetProvisioningCode | C |

6.1.2 Service DeviceConfig

Action	User Rights
ConfigurationFinished	C
ConfigurationStarted	C
FactoryReset	C
GetPersistentData	C
Reboot	C
SetPersistentData	C
X_AVM-DE_CreateUrlSID	C or A or P or N or H
X_AVM-DE_GetConfigFile	C
X_AVM-DE_SetConfigFile	C
X_GenerateUUID	C

6.1.3 Service Layer3Forwarding

Action	User Rights
AddForwardingEntry	C
DeleteForwardingEntry	C
GetDefaultConnectionService	C
GetForwardNumberOfEntries	C
GetGenericForwardingEntry	C
GetSpecificForwardingEntry	C
SetDefaultConnectionService	C
SetForwardingEntryEnabled	C

6.1.4 Service LANConfigSecurity

Action	User Rights
GetInfo	-
SetConfigPassword	C or A or P or N or H
X_AVM-DE_GetAnonymousLogin	-
X_AVM-DE_GetCurrentUser	C or A or P or N or H

6.1.5 Service ManagementServer

Action	User Rights
GetInfo	C
SetConnectionRequestAuthentication	C
SetManagementServerPassword	C
SetManagementServerURL	C
SetManagementServerUsername	C
SetPeriodicInform	C
SetUpgradeManagement	C
X_AVM-DE_GetTR069FirmwareDownloadEnabled	C
X_AVM-DE_SetTR069FirmwareDownloadEnabled	C
X_SetTR069Enable	C

6.1.6 Service Time

Action	User Rights
GetInfo	C or A or P or N or H
SetNTPServers	C

6.1.7 Service UserInterface

Action	User Rights
GetInfo	-
X_AVM-DE_CheckUpdate	C
X_AVM-DE_DoUpdate	C
X_AVM-DE_DoPrepareCGI	C
X_AVM-DE_DoManualUpdate	C
X_AVM-DE_GetInternationalConfig	C
X_AVM-DE_SetInternationalConfig	C
X_AVM_DE_GetInfo	C
X_AVM_DE_SetConfig	C

6.1.8 Service LANHostConfigManagement

Action	User Rights
GetAddressRange	C
GetDNSServers	C
GetInfo	C
GetIPInterfaceNumberOfEntries	C

GetIPRoutersList	C
GetSubnetMask	C
SetAddressRange	C
SetDHCPServerEnable	C
SetIPInterface	C
SetIPRouter	C
SetSubnetMask	C

6.1.9 Service LANEthernetInterfaceConfig

Action	User Rights
GetInfo	C
GetStatistics	C
SetEnable	C

6.1.10 Service Hosts

Action	User Rights
GetGenericHostEntry	-
GetHostNumberOfEntries	-
GetSpecificHostEntry	-
X_AVM-DE_GetAutoWakeOnLANByMACAddress	C or A or P or N or H
X_AVM-DE_GetChangeCounter	-
X_AVM-DE_GetHostListPath	C or A or P
X_AVM-DE_GetSpecificHostEntyByIP	C or A or P
X_AVM-DE_HostDoUpdate	C or A
X_AVM-DE_HostsCheckUpdate	C or A
X_AVM-DE_SetAutoWakeOnLANByMACAddress	C or A or P or N or H
X_AVM-DE_SetHostNameByMACAddress	C
X_AVM-DE_WakeOnLANByMACAddress	C or A or P or N or H
X_AVM-DE_GetMeshListPath	C or P or A

6.1.11 Service WANCommonInterfaceConfig

Action	User Rights
GetCommonLinkProperties	C
GetTotalBytesReceived	C
GetTotalBytesSent	C

GetTotalPacketsReceived	C
GetTotalPacketsSent	C
X_AVM-DE_SetWANAccessType	C
X_AVM-DE_GetOnlineMonitor	C

6.1.12 Service WANDSLInterfaceConfig

Action	User Rights
GetInfo	C
GetStatisticsTotal	C
X_AVM-DE_GetDSLDiagnoseInfo	-

6.1.13 Service WANDSLLinkConfig

Action	User Rights
GetATMEncapsulation	C
GetAutoConfig	C
GetDestinationAddress	C
GetDSLLinkInfo	C
GetInfo	C
GetStatistics	C
SetATMEncapsulation	C
SetDestinationAddress	C
SetDSLLinkType	C
SetEnable	C

6.1.14 Service WANEthernetLinkConfig

Action	User Rights
GetEthernetLinkStatus	C

6.1.15 Service WANPPPConnection

Action	User Rights
AddPortMapping	C
DeletePortMapping	C
ForceTermination	C
GetConnectionType	C
GetConnectionTypeInfo	C
GetExternalIPAddress	C

GetGenericPortMappingEntry	C
GetInfo	C
GetLinkLayerMaxBitRates	C
GetNATRSIPStatus	C
GetPortMappingNumberOfEntries	C
GetSpecificPortMappingEntry	C
GetStatusInfo	C
GetUserName	C
RequestConnection	C
SetConnectionTrigger	C
SetIdleDisconnectTime	C
SetPassword	C
SetRouteProtocolRx	C
SetUserName	C
X_AVM-DE_GetAutoDisconnectTimeSpan	C
X_AVM-DE_SetAutoDisconnectTimeSpan	C
X_GetDNSServers	C

6.1.16 Service WANIPConnection

Action	User Rights
AddPortMapping	C
DeletePortMapping	C
ForceTermination	C
GetConnectionType	C
GetConnectionTypeInfo	C
GetExternalIPAddress	C
GetGenericPortMappingEntry	C
GetInfo	C
GetNATRSIPStatus	C
GetPortMappingNumberOfEntries	C
GetSpecificPortMappingEntry	C
GetStatusInfo	C
RequestConnection	C
SetConnectionTrigger	C
SetIdleDisconnectTime	C

SetRouteProtocolRx	C
X_GetDNSServers	C

6.1.17 Service WLANConfiguration

Action	User Rights
GetBasBeaconSecurityProperties	C
GetBeaconAdvertisement	C
GetBeaconType	C
GetBSSID	C
GetChannelInfo	C
GetDefaultWEPKeyIndex	C
GetGenericAssociatedDeviceInfo	C or A or P
GetInfo	C or A or P
GetPacketStatistics	C
GetSecurityKeys	C
GetSpecificAssociatedDeviceInfo	C or A or P
GetSSID	C
GetStatistics	C
GetTotalAssociations	C or A or P
SetBasBeaconSecurityProperties	C
SetBeaconAdvertisement	C
SetBeaconType	C
SetChannel	C
SetConfig	C
SetDefaultWEPKeyIndex	C
SetEnable	A
SetSecurityKeys	C
SetSSID	C
X_AVM-DE_GetIPTVOptimzed	C
X_AVM-DE_GetNightControl	-
X_AVM-DE_GetSpecificAssociatedDeviceInfoByIp	C or A or P
X_AVM-DE_GetWLANExtInfo	C or A (guest AP only)
X_AVM-DE_GetWLANHybridMode	C
X_AVM-DE_GetWPSInfo	A
X_AVM-DE_SetIPTVOptimzed	C

X_AVM-DE_SetStickSurfEnable	C
X_AVM-DE_SetWLANGlobalEnable	A
X_AVM-DE_SetWLANHybridMode	C
X_AVM-DE_SetWPSConfig	A
X_SetHighFrequencyBand	-

6.1.18 Service X_VoIP

Action	User Rights
GetExistingVoIPNumbers	P
GetInfo	P
GetInfoEx	P
GetMaxVoIPNumbers	P
GetVoIPCommonAreaCode	P
GetVoIPCommonCountryCode	P
GetVoIPEnableAreaCode	P
GetVoIPEnableCountryCode	P
SetConfig	P
SetVoIPCommonAreaCode	P
SetVoIPCommonCountryCode	P
SetVoIPEnableAreaCode	P
SetVoIPEnableCountryCode	P
X_AVM-DE_AddVoIPAccount	P
X_AVM-DE_DeleteClient	P
X_AVM-DE_DelVoIPAccount	P
X_AVM-DE_DialGetConfig	P
X_AVM-DE_DialHangup	P
X_AVM-DE_DialNumber	P
X_AVM-DE_DialSetConfig	P
X_AVM-DE_GetClient	P
X_AVM-DE_GetClient2	P
X_AVM-DE_GetClient3	P
X_AVM-DE_GetClientByClientId	A or P
X_AVM-DE_GetClients	P
X_AVM-DE_GetNumberOfClients	P
X_AVM-DE_GetNumberOfNumbers	P

X_AVM-DE_GetNumbers	P
X_AVM-DE_GetPhonePort	P
X_AVM-DE_GetVoIPAccount	P
X_AVM-DE_GetVoIPCommonAreaCode	P
X_AVM-DE_GetVoIPCommonCountryCode	P
X_AVM-DE_SetClient	P
X_AVM-DE_SetClient2	P
X_AVM-DE_SetClient3	P
X_AVM-DE_SetClient4	P
X_AVM-DE_SetDelayedCallNotification	P
X_AVM-DE_SetVoIPCommonAreaCode	P
X_AVM-DE_SetVoIPCommonCountryCode	P

6.1.19 Service X_AVM-DE_Storage

Action	User Rights
GetInfo	C
GetUserInfo	C
RequestFTPServerWAN	A or N only but not C
SetFTPServer	C
SetFTPServerWAN	C
SetSMBServer	C
SetUserConfig	C

6.1.20 Service X_AVM-DE_WebDAVClient

Action	User Rights
GetInfo	C
SetConfig	C

6.1.21 Service X_AVM-DE_UPnP

Action	User Rights
GetInfo	C
SetConfig	C

6.1.22 Service X_AVM-DE_OnTel

Action	User Rights
AddPhonebook	P
DeleteByIndex	P
DeletePhonebook	P
DeletePhonebookEntry	P
DeletePhonebookEntryUID	P
GetCallList	P
GetDECTHandsetInfo	P
GetDECTHandsetList	P
GetDeflection	P
GetDeflections	P
GetInfo	P
GetInfoByIndex	P
GetNumberOfDeflections	P
GetNumberOfEntries	P
GetPhonebook	P
GetPhonebookEntry	P
GetPhonebookEntryUID	P
GetPhonebookList	P
SetConfig	P
SetConfigByIndex	P
SetDECTHandsetPhonebook	P
SetDeflectionEnable	P
SetEnable	P
SetEnableByIndex	P
SetPhonebookEntry	P
SetPhonebookEntryUID	P

6.1.23 Service X_AVM-DE_TAM

Action	User Rights
DeleteMessage	P
GetInfo	P
GetList	A or P
GetMessageList	P

MarkMessage	P
SetEnable	P

6.1.24 Service X_AVM-DE_RemoteAccess

Action	User Rights
GetDDNSInfo	C or A or P or N or H
GetDDNSProviders	C
GetInfo	C or A or P or N or H
SetConfig	C
SetDDNSConfig	C
SetEnable	C

6.1.25 Service X_AVM-DE_MyFritz

Action	User Rights
DeleteServiceByIndex	C or A or P
GetInfo	C or A or P or N or H
GetNumberOfServices	C or A or P
GetServiceByIndex	C or A or P
SetServiceByIndex	C or A or P

6.1.26 Service X_AVM-DE_Speedtest

Action	User Rights
GetInfo	C
SetConfig	C

6.1.27 Service X_AVM-DE_AppSetup

Action	User Rights
GetAppMessageFilter	C or A or P or N or H
GetConfig	C or A or P or N or H
GetInfo	-
RegisterApp	C or P or N or H but not A
SetAppVPN	C
SetAppMessageFilter	C or A or P or N or H
SetAppMessageReceiver	C or A or P or N or H
SetAppVPNwithPFS	C
ResetEvent	C

6.1.28 Service X_AVM-DE_Homeplug

Action	User Rights
DeviceDoUpdate	C or A
GetGenericDeviceEntry	C or A
GetNumberOfDeviceEntries	C or A
GetSpecificDeviceEntry	C or A

6.1.29 Service X_AVM-DE_Homeauto

Action	User Rights
GetGenericDeviceInfos	C or H
GetInfo	C or H
GetSpecificDeviceInfos	C or H
SetSwitch	C or H

6.1.30 Service X_AVM-DE_Dect

Action	User Rights
DectDoUpdate	C or A
GetDectListPath	C or A
GetGenericDectEntry	C or A or P or H
GetNumberOfDectEntries	C or A or P or H
GetSpecificDectEntry	C or A or P or H

6.1.31 Service X_AVM-DE_Filelinks

Action	User Rights
DeleteFilelinkEntry	C or N
GetFileLinkListPath	C or N
GetGenericFilelinkEntry	C or N
GetNumberOfFilelinkEntries	C or N
GetSpecificSpecificEntry	C or N
NewFilelinkEntry	C or N
SetFilelinkEntry	C or N

6.1.32 Service X_AVM-DE_Auth

Action	User Rights
GetInfo	C or A or P or N or H
GetState	C or A or P or N or H
SetConfig	C or A or P or N or H

7 State Variables

The vendor specific state variables with the format X_<VENDOR>_StateVariable use the following string for compatibility reasons.
AVM-DE
e.g. X_AVM-DE_Password
This string is not conform to the UPnP specification [UPNP11], that does not allow a – in the name of a state variable.

7.1 Compatibility with clients

At least one client has compatibility problems with these names of state variables.
Herqq UPnP http://www.herqq.org

8 Support for Multiple Clients and Parallel Access

There are two features that support parallel access of multiple TR-064 clients to one TR-064 service.
The first feature is the usage of transactions which is described in chapter 9 Transactions and the second feature are multiple internal session IDs.
These internal session IDs are used as parameters for URL access. The action GetCallList () returns such an URL for example.

9 Transactions

To support TR-064 access for several clients in parallel the [TR064] specification recommends the usage of transactions.
The description of the transactions is described in the chapter 6.3 Transactional Approach and in the chapter 6.5.2 DeviceConfig in [TR064] .
Some message examples can be found on the page 87 and following pages.

9.1 Usage of Transactions

Transactions cover the execution of SOAP actions without interruption by other TR-064 clients.
To begin a transaction the SOAP action DeviceConfig::ConfigurationStarted has to be used.
To end a transaction the SOAP action DeviceConfig::ConfigurationFinished has to be used.
The following sequence of SOAP actions is recommended for the communication with the AVM TR-064 service.
1. DeviceConfig::X_GenerateUUID
2. DeviceConfig::ConfigurationStarted

3. One or more SOAP actions to be protected against parallel access.
4. DeviceConfig::ConfigurationFinished

A transaction permits to successfully execute SOAP actions for its duration.

A transaction times out 45 seconds after DeviceConfig::ConfigurationStarted was called, if the client does not call DeviceConfig::ConfigurationFinished to handle connection loss between TR-064 client and server and similar failures.

10 Examples

The following examples show unencrypted communication between a TR-064 enabled CPE and a TR-064 application.

10.1 SSDP request from application

Multicast HTTP message from application.

```
M-SEARCH * HTTP/1.1
HOST: 239.255.255.250:1900
MAN: "ssdp:discover"
MX: 5
ST: urn:dslforum-org:device:InternetGatewayDevice:1
```

10.2 SSDP response from CPE

Unicast HTTP response message from CPE to application.

```
HTTP/1.1 200 OK
LOCATION: http://192.168.178.1:49000/tr64desc.xml
SERVER: FRITZBOX UPnP/1.0 AVM FRITZ!Box Fon WLAN 7270 v3 74.04.85
CACHE-CONTROL: max-age=1800
EXT:
ST: urn:dslforum-org:device:InternetGatewayDevice:1
USN: uuid:739f2409-bccb-40e7-8e6c-0024FE6E00C3::urn:dslforum-
org:device:InternetGatewayDevice:1
```

10.3 Service description request from application

Unicast HTTP GET request message from application to CPE using values of SSDP discovery response message LOCATION header.

```
GET /tr64desc.xml HTTP/1.1
HOST: 192.168.178.1:49000
CONNECTION: Close
USER-AGENT: AVM UPnP/1.0 Client 1.0
```

10.4 Service description response from CPE

Unicast HTTP response message (trimmed) from CPE to application.

```
HTTP/1.0 200 OK
Content-Length: 10327
Content-Type: text/xml
Date: Thu, 17 Jun 2010 11:35:47 GMT
Last-Modified: Thu, 17 Jun 2010 10:33:08 GMT
Mime-Version: 1.0

<?xml version="1.0"?>
<root xmlns="urn:dslforum-org:device-1-0">
```

```xml
 <specVersion>
  <major>1</major>
  <minor>0</minor>
 </specVersion>
 <device>
  <deviceType>urn:dslforum-
org:device:InternetGatewayDevice:1</deviceType>
  <friendlyName>FRITZBOX UPnP/1.0 AVM FRITZ!Box Fon WLAN 7270 v3
74.04.85</friendlyName>
  <manufacturer>AVM</manufacturer>
  <manufacturerURL>www.avm.de</manufacturerURL>
  <modelDescription>FRITZ!Box Fon WLAN 7270 v3</modelDescription>
  <modelName>FRITZ!Box Fon WLAN 7270 v3</modelName>
  <modelNumber> - avm</modelNumber>
  <modelURL>www.avm.de</modelURL>
  <UDN>uuid:739f2409-bccb-40e7-8e6c-0024FE6E00C3</UDN>
  <iconList>
   <icon>
    <mimetype>image/gif</mimetype>
    <width>118</width>
    <height>119</height>
    <depth>8</depth>
    <url>/ligd.gif</url>
   </icon>
  </iconList>
  <serviceList>
   <service>
    <serviceType>urn:dslforum-org:service:DeviceInfo:1</serviceType>
    <serviceId>urn:DeviceInfo-com:serviceId:DeviceInfo1</serviceId>
    <controlURL>/upnp/control/deviceinfo</controlURL>
    <eventSubURL>/upnp/control/deviceinfo</eventSubURL>
    <SCPDURL>/deviceinfoSCPD.xml</SCPDURL>
   </service>
...
  </serviceList>
  <deviceList>
   <device>
    <deviceType>urn:dslforum-org:device:LANDevice:1</deviceType>
    <friendlyName>LANDevice - FRITZ!Box Fon WLAN 7270 v3</friendlyName>
    <manufacturer>AVM</manufacturer>
    <manufacturerURL>www.avm.de</manufacturerURL>
    <modelDescription>LANDevice - FRITZ!Box Fon WLAN 7270
v3</modelDescription>
    <modelName>LANDevice - FRITZ!Box Fon WLAN 7270 v3</modelName>
    <modelNumber> - avm</modelNumber>
    <modelURL>www.avm.de</modelURL>
    <UDN>uuid:75802409-bccb-40e7-8e6b-0024FE6E00C3</UDN>
    <UPC>AVM TR-064</UPC>
    <serviceList>
     <service>
      <serviceType>urn:dslforum-
org:service:WLANConfiguration:1</serviceType>
      <serviceId>urn:WLANConfiguration-
com:serviceId:WLANConfiguration1</serviceId>
```

```
        <controlURL>/upnp/control/wlanconfig1</controlURL>
        <eventSubURL>/upnp/control/wlanconfig1</eventSubURL>
        <SCPDURL>/wlanconfigSCPD.xml</SCPDURL>
      </service>
...
    </serviceList>
   </device>
...
  </deviceList>
  <presentationURL>http://fritz.box</presentationURL>
 </device>
</root>
```

10.5 SOAP Request with Action GetSecurityPort

Unicast SOAP message from application to CPE using values from SCPD description file
and SSDP discovery response message.

```
POST /upnp/control/deviceinfo HTTP/1.1
HOST: 192.168.178.1:49000
CONTENT-LENGTH: 267
CONTENT-TYPE: text/xml; charset="utf-8"
SOAPACTION: "urn:dslforum-org:service:DeviceInfo:1#GetSecurityPort"
USER-AGENT: AVM UPnP/1.0 Client 1.0

<?xml version="1.0"?>
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"
s:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/">
<s:Body><u:GetSecurityPort xmlns:u="urn:dslforum-
org:service:DeviceInfo:1"></u:GetSecurityPort>
</s:Body>
</s:Envelope>
```

10.6 SOAP Response for Action GetSecurityPort

Unicast SOAP message from CPE to application.

```
HTTP/1.1 200 OK
DATE: Thu, 17 Jun 2010 11:53:59 GMT
SERVER: FRITZBOX UPnP/1.0 AVM FRITZ!Box Fon WLAN 7270 v3 74.04.85
CONNECTION: keep-alive
CONTENT-LENGTH: 324
CONTENT-TYPE: text/xml; charset="utf-8"
EXT:

<?xml version="1.0"?>
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"
s:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"><s:Body>
<u:GetSecurityPortResponse xmlns:u="urn:dslforum-
org:service:DeviceInfo:1">
<NewSecurityPort>49443</NewSecurityPort>
</u:GetSecurityPortResponse>
</s:Body> </s:Envelope>
```

10.7 Content Level Authentication

The used values are listed below.

Variable	Value	Remark
Username	admin	
Password	gurkensalat	
Realm	F!Box SOAP-Auth	Not writeable.
Nonce	F758BE72FB999CEA	
Auth	b4f67585f22b0af7c4615db5a18faa14	
Nonce (next value)	0B9813494DD27C93	

10.7.1 Initial Client Request

```xml
<?xml version="1.0" encoding="utf-8"?>
<s:Envelope s:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:s="http://schemas.xmlsoap.org/soap/envelope/" >
  <s:Header>
    <h:InitChallenge
      xmlns:h="http://soap-authentication.org/digest/2001/10/"
      s:mustUnderstand="1">
      <UserID>admin</UserID>
    </h:InitChallenge >
  </s:Header>
  <s:Body>
    <u:GetHostNumberOfEntries xmlns:u="urn:dslforum-org:service:Hosts:1">
    </u:GetHostNumberOfEntries>
  </s:Body>
</s:Envelope>
```

10.7.2 Server Response to Initial Client Request

```xml
<?xml version="1.0" encoding="utf-8"?>
<s:Envelope s:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:s="http://schemas.xmlsoap.org/soap/envelope/" >
  <s:Header>
    <h:Challenge
      xmlns:h="http://soap-authentication.org/digest/2001/10/"
      s:mustUnderstand="1">
      <Status>Unauthenticated</Status>
      <Nonce>F758BE72FB999CEA</Nonce>
      <Realm>F!Box SOAP-Auth</Realm>
    </h:Challenge>
  </s:Header>
  <s:Body>
    <sFault>
      <errorCode>503</errorCode>
      <errorDescription>Auth. failed</errorDescription>
    </s:Fault>
  </s:Body>
</s:Envelope>
```

10.7.3 Client Request with Authentication

```xml
<?xml version="1.0" encoding="utf-8"?>
<s:Envelope s:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:s="http://schemas.xmlsoap.org/soap/envelope/" >
  <s:Header>
    <h:ClientAuth
      xmlns:h="http://soap-authentication.org/digest/2001/10/"
      s:mustUnderstand="1">
      <Nonce>F758BE72FB999CEA</Nonce>
      <Auth>b4f67585f22b0af7c4615db5a18faa14</Auth>
      <UserID>admin</UserID>
      <Realm>F!Box SOAP-Auth</Realm>
    </h:ClientAuth>
  </s:Header>
  <s:Body>
    <u:GetHostNumberOfEntries xmlns:u="urn:dslforum-org:service:Hosts:1">
    </u:GetHostNumberOfEntries>
  </s:Body>
</s:Envelope>
```

10.7.4 Server Response for successful Authentication

```xml
<?xml version="1.0" encoding="utf-8"?>
<s:Envelope s:encodingStyle="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:s="http://schemas.xmlsoap.org/soap/envelope/" >
  <s:Header>
    <h:NextChallenge
      xmlns:h="http://soap-authentication.org/digest/2001/10/"
      s:mustUnderstand="1">
      <Status>Authenticated</Status>
      <Nonce>0B9813494DD27C93</Nonce>
      <Realm>F!Box SOAP-Auth</Realm>
    </h:NextChallenge>
  </s:Header>
  <s:Body>
    <u:GetHostNumberOfEntriesResponse
      xmlns:u="urn:dslforum-org:service:Hosts:1">
      <HostNumberOfEntries>42</HostNumberOfEntries>
    </u:GetHostNumberOfEntriesResponse>
  </s:Body>
</s:Envelope>
```

11 Appendix

11.1 References

TR064: DSL Forum, LAN-Side DSL CPE Configuration, 2004
SOAPAUTH01: Robert Cunnings, Rich Salz, SOAP Extensions: Basic and Digest
Authentication, 2001, http://www.whitemesa.com/soapauth.html
UPNP11: UPnP Forum, UPnP Device Architecture version 1.1, 2008