

PPP-controlled Settings for AVM's FRITZ!OS
supported by AVM

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History

Date	Version	Changes
2019-10-10	1.0	Initial version
2019-11-19	1.1	Line ID added
2020-05-05	1.2	TR-069 ACS Discovery added PAP-/CHAP-Info adapted Title changed
2025-05-05	1.3	USP Discovery added Added USP parameters to an example

1 Introduction

FRITZ!OS offers a special interface for Internet Service Providers (ISP) to set some useful system parameters. It gives ISP an easy option to configure each device with individual settings. These settings are conveyed via the Point to Point Protocol (PPP RFC 1334, 1994) at dial-in time and applied immediately in FRITZ!OS. This document describes how to make use of PPP-controlled settings for FRITZ!OS.

1.1 Speed Rate Shaping

Using the speed rates over this interface is especially useful for service providers if they have customers with line speeds exceeding the speed rates declared in their contract. For instance, on a DSL line the synchronized speed is 100/40 Mbit/s, but the customer signed a contract that offers only 50/10 Mbit/s. In this case the service provider can utilize this interface to set the speed rates to 50/10 Mbit/s, so that FRITZ!OS will automatically adopt these new speed rates and set up the internal shaping parameters accordingly. This will ensure proper QoS configuration in FRITZ!OS for services such as voice or others, even during high data load situations.

In addition to the speed rates, the type of rate will be transferred. The type can be either layer 2 (L2, Ethernet) or layer 3 (L3, IP only). FRITZ!OS will interpret the transferred speed rates with respect to the type provided. L2 means that the speed rate already includes the Ethernet header – this is not the case for L3.

For clarification: Normally, Ethernet frames are transmitted in any case. But the type of rate instructs the FRITZ!OS to interpret the rate as a value either including the Ethernet header (L2) or not (L3) .

FRITZ!OS will check the plausibility of the transferred speed rates. If the speed rates are very close to or higher than the line speed, FRITZ!OS will use the line speed rate instead. This allows the service provider to deliver customers speed rates irrespective of the available line speed.

The information will be transferred to the FRITZ!OS via PPP authentication and will be set in the PPP-PAP/CHAP authentication message, PAP=Code 2 or 3, CHAP=Code 3 or 4 (RFC 1334, 1994).

1.2 Line ID

The Line ID is provided only for information purposes and is displayed in the WebUI of the FRITZ!Box.

The information will be transferred to the FRITZ!OS via PPP authentication and will be set in the PPP-PAP/CHAP authentication message, PAP=Code 2 or 3, CHAP=Code 3 or 4 (RFC 1334, 1994).

1.3 TR-069 ACS Discovery

As part of PPP Authentication, a PPP server on the access network MAY be configured to include the ACS URL and the provisioning code in the PPP Authentication ACK. If FRITZ!OS needs to contact a ACS, it MAY use the PPP discovery mechanism if both conditions are met:

- FRITZ!OS has an empty value for the 'ManagementServer.URL' parameter
- FRITZ!OS has a PPP connection and authenticates successfully via PPP PAP or PPP CHAP

The information will be transferred to the FRITZ!OS via PPP authentication and will be set in the PPP-PAP/CHAP authentication message, PAP=Code 2, CHAP=Code 3 (RFC 1334, 1994).

The ACS URL MUST be in the form of a valid HTTPS URL. It indicates that FRITZ!OS MUST establish an SSL or TLS connection to the ACS. Other URLs than HTTPS will be ignored. The value of TR069URL is applied only if the ManagementServer.URL parameter is empty. The value of TR069PROVC is applied only if the ManagementServer.URL parameter is empty.

There is no PPP rediscover mechanism if FRITZ!OS obtained an ACS URL through PPP and it cannot reach the ACS.

FRITZ!OS will use DNS to resolve the IP address of the ACS from the host name component of the URL. The "host" portion of the ACS URL is used by FRITZ!OS to validate the certificate from the ACS. FRITZ!OS will authenticate the ACS using the root certificate store on FRITZ!OS.

Once FRITZ!OS has established a connection to the ACS via a CWMP Endpoint, the ACS MAY at any time modify the ACS URL Parameter (ManagementServer.URL) as well as the provisioning code (DeviceInfo.ProvisioningCode).

1.4 USP (TR-369) Controller Discovery

Similarly to TR-069 ACS discovery, a PPP server may configure a USP controller during PPP authentication.

For this, a controller URL with WebSocket or MQTT protocol, an endpoint ID, and a provisioning code must be included in the PPP-PAP/CHAP authentication message. If only a host name is provided for the URL, the default protocol WebSocket is assumed. The provisioning code may be an empty string, but the option must be assigned in the authentication message.

The connection minimum wait interval and interval multiplier are set to the default values given by the USP specification. Upon connection, the USP controller may change any of these and all other values.

Should any of the options contain invalid values, there is no negative response, the controller will simply not be added.

2 Variables

2.1 Speed rate downstream

SRD=xxxx

xxxx = speed rate in Kbit/s (1 Kbit/s = 1000 Bit/s)

2.2 Speed rate upstream

SRU=yyyy

yyyy = speed rate in Kbit/s (1 Kbit/s = 1000 Bit/s)

2.3 Speed rate type

SRT=zz

zz = speed rate type. Possible values are L2 or L3.

If the speed rate type is not delivered, the default value L3 will be used.

2.4 Line ID

LID=line-id

line-id = The Line ID.

2.5 TR-069 ACS URL

TR069URL=url

url = HTTPS URL of the ACS

url max. length: 128 Byte

allowed characters for url : [a-Z, 0-9, :.-_/]

2.6 TR-069 Provisioning Code

TR069PROVC=provisioningcode

provisioningcode = Provisioning Code

provisioningcode max. length: 64 Byte

2.7 USP Controller URL

USPURL=url

url = Controller URL (WSS or MQTT)

url max. length: 128 Byte

allowed characters for url : [a-Z, 0-9, :- _/]

2.8 USP Controller Provisioning Code

USPPRV=provisioningcode

provisioningcode = Provisioning Code

provisioningcode max. length: 64 Byte

2.9 USP Controller Endpoint ID

USPEID=endpointid

endpointid = Endpoint ID

endpointid max. length: 64 Byte

3 Syntax

All parameters are optional. The ACK/NAK response message must have the following format:

SRD=xxxx#SRU=yyyy#SRT=zz#LID=line-id#TR069URL=url#TR069PROVC=provisioningcode

For example:

SRD=50000#SRU=10000#SRT=L2#LID=PROVXYZ.DEU.VL.ABCD#

or

SRD=50000#SRU=10000#LID=PROVXYZ.DEU.VL.ABCD#

or

LID=PROVXYZ.DEU.VL.ABCD#USPURL=mqtt://acs.xyz123.com#USPPRV=setup#USPEID=se
lf::TEST#

or

SRD=50000#SRU=10000#TR069URL=https://myacs.xyz123.com:7547#TR069PROVC=setup#

3.1 Sample Trace

The image shows a Wireshark packet capture trace for a PPP connection. The top pane displays a list of 29 packets. Packet 23 is selected, showing its details in the middle pane and its raw data in the bottom pane.

Packet List:

No.	Time	Macrc	Source	Destination	Protocol	Length	Info
9	01:11:54.684301	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Broadcast	PPPoED	58	Active Discovery Initiation (PADI)
10	01:11:54.687748	Avm_19:c6:41	Avm_19:c6:41	AvmAudio_93:ee:68	PPPoED	89	Active Discovery Offer (PADO) AC-Name='isp'
11	01:11:54.687871	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPPoED	82	Active Discovery Request (PADR)
12	01:11:54.691195	Avm_19:c6:41	AvmAudio_93:ee:68	AvmAudio_93:ee:68	PPPoED	68	Active Discovery Session-confirmation (PADS)
13	01:11:54.691390	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP LCP	36	Configuration Request
14	01:11:54.694144	Avm_19:c6:41	AvmAudio_93:ee:68	AvmAudio_93:ee:68	PPP LCP	60	Configuration Request
15	01:11:54.694144	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP LCP	40	Configuration Ack
16	01:11:54.698095	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP LCP	36	Configuration Request
17	01:11:54.671424	Avm_19:c6:41	AvmAudio_93:ee:68	AvmAudio_93:ee:68	PPP LCP	60	Configuration Ack
18	01:11:54.671532	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP LCP	73	Discard Request
19	01:11:54.671626	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP PAP	34	Authenticate-Request (Peer-ID='avm', Password='avm')
20	01:11:54.671697	Avm_19:c6:41	AvmAudio_93:ee:68	AvmAudio_93:ee:68	PPP LCP	60	Echo Request
21	01:11:54.671697	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP LCP	30	Echo Reply
22	01:11:54.671765	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP LCP	73	Discard Request
23	01:11:54.674893	Avm_19:c6:41	AvmAudio_93:ee:68	AvmAudio_93:ee:68	PPP PAP	131	Authenticate-Ack (Message='SRD=50000#SRU=10000#SRT=L2#LID=Test-Lineid-Text#TR069URL=https://myacs.xyz123.com:7547#TR069PROVC=setup#')
24	01:11:54.675037	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP IPCP	44	Configuration Request
25	01:11:54.675210	Avm_19:c6:41	AvmAudio_93:ee:68	AvmAudio_93:ee:68	PPP IPCP	44	Configuration Request
26	01:11:54.675210	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP IPCP	32	Configuration Ack
27	01:11:54.678359	Avm_19:c6:41	AvmAudio_93:ee:68	AvmAudio_93:ee:68	PPP IPCP	60	Configuration Nak
28	01:11:54.678466	AvmAudio_93:ee:68	AvmAudio_93:ee:68	Avm_19:c6:41	PPP IPCP	44	Configuration Request
29	01:11:54.682344	Avm_19:c6:41	AvmAudio_93:ee:68	AvmAudio_93:ee:68	PPP IPCP	60	Configuration Ack

Packet 23 Details:

- Frame 23: 131 bytes on wire (1048 bits), 131 bytes captured (1048 bits)
- Ethernet II, Src: Avm_19:c6:41 (9c:c7:a6:19:c6:41), Dst: AvmAudio_93:ee:68 (e0:28:6d:93:ee:68)
- PPP-over-Ethernet Session
- Point-to-Point Protocol
- PPP Password Authentication Protocol
- Code: Authenticate-Ack (2)
- Identifier: 1
- Length: 109
- Data
- Message Length: 104
- Message: SRD=50000#SRU=10000#SRT=L2#LID=Test-Lineid-Text#TR069URL=https://myacs.xyz123.com:7547#TR069PROVC=setup#

Raw Data:

```
0000  e0 28 6d 93 ee 68 9c c7 a6 19 c6 41 08 64 11 00  (M'h: ...A.d
0010  00 64 00 0f c8 23 02 01 00 6d 68 52 52 44 50 52  ..o.#..m0005
0020  30 30 30 30 23 53 52 55 3d 11 30 30 30 30 23 53  SRD=50000#SRU=10000#S
0030  52 54 3d 4c 32 23 4c 49 44 3d 54 65 73 74 3d 4c  RT=L2#LID=Test-L
0040  69 6e 65 69 64 2d 54 65 70 74 23 54 52 30 36 35  Field-Te-xt#TR069
0050  55 52 4c 3d 68 74 74 70 73 3a 2f 2f 6d 79 61 63  URL=http s://myac
0060  73 2e 78 79 7a 31 32 33 2e 63 6f 6d 3a 37 35 34  s.xyz123 .com:754
0070  77 23 54 63 20 26 20 20 52 4f 56 43 34 73 65 34  #TR069# URL=htt
0080  75 70 23 44 34 34 34 34 34 34 34 34 34 34 34 34  up#
```