

Canopy PPPoE Quick Start Documentation

Canopy Firmware Engineering

PPPoE has been implemented as a Feature in software release 9.0 for Canopy Multipoint systems. PPPoE options will be configurable on the SM only. The AP will indicate whether or not PPPoE is enabled for a specific subscriber.

When PPPoE is enabled, once the RF session comes up between the SM and the AP, the SM will immediately attempt to connect to the PPPoE Server. You can watch the status of this by viewing the PPPoE Session Log in the Logs section (Administrator only). Every time the RF session comes up, the SM will check the status of the link and if it is down, the SM will attempt to redial the link if necessary depending on the Timer Type. This document will cover the configuration options for PPPoE on the Canopy SM. Also, on the Configuration page, the user may Connect or Disconnect the session manually. This can be used to override the session to force a manual disconnect and/or reconnect if there is a problem with the session.

In order to be enabled PPPoE, NAT MUST be enabled on the SM, and Translation Bridging MUST be disabled on the AP. These items will be strictly enforced for you when you are trying to enable PPPoE. A message will indicate any prerequisites not being met. Also, the NAT Public IP DHCP client cannot be enabled. This is because the NAT Public IP will be received through the IPCP process of the PPPoE discovery stages.

Configuration

On the SM, there is a new PPPoE Configuration Page:

On this page, there are several options for configuring PPPoE.

In order to enable PPPoE, pre-requisites will be checked. If any of them fail, PPPoE will remain disabled and a message will display indicating the reason for failure. For example, if the user attempts to enable PPPoE without enabling NAT prior, then this will be the resulting display:

The pre-requisites required are:

- NAT MUST be ENABLED on the SM
 - NAT DHCP Client will be disabled automatically. The NAT public IP will be received from the PPPoE Server.

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- NAT Public Network Interface Configuration will not be used and should be left to defaults. Also, NAT Public IP DHCP will be disabled if it is enabled.
- Translation Bridging **MUST** be **DISABLED** on the AP
 - This will only be determined if the SM is in session since the SM won't know the AP configuration otherwise. If SM is not in session, PPPoE can be enabled, but if the SM goes in session to a Translation Bridge enabled AP, then PPPoE will not be enabled.

Once PPPoE is enabled, then the following configuration options may be customized:

- **PPPoE Authentication Type**
 - Currently only None and PAP are supported. There are currently no plans to support any other Authentication protocols.
- **PPPoE Access Concentrator**
 - An optional entry to set a specific AC to connect to for the PPPoE Session. If this is blank, the SM will accept the first AC which matches the Service Name, if specified. This is limited to 32 characters.
- **PPPoE Service Name**
 - An optional entry to set a specific Service Name to connect to for the PPPoE Session. If this is blank the SM will accept the first Service option that comes back from the AC specified above, if any. This is limited to 32 characters.
- **PPPoE User Name**
 - This is the PAP user name that will be used if PAP authentication is selected. If "None" is selected for authentication then this field has no use. This is limited to 32 characters.
- **PPPoE PAP Password**
 - This is the PAP password that will be used if PAP Authentication is selected. If "None" is selected for authentication then this field has no use. This is limited to 32 characters.

- **PPPoE MTU**

- User Defined MTU
 - Allows the user to specify an MTU value to use to override any MTU that may be determined in LCP phase of PPPoE Session setup.
 - If this is selected, the user will be able to enter an MTU value up to 1492. However, if the MTU determined in LCP negotiations is SMALLER than this user-specified value, the SM will use the smaller value as its MTU for the PPPoE link.
- Use MTU Received from PPPoE Server
 - This option will cause the SM to use the MRU of the PPPoE Server received in LCP as the MTU for the PPPoE link.

- **Timer Type**

- **Keep Alive** – This is the default Timer Type. This timer will enable a keepalive that will check the status of the link periodically. The user can set a keepalive period. If no data is seen from the PPPoE server for that period, the link will be taken down and a reconnection attempt will be started.
 - For marginal links, the keep alive timer can be useful so that the session will stay alive over periodic dropouts. The Keepalive timer should set such that the session can outlast any session drop. Some PPPoE servers will have a session check timer of their own, so the timeouts of the Server and the SM should be in sync so that one side doesn't drop the session prematurely.
- **Idle Timeout** – This timer will enable an idle timeout timer that will check the usage of the link from the customer side. If there is no data seen from the customer for the idle timeout period, the PPPoE session will be dropped. Once data starts flowing from the customer again, the session will be started up again.
 - This timer is useful for users who may not be using the connection very much. If they are idle for long periods of time, this timer will allow the resources used by the session to be returned to the server. Once the connection is used again by the customer, the link will be reestablished automatically.

- **Timer Values** – For the Keep Alive timer, the timeout period is in seconds with a minimum value of 20 seconds. For the idle timer, the timeout period is in minutes with a minimum value of 5 minutes.
- **TCP MSS Clamping**
 - If this is enabled, then the SM will alter TCP SYN and SYN-ACK packets by changing the Maximum Segment Size to be compatible the current MTU of the PPPoE link. This way the user does not have to worry about MTU on the client side for TCP packets. The MSS will be set to the current MTU – 40 (20 bytes for IP and 20 bytes for TCP headers). This will cause the application on the client side to not send any TCP packets larger than the MTU.
 - If you are seeing what looks like large packet loss (web pages taking forever to load, etc), try enabling this option. This may also be an option on the PPPoE server itself. The SM will NOT reassemble IP fragments, so if the MTU's are incorrect on the end stations, then MSS clamping will solve that problem for TCP connections.

Another section is on the PPPoE configuration page called PPPoE Connect On Demand. There are two buttons that will attempt to do what they say: Connect or Disconnect. Disconnecting manually will also stop the KeepAlive or Idle Timeout timers from running so that the SM doesn't attempt to reconnect on its own. The automatic connect on RF session coming up is still enabled and will override a manual disconnect. For example, if you manually disconnect, and then the RF session bounces, when the RF session comes back up, the SM will automatically try to dial the PPPoE server.

All of these items are also configurable via SNMP. The OIDs for configuration are found in the following table:

whispSMConfig Additions		
SNMP OID Value SNMP OID Name	SNMP Type	SNMP Access
.1.3.6.1.4.1.161.19.3.2.1.77.0 WHISP-SM-MIB::PPPoEEnable.0	INTEGER 0 – enable 1 - disable	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.78.0 WHISP-SM-MIB::PPPoEAuthenticationType.0	INTEGER 0 – disabled 1 – PAP	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.79.0 WHISP-SM-MIB::PPPoEAccessConcentrator.0	DisplayString Default: "" MaxLen: 32 char	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.80.0 WHISP-SM-MIB::PPPoEServiceName.0	DisplayString Default: "" MaxLen: 32 char	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.81.0 WHISP-SM-MIB::PPPoEPAPUserName.0	DisplayString Default: "" MaxLen: 32 char	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.82.0 WHISP-SM-MIB::PPPoEPAPPassword.0	DisplayString Default: "" MaxLen: 32 char	Write
.1.3.6.1.4.1.161.19.3.2.1.83.0 WHISP-SM-MIB::PPPoETCPMSSClampEnable.0	INTEGER 0 – enable 1 - disable	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.84.0 WHISP-SM-MIB::PPPoEMTUOverrideEnable.0	INTEGER 0 – enable 1 - disable	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.85.0 WHISP-SM-MIB::PPPoEMTUOverrideValue.0	INTEGER Range: 0 - 1492	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.86.0 WHISP-SM-MIB::PPPoETimerType.0	INTEGER 0 – Disable 1 – KeepAlive 2 – Idle Timeout	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.87.0 WHISP-SM-MIB::PPPoETimeoutPeriod.0	INTEGER Range: KeepAlive: >=20s IdleTimeout: >= 5m	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.91.0 WHISP-SM-MIB::PPPoEConnectOD.0	INTEGER 1 - connect	Read/Write
.1.3.6.1.4.1.161.19.3.2.1.92.0 WHISP-SM-MIB::PPPoEDisconnectOD.0	INTEGER 1 - disconnect	Read/Write

Statistics

For PPPoE Statistic and Link information there have been some additions to the webpage as well. For a quick glance at the PPPoE Session status, the following has been added to the main SM status page:

Subscriber Module Stats	
Session Status :	REGISTERED VC 20 Rate 2X/2X
Session Uptime :	01:14:10
PPPoE Session Status :	In Session
PPPoE Session Uptime :	01:14:09

Also, on the AP, there is a new entry in the Session Status of each SM indicating whether SM PPPoE is enabled, and if so, the status of that session. If PPPoE is disabled, or the SM doesn't support PPPoE (Pre 9.0), this line will not be displayed.

Session Status List
LUID: 002 : MAC: 0a-00-3e-f0-1a-27 State: IN SESSION (Encrypt Disabled)
Site Name : Firmware Public SM #108 (P8)
Software Version : CANOPY 9.0 (W) 04/02/2008 18:31
Software Boot Version : CANOPYBOOT 3.0
FPGA Version : 012308 (DES, Sched, NO DFS) P8
Session Timeout: 0, AirDelay 2 (approximately 0.02 miles (98 feet))
Session Count: 60, Reg Count: 56, Re-Reg Count: 4
SM PPPoE: Enabled SM PPPoE State: In Session
RSSI (Avg/Last): 2515/2510 Jitter (Avg/Last): 1/1 Power Level (Avg/Last): -23/-23
Sustained Uplink Data Rate (SM): 3500 (kbit)
Uplink Burst Allocation (SM): 500000 (kbit)
Sustained Downlink Data Rate (SM): 3500 (kbit)
Downlink Burst Allocation (SM): 500000 (kbit)
Low Priority Uplink CIR (SM): 0 (kbps) Low Priority Downlink CIR (SM): 0 (kbps)
Rate : VC 18 Rate 1X/1X

Also, once a user is logged in at administrator level there are several more areas to find information about the link.

On the Home => Network Interface page there is a new section showing the IP address, PPPoE Session Status, and PPPoE Session ID, Access Concentrator, and Service Name currently in use. Remember, the IP of the PPPoE interface is the IP received from the PPPoE Server and will be used as the NAT Public IP.

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- Home
- Configuration
- Statistics
- Tools
- Logs
- Account
- PDA
- Copyright
- Logoff
- Account admin Level ADMINISTRATOR

General Status
Event Log
Network Interface
Layer 2 Neighbors

Home => Network Interface

5.7GHz - Subscriber Module - 0a-00-3e-f2-8c-2e

LAN1 Network Interface	
Ethernet Interface :	100Base-TX Full Duplex
IP address :	169.254.1.1
Subnet Mask :	255.255.255.0
DHCP status :	DHCP not enabled

RF Public Network Interface (Valid only when NAT enabled with public addressing)	
IP address :	10.2.133.212
Subnet Mask :	255.255.255.0
Gateway IP address :	10.2.133.254
DHCP status :	Address acquired

RF PPPoE Interface (Valid only when NAT and PPPoE Enabled)	
IP address :	10.2.150.20
PPPoE Session Status :	In Session
PPPoE AC Name :	Canopy
PPPoE Service Name :	Canopy
PPPoE Session ID :	1

On the Statistics Page there is a new entry called PPPoE Statistics. This page will display more information about the link.

Scheduler
NI Buffer
Bridge Control Block
Bridging Table
Translation Table
Ethernet
Socket
Radio

VLAN
Data VC
Filter
NAT Stats
NAT DHCP
Web GUI Engine
ARP
Overload
PPPoE Statistics

Statistics => PPPoE Statistics

5.7GHz - Subscriber Module - 0a-00-3e-fb-80-cd

PPPoE Statistics	
IP address :	10.2.150.39
PPPoE Session Status :	In Session
PPPoE AC Name :	MikroTik
PPPoE Service Name :	screentik
PPPoE Session ID :	1639
PPPoE Session Uptime :	18:28:17
PPPoE Session Idle Time :	00:00:00
PPPoE Session MTU :	1492
Primary DNS Address :	172.16.20.2
Secondary DNS Address :	172.16.20.3
PPPoE Control Bytes Sent :	363004
PPPoE Control Bytes Received :	774272
PPPoE Data Session Bytes Sent :	25553467
PPPoE Data Session Bytes Received :	626013193

All of these Statistics are also accessible via SNMP. The following table covers the OIDs to be used for PPPoE Statistics:

whispSMStatus Additions		
SNMP OID Value SNMP OID Name	SNMP Type	SNMP Access
.1.3.6.1.4.1.161.19.3.2.2.37.0 WHISP-SM-MIB::PPPoESessionStatus.0	DisplayString	Read Only
.1.3.6.1.4.1.161.19.3.2.2.38.0 WHISP-SM-MIB::PPPoESessionID.0	INTEGER	Read Only
.1.3.6.1.4.1.161.19.3.2.2.39.0 WHISP-SM-MIB::PPPoEIPCPAddress.0	IpAddress	Read Only
.1.3.6.1.4.1.161.19.3.2.2.40.0 WHISP-SM-MIB::PPPoEMTUOverrideEn.0	INTEGER 0 – disabled 1 – enabled	Read Only
.1.3.6.1.4.1.161.19.3.2.2.41.0 WHISP-SM-MIB::PPPoEMTUValue.0	INTEGER Current MTU value in use.	Read Only
.1.3.6.1.4.1.161.19.3.2.2.42.0 WHISP-SM-MIB::PPPoETimerTypeValue.0	INTEGER 0 – disabled 1 – KeepAlive 2 – Idle Time	Read Only
.1.3.6.1.4.1.161.19.3.2.2.43.0 WHISP-SM-MIB::PPPoETimeoutValue.0	INTEGER	Read Only
.1.3.6.1.4.1.161.19.3.2.2.44.0 WHISP-SM-MIB::PPPoEDNSServer1.0	IpAddress	Read Only
.1.3.6.1.4.1.161.19.3.2.2.45.0 WHISP-SM-MIB::PPPoEDNSServer2.0	IpAddress	Read Only
.1.3.6.1.4.1.161.19.3.2.2.46.0 WHISP-SM-MIB::PPPoEControlBytesSent.0	INTEGER	Read Only
.1.3.6.1.4.1.161.19.3.2.2.47.0 WHISP-SM-MIB::PPPoEControlBytesReceived.0	INTEGER	Read Only
.1.3.6.1.4.1.161.19.3.2.2.48.0 WHISP-SM-MIB::PPPoEDataBytesSent.0	INTEGER	Read Only
.1.3.6.1.4.1.161.19.3.2.2.49.0 WHISP-SM-MIB::PPPoEDataBytesReceived.0	INTEGER	Read Only
.1.3.6.1.4.1.161.19.3.2.2.50.0 WHISP-SM-MIB::PPPoEEnabledStatus.0	INTEGER 0 – disabled 1 – enabled	Read Only
.1.3.6.1.4.1.161.19.3.2.2.51.0 WHISP-SM-MIB::PPPoETCPMSSClampEnableStatus.0	INTEGER 0 – disabled 1 – enabled	Read Only
.1.3.6.1.4.1.161.19.3.2.2.52.0 WHISP-SM-MIB::PPPoEACNameStatus.0	DisplayString	Read Only
.1.3.6.1.4.1.161.19.3.2.2.53.0 WHISP-SM-MIB::PPPoESvcNameStatus.0	DisplayString	Read Only
.1.3.6.1.4.1.161.19.3.2.2.54.0 WHISP-SM-MIB::PPPoESessUptime.0	TimeTicks	Read Only
.1.3.6.1.4.1.161.19.3.2.2.60.0 WHISP-SM-MIB::PPPoESessIdleTime.0	TimeTicks	Read Only

High Priority

IP Prioritization will work normally in the upstream direction. This is because the packet does not get its PPPoE header attached until it leaves the FEC interface of the AP. In the downstream direction, the packets will already have a PPPoE header attached, so the IP priority field will be masked. To get around this, we will dig into the IP portion of the PPP packet and pull out the Priority information. This will allow us to properly prioritize PPPoE packets in the downstream direction as well.

The prioritization of PPPoE packets through other switches and or routers should be explored so you can retain QoS originally set in the IP header.

Logs

Finally, on the Logs page, there is a new section called PPPoE Session Log. This log is for development use in debugging issues with the PPPoE Session.

The screenshot shows a web interface with a navigation menu on the left and a main content area. The navigation menu includes links for Home, Configuration, Statistics, Tools, Logs, Account, PDA, Copyright, and Logoff. The main content area has a breadcrumb trail: NAT Table > PPPoE Session Log. The title is 'Logs => PPPoE Session Log' and the subtitle is '5.7GHz - Subscriber Module - 0a-00-3e-f2-8c-2e'. The log entries are as follows:

```
PPPoE Session Log
02:32:59 UT : Tue Jan 02 2001 : c0 21 09 02 00 08 00 df 01 29
02:32:59 UT : Tue Jan 02 2001 : rcvd PPPoE data pkt, type 0xc021

02:32:59 UT : Tue Jan 02 2001 : ppp link 0xdf011c rcvd:
02:32:59 UT : Tue Jan 02 2001 : c0 21 0a 02 00 08 d7 d4 47 09 00 00 00 00 00 00 00 00 00 00 00 00 00
02:32:59 UT : Tue Jan 02 2001 : ppp_inpkt (link 0xdf011c); prot: LCP, code PECHOREP, state OPENED, len 34

02:33:04 UT : Tue Jan 02 2001 : link 0xdf011c sending:
02:33:04 UT : Tue Jan 02 2001 : c0 21 09 02 00 08 00 df 01 29
02:33:04 UT : Tue Jan 02 2001 : rcvd PPPoE data pkt, type 0xc021

02:33:04 UT : Tue Jan 02 2001 : ppp link 0xdf011c rcvd:
02:33:04 UT : Tue Jan 02 2001 : c0 21 0a 02 00 08 d7 d4 47 09 00 00 00 00 00 00 00 00 00 00 00 00 00
02:33:04 UT : Tue Jan 02 2001 : ppp_inpkt (link 0xdf011c); prot: LCP, code PECHOREP, state OPENED, len 34
```