

# University of Babylon, IT College

Information Network Dep., Third Class, Second Semester



## MTCNA Course

MikroTik Certified Network Associate

2015-2016

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## **Secure local network;**

- point-to-point addresses;
- create PPPoE client on
- PPPoE service-name;
- create PPPoE server + LAB;

## **PPP settings;**

- ppp secret + LAB;
- ppp profile + LAB;
- ppp status;

## **IP pool;**

- create pool;
- manage ranges;
- assign to service;

# Point-to-point protocol

- In networking, the Point-to-Point Protocol (PPP) is a *data link protocol* commonly used in establishing a direct connection between two networking nodes. It can provide connection authentication, transmission encryption and compression.

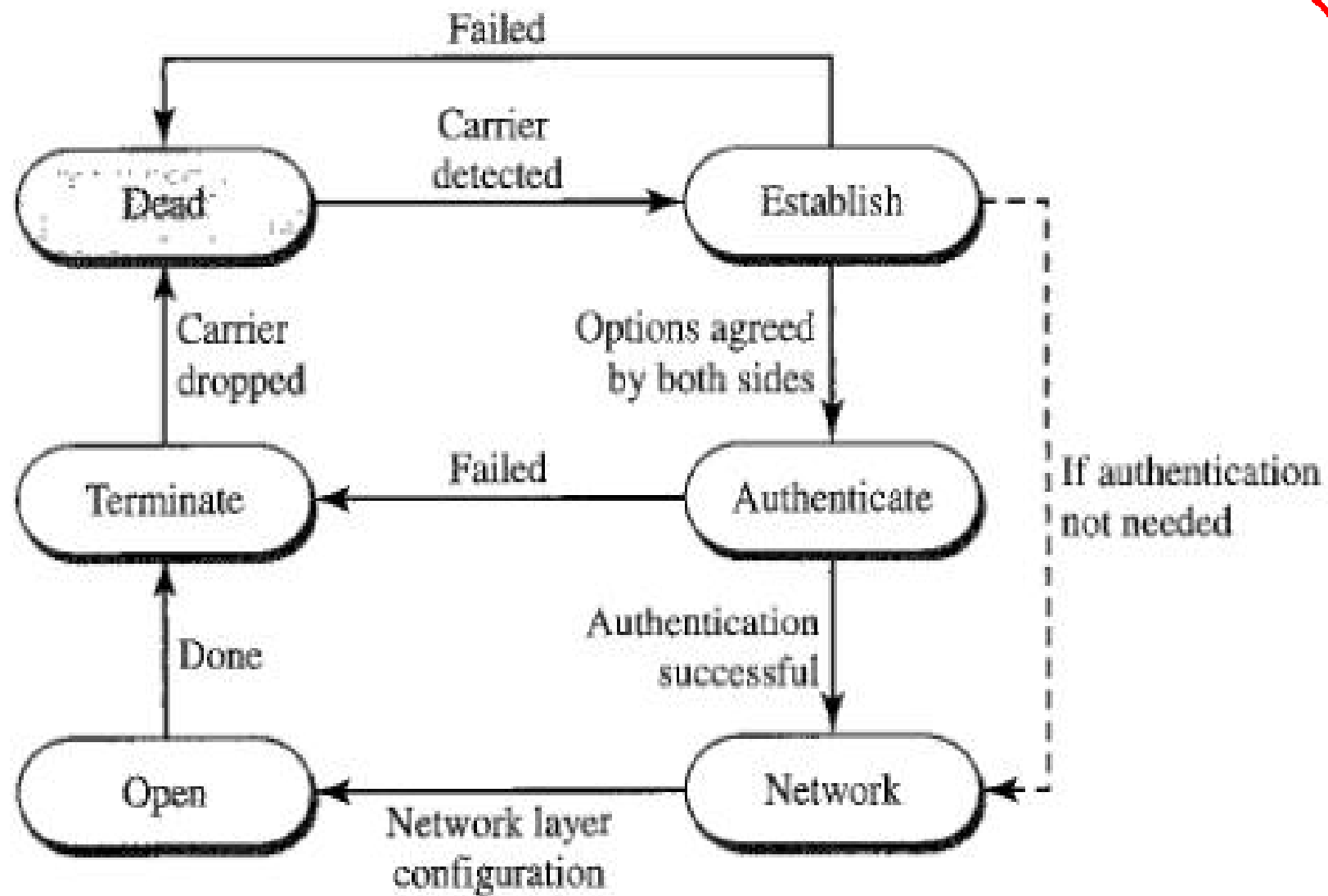
- PPP is used over many types of physical networks including *serial cable*, *phone line*, *cellular telephone*, radio links, and fiber optic links.
- PPP is also used over Internet access connections (now marketed as "**broadband**").

Most encapsulated forms of PPP is *Point-to-Point Protocol over Ethernet* (PPPoE) which used most commonly by Internet Service Providers (ISPs) to establish an Internet service connection with customers.

- RFC 2516 describes Point-to-Point Protocol over Ethernet (PPPoE) as a method for transmitting PPP over Ethernet

- The PPPoE (Point to Point Protocol over Ethernet) protocol provides extensive user management, network management and accounting benefits to ISPs and network administrators. Currently PPPoE is used mainly by ISPs to control client connections for Ethernet networks. PPPoE is an extension of the standard Point to Point Protocol (PPP). The difference between them is expressed in transport method: PPPoE employs Ethernet instead of serial modem connection.

## *Transition Phases*





## ***Transition Phases***

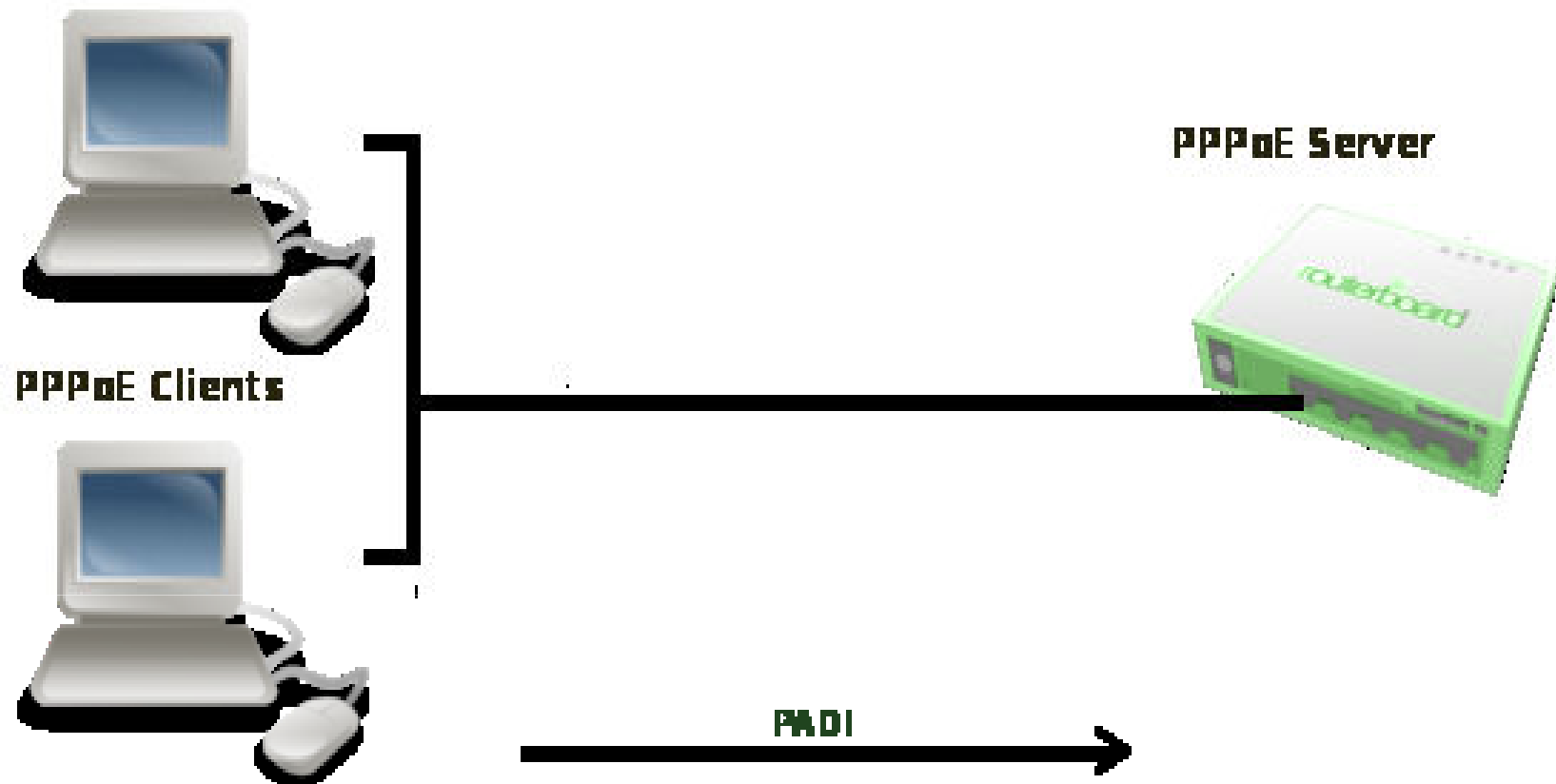
- **Dead:** In the dead phase the link is not being used. There is no active carrier (at the physical layer) and the line is quiet.
- **Establish:** When one of the nodes starts the communication, the connection goes into this phase. In this phase, options are negotiated between the two parties. If the negotiation is successful, the system goes to the authentication phase (if authentication is required) or directly to the networking phase. The link control protocol packets, that will be discussed shortly, are used for this purpose. Several packets may be exchanged here.

## ***Transition Phases***

- **Authenticate:** The authentication phase is optional; the two nodes may decide, during the establishment phase, not to skip this phase. However, if they decide to proceed with authentication, they send several authentication packets. If the result is successful, the connection goes to the networking phase; otherwise, it goes to the termination phase.
- **Network:** In the network phase, negotiation for the network layer protocols takes place. PPP specifies that two nodes establish a network layer agreement before data at the network layer can be exchanged. The reason is that PPP supports multiple protocols at the network layer. If a node is running multiple protocols simultaneously at the network layer, the receiving node needs to know which protocol will receive the data.

## *Transition Phases*

- **Open:** In the open phase, data transfer takes place. When a connection reaches this phase, the exchange of data packets can be started. The connection remains in this phase until one of the endpoints wants to terminate the connection.
- **Terminate:** In the termination phase the connection is terminated. Several packets are exchanged between the two ends for house cleaning and closing the link.



- PPPoE is used to hand out IP addresses to clients based on the username.

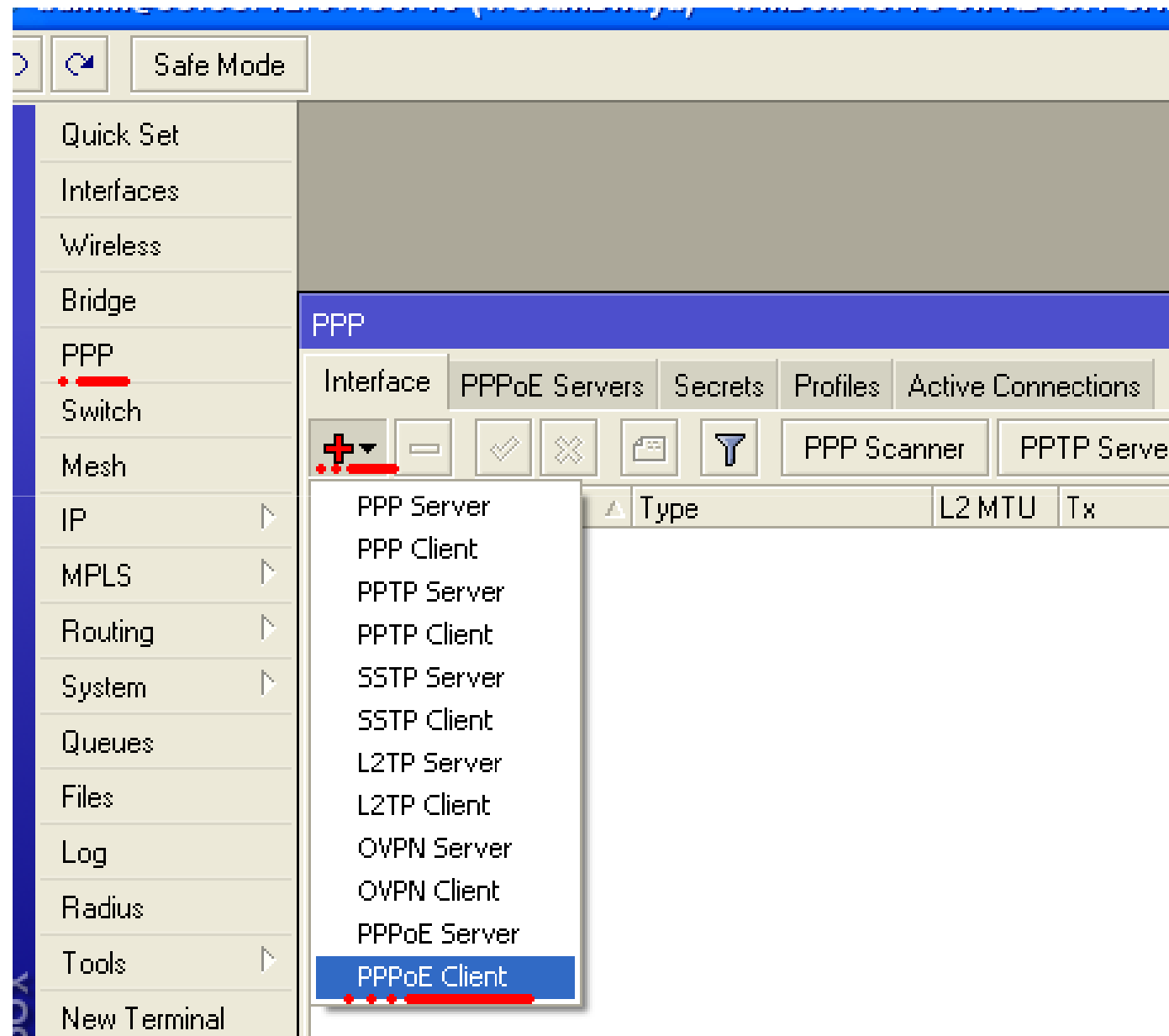
# Supported

- MikroTik RouterOS PPPoE client to any PPPoE server
- MikroTik RouterOS server to multiple PPPoE clients (clients are available for almost all operating systems and most routers)

# Hardware usage

- PPPoE server may require additional RAM (uses approx. 9KiB (plus extra 10KiB for packet queue, if data rate limitation is used) for each connection) and CPU power. Maximum of 65535 connections is supported .

# PPPoE client configuration





**New Interface** [X]

General | Dial Out | Status | Traffic

Name:

Type:

Max MTU:

Max MRU:

MRRU:

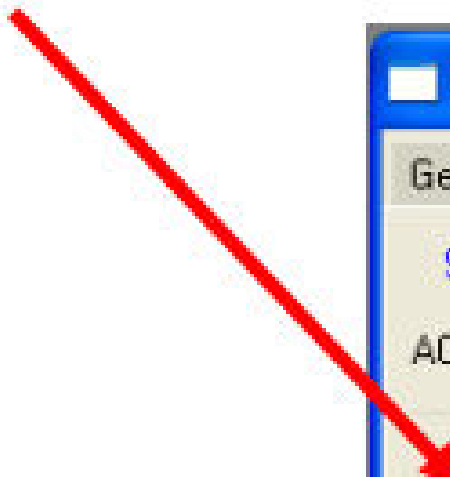
Interface:

OK  
Cancel  
Apply  
Disable  
Comment  
Copy  
Remove  
Torch

disabled | running | slave | Status:

- You need to set Interface

## Set Login and Password



**New Interface**

General | Dial Out | Status | Traffic

Service: MikroTik

AC Name:

User: class1

Password:

Profile: default

☐ Dial On Demand

☒ Add Default Route

☐ Use Peer DNS

Allow

☒ pap ☒ chap

☒ mschap1 ☒ mschap2

disabled | running | slave | Status:

OK

Cancel

Apply

Disable

Comment

Copy

Remove

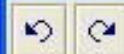
Torch

# **PPPoE Server**

## **(Access Concentrator)**

To configure MikroTik RouterOS to be an PPPoE Server:

- 1- Add an address pool for the clients
- 2- Add ppp profile;
- 3- Add ppp secret (username/password);
- 4- Add pppoe server itself.
- 5-Add Masquerade action to the firewall



Safe Mode

☒ Hide Passwords

Quick Set

Interfaces

Wireless

Bridge

PPP

Switch

Mesh

IP

MPLS

Routing

System

Queues

Files

Log

Radius

Tools

New Terminal

MetaROUTER

Make Supout.tif

Manual

Exit

PPP

Interface

PPPoE Servers

Secrets

Profiles

Active Connections



PPP Scanner

PPTP Server

SSTP Server

L2TP Server

OVPN Server

PPP

Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx Drops	Tx B
pppoe-Server	PPPoE Server		0 bps	0 bps	0	0	0	0	

Interface &lt;pppoe-Server&gt;



General

Status

Traffic

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Torch

Name: pppoe-Server

Type: PPPoE Server

L2 MTU:

User:

Service:



enabled





















running

slave:

Status: disconnected

1 item out of 7 (1 selected)

  Safe Mode

-  Quick Set
-  CAPsMAN
-  Interfaces
-  Wireless
-  Bridge
-  PPP
-  Switch
-  Mesh
-  IP
-  IPv6
-  MPLS
-  OpenFlow
-  Routing
-  System
-  Queues
-  Files
-  Log
-  Radius
-  Tools
-  New Terminal
-  MetaROUTER

## PPP

Interface


PPPoE Servers

Secrets

Profiles

Active Connections



Service ...	Interface	Max MTU	Max MRU	MRRU	Default Profile	Authentication
 pppoe	ether2	1480	1480	1600	default	pap

## PPPoE Service &lt;pppoe&gt;

Service Name: pppoe

Interface: ether2

Max MTU: 1480

Max MRU: 1480

MRRU: 1600

Keepalive Timeout: 10

Default Profile: default

☒ One Session Per Host

Max Sessions:

- Authentication

☒ pap☐ chap☐ mschap1☐ mschap2

enabled

OK

Cancel

Apply

Disable

Copy

Remove



Safe Mode



Quick Set



CAPsMAN



Interfaces



Wireless



Bridge



PPP



Switch



Mesh



IP



IPv6



MPLS



OpenFlow



Routing



System



Queues



Files

## IP Pool

Pools

Used Addresses



Name	Addresses	Next Pool
pppoe-pool	10.12.13.1-10.12.13.253	none

### IP Pool <pppoe-pool>

Name: pppoe-pool

Addresses: 10.12.13.1-10.12.13.253

Next Pool: none

OK

Cancel

Apply

Copy

Remove

Safe Mode

Quick Set

CAPsMAN

Interfaces

Wireless

Bridge

PPP

Switch

Mesh

IP

IPv6

MPLS

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PPPoE Servers

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Active Connections



Name	Local Address	Remote Address	Bridge	Rate Limit...	Only One	
* default					default	
* default-encr...					default	
* it-pppoe	10.12.13.254	pppoe-pool		1m/1m	default	

PPP Profile &lt;it-pppoe&gt;

General

Protocols

Limits

Queue

Name: it-pppoe

Local Address: 10.12.13.254

Remote Address: pppoe-pool

Remote IPv6 Prefix Pool:

DHCPv6 PD Pool:

Bridge:

Bridge Port Priority:

Bridge Path Cost:

Incoming Filter:

OK

Cancel

Apply

Comment

Copy

Remove



# New PPP Profile



General

Protocols

Limits

Session Timeout:



Idle Timeout:



Rate Limit (rx/tx):



— Only One —



default



no



yes

OK

Cancel

Apply

Comment

Copy

Remove

Safe Mode

Hide Passwords

Quick Set

CAPsMAN

Interfaces

Wireless

Bridge

PPP

Switch

Mesh

IP

IPv6

MPLS

OpenFlow

Routing

System

Queues

Files

Log

Radius

Tools

New Terminal

MetaROUTER

Partition

Make Sure of

PPP

Interface

PPPoE Servers

Secrets

Profiles

Active Connections

PPP Authentication & Accounting

Find

Name	Password	Service	Caller ID	Profile	Local Address	Remote Address	Last Logg
IT	2015	pppoe		profile1			Apr/22/2

PPP Secret <IT>

Name: IT

Password: 2015

Service: pppoe

Caller ID:

Profile: profile1

Local Address:

Remote Address:

Remote IPv6 Prefix:

Routes:

Limit Bytes In:

Limit Bytes Out:

OK

Cancel

Apply

Disable

Comment

Copy

Remove

2 items

Safe Mode

Quick Set

CAPsMAN

Interfaces

Wireless

Bridge

PPP

Switch

Mesh

IP

IPv6

MPLS

OpenFlow

Routing

System

Queues

Files

Log

Radius

Tools

New Terminal

Firewall

Filter Rules

NAT

Mangle

Service Ports

Connections

Address Lists

Layer7 Protocols



00 Reset Counters

00 Reset All Counters

#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Inter...	Out. Int...	Bytes	Packets
0	masquerade	srcnat	10.12.13.1-...							623.0 KiB	2 759

NAT Rule &lt;10.12.13.1-10.12.13.253&gt;

General

Advanced

Extra

Action

Statistics

Chain: srcnat

Src. Address: ☐ 10.12.13.1-10.12.13.253

Dst. Address:

Protocol:

Src. Port:

Dst. Port:

Any. Port:

In. Interface:

Out. Interface:

Packet Mark:

OK

Cancel

Apply

Disable

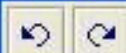
Comment

Copy

Remove

Reset Counters

Reset All Counters



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☒ Hide Passwords

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MPLS



Routing



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MetaROUTER

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Exit

## New NAT Rule



General

Advanced

Extra

Action

Statistics

Action: masquerade



OK

Cancel

Apply

Disable

Comment

Copy

Remove

Reset Counters

Reset All Counters

enabled