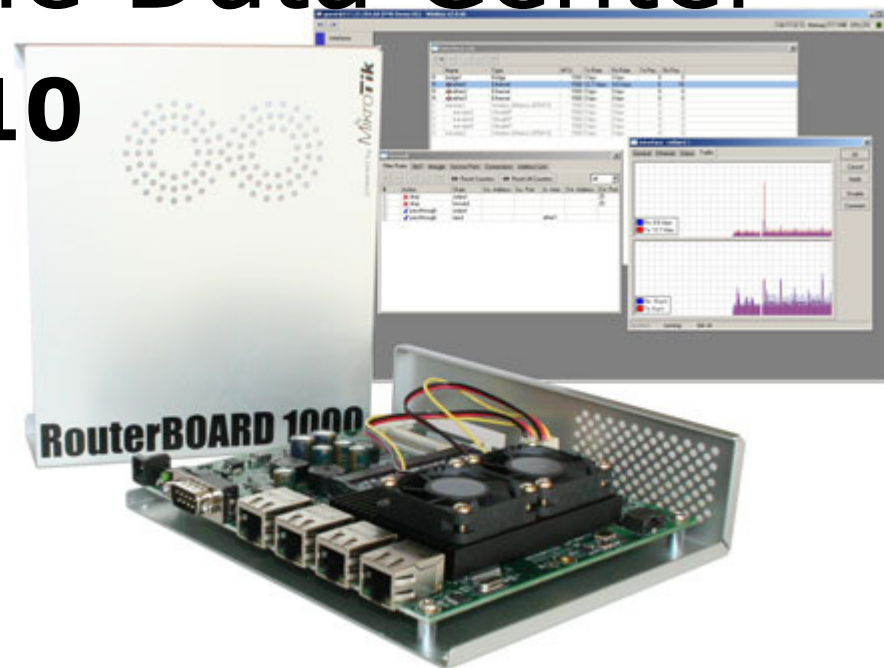


# RouterOS in the Data Center

## MUM Poland 2010

by Patrik Schaub



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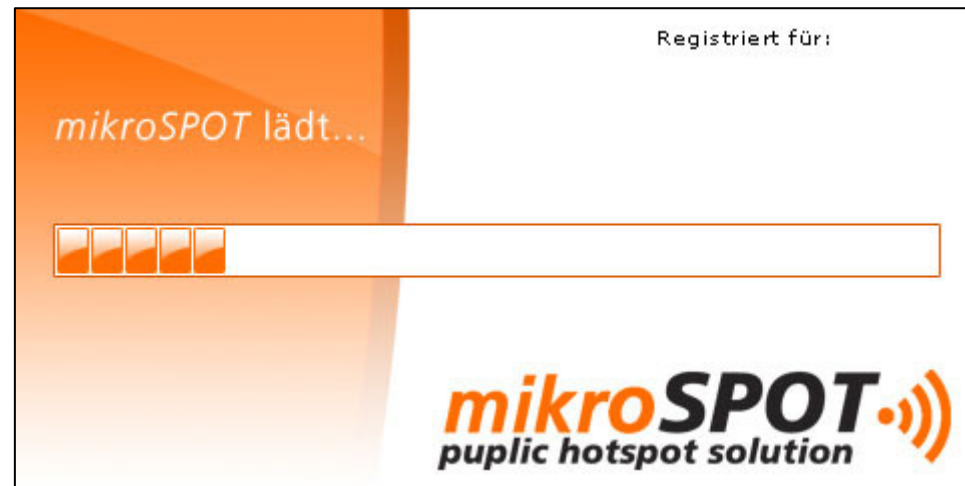
## About FMS

Patrik Schaub, [schaub@fmsweb.de](mailto:schaub@fmsweb.de)

- Founded in 1999
- MikroTik
  - Distribution ([www.mikrotik-shop.de](http://www.mikrotik-shop.de))
  - Training ([www.mikrotik-training.de](http://www.mikrotik-training.de))
  - Consulting and service contracts
  - Custom AAA development
- Supplementary products
- Own / exclusive product lines

# mikroSPOT Addon Software

- Hotspot management for windows
- Controls a RouterOS based hotspot
- Easy to use for untrained staff (hotel, camping...)



# mikroSPOT Addon Software

- Resellers welcome
- Test drive at our distributor tabel



The screenshot shows a registration form for mikroSPOT. The form is set against an orange background with abstract wavy lines. It contains several input fields for personal and contact information, dropdown menus for payment and validity, and a checkbox for SMS notifications. At the bottom, there are three buttons: [Speichern], [Abbrechen], and [Abmelden]. The mikroSPOT logo is in the bottom right corner.

Vorname:	Nachname:
<input type="text"/>	<input type="text"/>
E-Mail:	Handy:
<input type="text"/>	<input type="text"/>
Bezahlprofil:	Gültig bis:
<input type="text"/> 	<input type="text"/> 
Profil:	Tage/Zeitraum:
<input type="text"/> 	<input type="text"/> 
<input type="checkbox"/> SMS mit Zugangsdaten senden?	

[Speichern] [Abbrechen] [Abmelden]

**mikroSPOT**   
public hotspot solution

## mikroCase Classic

- For RouterBOARD, ALIX and ITX
- Two mainboards per U

Classic series:

- Integrated PSU
- Integrated DSL modem possible



## mikroCase Budget

- For RouterBOARD, ALIX and ITX
- Two mainboards per U (except RB493)

Budget series:

- Low cost
- External PSU



# Licenced band microwave equipment

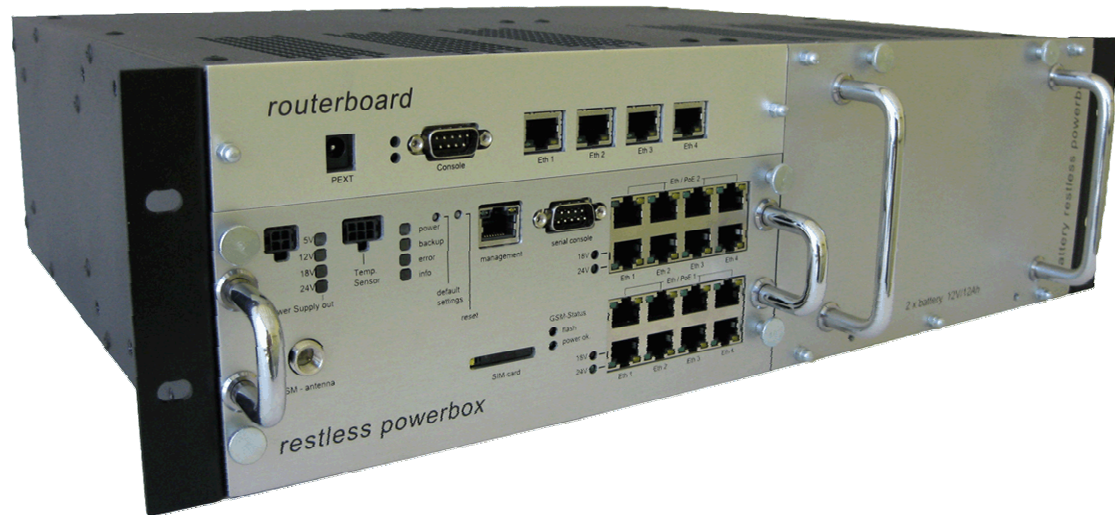
- Licenced band (7-38GHz)
- Up to 800MBit Full Duplex
- Full outdoor and split mount available
- Ideal as backhaul for MikroTik basestations





## Restless Powerbox

- Remote control passive PoE ports
- Integrated RouterBOARD (optional)
- Integrated UPS
- SMS/Email alarms

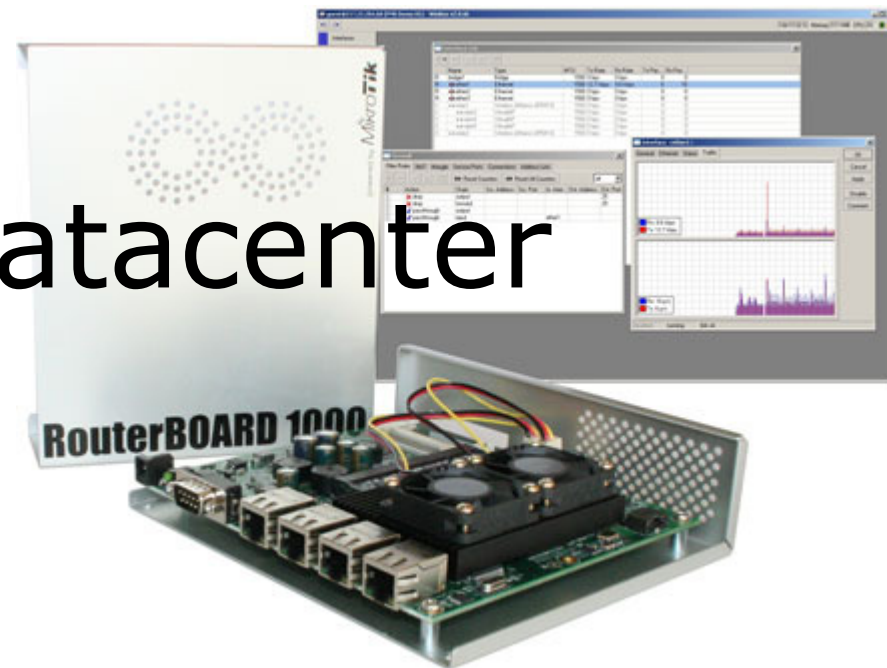


## Ogma Connect routers

- RouterOS based
- Up to 11 x GBit Eth
- PCI-X addon slot at back
- Different models available



# Why to the datacenter



# Datacenter

- Technical environment
- Multiple ISPs available

To get:

- High availability
- High uptime of services
- Good network performance

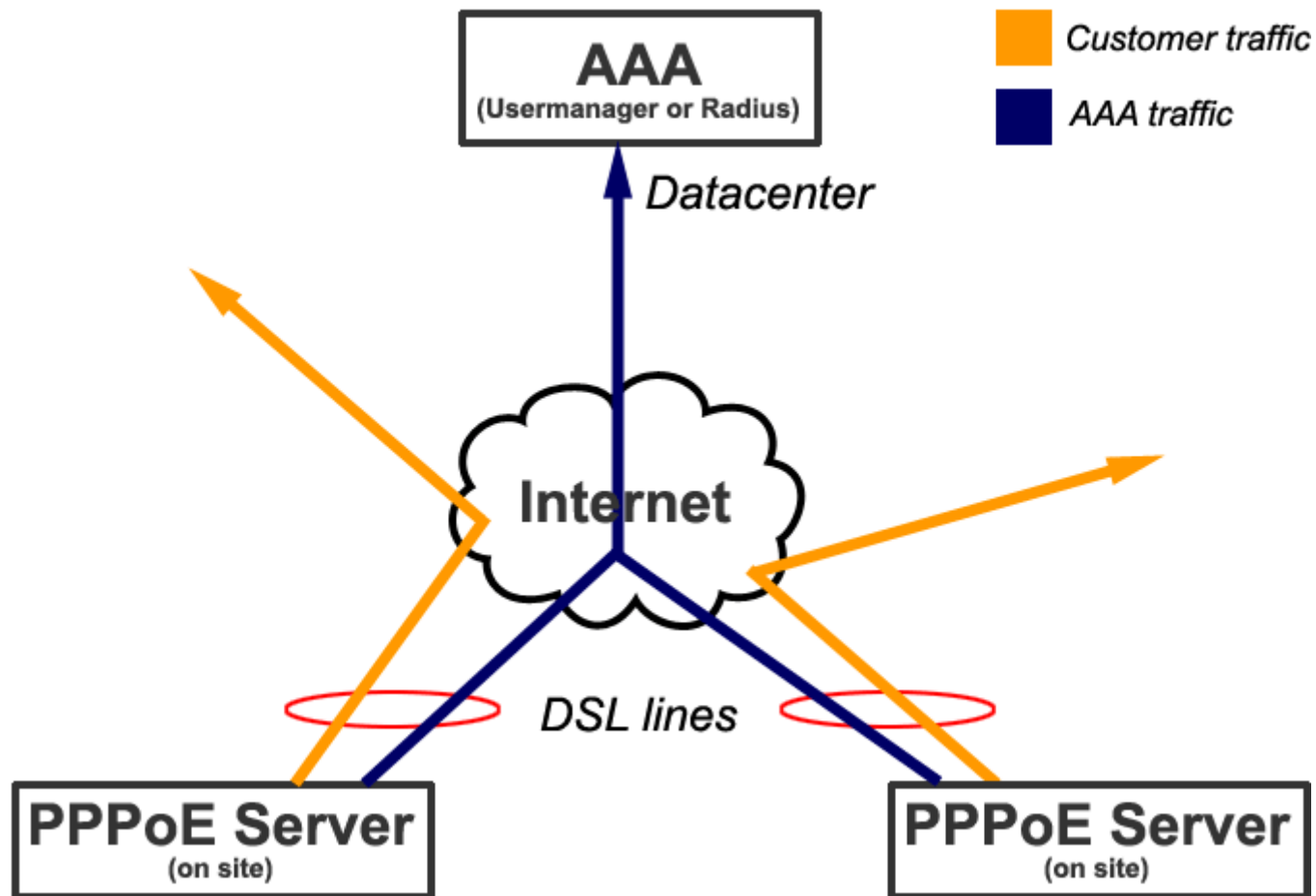
## **Data center based applications**

- Web- / Serverhosting
- Running VoIP and IPTV services
- Broadband reselling
- Special case: Wireless ISPs

## Common WISP setups

- Decentral with many broadband lines
- Central with leased line and wireless backbone

## Example1: Central AAA



## Example1: Central AAA

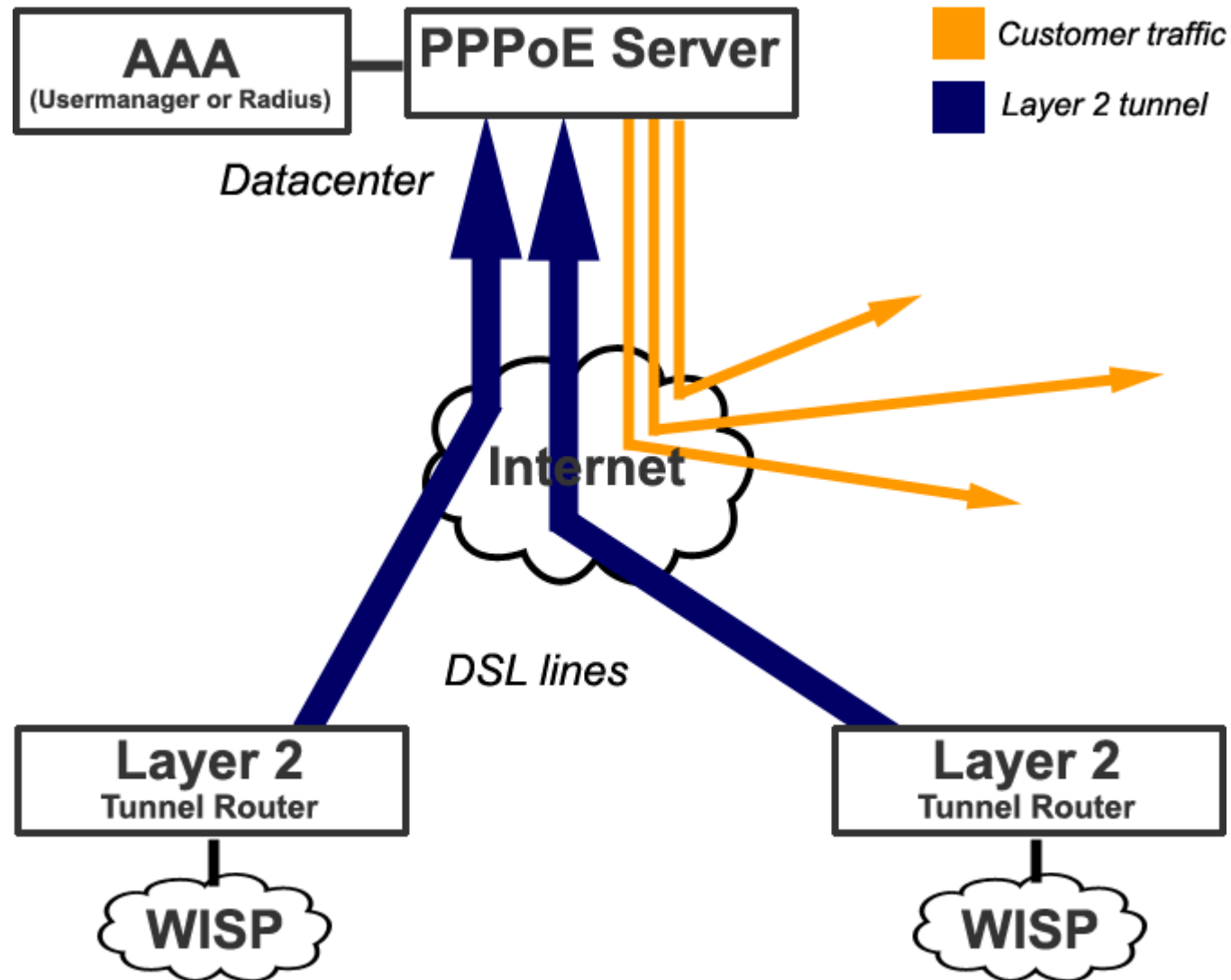
- Centralising on site AAAs in the datacenter
  - Easier management
  - Customer can use neighboring cells
  - Central AAA with Usermanager or RADIUS possible
  - Hotspot, PPPoE, PPTP



## **Example2: Datacenter tunneling**

- Virtual network by L2 tunneling
- Customer traffic goes through
- Public addressspace for customers
- Central AAA
- Very flexible design
- Free choice of broadband carrier

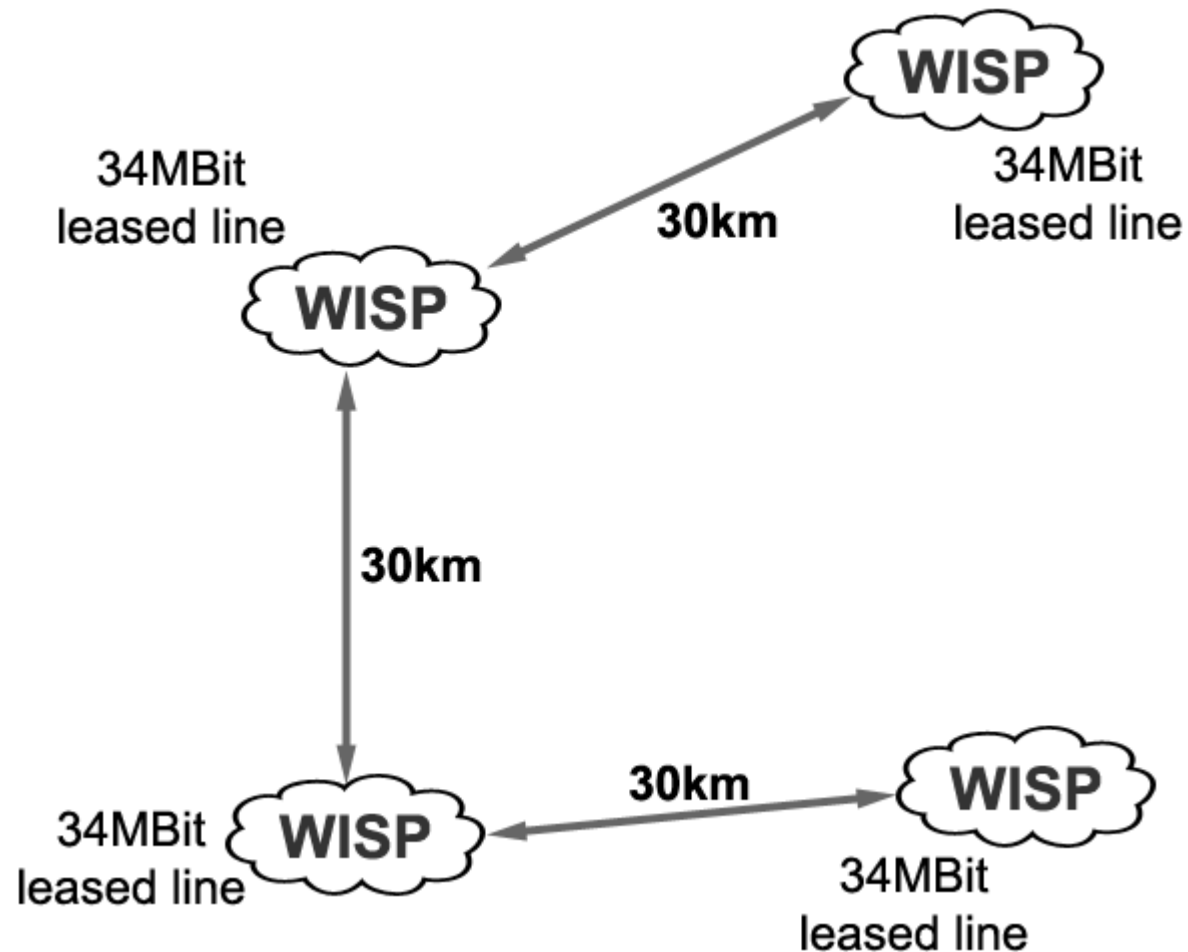
## Example2: Datacenter tunneling



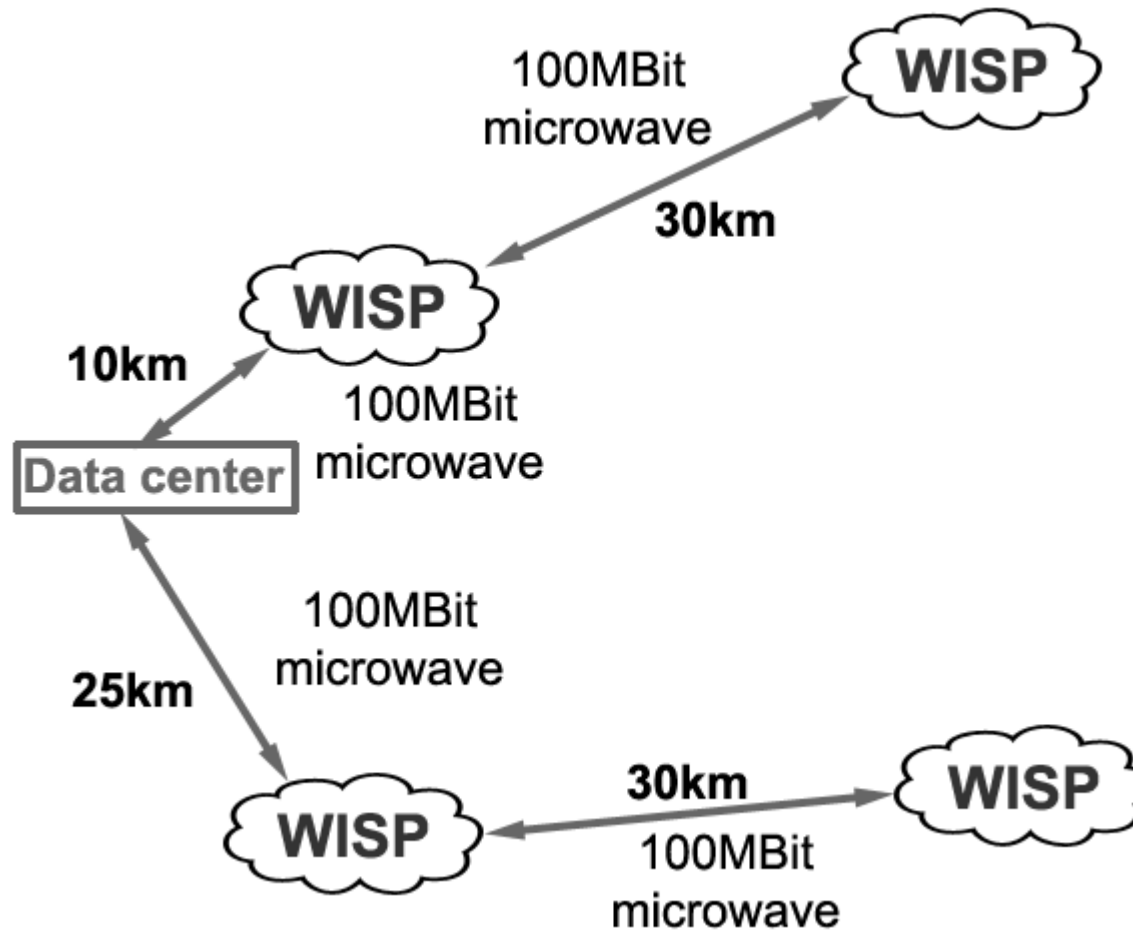
## **Example3: Wireless Backbone**

- Central network upstream
  - Distributed by a wireless backbone
  - Often more cost efficient than leased lines
  - Licenced band radio equipment
- 
- FMS provides professional microwave systems from 7 – 38GHz with up to 800MBit and has certified staff for consulting

## Example3: Wireless Backbone

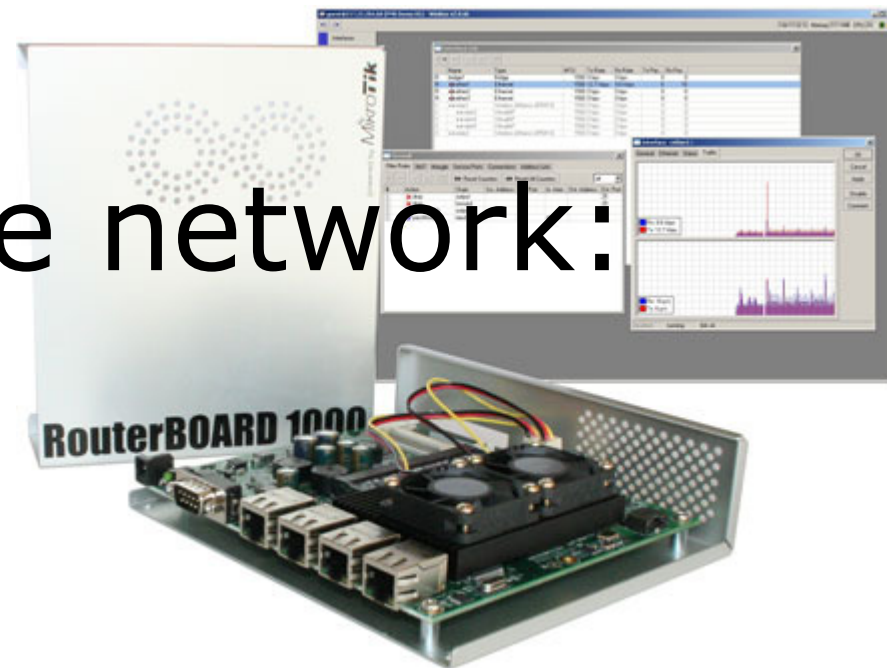


## Example3: Wireless Backbone



# High available network:

- Bonding -



## **A single homed core router**

- One upstream ISP
  - Copper or fibre inhouse cable to core switch
  - Corerouter behind core switch
  - ISP gateway as default gateway
- 
- The first three single points of failure in our network: Ethernetcable, router port, switch port
  - Sollution: Second cable for redundancy

## **If the link fails: Bonding**

- Can achieve redundancy and higher bandwidth
- Multiple physical interfaces form one virtual interface
- Different standards and approaches
- MikroTik: Bonding  
Others: Link Aggregation, NIC Teaming, Trunking



## RouterOS bonding modes

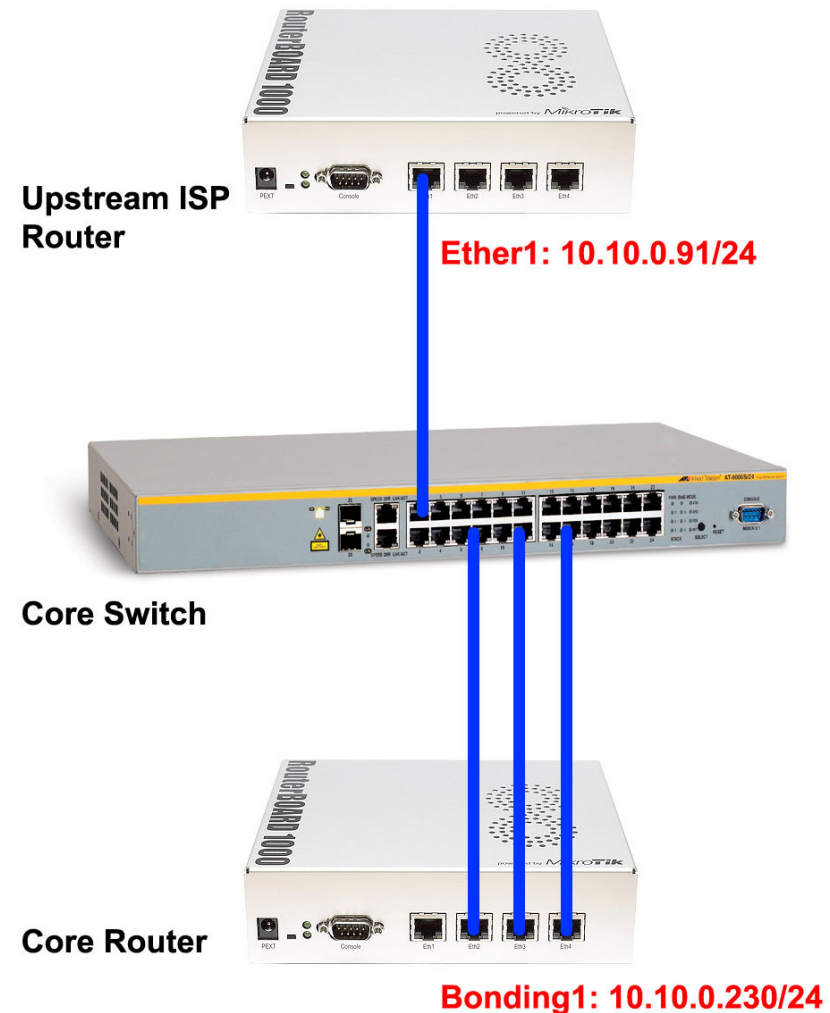
- Goal: redundancy and higher bandwidth
- Problem: reordering of packets for TCP connections
- Different solutions
- Standard for Aggregation 802.3ad & LACP

## RouterOS bonding modes

	<b>Fail-over</b>	<b>Load balancing</b>	<b>Switch config</b>	<b>Link Monitoring</b>
802.3ad	Yes	Yes	Different	MII
active backup	Yes	No	No	Different
broadcast	Yes	No	Yes	ARP, MII
balance rr	Yes	Yes	Yes	ARP, MII
balance xor	Yes	Yes	Yes	ARP, MII
balance tlb	Yes	Yes	No	MII
balance alb	Yes	Yes	No	MII

# Fail over for uplink connection

- active-backup
- only fail over
- no switch configuration



## **Fail over for uplink connection**

- Traffic will flow over primary interface while link is up
- Inactive slave MAC invisible
- More than 2 interfaces possible
- No switch configuration necessary

# Configuration: active-backup

admin@00:0C:42:40:98:54 (www.fmsweb.de) - WinBox v4.5 on RB1000 (powerpc)

**Interfaces**

**Interface List**

Interface	Ethernet	EoIP Tunnel	IP Tunnel	...
+				
EoIP Tunnel				
IP Tunnel				
VLAN				
VRRP				
<b>Bonding</b>				
Bridge				
Mesh				
Virtual Ethernet				
VPLS				
PPP Server				
PPP Client				
PPTP Server				
PPTP Client				
L2TP Server				
L2TP Client				
OVPN Server				
OVPN Client				
PPPoE Server				
PPPoE Client				
VirtualAP				
WDS				
Nstreme Dual				

**Interface <bonding1>**

**General** **Bonding** **Traffic**

Slaves: ether2 ether3 ether4

Mode: active backup

Primary: ether2

Link Monitoring: arp

Transmit Hash Policy: layer 2

Down Delay: 0 ms

Up Delay: 0 ms

LACP Rate: 1 s

ARP Interval: 100 ms

ARP IP Targets: 10.10.0.10

disabled running slave

# How good does it work?

### Ping

General Advanced

Ping To: 10.10.0.10

Interface: any

☐ ARP Ping

Packet Count:

Timeout: 1000 ms

#	Host	Time	Reply Size	TTL	Status
297	10.10.0.10	257ms	50	64	
298	10.10.0.10	257ms	50	64	
299	10.10.0.10	255ms	50	64	
300	10.10.0.10	257ms	50	64	
301	10.10.0.10	257ms	50	64	
302	10.10.0.10	255ms	50	64	
303	10.10.0.10	253ms	50	64	
304	10.10.0.10	254ms	50	64	
305	10.10.0.10	257ms	50	64	
306	10.10.0.10	254ms	50	64	
307	10.10.0.10	254ms	50	64	
308	10.10.0.10	257ms	50	64	
309	10.10.0.10	255ms	50	64	
310	10.10.0.10	254ms	50	64	
311	10.10.0.10	253ms	50	64	
312	10.10.0.10	253ms	50	64	
313	10.10.0.10	253ms	50	64	
314	10.10.0.10	254ms	50	64	
315	10.10.0.10	255ms	50	64	
316	10.10.0.10	255ms	50	64	
317	10.10.0.10	253ms	50	64	
318	10.10.0.10	253ms	50	64	
319	10.10.0.10	257ms	50	64	
320	10.10.0.10	255ms	50	64	
321	10.10.0.10	257ms	50	64	
322	10.10.0.10	257ms	50	64	
323	10.10.0.10	255ms	50	64	
324	10.10.0.10	253ms	50	64	
325	10.10.0.10	253ms	50	64	
326	10.10.0.10	253ms	50	64	
327	10.10.0.10	253ms	50	64	
328	10.10.0.10	253ms	50	64	

180 of 187 packets received 3% packet loss Min: 0ms Avg: 123ms Max: 581ms

### Interface List

Interface Ethernet EoIP Tunnel IP Tunnel VLAN VRRP Bonding

Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx Drops	Tx Error
R bonding1	Bonding		98.7 Mbps	98.7 Mbps	8 158	8 251	0	0	0
R ether1	Ethernet	1600	50.3 kbps	25.2 kbps	17	42	0	0	0
RS ether2	Ethernet	1600	98.6 Mbps	98.6 Mbps	8 139	8 184	0	0	0
RS ether3	Ethernet	1600	1.6 kbps	20.1 kbps	10	32	0	0	0
RS ether4	Ethernet	1600	1.6 kbps	80.2 kbps	10	37	0	0	0

1

2

### Bandwidth Test

Test To: 10.10.0.91

Protocol: ☒ udp ☐ tcp

Local UDP Tx Size: 1500

Remote UDP Tx Size: 1500

Direction: both

TCP Connection Count: 20

Local Tx Speed:  bps

Remote Tx Speed:  bps

User: admin

Password:

Tx/Rx 10s Average: 97.5 Mbps/97.4 Mbps

Tx/Rx Average: 92.4 Mbps/92.6 Mbps

Tx: 97.5 Mbps

Rx: 97.4 Mbps

running...

### Interface <bonding1>

General Bonding Traffic

Slaves: ether2 ether3 ether4

Mode: active backup

Primary: ether2

Link Monitoring: arp

Transmit Hash Policy: layer 2

Down Delay: 0 ms

Up Delay: 0 ms

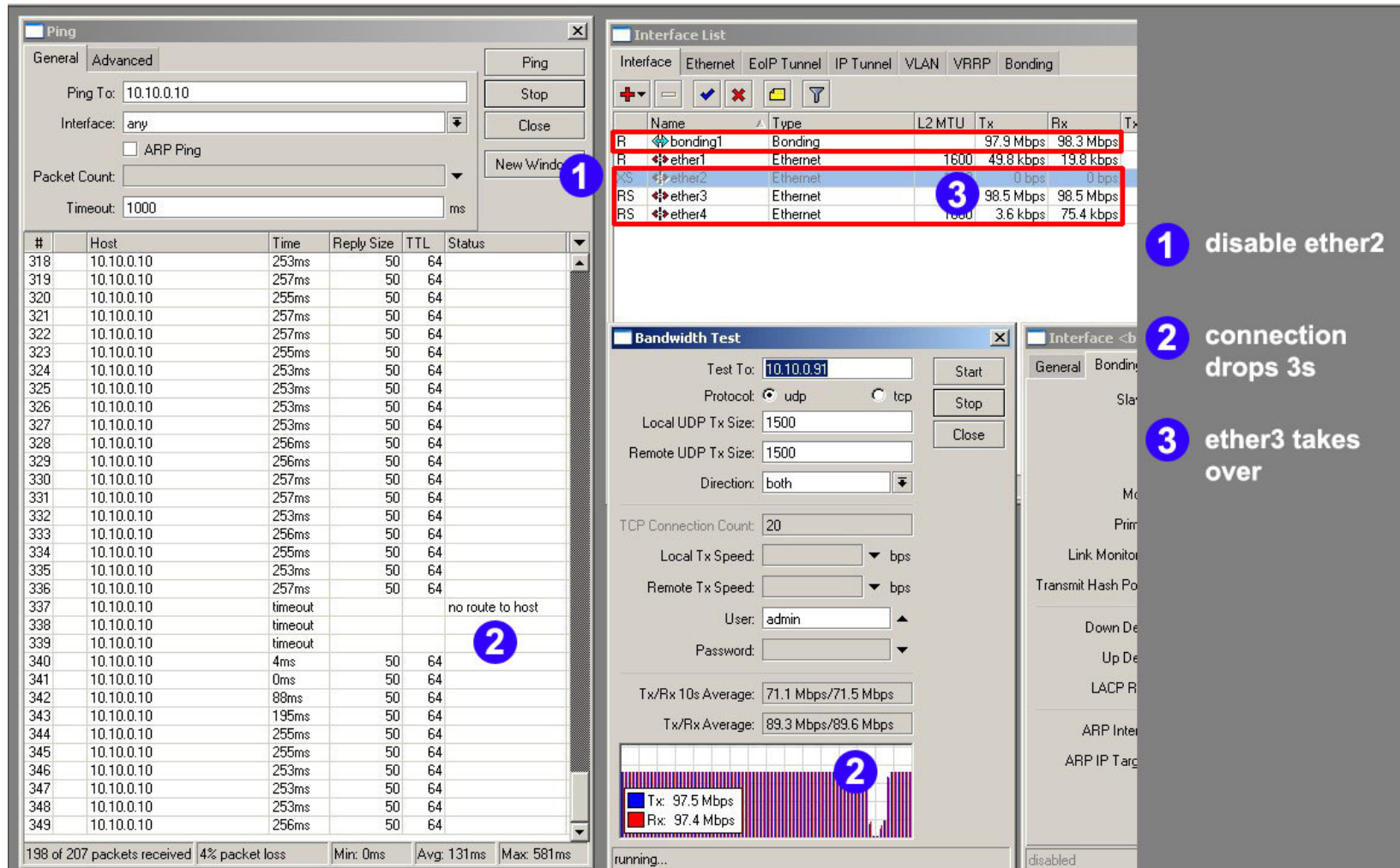
LACP Rate: 1 s

ARP Interval: 100 ms

ARP IP Targets: 10.10.0.10

disabled running slave

# Disable active slave



The screenshot displays the FMS network management interface with three main windows and a list of instructions on the right.

**1 Ping Window:** Shows a ping test to 10.10.0.10. The results table shows a transition from successful pings to timeouts.

#	Host	Time	Reply Size	TTL	Status
318	10.10.0.10	253ms	50	64	
319	10.10.0.10	257ms	50	64	
320	10.10.0.10	255ms	50	64	
321	10.10.0.10	257ms	50	64	
322	10.10.0.10	257ms	50	64	
323	10.10.0.10	255ms	50	64	
324	10.10.0.10	253ms	50	64	
325	10.10.0.10	253ms	50	64	
326	10.10.0.10	253ms	50	64	
327	10.10.0.10	253ms	50	64	
328	10.10.0.10	256ms	50	64	
329	10.10.0.10	256ms	50	64	
330	10.10.0.10	257ms	50	64	
331	10.10.0.10	257ms	50	64	
332	10.10.0.10	253ms	50	64	
333	10.10.0.10	256ms	50	64	
334	10.10.0.10	255ms	50	64	
335	10.10.0.10	253ms	50	64	
336	10.10.0.10	257ms	50	64	
337	10.10.0.10	timeout			no route to host
338	10.10.0.10	timeout			
339	10.10.0.10	timeout			
340	10.10.0.10	4ms	50	64	
341	10.10.0.10	0ms	50	64	
342	10.10.0.10	88ms	50	64	
343	10.10.0.10	195ms	50	64	
344	10.10.0.10	255ms	50	64	
345	10.10.0.10	255ms	50	64	
346	10.10.0.10	253ms	50	64	
347	10.10.0.10	253ms	50	64	
348	10.10.0.10	253ms	50	64	
349	10.10.0.10	256ms	50	64	

Summary: 198 of 207 packets received, 4% packet loss, Min: 0ms, Avg: 131ms, Max: 581ms.

**2 Interface List Window:** Shows a table of network interfaces. A red box highlights the 'bonding1' interface and its members: 'ether1', 'ether2', 'ether3', and 'ether4'.

Name	Type	L2 MTU	Tx	Rx
R bonding1	Bonding		97.9 Mbps	98.3 Mbps
R ether1	Ethernet	1600	49.8 kbps	19.8 kbps
RS ether2	Ethernet		0 bps	0 bps
RS ether3	Ethernet		98.5 Mbps	98.5 Mbps
RS ether4	Ethernet	1600	3.6 kbps	75.4 kbps

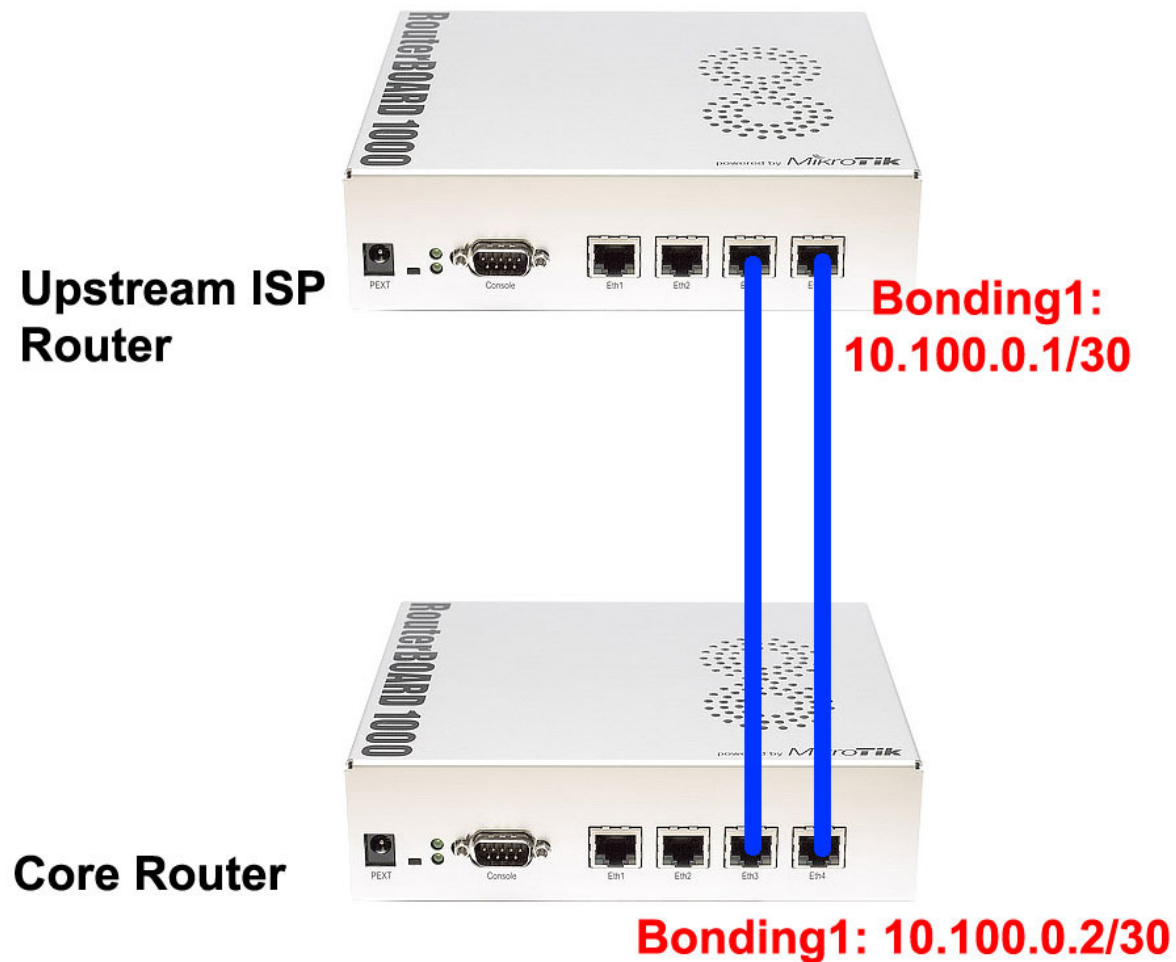
**3 Bandwidth Test Window:** Shows a test configuration for 10.10.0.91 using UDP. The results show a Tx/Rx 10s Average of 71.1 Mbps/71.5 Mbps and a Tx/Rx Average of 89.3 Mbps/89.6 Mbps. A graph shows the test results over time.

**Instructions on the right:**

- 1 disable ether2
- 2 connection drops 3s
- 3 ether3 takes over

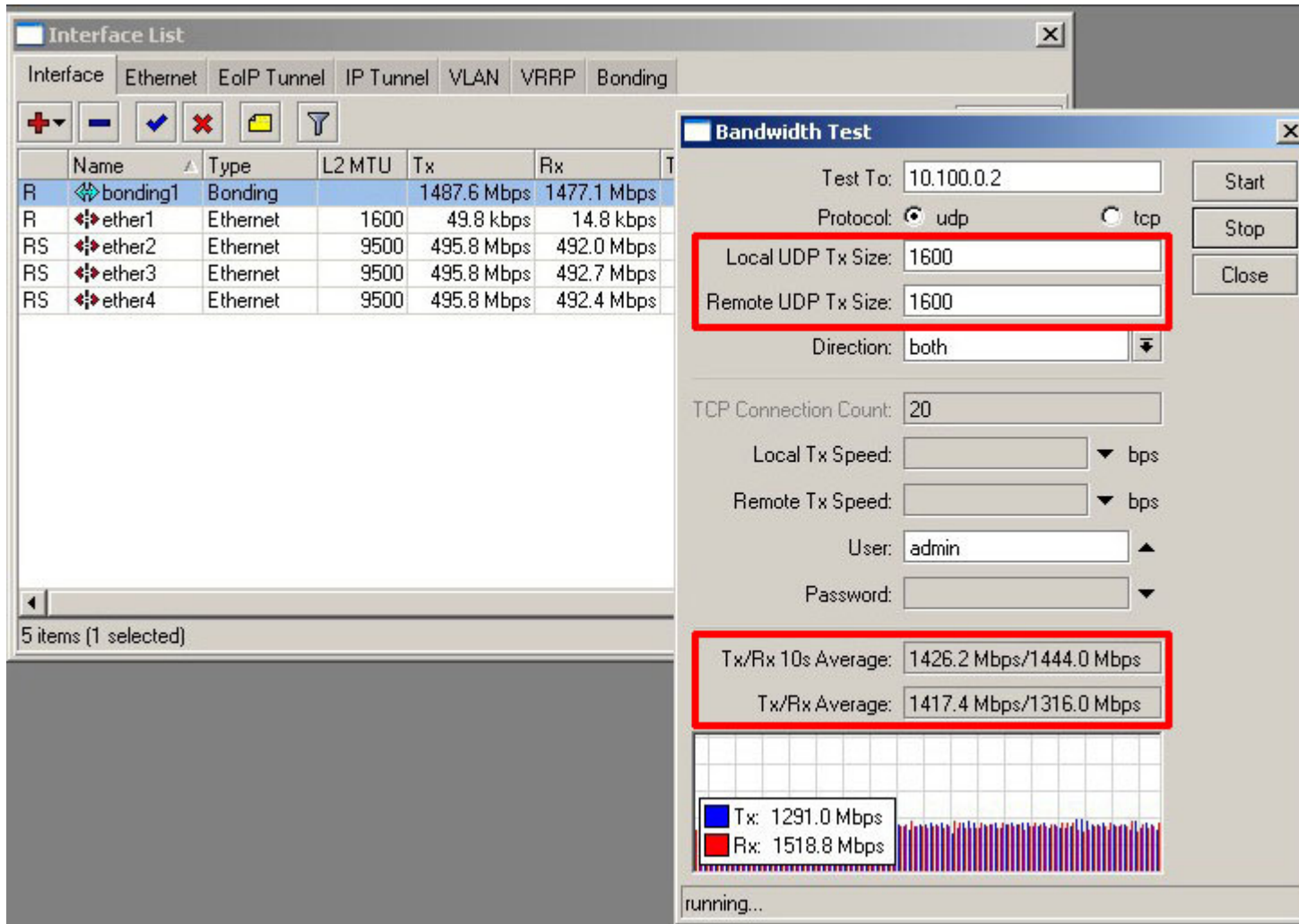


## Example: balance-rr





# 1600 Byte, bidirectional



The screenshot displays the FMS Bandwidth Test interface. On the left, the 'Interface List' window shows a table of interfaces. The 'bonding1' interface is selected. On the right, the 'Bandwidth Test' window is open, showing the test configuration for 'bonding1'.

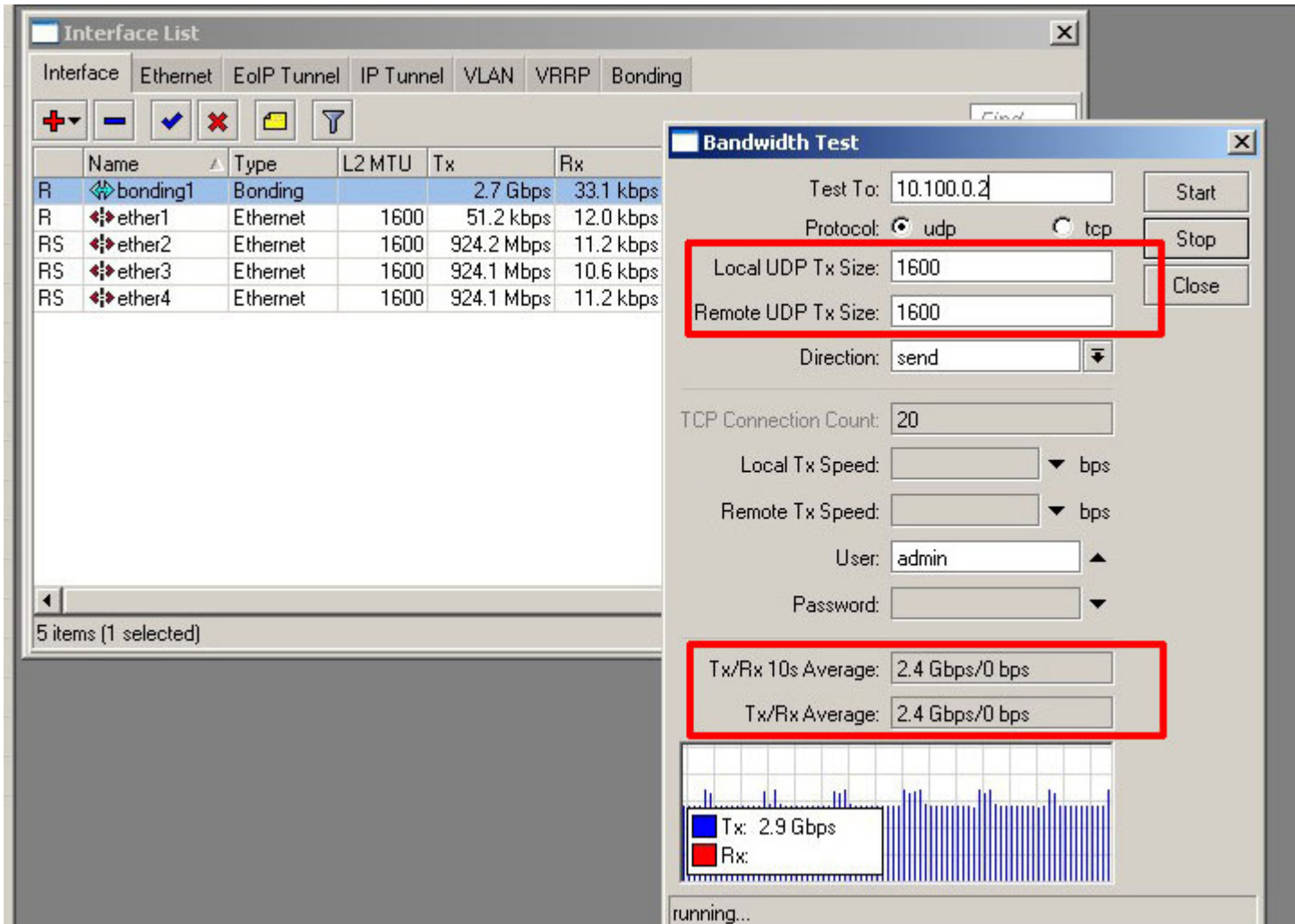
Interface	Type	L2 MTU	Tx	Rx
R bonding1	Bonding		1487.6 Mbps	1477.1 Mbps
R ether1	Ethernet	1600	49.8 kbps	14.8 kbps
RS ether2	Ethernet	9500	495.8 Mbps	492.0 Mbps
RS ether3	Ethernet	9500	495.8 Mbps	492.7 Mbps
RS ether4	Ethernet	9500	495.8 Mbps	492.4 Mbps

The 'Bandwidth Test' window shows the following configuration:

- Test To: 10.100.0.2
- Protocol: ☒ udp ☐ tcp
- Local UDP Tx Size: 1600
- Remote UDP Tx Size: 1600
- Direction: both
- TCP Connection Count: 20
- Local Tx Speed:  bps
- Remote Tx Speed:  bps
- User: admin
- Password:
- Tx/Rx 10s Average: 1426.2 Mbps/1444.0 Mbps
- Tx/Rx Average: 1417.4 Mbps/1316.0 Mbps

A graph at the bottom shows the test results over time, with a legend indicating Tx: 1291.0 Mbps (blue) and Rx: 1518.8 Mbps (red). The status at the bottom is 'running...'.

# 1600 Byte, unidirectional



The screenshot displays the FMS software interface. The 'Interface List' window shows a table of network interfaces. The 'Bandwidth Test' window is open, showing test parameters and results.

**Interface List Table:**

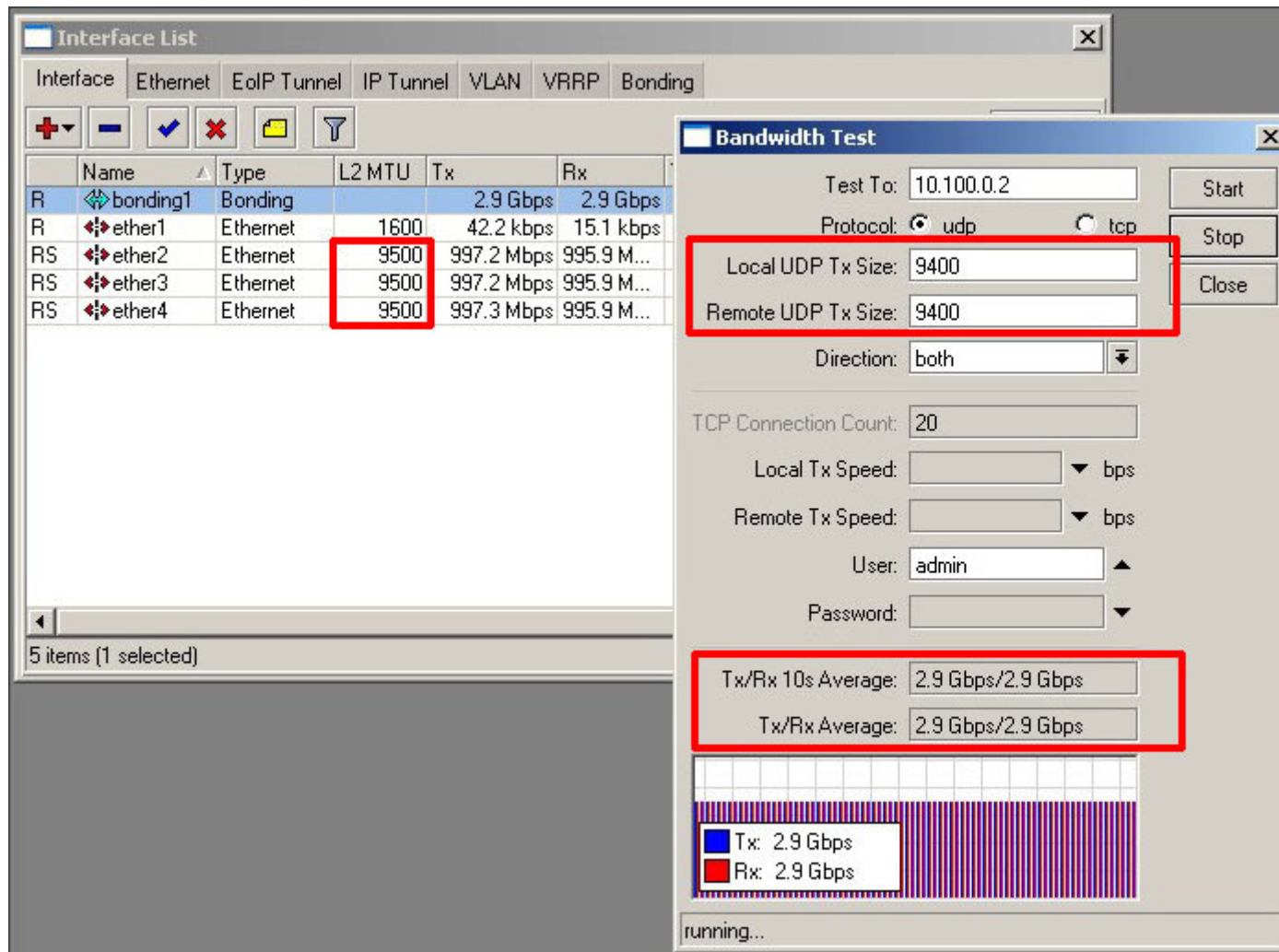
	Name	Type	L2 MTU	Tx	Rx
R	bonding1	Bonding		2.7 Gbps	33.1 kbps
R	ether1	Ethernet	1600	51.2 kbps	12.0 kbps
RS	ether2	Ethernet	1600	924.2 Mbps	11.2 kbps
RS	ether3	Ethernet	1600	924.1 Mbps	10.6 kbps
RS	ether4	Ethernet	1600	924.1 Mbps	11.2 kbps

**Bandwidth Test Window:**

- Test To: 10.100.0.2
- Protocol: ☒ udp ☐ tcp
- Local UDP Tx Size: 1600
- Remote UDP Tx Size: 1600
- Direction: send
- TCP Connection Count: 20
- Local Tx Speed: [ ] bps
- Remote Tx Speed: [ ] bps
- User: admin
- Password: [ ]
- Tx/Rx 10s Average: 2.4 Gbps/0 bps
- Tx/Rx Average: 2.4 Gbps/0 bps

The status bar at the bottom indicates 'running...'.

# 9400 Byte, bidirectional



The screenshot displays the FMS software interface. The 'Interface List' window shows a table of network interfaces. The 'Bandwidth Test' window is open, showing test parameters and results.

**Interface List Table:**

	Name	Type	L2 MTU	Tx	Rx
R	bonding1	Bonding		2.9 Gbps	2.9 Gbps
R	ether1	Ethernet	1600	42.2 kbps	15.1 kbps
RS	ether2	Ethernet	9500	997.2 Mbps	995.9 M...
RS	ether3	Ethernet	9500	997.2 Mbps	995.9 M...
RS	ether4	Ethernet	9500	997.3 Mbps	995.9 M...

**Bandwidth Test Window:**

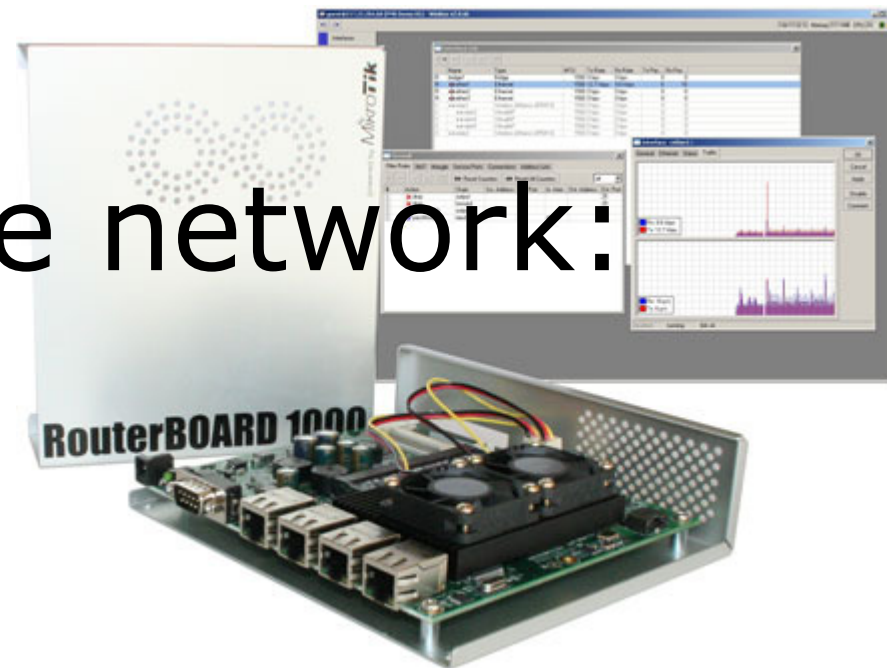
- Test To: 10.100.0.2
- Protocol: ☒ udp ☐ tcp
- Local UDP Tx Size: 9400
- Remote UDP Tx Size: 9400
- Direction: both
- TCP Connection Count: 20
- Local Tx Speed:  bps
- Remote Tx Speed:  bps
- User: admin
- Password:
- Tx/Rx 10s Average: 2.9 Gbps/2.9 Gbps
- Tx/Rx Average: 2.9 Gbps/2.9 Gbps

Legend: Tx: 2.9 Gbps (blue), Rx: 2.9 Gbps (red)

running...

# High available network:

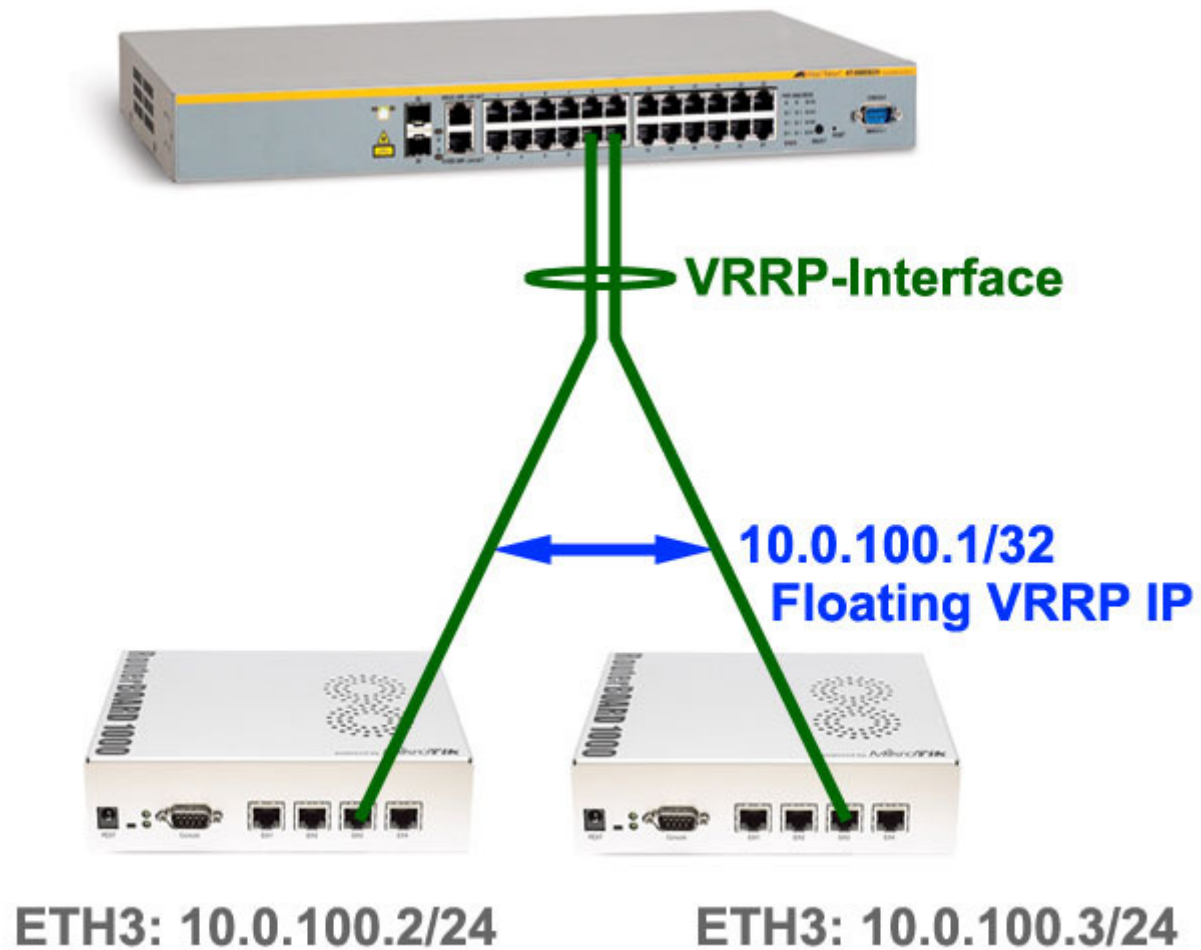
- VRRP -



## **If the router fails: VRRP**

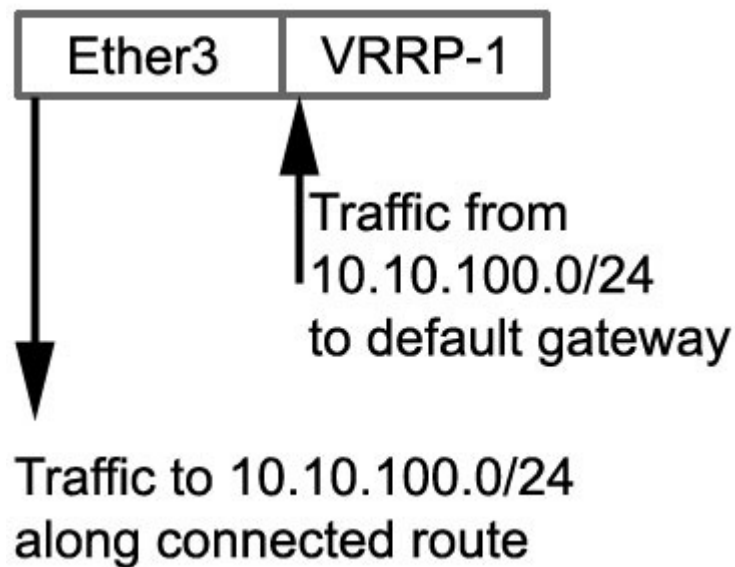
- VRRP (Virtual Router Redundancy Protocol)
- Cluster interfaces of different routers with shared IP address
- Hot standby of slaves
- Open standard

# VRRP Overview

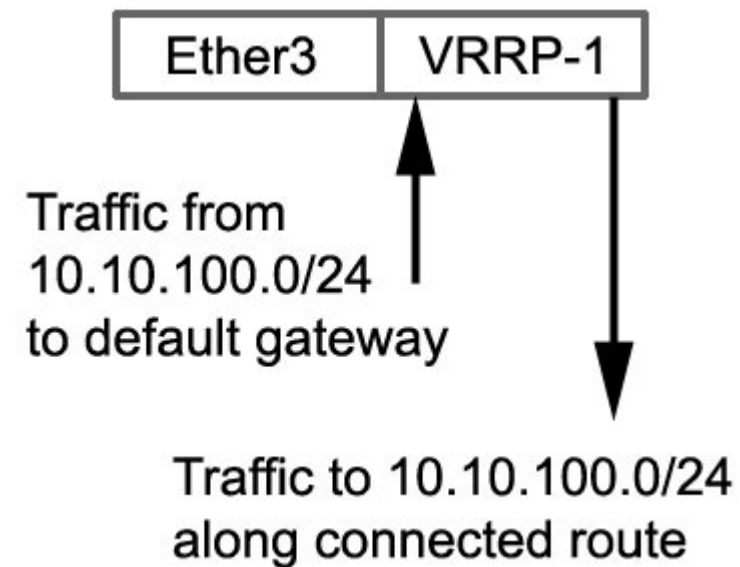


# Address decisions

**Ether3: 10.10.100.2 /24**  
**VRRP-1: 10.10.100.1 /32**

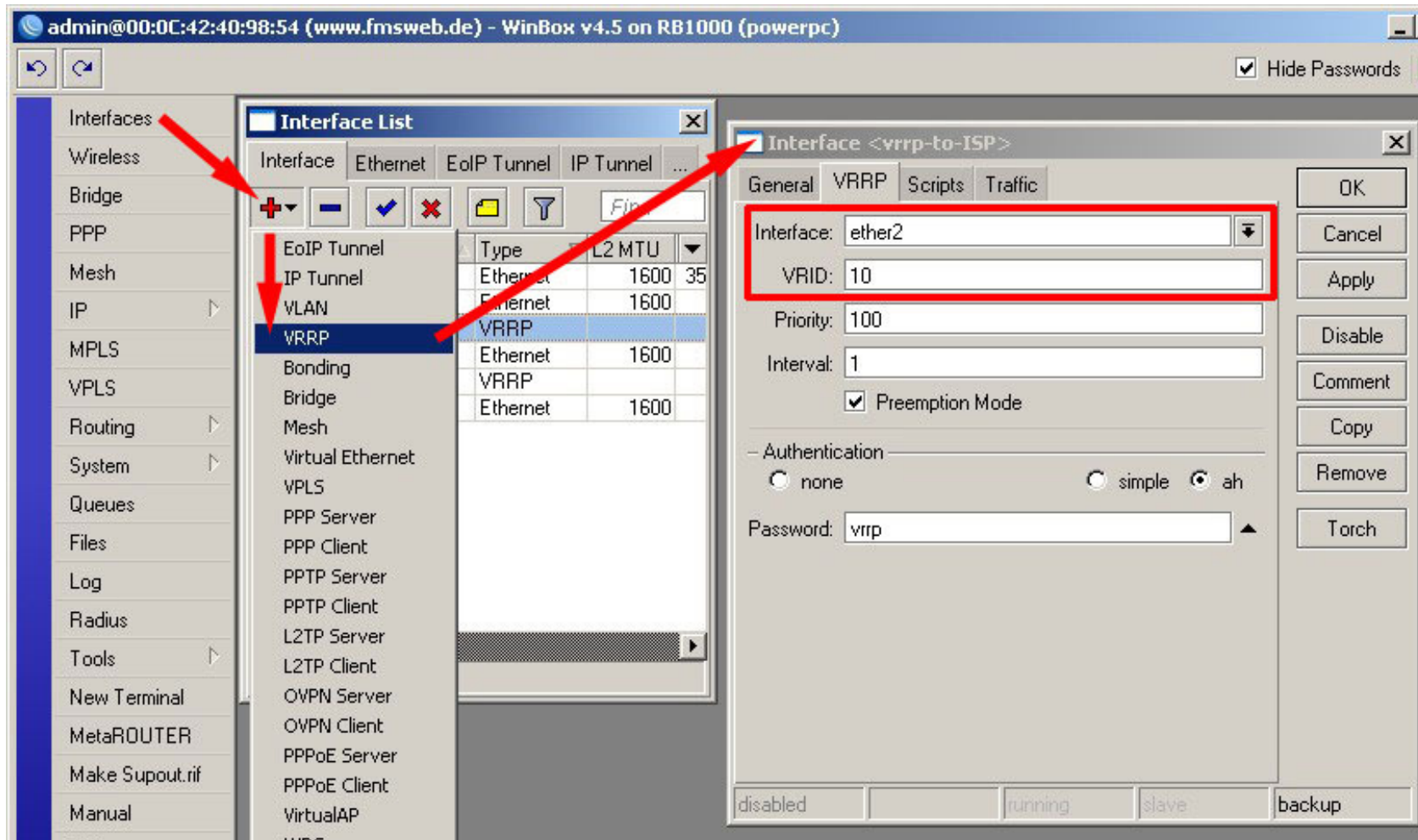


**Ether3: 10.10.90.1 /24**  
**VRRP-1: 10.10.100.1 /24**





# VRRP Configuration



The screenshot shows the WinBox v4.5 interface for configuring VRRP. The left sidebar contains a tree view with categories like Interfaces, Bridge, PPP, Mesh, IP, MPLS, VPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Make Supout.tif, and Manual. The 'Interfaces' category is expanded, and the 'VRRP' option is selected. The 'Interface List' window is open, showing a table of interfaces. The 'VRRP' entry is highlighted. The 'Interface <vrrp-to-ISP>' configuration window is also open, showing the 'General' tab. The 'Interface' field is set to 'ether2', and the 'VRID' field is set to '10'. The 'Priority' is set to '100', and the 'Interval' is set to '1'. The 'Preemption Mode' checkbox is checked. The 'Authentication' section shows 'none' selected. The 'Password' field is set to 'vrrp'. The 'Status' bar at the bottom shows 'disabled', 'running', 'slave', and 'backup'.

admin@00:0C:42:40:98:54 (www.fmsweb.de) - WinBox v4.5 on RB1000 (powerpc)

Hide Passwords

Interfaces

Wireless

Bridge

PPP

Mesh

IP

MPLS

VPLS

Routing

System

Queues

Files

Log

Radius

Tools

New Terminal

MetaROUTER

Make Supout.tif

Manual

Interface List

Interface	Type	L2 MTU
EoIP Tunnel	Ethernet	1600
IP Tunnel	Ethernet	1600
VLAN	Ethernet	1600
VRRP	Ethernet	1600
Bonding	Ethernet	1600
Bridge	Ethernet	1600
Mesh	Ethernet	1600
Virtual Ethernet	Ethernet	1600
VPLS	Ethernet	1600
PPP Server	Ethernet	1600
PPP Client	Ethernet	1600
PPTP Server	Ethernet	1600
PPTP Client	Ethernet	1600
L2TP Server	Ethernet	1600
L2TP Client	Ethernet	1600
OVPN Server	Ethernet	1600
OVPN Client	Ethernet	1600
PPPoE Server	Ethernet	1600
PPPoE Client	Ethernet	1600
VirtualAP	Ethernet	1600
WDS	Ethernet	1600

Interface <vrrp-to-ISP>

General VRRP Scripts Traffic

Interface: ether2

VRID: 10

Priority: 100

Interval: 1

☒ Preemption Mode

Authentication

☐ none ☐ simple ☒ ah

Password: vrrp

OK Cancel Apply Disable Comment Copy Remove Torch

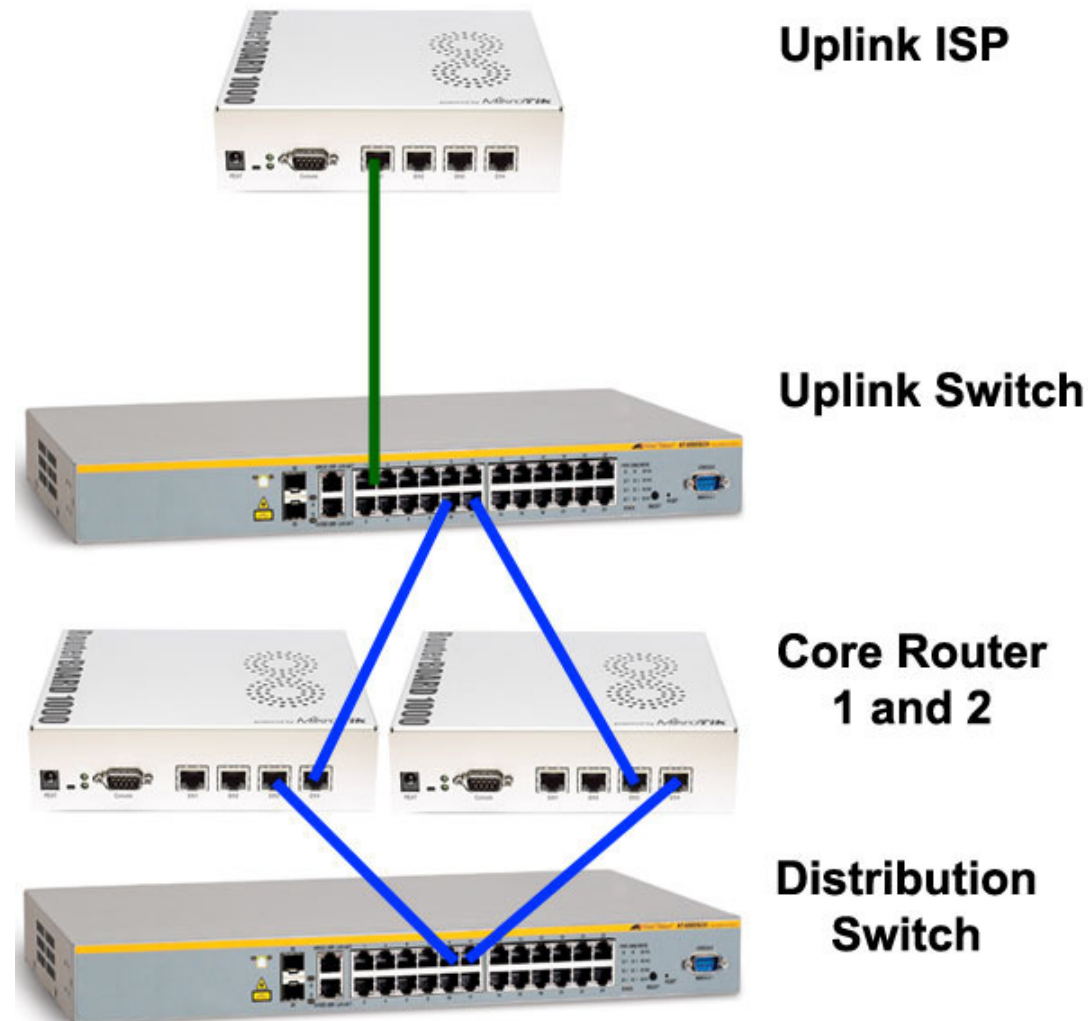
disabled running slave backup



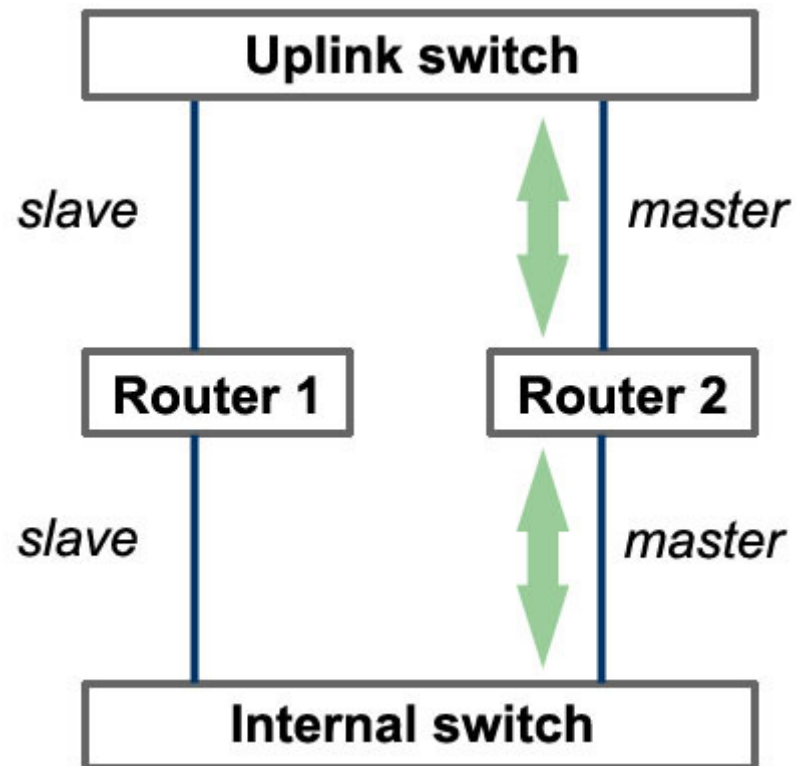
## **Single homed redundant core router**

- Two routers connected to uplink switch and client switch
- Interfaces configured for VRRP
- Seperate IP Adresses
- Failover for Dead router

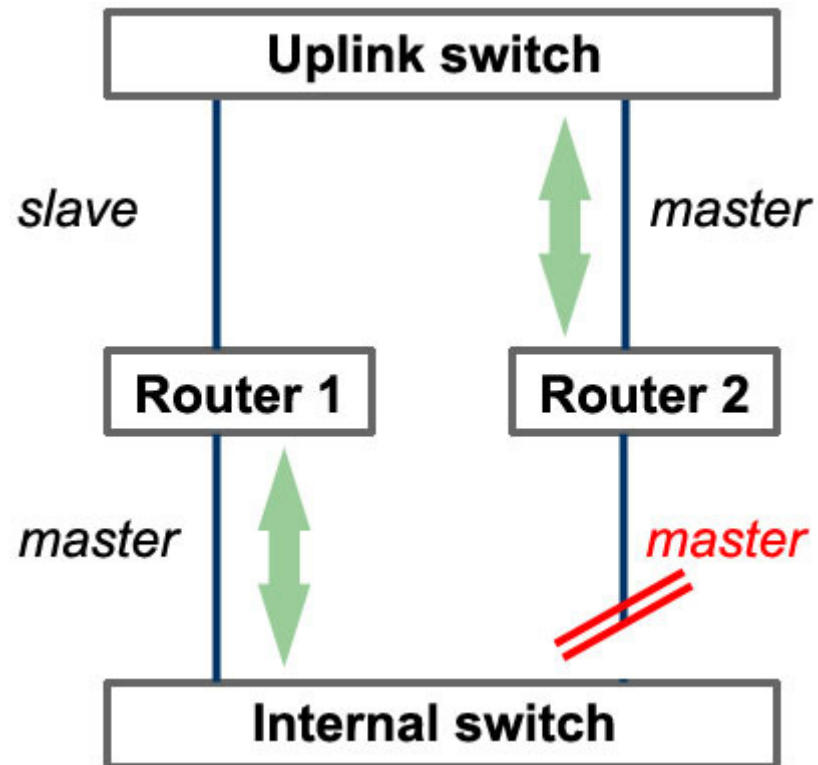
# Single homed redundant core router



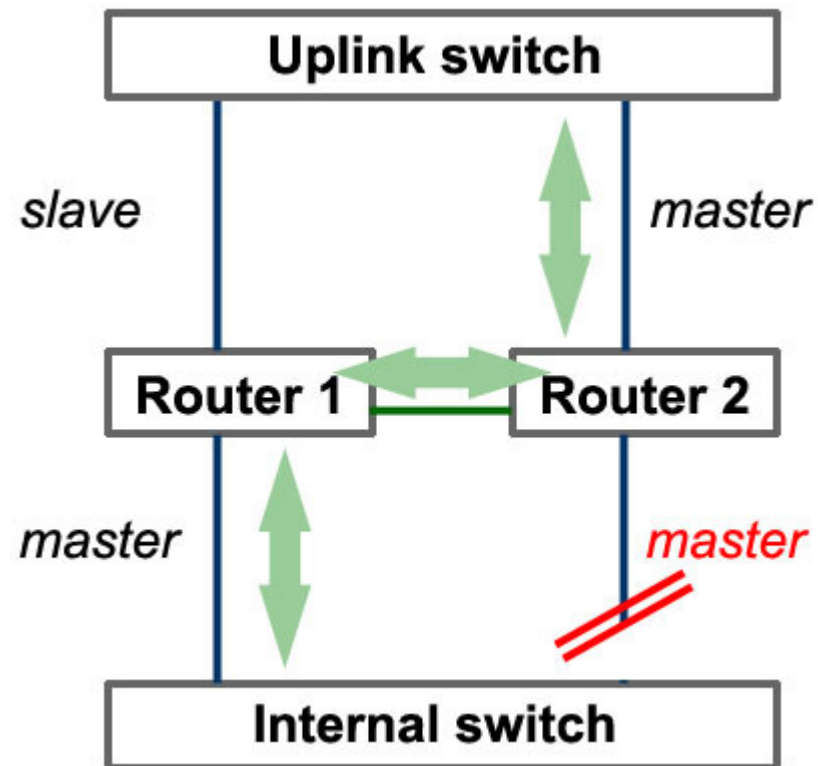
# VRRP optimisation



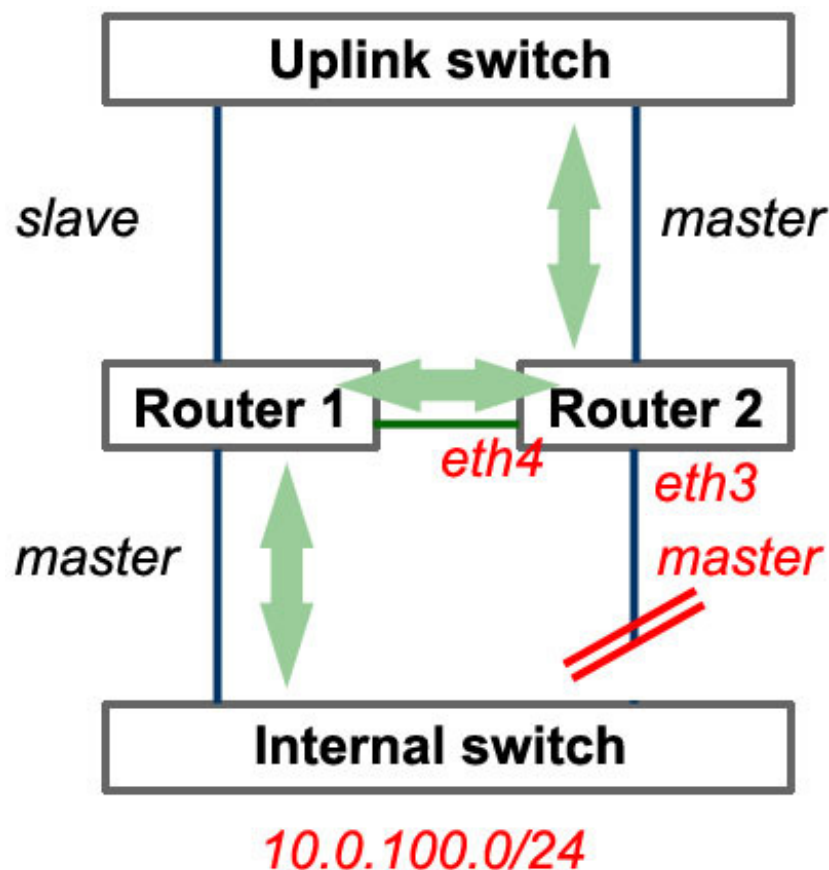
# VRRP optimisation



# VRRP optimisation



## Router 2 – policy based routing



Interface	Ethernet	EoIP Tunnel	IP Tunnel	VLAN	VRRP	Bonding
Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...
R ether1	Ethernet	1600	36.2 kbps	14.9 kbps	7	1
R ether2	Ethernet	1600	650 bps	0 bps	1	1
RM vrrp-to-ISP	VRRP		650 bps	0 bps	1	
R ether3	Ethernet	1600	0 bps	0 bps	0	0
M vrrp-to-LAN	VRRP		459 bps	0 bps	1	
R ether4	Ethernet	1600	0 bps	0 bps	0	0

Route List				
Routes	Nexthops	Rules	VRF	
Dst. Address	Gateway	Distance	Routing Mark	F
AS 0.0.0.0/0	10.0.101.1 reachable vrrp-to-ISP	55	vrrp-routing	
S 0.0.0.0/0	10.1.2.1 reachable ether4	60	vrrp-routing	
AS 10.0.100.0/24	10.1.2.1 reachable ether4	60	vrrp-routing	
S 10.0.100.0/24	vrrp-to-LAN unreachable	55	vrrp-routing	
DAC 10.0.100.0/24	vrrp-to-LAN unreachable	0		1
DAC 10.0.101.0/24	vrrp-to-ISP reachable	0		1
DAC 10.1.0.0/24	ether2 reachable	0		1
DAC 10.1.1.0/24	ether3 unreachable	0		1
DAC 10.1.2.0/24	ether4 reachable	0		1

## Router 2: routing policys for internal network

Route List							
Routes Nexthops Rules VRF							
+ - ✓ ✗ [icon] [icon]							
#	Src. Address	Dst. Address	Routing Mark	Interface	Action	Table	
0	▶ 10.0.100.0/24				lookup only in table	vrrp-routing	
1	▶	10.0.100.0/24			lookup only in table	vrrp-routing	

### vrrp- routing table

Route List					
Routes Nexthops Rules VRF					
+ - ✓ ✗ [icon] [icon]					
	Dst. Address ▲	Gateway ▲	Distance	Routing Mark	
AS	▶ 0.0.0.0/0	10.0.101.1 reachable vrrp-to-ISP	55	vrrp-routing	
S	▶ 0.0.0.0/0	10.1.2.1 reachable ether4	60	vrrp-routing	
AS	▶ 10.0.100.0/24	10.1.2.1 reachable ether4	60	vrrp-routing	
S	▶ 10.0.100.0/24	vrrp-to-LAN unreachable	55	vrrp-routing	

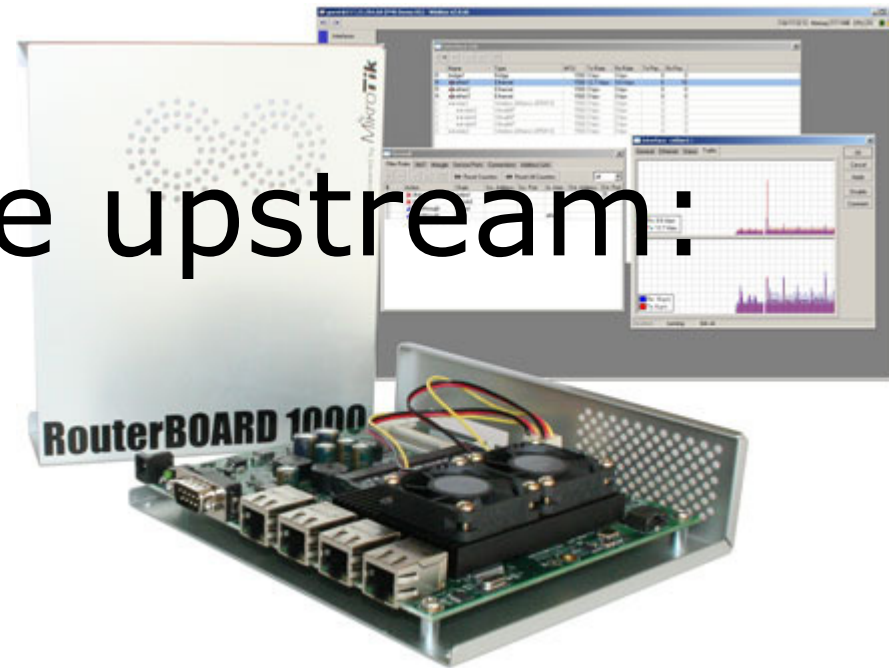
10.0.100.0/24: internal network

10.0.101.1: default Gateway, upstream ISP

10.1.2.1: router 1, direkt link on eth4

# High available upstream:

- BGP4-





## Redundant upstream

- ISP as the single point of failure
- Connection to multiple ISP
- Problem: Each ISP provides different IP space
- No fail over possibility

## **IP addresses**

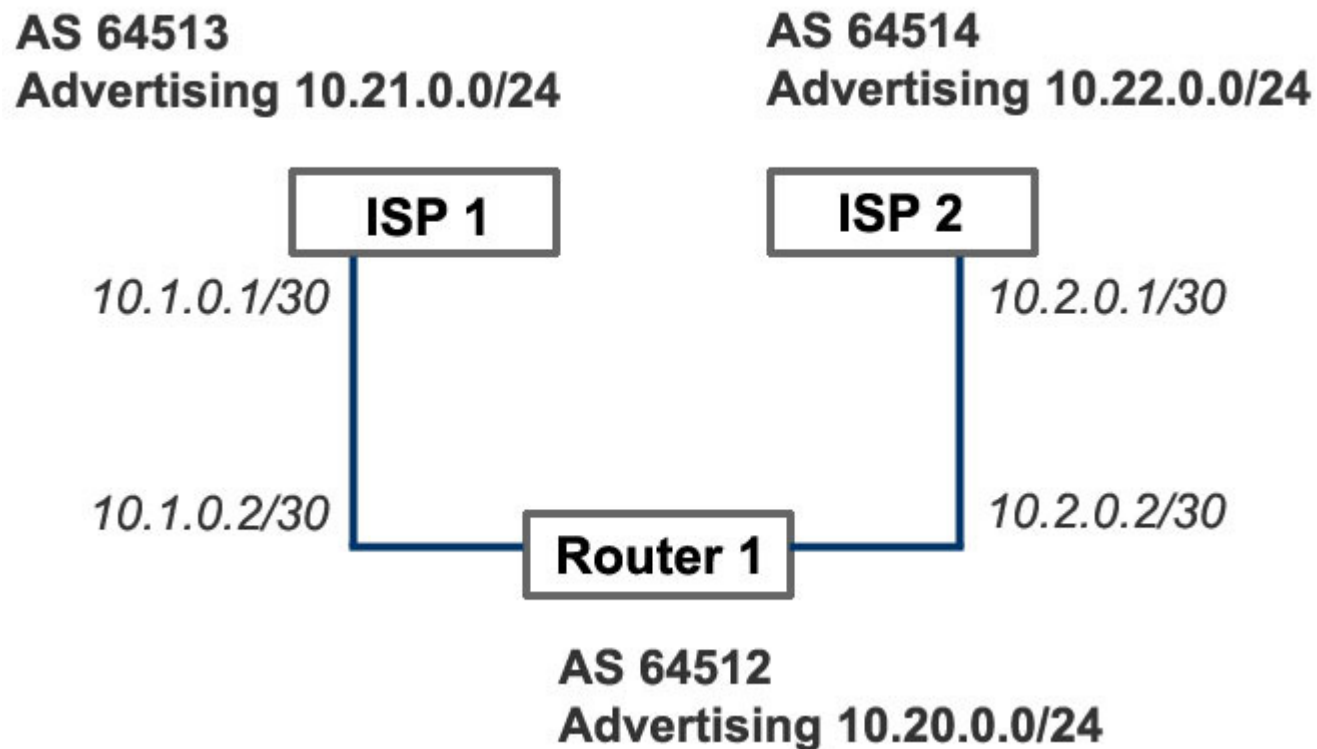
- PA (provider aggregatable)
  - PI (provider independent)
  - AS
- 
- PA assignment from ISP
  - PI and AS through sponsoring LIR
  - LIR membership and own PA and AS

# Multihoming

BGP4, inter domain routing:

- Announcement of prefixes to ISPs
- Receiving prefixes from ISPs (full feed about 300.000 routes)
- Select best route (usually shortest path) for internal routing table

## BGP4 test setup



# ISP2: New instance

admin@00:0C:42:40:98:54 (www.fmsweb.de) - WinBox v4.5 on RB1000 (powerpc)

Interfaces  
Wireless  
Bridge  
PPP  
Mesh  
IP  
MPLS  
VPLS  
Routing  
System  
Queues  
Files  
Log  
Radius  
Tools  
New Terminal  
MetaROUTER  
Make Supout.tif  
Manual  
Exit

BGP

Instances VRFs Peers Networks Aggregates VPN4 Routes Advertisements

AS-ROUT... 64514 10.2.0.1  
default 65530

BGP Instance <AS-ROUTER-3>

Name: AS-ROUTER-3  
AS: 64514  
Router ID: 10.2.0.1

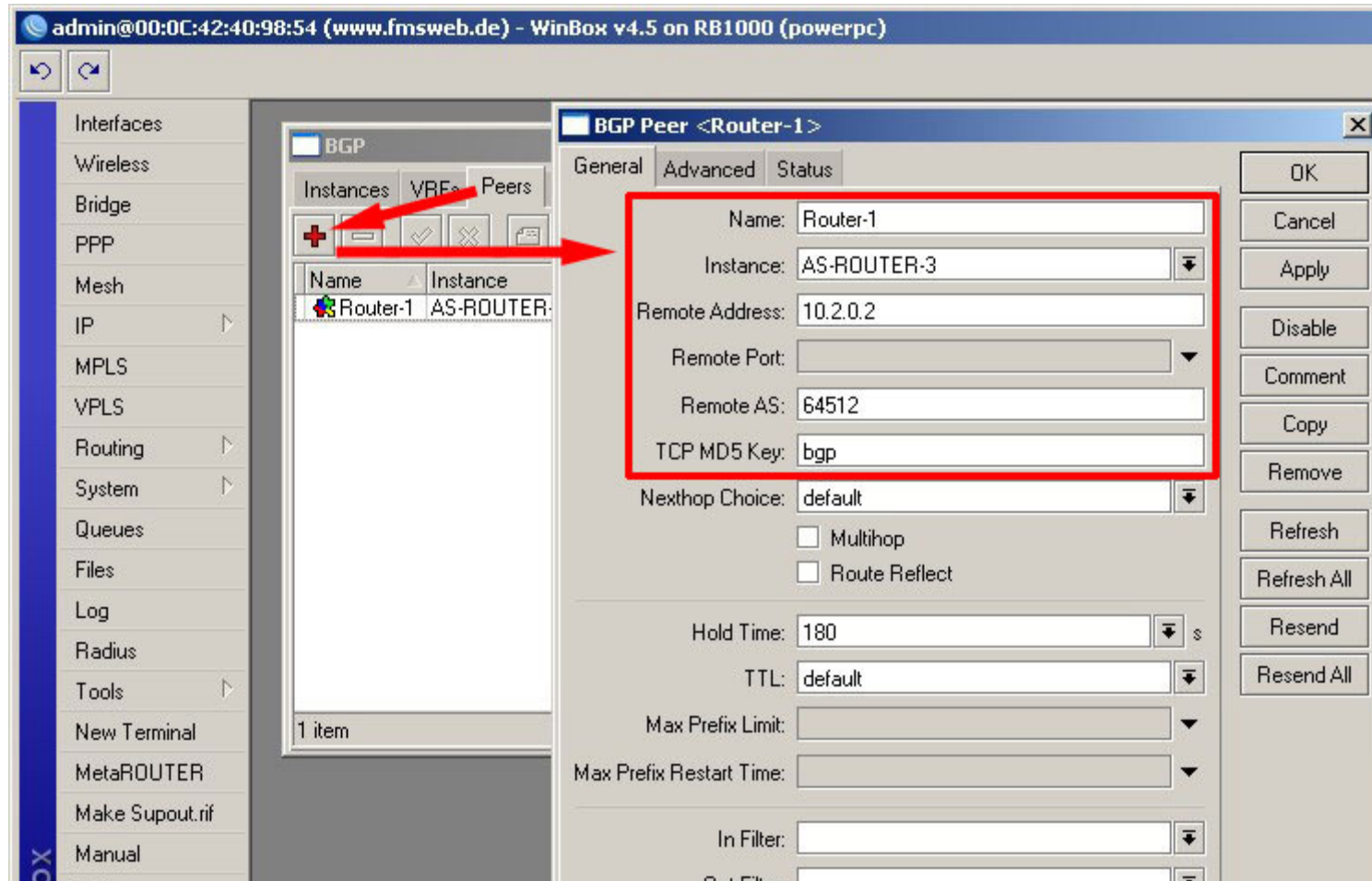
☐ Redistribute Connected  
☐ Redistribute Static  
☐ Redistribute RIP  
☐ Redistribute OSPF  
☐ Redistribute Other BGP

Out Filter:   
Confederation:   
Confederation Peers:   
Cluster ID:   
☐ Client To Client Reflection  
☐ Ignore AS Path Length

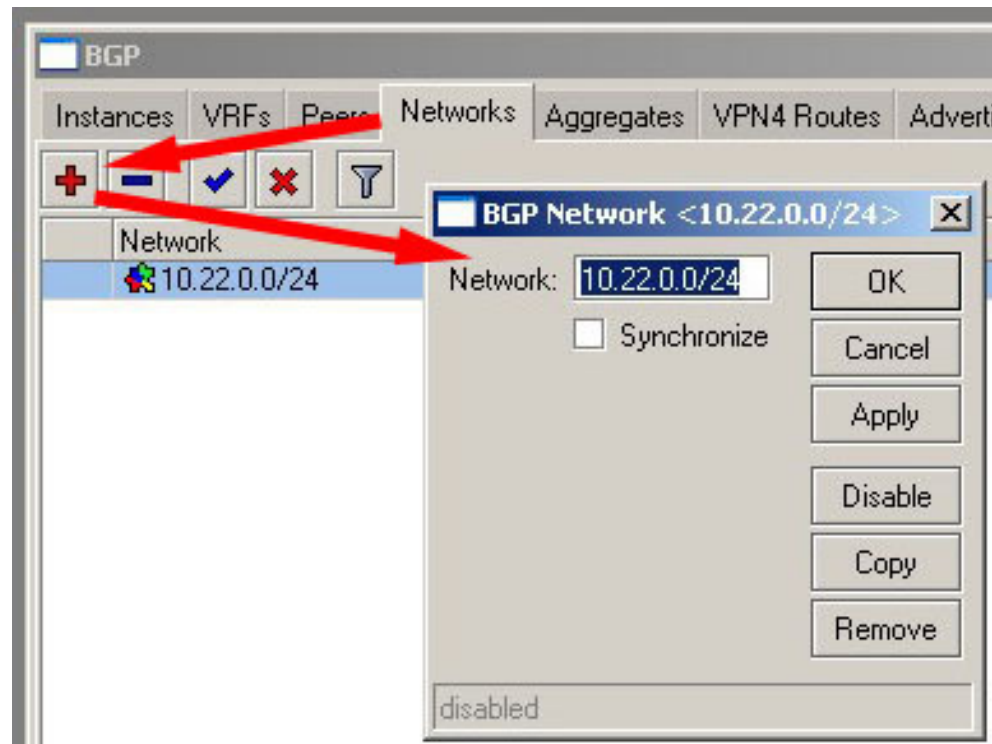
OK  
Cancel  
Apply  
Disable  
Comment  
Copy  
Remove

disabled

# ISP2: New Peer



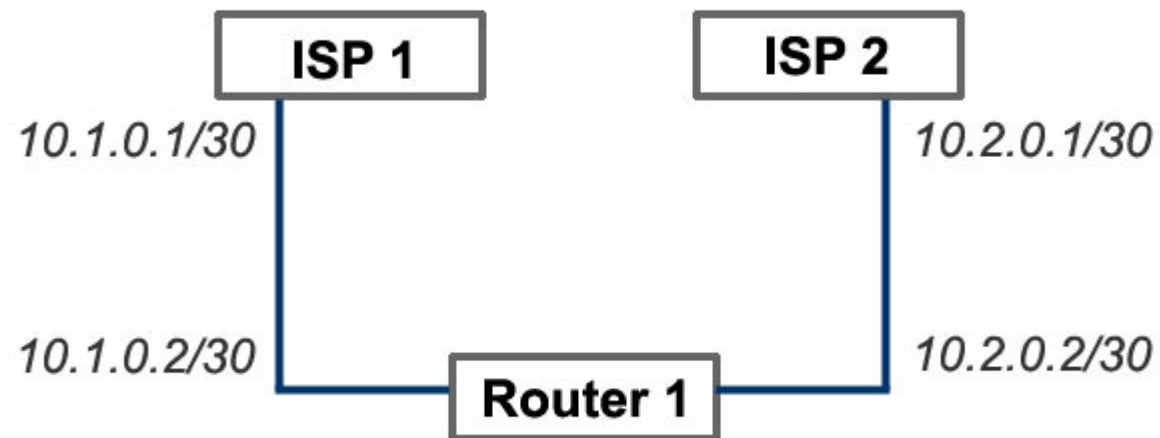
## ISP2: New Network



# Unwanted transit on router 1

**AS 64513**  
Advertising 10.21.0.0/24

**AS 64514**  
Advertising 10.22.0.0/24

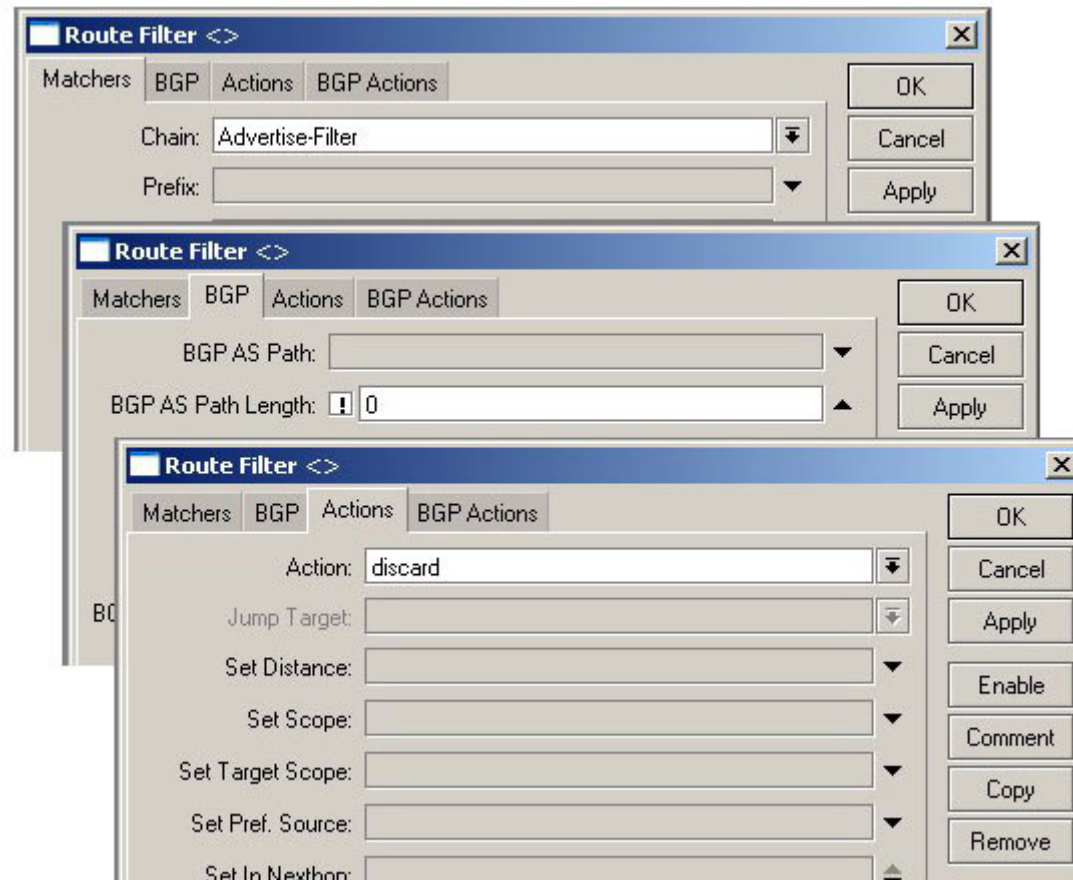


BGP						
Instances	VRFs	Peers	Networks	Aggregates	VPN4 Routes	Advertisements
<div> <div></div> <div></div> </div>						
Peer	Prefix	Nexthop	AS Path	Origin	Local Pref.	
Router-2	10.20.0.0/24	10.1.0.2		igp	0	
Router-3	10.20.0.0/24	10.2.0.2		igp	0	
Router-3	10.21.0.0/24	10.2.0.2	64513	igp	0	
Router-2	10.22.0.0/24	10.1.0.2	64514	igp	0	

**AS 64512**  
Advertising 10.20.0.0/24



# Out-Filter for peers



The image shows three overlapping 'Route Filter' configuration windows. The top window is on the 'Matchers' tab, showing a 'Chain' dropdown set to 'Advertise-Filter' and an empty 'Prefix' field. The middle window is on the 'BGP' tab, showing 'BGP AS Path' and 'BGP AS Path Length' (set to 0). The bottom window is on the 'Actions' tab, showing an 'Action' dropdown set to 'discard', and several other fields like 'Jump Target', 'Set Distance', 'Set Scope', 'Set Target Scope', 'Set Pref. Source', and 'Set In Nexthop'.

**Route Filter <>**

Matchers BGP Actions BGP Actions

Chain: Advertise-Filter

Prefix:

OK Cancel Apply

**Route Filter <>**

Matchers BGP Actions BGP Actions

BGP AS Path:

BGP AS Path Length: 0

OK Cancel Apply

**Route Filter <>**

Matchers BGP Actions BGP Actions

Action: discard

Jump Target:

Set Distance:

Set Scope:

Set Target Scope:

Set Pref. Source:

Set In Nexthop:

OK Cancel Apply Enable Comment Copy Remove

# Full feed

BGP

InstancesPeersNetworksAggregates

+ - ✓ ✗

RefreshRefresh AllResendResend All

Find

Name	Instance	Remote Address	Remote AS	Multihop	Route Reflect	TTL	Remote ID	Uptime	Prefix Count	State
peer-Ghostnet	BroadcoreAS	XXXXXX	12586	no	no	255	XXXXXX	259d 04:32:24	307873	established
peer-KleyRex	BroadcoreAS	XXXXXX	31142	no	no	255	XXXXXX	10d 12:24:31	8535	established
peer-Router1	BroadcoreAS	XXXXXX	49296	no	no	255				open sent

3 items

Route List

RoutesRules

+ - ✓ ✗

Find

all

Destination

in

+

-

Filter

Destination	Gateway	Gateway ...	Interface	Distance	Routing Mark	Pref. Source
<p>There are too many routes to show them all. Please specify more specific Destination filter.</p> <p><a href="#">Or click here to see them all.</a></p>						

0 items out of 316066

# Winbox / CLI Filter

### Route List

Routes
Nexthops
Rules
VRF

+
-
✓
✗
📁
🔍
Find
all

Dst. Address
in
10.21.0.0/15
+
-
Filter

	Dst. Address	Gateway	Distance	Routing Mark	Pref. Source
S	0.0.0.0/0	10.0.100.1 unreachable	1		
DAC	10.1.0.0/30	ether2 reachable	0		10.1.0.2
DAC	10.2.0.0/30	ether3 unreachable	0		10.2.0.2
DAb	10.21.0.0/24	10.1.0.1 reachable ether2	20		

### Terminal

```

[admin@Patrik-RB1000-1] > /ip route print where dst-address in 10.21.0.0/15
Flags: X - disabled, A - active, D - dynamic, C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
# DST-ADDRESS PREF-SRC GATEWAY DISTANCE
4 value of dst-address must have all host bits zero, as in 10.20.0.0/15
[admin@Patrik-RB1000-1] >

```

# Winbox / CLI Filter

### Route List

Routes | Nexthops | Rules | VRF

Find:  all

Dst. Address:  in  10.20.0.0/15

	Dst. Address	Gateway	Distance	Routing Mark	Pref. Source
DAb	10.21.0.0/24	10.1.0.1 reachable ether2	20		

### Terminal

```
[admin@Patrik-RB1000-1] >
[admin@Patrik-RB1000-1] > /ip route print where dst-address in 10.20.0.0/15
Flags: X - disabled, A - active, D - dynamic, C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
# DST-ADDRESS PREF-SRC GATEWAY DISTANCE
1 0 ADb 10.21.0.0/24 10.1.0.1 20
[admin@Patrik-RB1000-1] >
```

# Example with Full Feed

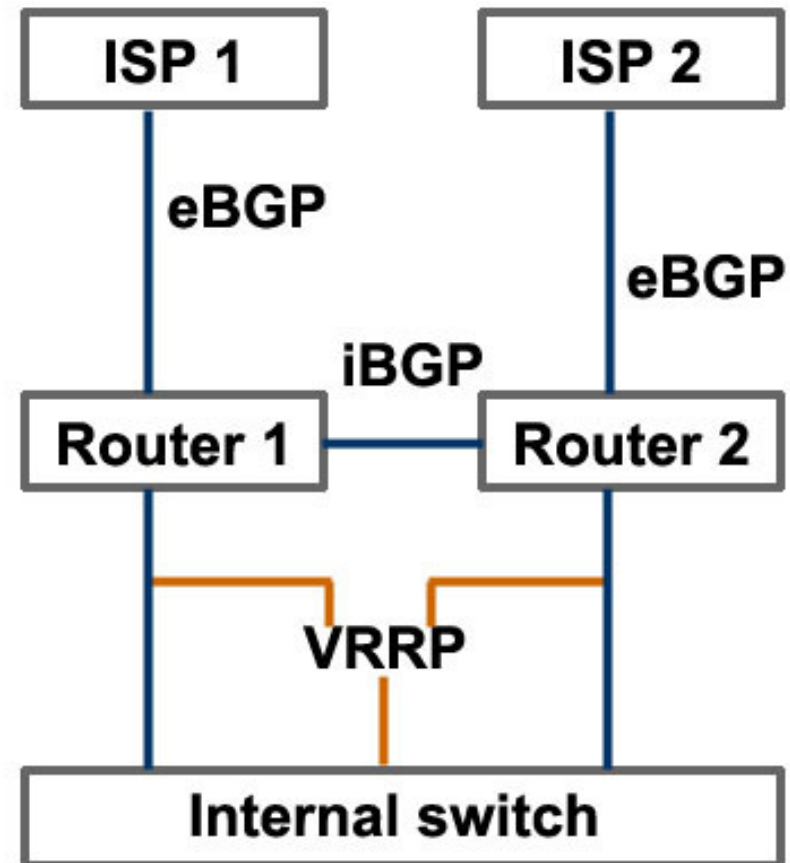
Dst. Address		in	74.120.0.0/13	+	-	Filter
	Dst. Address	Gateway	Distance	Routi...	Pref. Source	
DAb	74.127.71.0/24	77.67. reachable ether3-tiscali	20			
DAb	74.127.72.0/23	77.67. reachable ether3-tiscali	20			
DAb	74.127.74.0/24	77.67. reachable ether3-tiscali	20			
DAb	74.127.76.0/22	77.67.				
DAb	74.127.84.0/24	77.67.				
DAb	74.127.85.0/24	77.67.				
DAb	74.127.86.0/23	77.67.				
DAb	74.127.88.0/24	77.67.				
DAb	74.127.89.0/24	77.67.				
DAb	74.127.90.0/24	77.67.				
DAb	74.127.97.0/24	77.67.				
DAb	74.127.98.0/23	77.67.				
DAb	74.127.100.0/22	77.67.				
DAb	74.127.104.0/24	77.67.				
DAb	74.127.105.0/24	77.67.				
DAb	74.127.106.0/24	77.67.				
DAb	74.127.110.0/24	77.67.				
DAb	74.127.111.0/24	77.67.				
DAb	74.127.112.0/23	77.67.				
DAb	74.127.114.0/23	77.67.				
DAb	74.127.116.0/22	77.67.				
DAb	74.127.120.0/24	77.67.				
DAb	74.127.121.0/24	77.67.				
DAb	74.127.122.0/23	77.67.				
DAb	74.127.124.0/23	77.67.				
DAb	74.127.128.0/19	77.67.				
DAb	74.127.160.0/20	77.67.				
DAb	74.127.176.0/20	77.67.				
DAb	74.127.192.0/24	77.67.				
268 items out of 306356 (1 selected)						

Route <74.127.124.0/23>	
General	Attributes
BGP AS Path: 3257,3356,5650,7011	
BGP Weight:	
BGP Local Pref.:	
BGP Prepend:	
BGP MED: 29	
BGP Atomic Aggregate:	
BGP Origin:	
BGP Communities:	
BGP Communities: 3257:8040	
3257:30049	
3257:50002	
3257:51100	
3257:51102	
Route Tag:	

## Example Setup

- Next-hop for iBGP
- Policy based route to internal network over iBGP peer
- Policy based route to prevent loops



# Thank you for listening

