

MetaRouter and RB411 CPE

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Virtualization Usage Examples

- In the datacenter
 - consolidate a number of routers and services on one hardware platform, making it easier and cheaper to maintain

Virtualization Usage Examples

- In the hosting center
 - use RouterOS as a host with a server (mail, http, ftp, etc) running as guest

Virtualization Usage Examples

- At the wireless ISP client site
 - wireless control only for the WISP, while the Ethernet side router is fully under the clients control

Virtualization Usage Examples

- For network planning and testing
 - experiment with network setups without risking anything

Virtualization Usage Examples

- In custom applications
 - use low cost RouterBOARD embedded systems easily with your own Linux system for custom programs

RouterOS Virtualization Support

- Currently, RouterOS has two different Virtualization implementations:
 - Xen
 - Metarouter

Xen

- Xen is based on the Linux Xen Virtual machine project, and current RouterOS implementation is supported only on RouterOS X86 systems (PCs). Xen can create Virtual machines of different Operating Systems.

Metarouter

- Metarouter is created by MikroTik and currently is supported only on RouterBOARD 4xx series (mips-be). Currently Metarouter can only create RouterOS virtual machines.

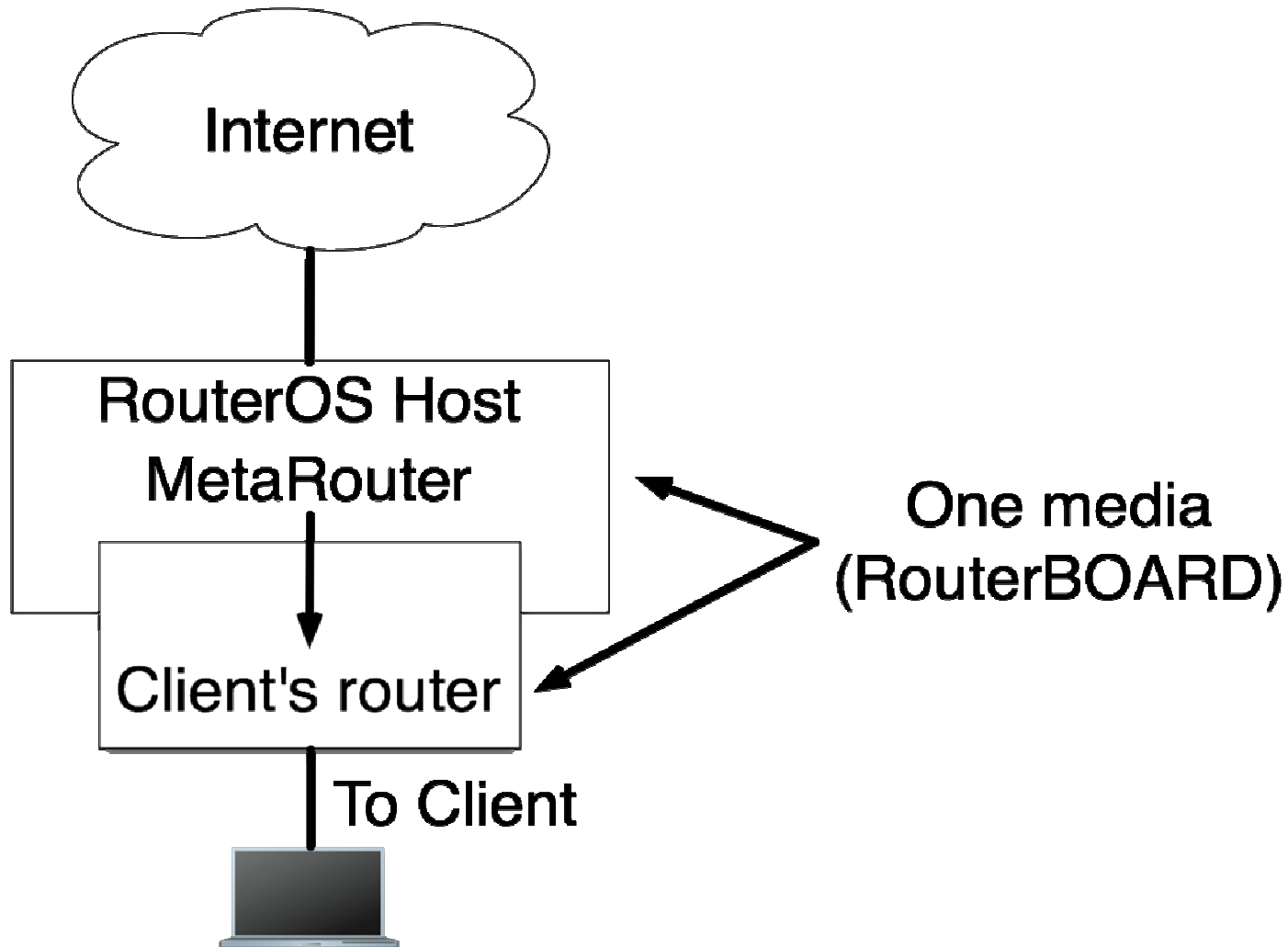
Metarouter Support

- RouterOS v3.21 or newer
- RB400 series board
- Minimum 16MB RAM for each Metarouter instance
- Up to 8 Metarouter virtual machines
- Up to 8 virtual interfaces can be connected to Metarouters. For more it's possible to use VLAN
- No support for external storage devices (Store) in the Metarouter virtual machines

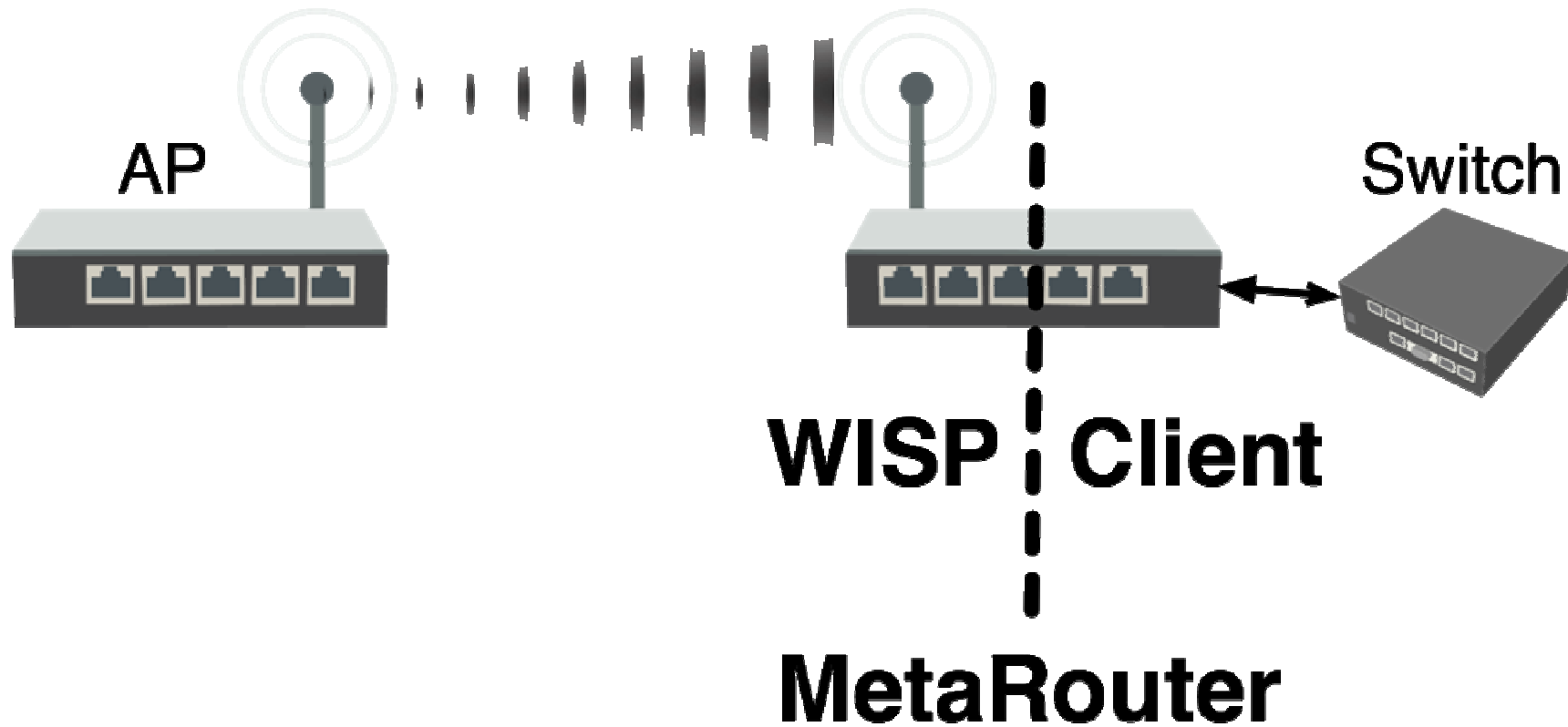
Metarouter Use

- Client can access his own 'router', without the need for other hardware
 - Client can configure his own firewall, without interfering with the WISP router's main configuration

Metarouter Setup



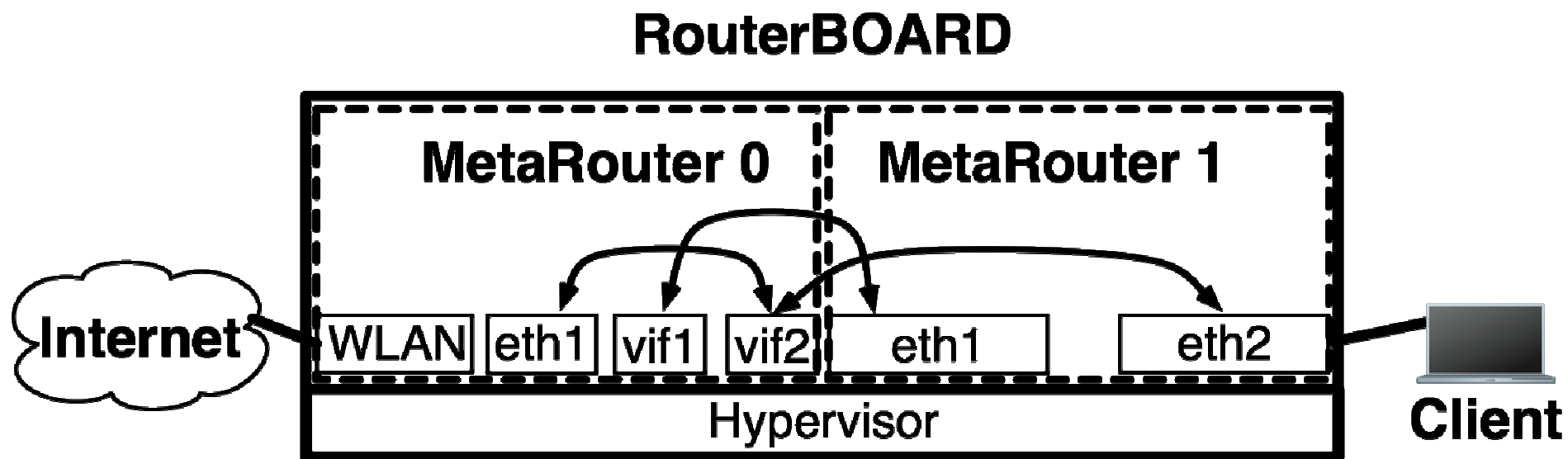
Metarouter WISP Example



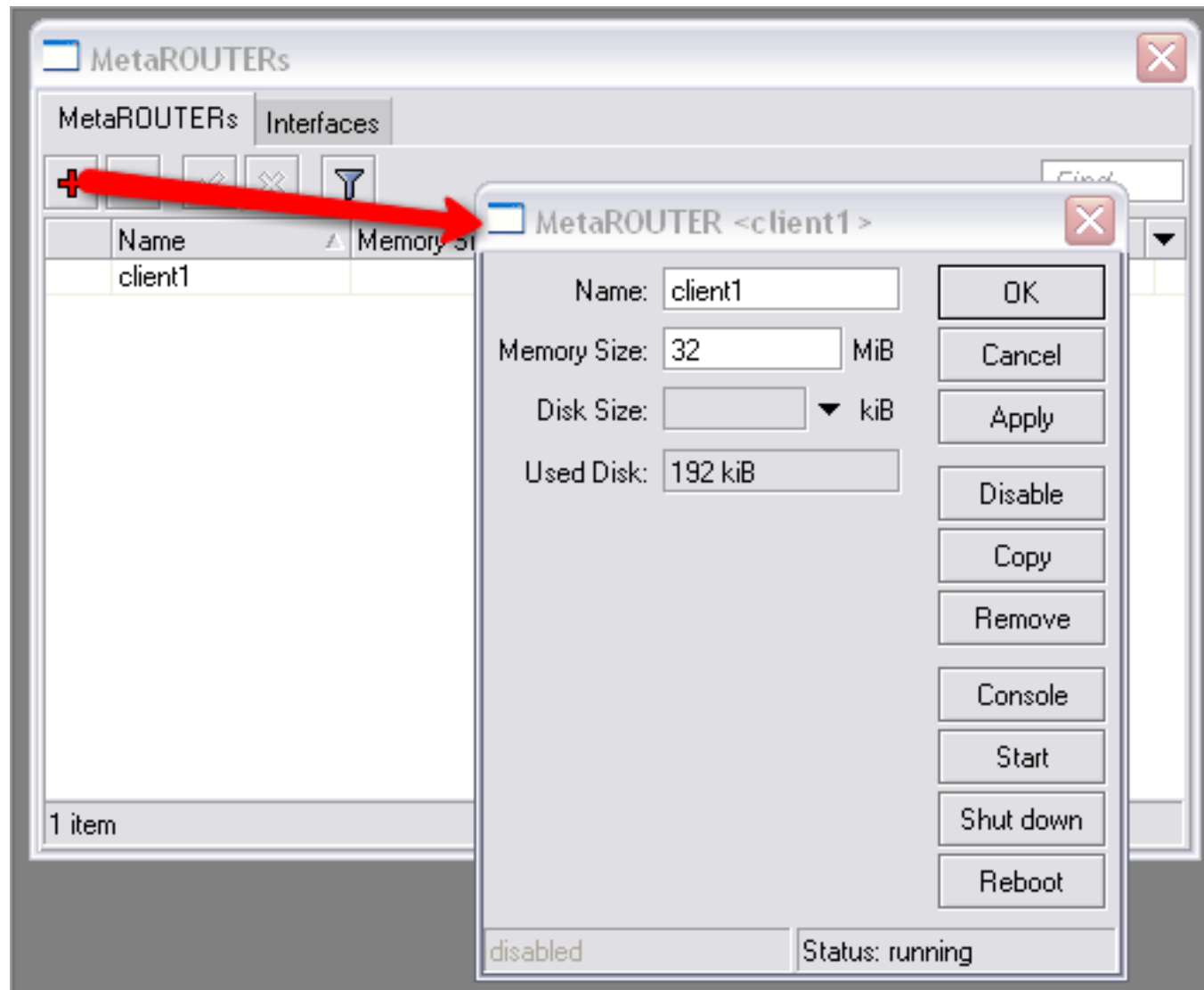
WISP client Metarouter features

- On Host for WISP management:
 - Wireless card management
 - IP configuration
 - Bandwidth control
 - Firewall for WISP
 - Routing and Failover
- For client access:
 - VPN tunnels
 - DHCP
 - Firewall
 - Bandwidth control for local clients
 - VLANs
 - Traffic monitoring (torch, graphs, dude)

Metarouter Setup On RB411 CPE



Creating a Metarouter



Adding Metarouter Interfaces

The screenshot shows a software interface for managing Metarouter interfaces. The main window is titled "MetaROUTERS" and has a tab labeled "Interfaces". Below the tab is a toolbar with icons for adding (+), deleting (-), confirming (checkmark), canceling (X), and filtering (funnel), along with a "Find" search box. A table lists the current interfaces:

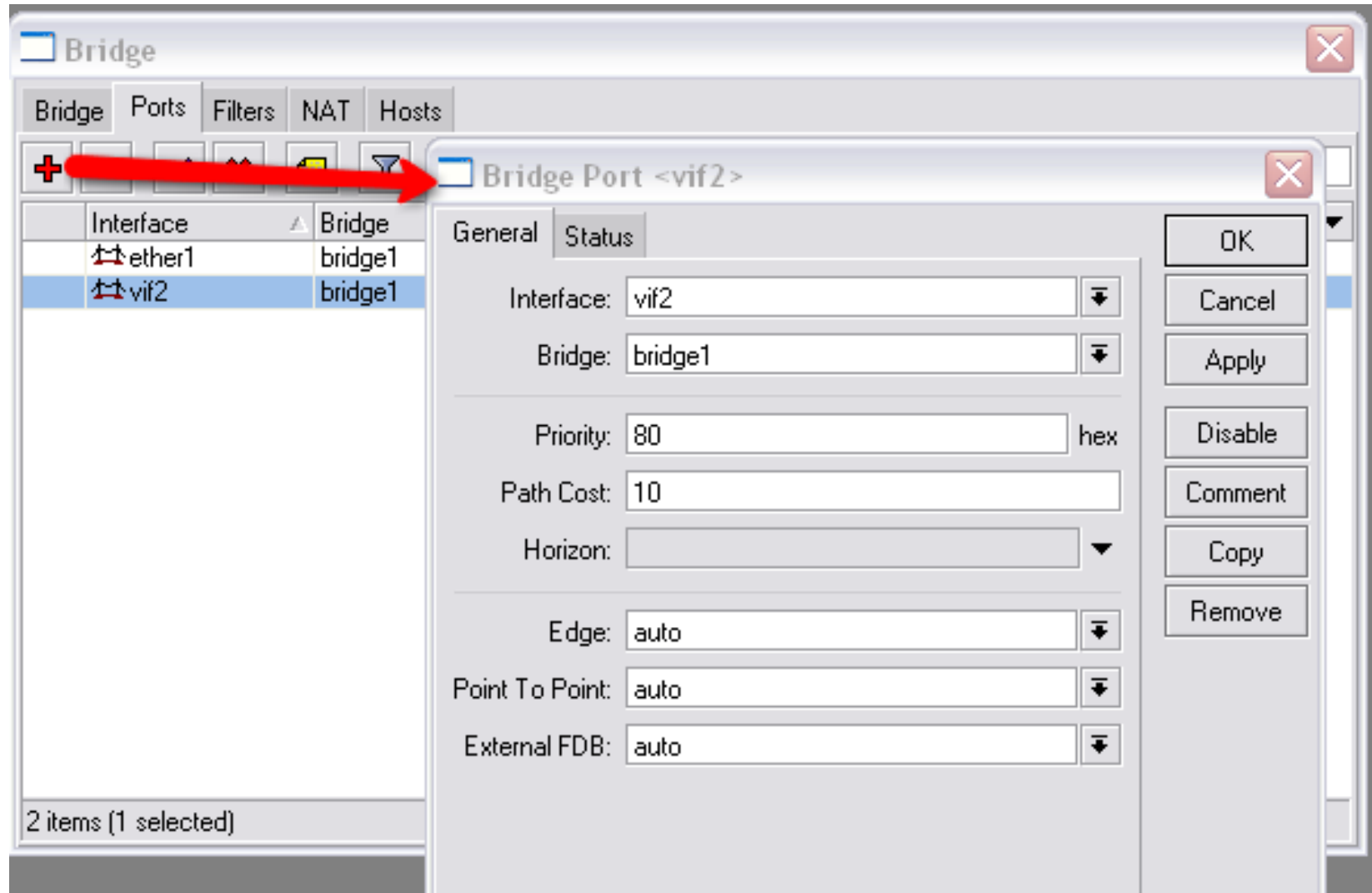
Virtual Machine	Type	VM MAC Address
client1	dynamic	02:8B:4A:49:A9:D5
client1	dynamic	02:C7:FA:B6:59:EC

The second row is selected. A red arrow points from the "+" icon in the toolbar to a dialog box titled "VM Interface <02:C7:FA:B6:59:EC>". The dialog box contains the following fields and options:

- Virtual Machine: client1
- Type: dynamic static
- VM MAC Address: 02:C7:FA:B6:59:EC
- Dynamic MAC Address: 02:3F:2F:00:19:56
- Dynamic Bridge: none

Buttons on the right side of the dialog include OK, Cancel, Apply, Disable, Copy, and Remove. The status bar at the bottom of the main window indicates "2 items (1 selected)" and "disabled".

Bridging Metarouter Interface



Setting up IP Configuration

The screenshot displays a network configuration window with two main components: an 'Address List' table and a configuration dialog for a selected address.

Address List Table:

	Address	Network	Broadcast	Interface
	10.0.1.1/24	10.0.1.0	10.0.1.255	vif1
D	10.5.8.65/24	10.5.8.0	10.5.8.255	wlan1

Address <10.0.1.1/24> Configuration Dialog:

Address: 10.0.1.1/24
Network: 10.0.1.0
Broadcast: 10.0.1.255
Interface: vif1

Buttons: OK, Cancel, Apply, Disable, Comment, Copy, Remove

2 items (1 selected)

disabled

Connecting to Metarouter

```
Terminal

MMM      MMM      KKK      TTTTTTTTTTTT      KKK
MMMM     MMMM     KKK      TTTTTTTTTTTT      KKK
MMM MMMM MMM III KKK KKK RRRRRR 000000 TTT III KKK KKK
MMM MM  MMM III KKKKK RRR RRR 000 000 TTT III KKKKK
MMM     MMM III KKK KKK RRRRRR 000 000 TTT III KKK KKK
MMM     MMM III KKK KKK RRR RRR 000000 TTT III KKK KKK

MikroTik RouterOS 3.21 (c) 1999-2009      http://www.mikrotik.com/

[admin@RouterGW] > metarouter
[admin@RouterGW] /metarouter> print
Flags: X - disabled
#  NAME          MEMORY-SIZE DISK-SIZE    USED-DISK    STATE
0  client1       32MiB       0kiB        192kiB       running
[admin@RouterGW] /metarouter> console 0
```

Configuring Metarouter

```
Terminal
MikroTik RouterOS 3.21 (c) 1999-2009      http://www.mikrotik.com/

Jan/01/1970 00:00:11 system,error,critical router was rebooted without proper shutdown

[admin@MikroTik] > in
[admin@MikroTik] /interface> et
[admin@MikroTik] /interface ethernet> p
Flags: X - disabled, R - running, S - slave
#  NAME                MTU  MAC-ADDRESS          ARP
0  R  ether1              1500  02:8B:4A:49:A9:D5  enabled
1  R  ether2              1500  02:C7:FA:B6:59:EC  enabled
[admin@MikroTik] /interface ethernet> set 0 name=public
[admin@MikroTik] /interface ethernet> set 1 name=local
[admin@MikroTik] /interface ethernet> p
Flags: X - disabled, R - running, S - slave
#  NAME                MTU  MAC-ADDRESS          ARP
0  R  public              1500  02:8B:4A:49:A9:D5  enabled
1  R  local               1500  02:C7:FA:B6:59:EC  enabled
[admin@MikroTik] /interface ethernet>
```

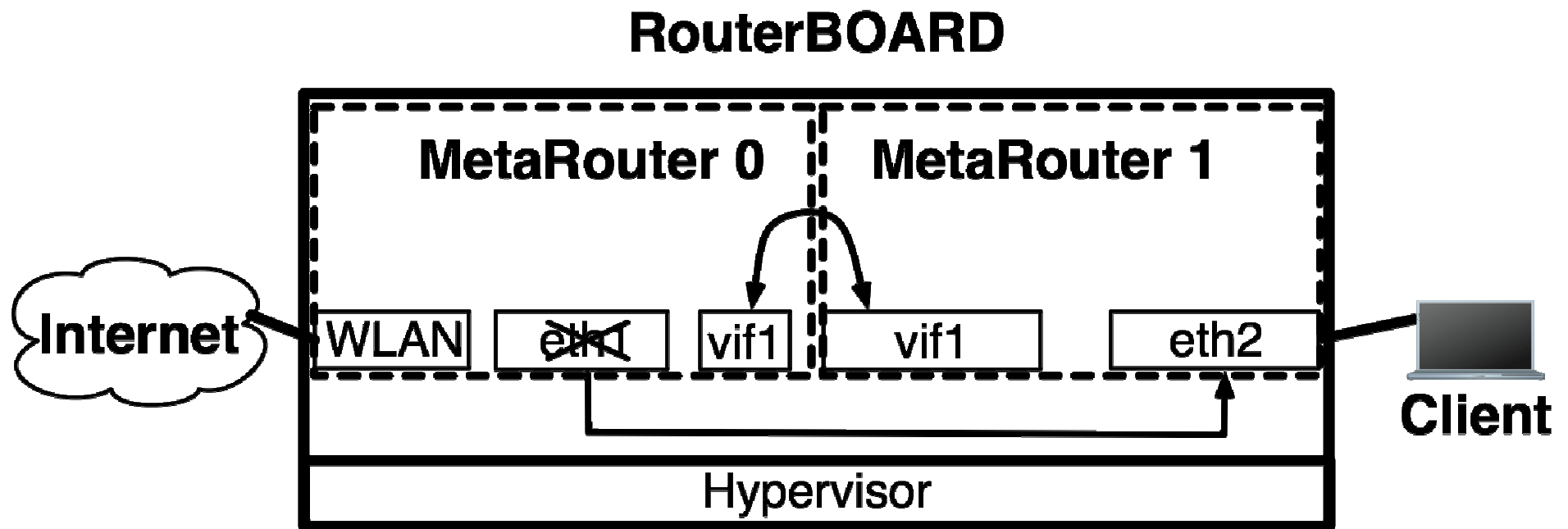
Configuring Metarouter

```
Terminal
0 R public 1500 02:8B:4A:49:A9:D5 enabled
1 R local 1500 02:C7:FA:B6:59:EC enabled
[admin@MikroTik] /interface ethernet> /ip ad
[admin@MikroTik] /ip address> ad address=10.0.1.2/24 interface=public
[admin@MikroTik] /ip address> ad address=10.0.2.1/24 interface=local
[admin@MikroTik] /ip address> print
Flags: X - disabled, I - invalid, D - dynamic
# ADDRESS NETWORK BROADCAST INTERFACE
0 10.0.1.2/24 10.0.1.0 10.0.1.255 public
1 10.0.2.1/24 10.0.2.0 10.0.2.255 local
[admin@MikroTik] /ip address> /ip ro ad gateway=10.0.1.1
[admin@MikroTik] /ip address> /ip ro print
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 G GATEWAY DISTANCE IN..
0 A S 0.0.0.0/0 r 10.0.1.1 1 pu..
1 ADC 10.0.1.0/24 10.0.1.2 0 pu..
2 ADC 10.0.2.0/24 10.0.2.1 0 lo..
[admin@MikroTik] /ip address> /ip fi nat
[admin@MikroTik] /ip firewall nat> ad action=masquerade out-interface=public cha
in=srcnat
[admin@MikroTik] /ip firewall nat> /sys identity set name=Client1
[admin@Client1] /ip firewall nat>
```

Future of Metarouter

- We are planning to add more features to Metarouter, so that it will even exceed Xen in functionality
- New hardware support will be added to Metarouter
- Isolated and forwarded ports from host router to Metarouter

MetaRouter v2



Thank You