

MUM in Kyrgyzstan 2015

MikroTik



ООО «ЛокТехно»

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Виртуализация RouterOS на базе оборудования MikroTik



- Что такое виртуализация?
- Как создать её с помощью metarouter?
- Для чего нужна виртуализация на RouterOS?
- Плюсы и минусы.



Виртуализация — это проверенная программная технология, которая делает возможной одновременное выполнение нескольких ОС и приложений на одном сервере. Она трансформирует ИТ-ландшафт и коренным образом меняет способ использования технологий



Как создать её с помощью Metarouter?



Возьмем Коммутатор
Mikrotik Cloud Router Switch
CRS125-24G-1S-2HnD-IN



Создадим мост

admin@4C:5E:0C:90:8B:9A (MikroTik) - WinBox v6.32.1 on CRS125-24G-1S-2HnD (mipsbe)

Safe Mode

Hide Passwords

Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
MetaROUTER
Partition
Make Supout.tif
Manual
Exit

Bridge

Bridge Ports Filters NAT Hosts

+ - ✓ ✗ 📄 🗑️ ⚙️

	Name	Type	L2
R	bridge-local	Bridge	
R	bridge-mr1	Bridge	

2 items out of 28 (1 selected)

Interface <bridge-mr1>

General STP Status Traffic

Name: bridge-mr1

Type: Bridge

MTU: []

Actual MTU: 1500

L2 MTU: 65535

MAC Address: []

ARP: enabled

Admin. MAC Address: []

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Torch

Packet (p/s)	MAC Address	Protoco...
23	4C:5E:0C:90:8B:9A	rstp
0		rstp

enabled running slave

RouterOS WinBox

Создаем 1вый виртуальный роутер

admin@4C:5E:0C:90:8B:9A (MikroTik) - WinBox v6.32.1 on CRS125-24G-1S-2HnD (mipsbe)

Safe Mode Hide Passwords

- Quick Set
- CAPsMAN
- Interfaces
- Wireless
- Bridge
- PPP
- Switch
- Mesh
- IP
- MPLS
- Routing
- System
- Queues
- Files
- Log
- Radius
- Tools
- New Terminal
- LCD
- MetaROUTER**
- Partition
- Make Supout.rif
- Manual
- Exit

MetaROUTERS

MetaROUTERS Interfaces Virtual Ethernet

+ = ✓ ✕ ⚡ Import Image

Name	Memory...	Disk Si...	Used
0 items			

New MetaROUTER

Name:

Memory Size: MiB

Disk Size: kiB

Used Disk:

Disk Reads:

Disk Writes:

enabled Status: disabled

RouterOS WinBox

Создаем 2 виртуальных порта и добавляем их в мост mr1

The screenshot displays the MikroTik WinBox interface. The left sidebar contains a navigation menu with the following items: Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, LCD, MetaROUTER (highlighted with a blue circle), Partition, Make Supout.rif, Manual, and Exit. The main window shows the 'MetaROUTERS' configuration page, with the 'Interfaces' tab selected. A 'New VM Interface' dialog box is open, showing the following configuration:

- Virtual Machine: mr1
- Type: dynamic static
- Dynamic MAC Address: 02:5A:5C:0D:F1:92
- Dynamic Bridge: bridge-mr1
- VM MAC Address: 02:C1:6E:4E:66:33

The 'OK' button in the dialog box is also highlighted with a blue circle. The status bar at the bottom of the dialog box indicates 'enabled'. The main window title bar shows 'admin@4C:5E:0C:90:8B:9A (MikroTik) - WinBox v6.32.1 on CRS125-24G-1S-2HnD (mipsbe)'. The top right corner of the window has a 'Hide Passwords' checkbox and a lock icon.

Добавляем физический порт в мост mr1

The screenshot shows the MikroTik WinBox interface. The left sidebar contains various configuration options, with 'Bridge' highlighted. The main window displays the 'Bridge' configuration page, which includes a table of bridge ports. The 'New Bridge Port' dialog box is open, showing the configuration for a new port. The 'Interface' field is set to 'ether3-slave-local' and the 'Bridge' field is set to 'bridge-mr1'. The 'Priority' is set to 80, 'Path Cost' is 10, and 'Edge' is set to 'auto'. The 'Auto Isolate' checkbox is unchecked. The status of the port is shown as 'enabled'.

Interface	Bridge	Priority
ether2-master1	bridge-local	
vif1	bridge-mr1	
vif2	bridge-mr1	
wlan1	bridge-local	

Для связи с виртуальным роутером указываем ему ip 10.10.1.1/24

The screenshot displays the Mikrotik WinBox interface. The top status bar shows the user 'admin@4C:5E:0C:90:8B:9A' connected to a MikroTik device. The left sidebar contains a menu with 'IP' highlighted. The main area shows the 'Address List' configuration window, where a 'New Address' dialog is open. In this dialog, the 'Address' field is set to '10.10.1.1/24' and the 'Interface' is set to 'bridge-mr1'. The 'Address List' window shows a table with one entry and a '2 items' count at the bottom.

RouterOS WinBox

admin@4C:5E:0C:90:8B:9A (MikroTik) - WinBox v6.32.1 on CRS125-24G-1S-2HnD (mipsbe)

Safe Mode

Hide Passwords

Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
MetaROUTER
Partition
Make Supout.rf
Manual
Exit

Address List

New Address

Address: 10.10.1.1/24

Network:

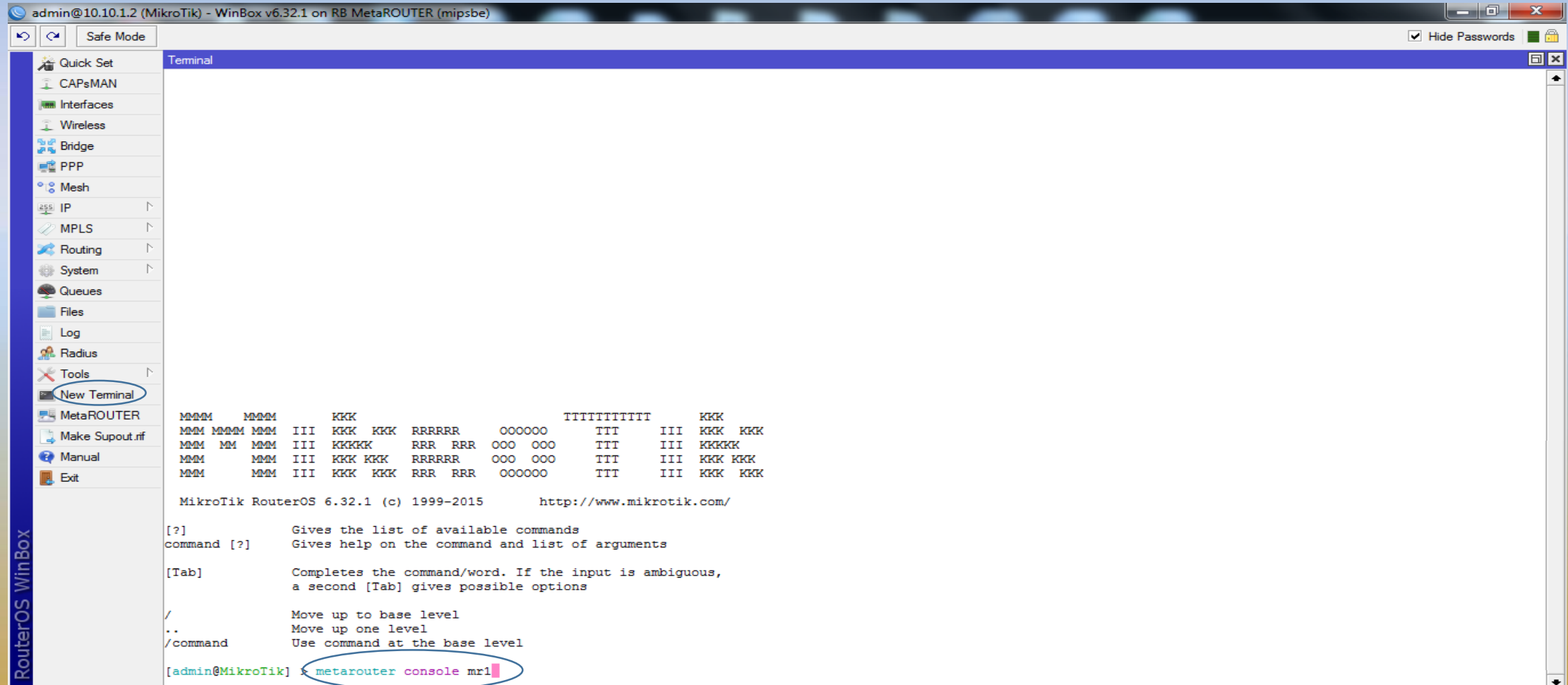
Interface: bridge-mr1

OK
Cancel
Apply
Disable
Comment
Copy
Remove

enabled

2 items

Заходим через консоль на виртуальный роутера командой



The screenshot shows the WinBox interface for MikroTik RouterOS. The left sidebar contains a menu with items like Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Make Supout.tif, Manual, and Exit. The 'New Terminal' item is circled in blue. The main terminal window displays the RouterOS boot screen with a ASCII art logo and version information. Below the logo, there is a list of help commands and their descriptions. At the bottom of the terminal, the command `metarouter console mr1` is being entered, with the entire command circled in blue.

```
admin@10.10.1.2 (MikroTik) - WinBox v6.32.1 on RB MetaROUTER (mipsbe)
Safe Mode
Terminal
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Make Supout.tif
Manual
Exit

MMMM  MMM  KKK                TTTTTTTTTT  KKK
MMM MMMM MMM III  KKK  KKK  RRRRRR  OOOOOO  TTT  III  KKK  KKK
MMM MM  MMM III  KKKKKK  RRR  RRR  OOO  OOO  TTT  III  KKKKK
MMM  MMM III  KKK  KKK  RRRRRR  OOO  OOO  TTT  III  KKK  KKK
MMM  MMM III  KKK  KKK  RRR  RRR  OOOOOO  TTT  III  KKK  KKK

MikroTik RouterOS 6.32.1 (c) 1999-2015      http://www.mikrotik.com/

[?]          Gives the list of available commands
command [?]  Gives help on the command and list of arguments

[Tab]        Completes the command/word. If the input is ambiguous,
              a second [Tab] gives possible options

/            Move up to base level
..           Move up one level
/command     Use command at the base level

[admin@MikroTik] > metarouter console mr1
```

Производим базовую настройку прописываем ip, настраиваем dhcp

```
admin@4C:5E:0C:90:8B:9A (MikroTik) - WinBox v6.32.1 on CRS125-24G-1S-2HnD (mipsbe)
Safe Mode
Hide Passwords

RouterOS WinBox
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
MetaROUTER
Partition
Make Supout.rif
Manual
Exit

Terminal
MMM   MMM   III   KKK   KKK   RRR   RRR   OOOOOO   TTT   III   KKK   KKK
MikroTik RouterOS 6.32.1 (c) 1999-2015      http://www.mikrotik.com/

[?]          Gives the list of available commands
command [?]  Gives help on the command and list of arguments

[Tab]        Completes the command/word. If the input is ambiguous,
              a second [Tab] gives possible options

/            Move up to base level
..           Move up one level
/command     Use command at the base level
Jan/02/1970 00:01:03 system,error,critical router was rebooted without proper shu
tdown

[admin@MikroTik] > interface ethernet print
Flags: X - disabled, R - running, S - slave
#   NAME   MTU MAC-ADDRESS   ARP   MASTER-PORT   SWITCH
0 R ether1  1500 02:C1:6E:4E:66:33 enabled none
1 R ether2  1500 02:76:24:00:66:C7 enabled none

[admin@MikroTik] > ip address add address=10.10.1.2/24 interface=ether1
[admin@MikroTik] > ip address add address=10.10.10.1/24 interface=ether2
[admin@MikroTik] > ip dhcp-server setup
Select interface to run DHCP server on

dhcp server interface: ether2
Select network for DHCP addresses

dhcp address space: 10.10.10.0/24
Select gateway for given network

gateway for dhcp network: 10.10.10.1
Select pool of ip addresses given out by DHCP server

addresses to give out: 10.10.10.2-10.10.10.254
Select DNS servers

dns servers: 10.10.10.1
Select lease time

lease time: 10m
[admin@MikroTik] >
```

Подключаемся через Winbox с рабочего компьютера для которого мы добавили ip

The screenshot shows the Mikrotik WinBox interface. The title bar indicates the user is logged in as 'admin@10.10.10.1' on a MikroTik RB MetaROUTER. The left sidebar contains a menu with options like Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Make Supout.rif, Manual, and Exit. The 'IP' menu item is highlighted with a blue circle. Two windows are open in the main area: 'Interface List' and 'Address List'.

Interface List

Interface	Name	Type	L2
R	ether1	Ethernet	
R	ether2	Ethernet	

Address List

Address	Network	Interface
10.10.1.2/24	10.10.1.0	ether1
10.10.10.1/24	10.10.10.0	ether2

2 items

RouterOS WinBox

Это не все



- Также в качестве операционной системы для виртуального маршрутизатора, можно использовать не только Mikrotik RouterOS, но и специально собранные образы других систем на базе ядра Linux. Так, например, собрать образ операционной системы OpenWRT, с необходимым вам набором пакетов, и установить его в MetaRouter. Или же, скачать уже готовый образ.

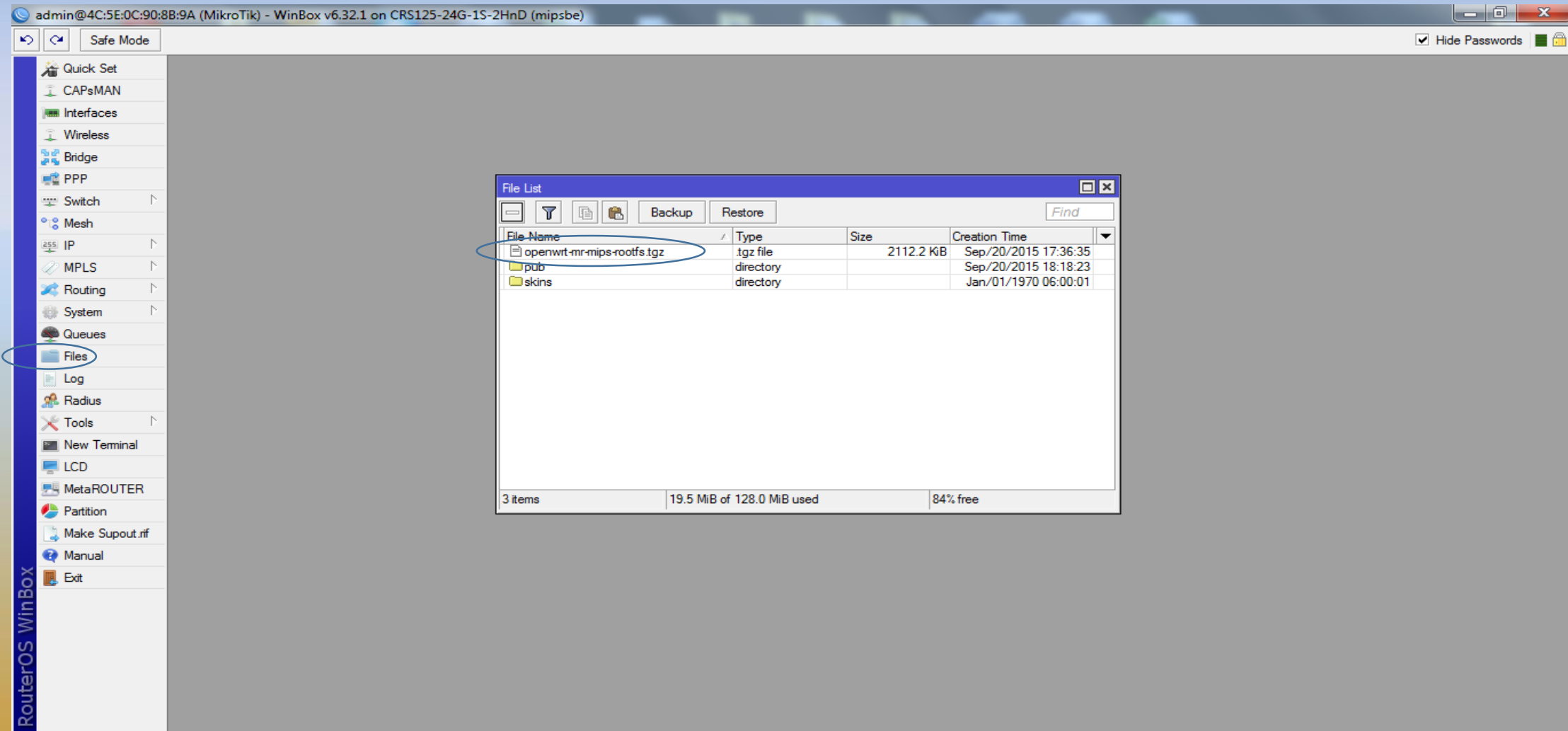


Качаем готовый OpenWRT. Зальем файл на маршрутизатор, в раздел Files.

- <http://www.mikrotik.com/download/metarouter/openwrt-mr-mips-rootfs.tgz>



Перетаскиваем скопированный нами в файл в файлообменник



Далее переходим в раздел MetaROUTER и нажимаем на кнопку Import Image. Выбираем наш файл.

The screenshot shows the WinBox interface for a MikroTik device. The left sidebar contains a navigation menu with the following items: Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, LCD, MetaROUTER (highlighted with a blue circle), Partition, Make Supout.rif, Manual, and Exit. The main window displays the 'MetaROUTERS' configuration page, which is divided into three tabs: 'MetaROUTERS', 'Interfaces', and 'Virtual Ethernet'. The 'MetaROUTERS' tab is active, showing a table with the following data:

Name	Memory...	Disk Si...	Used D...	Status
mr1	24		112	running
mr2	16			

Below the table, there is a '2 items' indicator. The 'Import Image' button is circled in blue. An 'Import Image (Running)' dialog box is open, showing the following fields and buttons:

- File Name: openwrt-mr-mips-rootfs.tgz (circled in blue)
- Memory Size: 16 MiB
- Enabled:
- Imported: 18 %
- Start button (circled in blue)
- Stop button

Создаем второй виртуальный роутер mr2 по схеме как и первый

The screenshot displays the MikroTik WinBox interface with the following configurations:

- Bridge Table:**

Name	Type	L2 MTU	Tx	Rx
bridge-local	Bridge	1588	5.5 kbps	9.6 kbps
bridge-mr1	Bridge	1588	0 bps	0 bps
bridge-mr2	Bridge	1588	0 bps	0 bps

3 items out of 33

- MetaROUTERS Table:**

Virtual Machine	Type	Static Interface	VM MAC Address
mr1	dynamic		02:C1:6E:4E:66:33
mr1	dynamic		02:76:24:00:66:C7
mr2	dynamic		02:7C:93:BE:D7:88
mr2	dynamic		02:B1:33:8C:BA:85

4 items

- Bridge Table (Detailed):**

Interface	Bridge	Priority (h...)	Path Cost	Horizon	Role	Root P...
ether2-master-local	bridge-local	80	10		designated port	
ether3-slave-local	bridge-mr1	80	10		designated port	
ether4-slave-local	bridge-mr2	80	10		disabled port	
vif1	bridge-mr1	80	10		designated port	
vif2	bridge-mr1	80	10		designated port	
vif3	bridge-mr2	80	10		designated port	
vif4	bridge-mr2	80	10		designated port	
wlan1	bridge-local	80	10		designated port	

- Address List Table:**

Address	Network	Interface
10.10.1.1/24	10.10.1.0	bridge-mr1
10.10.2.1/24	10.10.2.0	bridge-mr2
::: default configuration		
192.168.87.1/...	192.168.87.0	ether2-master-lo...
192.168.88.24...	192.168.88.0	ether1-gateway

Заходим на консоль виртуального роутера mr2 командой `metarouter console mr2` или же нажав кнопку КОНСОЛЬ.

The screenshot shows the WinBox interface for a MikroTik device. The left sidebar contains various configuration menus, with 'MetaROUTER' highlighted. The main window displays a table of MetaROUTERs and a configuration dialog for 'mr2'.

Name	Memory...	Disk Size (kiB)	Used Disk (kiB)	Status
mr1	24		112	running
mr2	24		5146	running

The configuration dialog for 'MetaROUTER <mr2>' shows the following fields and buttons:

- Name: mr2
- Memory Size: 24 MiB
- Disk Size: [] kiB
- Used Disk: 5146 kiB
- Disk Reads: 4852
- Disk Writes: 224
- Buttons: OK, Cancel, Apply, Disable, Copy, Remove, Console (circled), Start, Shut down, Reboot
- Status: running

Для чего нужна виртуализация на RouterOS?



- Обучения.
- Создания тестовой среды.
- Создания разных сетей.
- Использование других ос.



Плюсы

- Все в одной коробке
- Простота в настройке
- Цена



Минусы

- Отказоустойчивость
- Потеря
производительности



Вопросы?



Спасибо за внимание!

