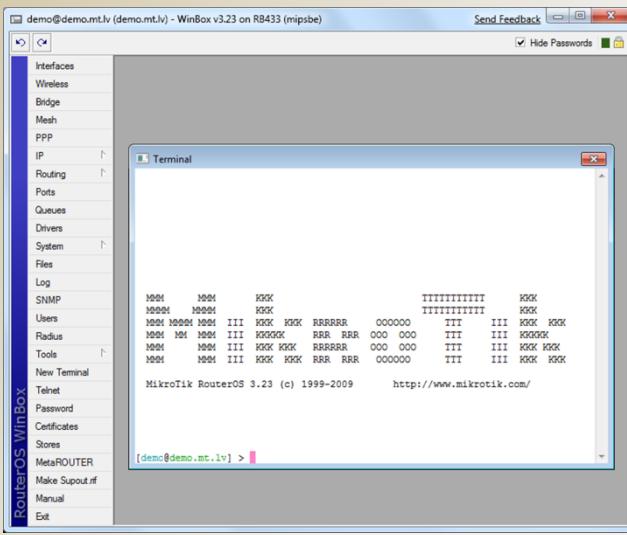


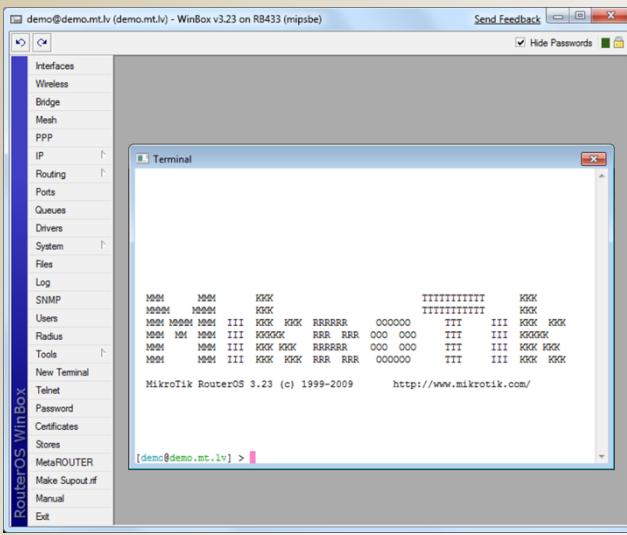


Introducing Mikrotik RouterBoard and RouterOS



RouterOS

RouterOS is a stand-alone operating system based on the Linux v2.6 kernel, and our goal here at MikroTik is to provide all these features with a quick and simple installation and an easy to use interface.



RouterOS

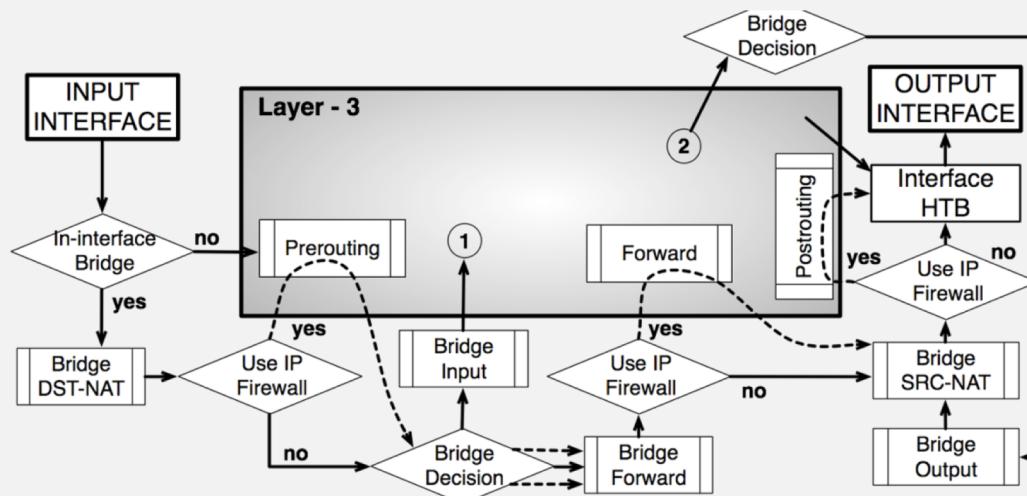
RouterOS is a stand-alone operating system based on the Linux v2.6 kernel, and our goal here at MikroTik is to provide all these features with a quick and simple installation and an easy to use interface.

- Wireless and Wired interfaces (ethernet)
- Stateful Firewall with NAT and powerful Packet matching and inspection
- Layer 2 configuration – bridging and VLANs
- Layer 3 IP4 and IP6
- Advanced QoS and traffic management
- Built-in applications including web proxy captive portal (HotSpot)
- Full featured set of administrative tools including packet sniffing and bandwidth testing

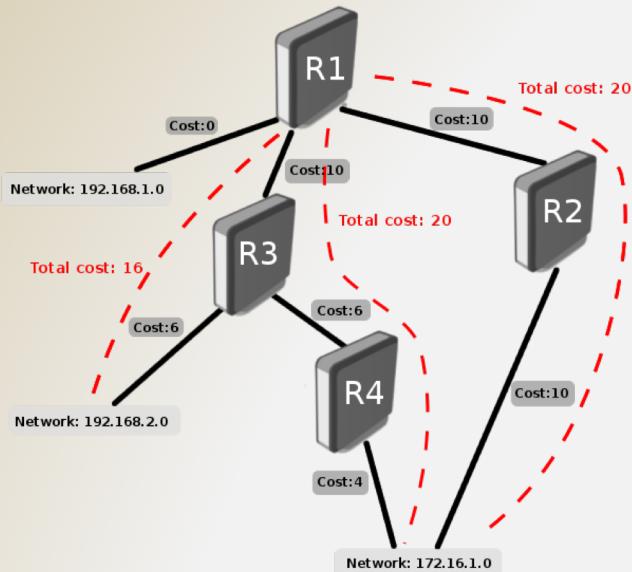
FIREWALL



RouterOS features a stateful firewall with internal packet, connection, and route marking based on more than 50 independent properties. It can filter by IP address, address range, port, port range, IP protocol, DSCP and other parameters, also supports Static and Dynamic Address Lists, and can even match packets by pattern in their content, specified in Regular Expressions, called Layer7 matching. The RouterOS Firewall facility also supports IPv4 and IP6 packets.



ROUTING



RouterOS supports static routing and a multitude of dynamic routing protocols.

For IPv4 it supports:

- RIP v1 and v2
- OSPF v2
- BGP v4.

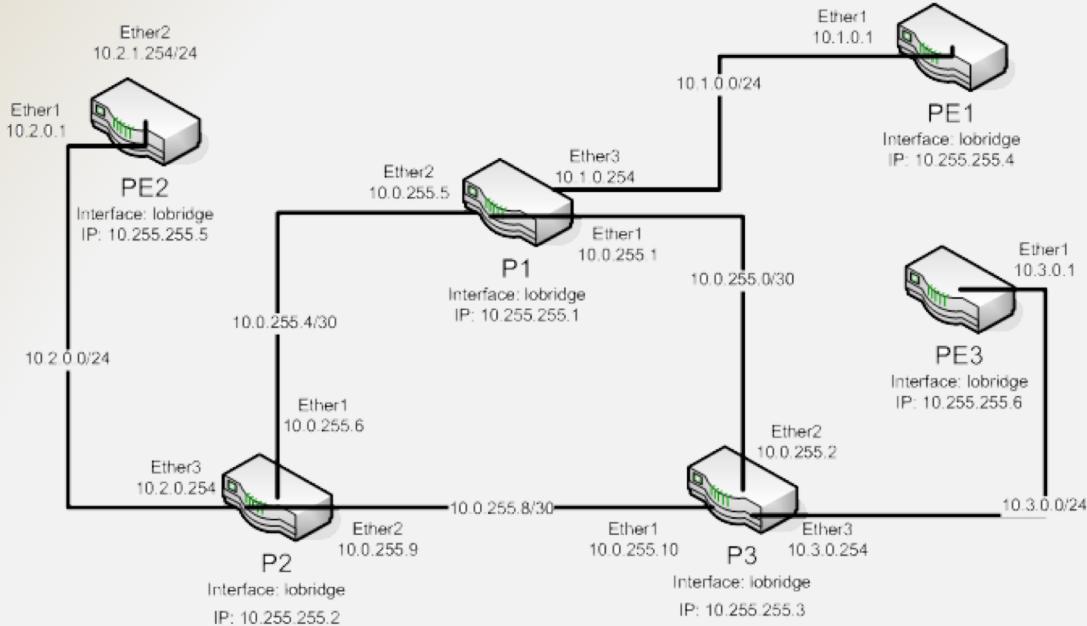
For IPv6 it supports:

- RIPng
- OSPFv3
- BGP

RouterOS also supports Virtual Routing and Forwarding (VRF), Policy based routing, Interface based routing and ECMP routing.

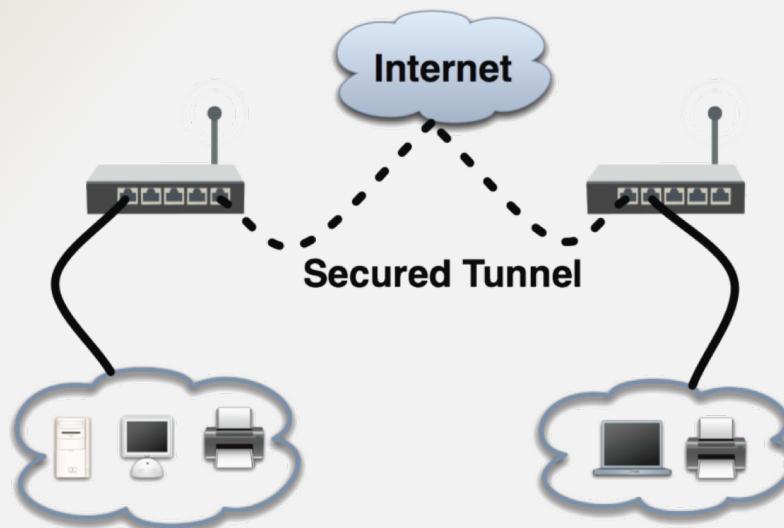
You can use the Firewall filter to mark specific connections with Routing marks, and then make the marked traffic use a different ISP.

MPLS



MultiProtocol Label Switching. It can be used to replace IP routing - packet forwarding decision is no longer based on fields in IP header and routing table, but on labels that are attached to packet. This approach speeds up forwarding process because next hop lookup becomes very simple compared to routing lookup.

VPN



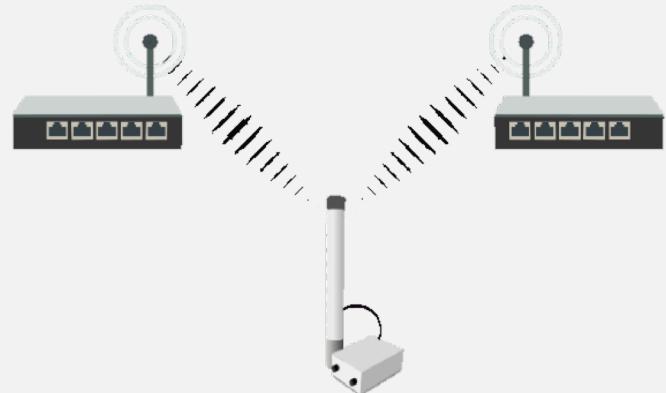
RouterOS supports various VPN methods and tunnel protocols:

- Ipsec – tunnel and transport mode, certificate or PSK, AH and ESP security protocols
- Point to point tunneling (OpenVPN, PPTP, PPPoE, L2TP)
- Advanced PPP features (MLPPP, BCP)
- Simple tunnels (IPIP, EoIP)
- 6to4 tunnel support (IPv6 over IPv4 network)
- VLAN – IEEE802.1q Virtual LAN support, Q-in-Q support
- MPLS based VPNs

WIRELESS – Point to Multipoint

A variety of Wireless technologies are supported in RouterOS, the most basic of them being the wireless access point and client. Some of the features supported by RouterOS:

- IEEE802.11a/b/g/n wireless client and access point
- Nstreme and Nstreme2 proprietary protocols
- Client polling
- RTS/CTS
- Wireless Distribution System (WDS)
- Virtual AP
- WEP, WPA, WPA2 encryption
- Access control list
- Wireless client roaming
- WMM
- HWMP+ Wireless MESH protocol
- MME wireless routing protocol



WIRELESS – Point to Point



RouterOS also features the NStreme proprietary wireless protocol that allows to extend the connection range and speed, when using MikroTik routers at each end. This has helped to achieve the current non-amplified wifi link length world record in Italy (304Km). Also supported is NSteme dual which allows to use two antennas at each end, one for receiving and one for sending.



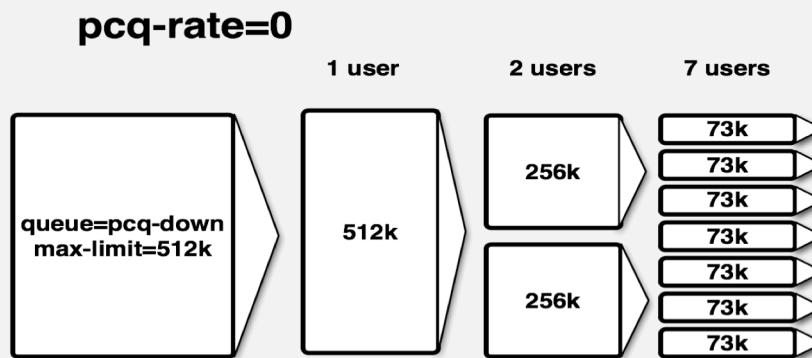
QoS

Bandwidth Control is a set of mechanisms that control data rate allocation, delay variability, timely delivery, and delivery reliability.

Quality of Service (QoS) means that the router can prioritize and shape network traffic.

Some features of MikroTik RouterOS traffic control mechanism are listed below:

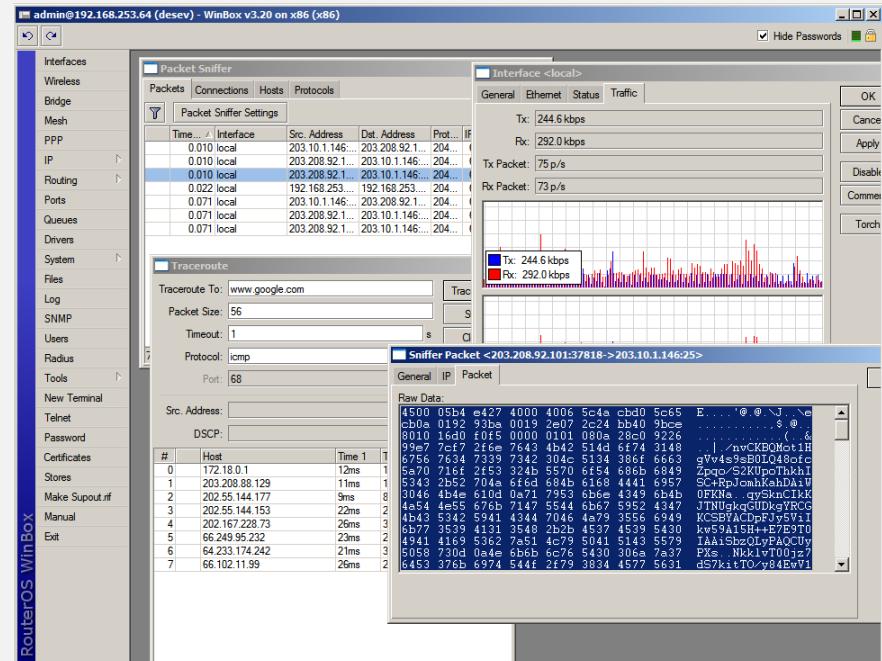
- limit data rate for certain IP addresses, subnets, protocols, ports, and other parameters
- limit peer-to-peer traffic
- prioritize some packet flows over others
- use queue bursts for faster web browsing
- apply queues on fixed time intervals
- share available traffic among users equally, or depending on the load of the channel



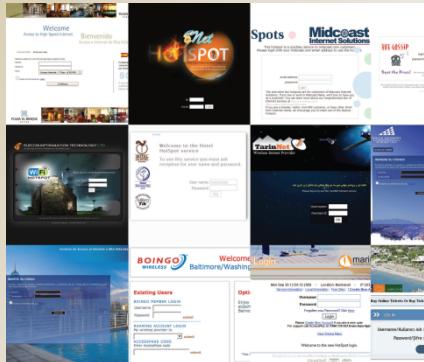
TOOLS

To help administrating your network, RouterOS also provides a large number of small network tools to optimize your everyday tasks. Here are some of them:

- Ping, traceroute
- Bandwidth test, ping flood
- Packet sniffer, torch
- Telnet, SSH
- E-mail and SMS send tools
- Automated script execution tools
- CALEA data mirroring
- File Fetch tool
- Active connection table
- NTP Client and Server
- TFTP server
- Dynamic DNS updater
- VRRP redundancy support
- SNMP for providing graphs and stats
- RADIUS client and server (User Manager)



APPLICATIONS

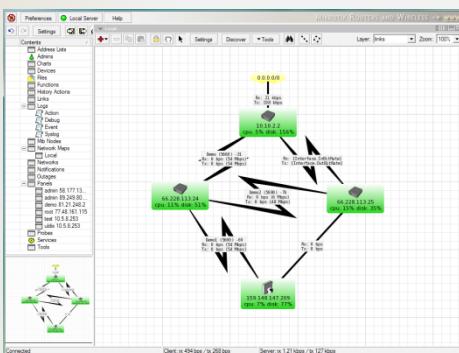


HOTSPOT

Built-in walled garden provides a powerful captive portal public access hotspot system with MAC address authentication capabilities and RADIUS server

Web Proxy

Fully featured web cache supporting transparent and traditional web proxy plus SOCKS. Web cache can be stored on-board for high performance, or external storage for high capacity



The DUDE Network Management

The Dude SNMP network monitor is a *free* application by MikroTik which can dramatically improve the way you manage your network environment. Provides real-time availability and performance logging and graphing of any SNMP device

CONFIGURATION

Configuration is by three methods:

- Shell access by telnet, ssh or serial port
- Rudimentary web based interface
- Winbox – the most powerful GUI configuration tool on the planet!

```
demo@demo.mt.lv - PuTTY
Send Feedback
ppp -- Point to Point Protocol
queue -- Bandwidth management
quit -- Quit console
radius -- Radius client settings
redo -- Redo previously undone action
routing --
setup -- Do basic setup of system
snmp -- SNMP settings
special-login -- Special login users
store --
system --
tool -- Diagnostics tools
undo -- Undo previous action
user --
export -- Print or save an export script that can be used to restore configuration
on

[demo@demo.mt.lv] > interface wireless registration-table print
# INTERFACE      RADIO-NAME    MAC-ADDRESS   AP   SIGNAL... TX-RATE...
0 wlan3-ap1     000C4218551A  00:0C:42:18:55:1A no  -69dBm... 54Mbps
1 wlan2-st2     000C42050127  00:0C:42:05:01:27 yes -65dBm... 54Mbps
2 wlan1-uplink  000B6B4D461F  00:0B:6B:4D:46:1F yes -26dBm... 54Mbps
[demo@demo.mt.lv] >
```

MikroTik

Name	Type	Configuration	Graph
ether1	ethernet	enabled	graph
ether2	ethernet	192.168.212.1/24	graph
ether3	ethernet	192.168.213.1/24	graph
wlan1-uplink	wireless	66.228.113.24/32	graph
wlan2-st2	wireless	66.228.113.24/32	graph
wlan3-ap1	wireless	66.228.113.24/32	graph

MikroTik RouterOS 3.23 (c) 1999-2009 http://www.mikrotik.com/

```
[demo@demo.mt.lv] >
```

More information:

Official Mikrotik Web Site: <http://www.mikrotik.com>

- Full product information
- Full Documentation
- User Forums
- Wiki Documents

Official RouterBoard Web Site: <http://www.routerboard.com>

- Product Catalogue and Documentation

Learn RouterOS

– the definitive Guide by Dennis Burgess

