

MikroTik RouterOS v3

New
Obvious and Obscure
Mikrotik RouterOS v3.0 features

Kernel

- RouterOS 2.9.39
 - Linux kernel version 2.4.31
- RouterOS 3.0beta5
 - Linux kernel version 2.6.19
- For more detailed information see:
<http://www.kernel.org/>

Hardware Compatibility

- SMP (Symmetric Multiprocessing) support



- SATA (Serial-ATA) disk support
- Maximum RAM support increased from 1GB to 2GB
- Latest interface driver support
- Dropped legacy interface support

API Support

- An application programming interface (API) is a source code interface that a computer system provides in order to support requests for services to be made of it by a computer program. (from wikipedia.org)
- To enable API use “/ip services enable api”
- Default RouterOS API port is 8728 TCP.
- For more information see:
<http://wiki.mikrotik.com/wiki/API>

New Web-proxy Implementations

- Completely Mikrotik rewritten web-proxy (no Squid or another pre written source code used)
- Web-proxy package is now fully integrated into main system package
- Web-proxy now is more suitable for Hotspot use
- Web-proxy now works faster and have optimized memory usage

New OSPF Implementation

- Completely Mikrotik rewritten OSPF (no Zebra or another pre written source code used)
- Completely new routing-test v3.0 package created (routing-test v2.9 package is now standard routing v3.0 package)
- Several previously unfixable bugs fixed
- OSPF now have potential for further improvements (interface routes, inter-area filters, pre-interface filters, ...)

New VRRP Implementation

- Completely new VRRP implementation, not compatible with previous versions
- Several previously unfixable bugs fixed
- Now it is necessary to create VRRP interfaces instead of just enabling VRRP feature
- VRRP addresses now must be assigned as regular (/32) IP addresses

Wireless Features

- “MAC NAT” bridge

- ◆ Station-pseudobridge

Learns which IP address has which MAC address and translates it.

- ◆ Station-pseudobridge-clone

Uses one MAC address of the device and clones it to the wireless interface.

Wireless Features

- WDS-MESH

- ◆ WDS-mode=dynamic-mesh/static-mesh

New improved WDS connection between RouterOS devices for MESH networking.

Interface <wlan1 >

Advanced WDS Nstreme Tx Power Status ...

WDS Mode: disabled

WDS Default Bridge: disabled
static
dynamic

WDS Default Cost: static mesh
dynamic mesh

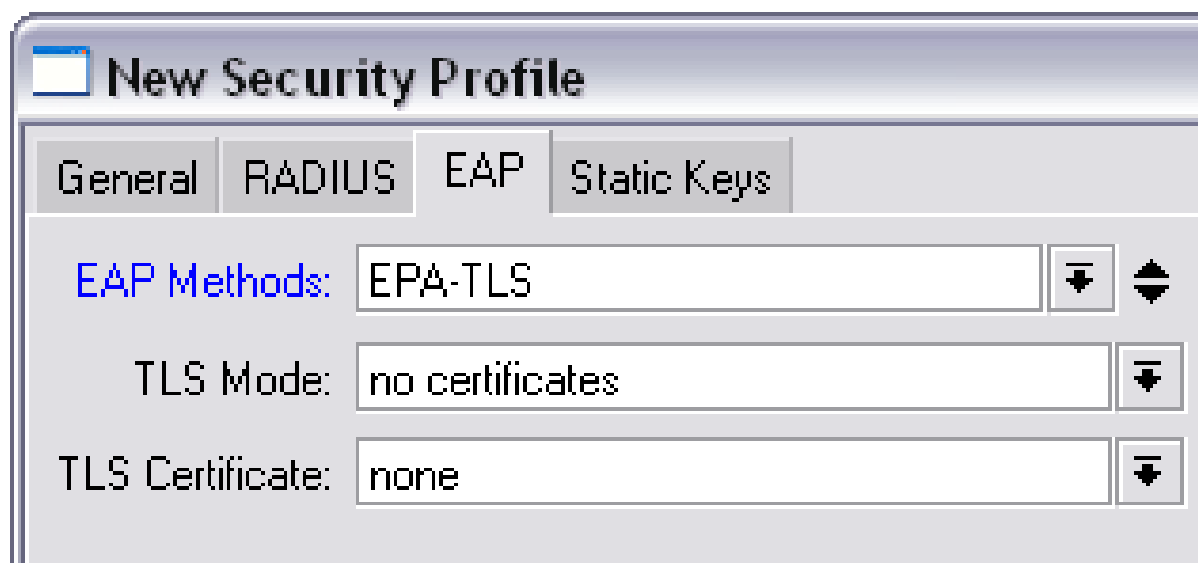
WDS Cost Range: 50-150

WDS Ignore SSID

Wireless Features

- WPA2 Pairwise Master Key caching
 - 802.11i optional feature

Increased the speed of the EAP authentication;
Useful to decrease the CPU usage when tls-mode=no-certificate is used.



The screenshot shows a web-based configuration interface for a MikroTik RouterOS. The window title is "New Security Profile". There are four tabs: "General", "RADIUS", "EAP", and "Static Keys". The "EAP" tab is selected. The configuration fields are as follows:

Field	Value
EAP Methods:	EPA-TLS
TLS Mode:	no certificates
TLS Certificate:	none

Wireless Features

• Access-list

- Entries are ordered now, just like in firewall
- Matching by all interfaces “interface=all”
- “Time” - works just like in firewall
- “Signal-range” - clients signal should be within this range to match the rule. If the signals goes outside the range, it will be disconnected.
- “Private-pre-shared-key” - each client can have different key; works only when PSK method is used

Wireless Features

New AP Access Rule

MAC Address:

Interface: ▾

Signal Strength Range:

AP Tx Limit: ▾

Client Tx Limit: ▾

Authentication

Forwarding

Private Key: ▾ 0x

Private Pre Shared Key:

Time: -

sun mon tue wed thu fri sat

Wireless Features

● Connect-list

- ◆ “Signal-range” - client will connect to the AP which will be within this signal range. If the signal goes out the range client will disconnect from AP and start to look for a new AP by checking the connect-list entries.

● Nstreme

- ◆ Improved performance on lower speed boards (RB100 Series)
- ◆ “Disable-csma” - disables the “medium access” protocol if the polling is enabled

Wireless Features

• Security-profile

- ◆ “Radius-mac-accounting” - MAC address uses as user-name
- ◆ “Radius-eap-accounting” - EAP supplicant-identity used as user-name
- ◆ “Radius-mac-format” - which format should be used to code clients MAC address
- ◆ “Radius-mac-mode” - where to put the MAC address “as-username” or “as-username-and-password”

Wireless Features

- Security-profile

New Security Profile

General RADIUS EAP Static Keys

MAC Authentication

MAC Accounting

EAP Accounting

Interim Update: 00:00:00

MAC Format: XX:XX:XX:XX:XX:XX

MAC Mode: as username

User Manager

- User Authorization using MSCHAPv1,MSCHAPv2
- User status page
- User sign up system
- Support for decimal places in credits
- Authorize.net payment gateway support
- Database backup feature
- License changes in RouterOS v3.0 for active users:
 - Level3 – 10 active users
 - Level4 – 20 active users
 - Level5 – 50 active users
 - Level6 – Unlimited active users

The Dude

- RouterOS package – works as dude server
- Speed improvements between server/client
- Dude Agents to reach private networks and offload service monitoring
- Reports from any list/table
- Support for SNMP v3

Console: Colors

```
[admin@RB_7] > interface export
# jan/01/2000 00:26:40 by RouterOS 3.0beta5
# software id = RD45-3TT
#
/interface ethernet
set 0 arp=enabled auto-negotiation=yes cable-settings=default comment="" disable-running-check=yes \
  disabled=no full-duplex=yes mac-address=00:0C:42:0D:4B:37 mtu=1500 name="ether1" speed=100Mbps
set 1 arp=enabled auto-negotiation=yes cable-settings=default comment="" disable-running-check=yes \
  disabled=no full-duplex=yes mac-address=00:0C:42:0D:4B:38 mtu=1500 name="ether2" speed=100Mbps

[admin@RB_7] > :put "Name : ${/system identity get name}\r\nOk"
Name : RB_7
Ok
[admin@RB_7] > error █
```

- Console consumes less memory, it has faster startup and first export time
- References to items, commands, prompts and exports are coloured
- Currently no way to turn colours off, except running under dumb terminal

Multi-line Commands

```
[admin@r4] > :put [  
line 2 of 2>         /system \  
line 3 of 3>         package \  
line 4 of 4> get system version]  
3.0beta5
```

- If input line ends with backslash, or has unclosed braces / brackets / quotes / parentheses, then next line is automatically prompted
- Prompt shows "line N of M>" if editing multi-line command
- History walks through multi-line commands line-by-line

Scripting

```
[admin@RB_7] > :global contrack [:parse "/i f c t p"]
[admin@RB_7] > $contrack
bad command name i (line 1 column 2)
[admin@RB_7] > :global contrack [:parse "/ip f c t p"]
[admin@RB_7] > :environment pr
Global Variables
"contrack"=>{[/ip firewall connection tracking print]}

Automatic Variables

[admin@RB_7] > $contrack
                enabled: yes
        tcp-syn-sent-timeout: 5s
        tcp-syn-received-timeout: 5s
```

- Errors now show line position
- New console command “:parse” - transform text into Mikrotik RouterOS command
- Non-existing commands now generates runtime error instead of parse-time error

Scripting (part 2)

```
[admin@RB_7] > :put ((1/0) . "...continue..")
division by zero
[admin@RB_7] > :put ([:surely [:put (1/0) ]] . "..continue.." )
division by zero..continue..
[admin@RB_7] > █
```

- New console command “:surely” - allow to catch and freeze errors

```
[admin@RB_7] > :put (a=>1)
a=1
[admin@RB_7] > :put [:typeof (a=>1)]
pair
[admin@RB_7] > :put [:typeof ((a=>1;b=>2))]
array
[admin@RB_7] > :put [:typeof ((a=>1;b=>2)->b)]
str
[admin@RB_7] > :put ((a=>1;b=>2)->b)
2
```

- Updated console command “:typeof”

Scripting (part 3)

```
[admin@r4] > :put ([/in et pr as-value ])  
.id=*1;comment=;name=ether1;mtu=1500;mac-address=52:54:00:64:03:00;arp=enabled;  
.id=*2;comment=;name=ether2;mtu=1500;mac-address=52:54:00:64:03:01;arp=enabled;  
.id=*3;comment=;name=ether3;mtu=1500;mac-address=52:54:00:64:03:02;arp=enabled  
[admin@r4] > :put [:typeof ([/in et pr as-value ])]  
array  
[admin@r4] > :put ([/in et get ether1]->"mac-address")  
52:54:00:64:03:00
```

- Arrays can be written as { item ; item ; item } inside expressions
- New “print” argument “as-value” - allow to return content of the menu as one array
- Each item now have unique, constant ID (.id) could be used instead of item numbers

NAT Traversal

- NAT Traversal (NAT-T) is a workaround allowing specific services to establish connections from masqueraded TCP/IP networks
 - Introduced NAT-T for SIP
 - Introduced NAT-T for IPSec
 - Rewritten NAT-T for h323
 - Rewritten NAT-T for PPTP

Interface Bridge Settings

- There is new menu in RouterOS v3.0
 - /interface bridge settings
- There are two new options
 - use-ip-firewall (yes|no, default:no)- whether to pass internal bridge packet through the IP firewall (conntrack, filters, mangle, nat) or not
 - use-ip-firewall-for-vlan (yes|no, default:no) – if “use-ip-firewall=yes” whether to pass bridge VLAN packet through the IP firewall (conntrack, filters, mangle, nat) or not

Use-ip-firewall Option

- By disabling “use-ip-firewall” option you can increase bridge performance by:
 - ◆ Up to 40% with random size packets on the RouterBOARD 200 series
(up to 65% with small and up to 20% with big packets)
 - ◆ Up to 65% with random size packets on the RouterBOARD 100 series
(up to 80% with small and up to 45% with big packets)
 - ◆ Up to 80% with random size packets on the RouterBOARD 500 series
(up to 100% with small and up to 65% with big packets)

To be continued...
... it is only beta6 ;)

Questions?