



Initial debugging steps in RouterOS

Mārtiņš Strods

MikroTik, Latvia

Portugal, Lisbon

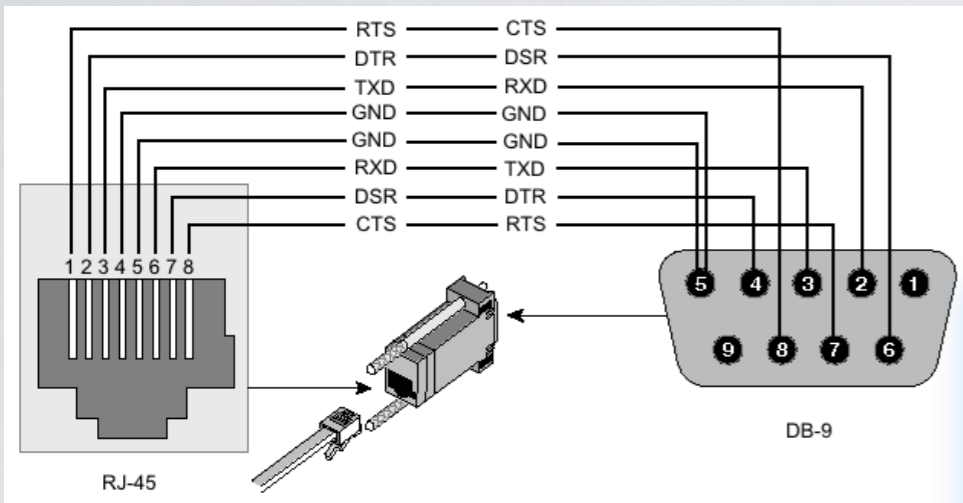
May 2016

“Am I the only one who can be responsible for this?”

- Router is not accessible
- Lost license key
- Debugging by using Log
- Upgrade
- support@mikrotik.com

- **Router is not accessible**
- Lost license key
- Debugging by using Log
- Upgrade
- support@mikrotik.com

Serial access



```
oem : sudo - Konsole <2>
File Edit View Bookmarks Settings Help
oem : sudo

RouterBOOT booter 3.24

RouterBoard 411AH

CPU frequency: 680 MHz
Memory size: 64 MiB
NAND size: 64 MiB

Press any key within 2 seconds to enter setup..

loading kernel from nand... kernel not found
Please, check ethernet cable...
█
```

http://wiki.mikrotik.com/wiki/Manual:System/Serial_Console

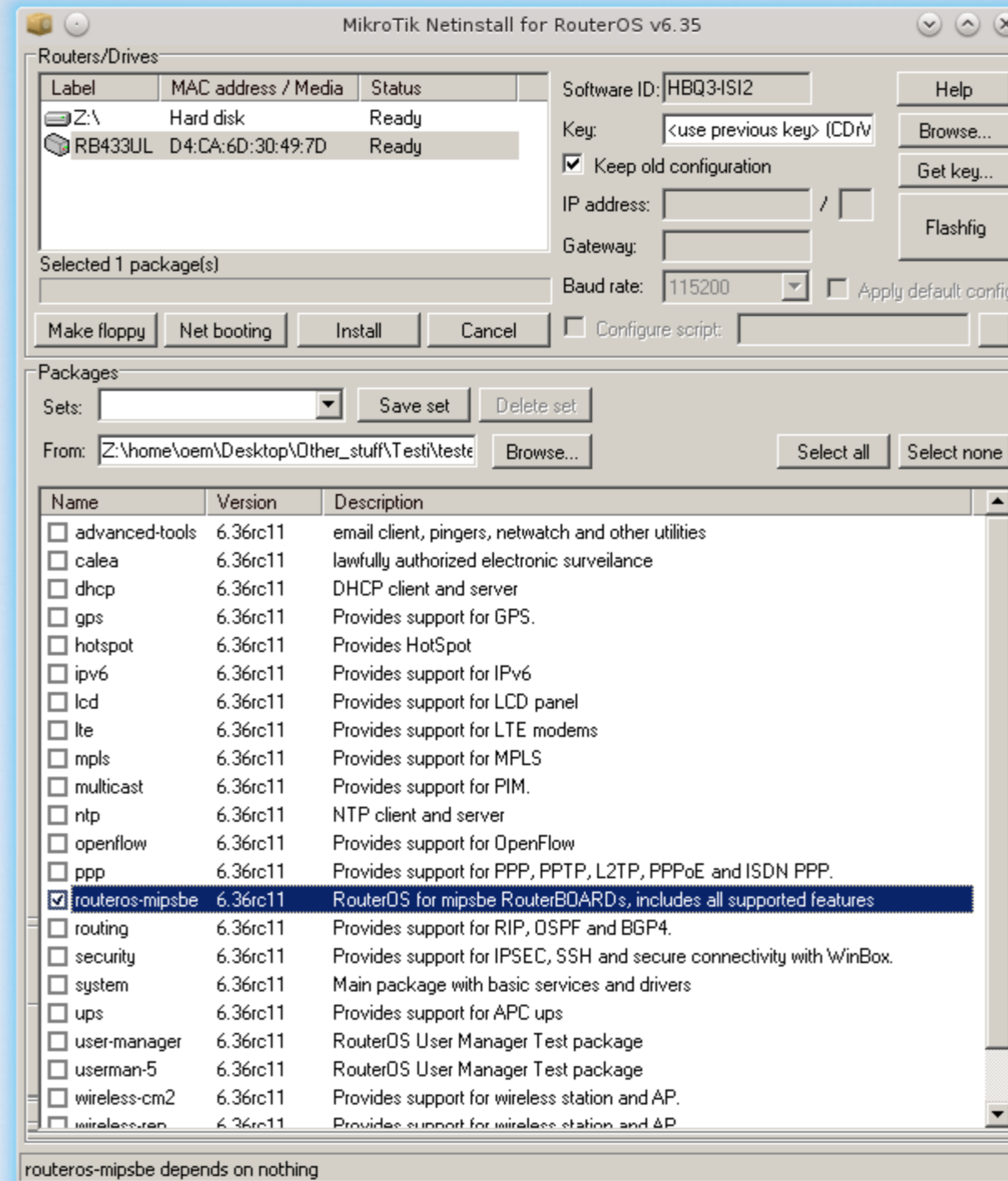
Backup bootloader

- Power off the router
- Press and hold reset button
- Power on the router
- Release reset button after 1-2 seconds
- Perform “/system routerboard upgrade”

```
RouterBOOT backup booter 2.39
```

<http://wiki.mikrotik.com/wiki/Manual:RouterBOOT>

Netinstall



<http://wiki.mikrotik.com/wiki/Manual:Netinstall>

Netinstall

- Use latest Netinstall
- Firewall must be off
- IP of computer and Netinstall must be on same subnet
- If you use Windows, then gateway IP must be specified
- Other DHCP servers must not be involved
- Router must be connected on boot interface

<http://wiki.mikrotik.com/wiki/Manual:Netinstall>

Netinstall

- To start installation you must power on the router with pressed reset button and wait until it shows up in Netinstall
- If you use bootloader, then under "o - boot device " select "1 – boot Ethernet once, then NAND"

<http://wiki.mikrotik.com/wiki/Manual:Netinstall>

Configuration reset

Power on the router with pressed reset button and wait until USER LED starts flashing. Now release the button.

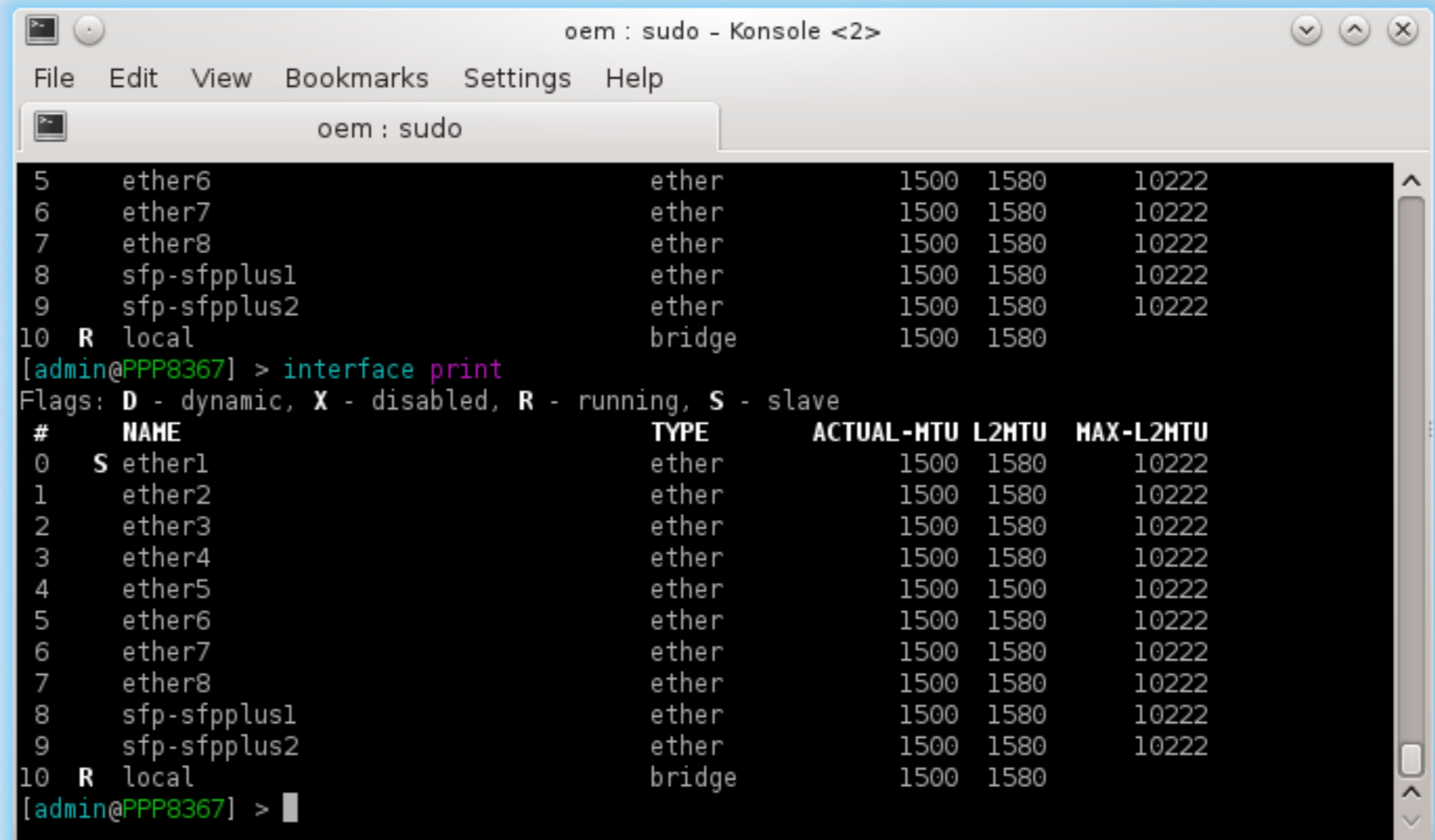


<http://wiki.mikrotik.com/wiki/Manual:Reset>

Interface is down

Router is working but there is no link on any of interfaces

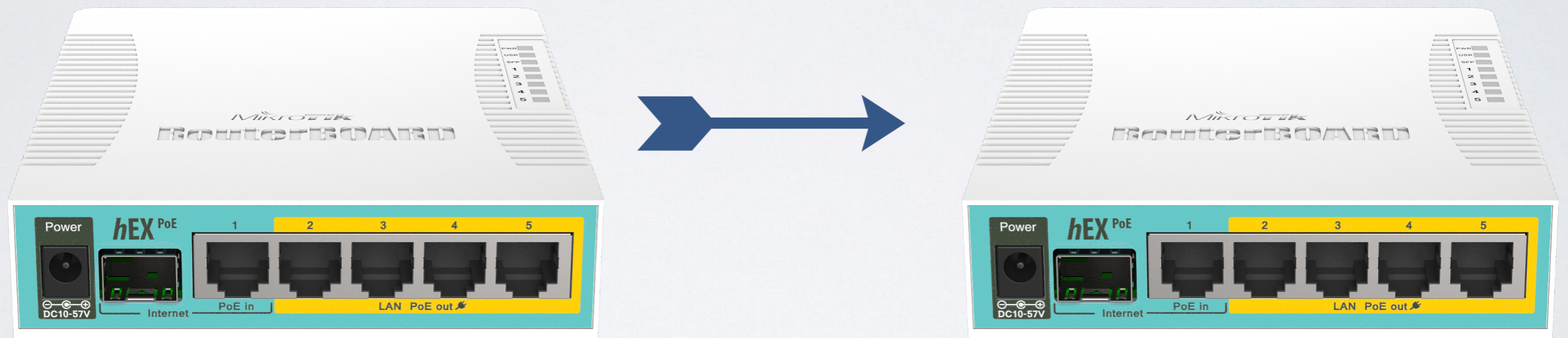
- Cable?
- PoE?
- Hardware?
- Software?



```
oem : sudo - Konsole <2>
File Edit View Bookmarks Settings Help
oem : sudo
5 ether6 ether 1500 1580 10222
6 ether7 ether 1500 1580 10222
7 ether8 ether 1500 1580 10222
8 sfp-sfpplus1 ether 1500 1580 10222
9 sfp-sfpplus2 ether 1500 1580 10222
10 R local bridge 1500 1580
[admin@PPP8367] > interface print
Flags: D - dynamic, X - disabled, R - running, S - slave
# NAME TYPE ACTUAL-MTU L2MTU MAX-L2MTU
0 S ether1 ether 1500 1580 10222
1 ether2 ether 1500 1580 10222
2 ether3 ether 1500 1580 10222
3 ether4 ether 1500 1580 10222
4 ether5 ether 1500 1500 10222
5 ether6 ether 1500 1580 10222
6 ether7 ether 1500 1580 10222
7 ether8 ether 1500 1580 10222
8 sfp-sfpplus1 ether 1500 1580 10222
9 sfp-sfpplus2 ether 1500 1580 10222
10 R local bridge 1500 1580
[admin@PPP8367] >
```


Exchange device

Swap device to be sure that hardware is not faulty



Overloaded router

If we talk about CPU, then there is no $> 100\%$ load...

The screenshot shows a window titled 'Resources' with the following data:

Uptime:	20:55:01	OK
Free Memory:	103.4 MiB	PCI
Total Memory:	128.0 MiB	USB
CPU:	MIPS 74Kc V5.0	CPU
CPU Count:	1	IRQ
CPU Frequency:	720 MHz	
CPU Load:	100 %	
Free HDD Space:	109.4 MiB	
Total HDD Size:	128.0 MiB	
Sector Writes Since Reboot:	4 696	
Total Sector Writes:	1 034 486	
Bad Blocks:	0.0 %	
Architecture Name:	mipsbe	
Board Name:	RB953GS-5HnT	
Version:	6.35rc38 (testing)	
Build Time:	Mar/23/2016 12:56:26	

- Router is not accessible
- **Lost license key**
- Debugging by using Log
- Upgrade
- support@mikrotik.com

x86

Request replacement key which costs \$10

For already created software keys

- all keys **or** *try search*
- replacement key (0)
- request key from another account

What to do if I need replacement key?

Please send us e-mail with following information:

- your username
- old software ID
- include detailed information about how that happened.

We will write you with further instructions.

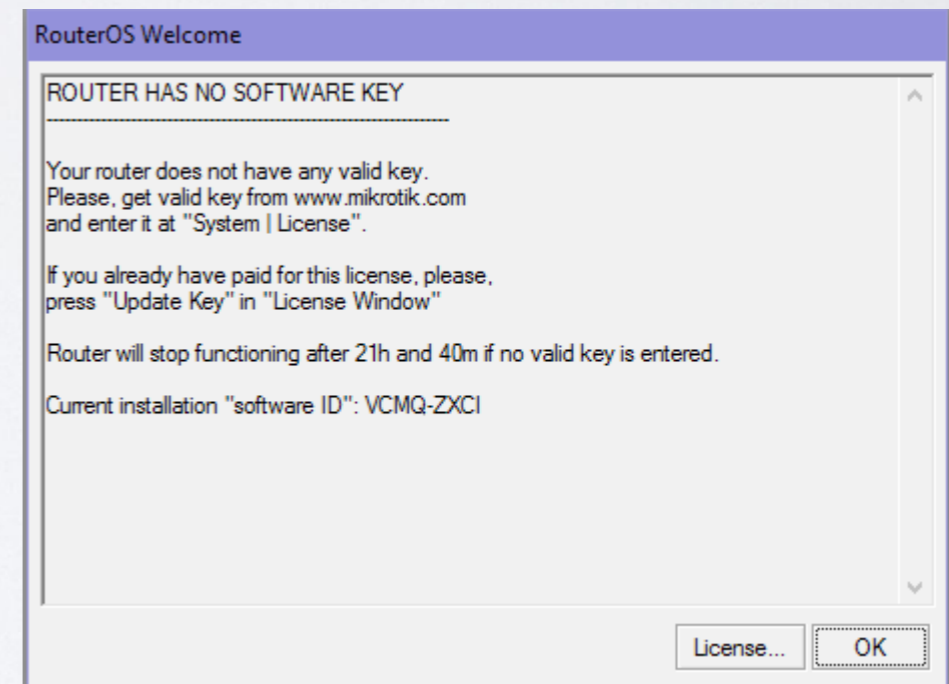
Each replacement key costs **\$10,-**

<http://wiki.mikrotik.com/wiki/Manual:License>

Router

- Upgrade RouterOS to the latest version
- Upgrade firmware `"/system routerboard upgrade"`
- Generate supout file and send it to MikroTik with explanation how it happened

 **Make Supout .rif**



http://wiki.mikrotik.com/wiki/Manual:Upgrading_RouterOS

- Router is not accessible
- Lost license key
- **Debugging by using Log**
- Upgrade
- support@mikrotik.com

Standard Log

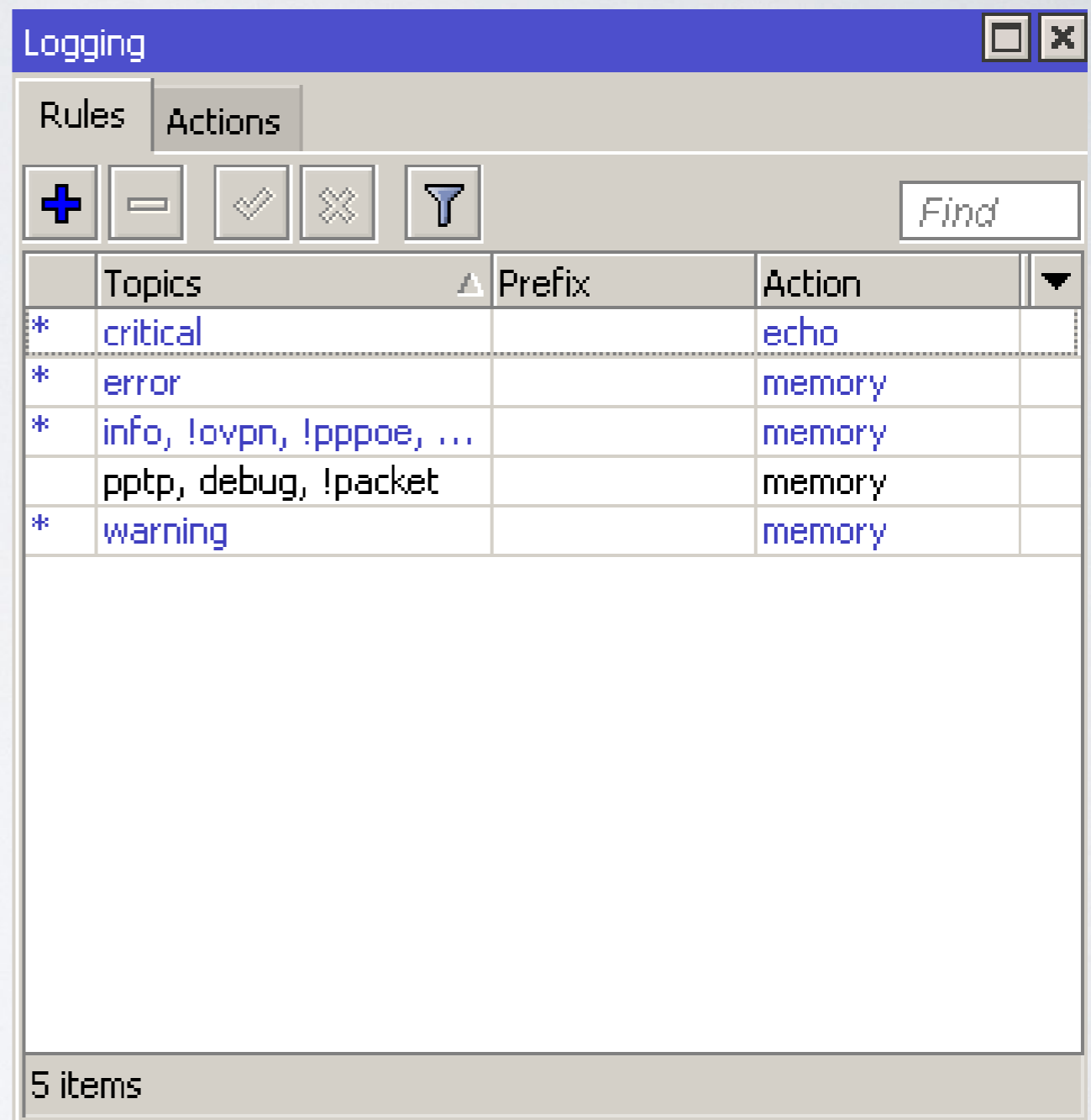
Log shows all actions which are enabled under System/Logging

memory	system, info, account	user admin logged in from 10.5.114.253 via telnet
memory	system, info, account	user admin logged out from 10.5.114.253 via telnet
memory	system, info	device changed by admin

<http://wiki.mikrotik.com/wiki/Manual:System/Log>

Add new debug Log rule

System/Logging



The screenshot shows the 'Logging' configuration window in Mikrotik WinBox. It has two tabs: 'Rules' and 'Actions'. The 'Rules' tab is active. Below the tabs are several control buttons: a plus sign (+), a minus sign (-), a checkmark (✓), an 'X' (✗), a funnel (filter), and a 'Find' text box. The main area contains a table with the following data:

	Topics ▲	Prefix	Action ▼	
*	critical		echo	
*	error		memory	
*	info, !ovpn, !ppoe, ...		memory	
	pptp, debug, !packet		memory	
*	warning		memory	

At the bottom of the window, it indicates '5 items'.

<http://wiki.mikrotik.com/wiki/Manual:System/Log>

Check new Log messages

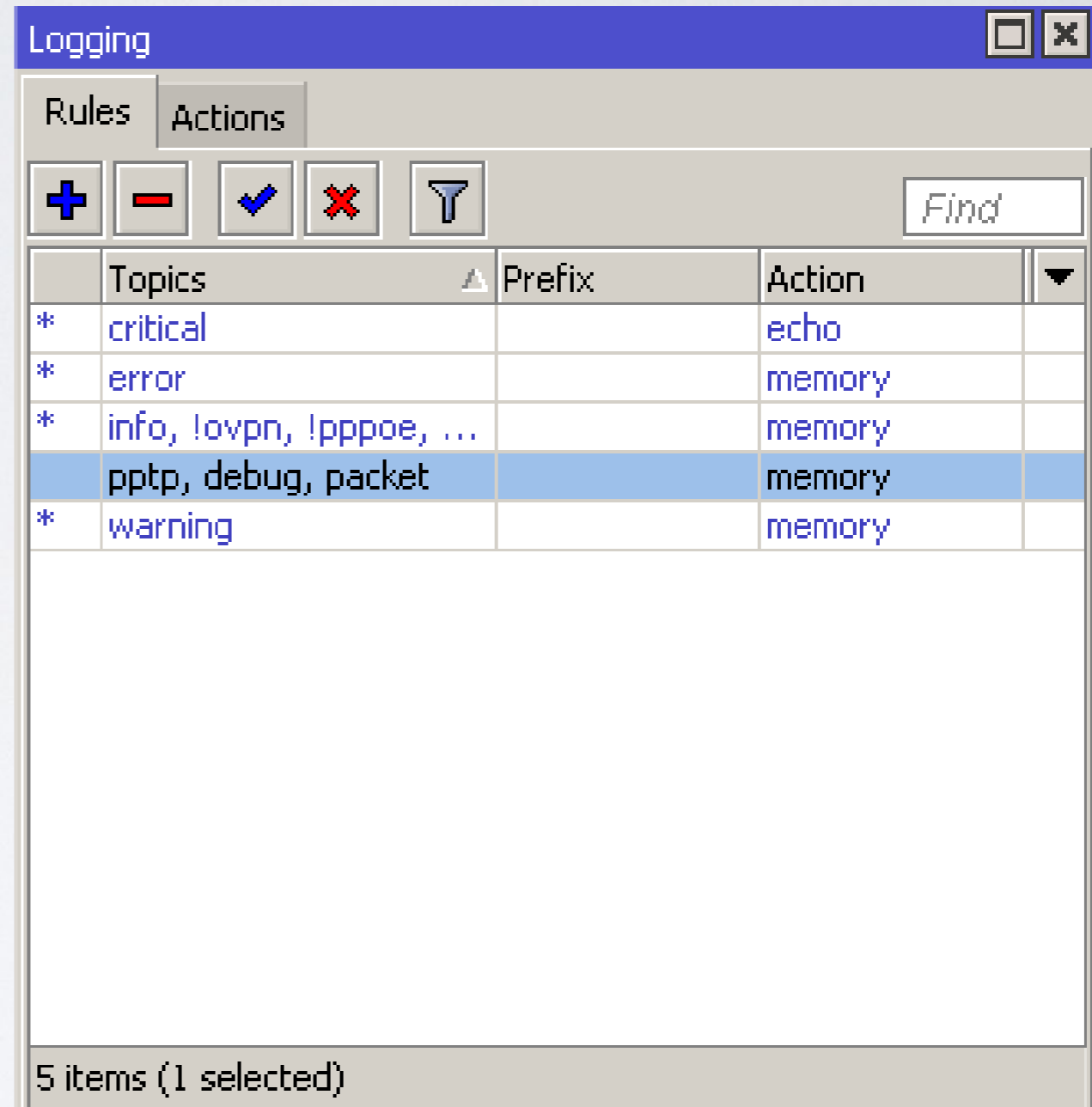
Log now shows also pptp,debug messages

memory	pptp, ppp, debug	pptp_test: LCP open
memory	pptp, ppp, debug	pptp_test: LCP opened
memory	pptp, ppp, debug	pptp_test: CHAP received challenge in initial state, dropping
memory	pptp, ppp, debug	pptp_test: LCP close
memory	pptp, ppp, debug	pptp_test: LCP closed
memory	pptp, ppp, debug	pptp_test: LCP lowerdown
memory	pptp, ppp, debug	pptp_test: LCP lowerdown
memory	pptp, ppp, debug	pptp_test: LCP down event in starting state
memory	pptp, ppp, debug	pptp_test: LCP lowerup
memory	pptp, ppp, debug	pptp_test: LCP open

<http://wiki.mikrotik.com/wiki/Manual:System/Log>

Extend Logging

Enable packet logging



The screenshot shows the 'Logging' configuration window in Mikrotik WinBox. It has two tabs: 'Rules' and 'Actions'. The 'Rules' tab is active. Below the tabs are several control buttons: a plus sign (+), a minus sign (-), a checkmark (✓), a red X (✗), and a funnel icon (filter). To the right of these buttons is a search box labeled 'Find'. Below the controls is a table with the following columns: 'Topics', 'Prefix', and 'Action'. The table contains five rows of logging rules. The fourth row, 'pptp, debug, packet', is selected. At the bottom of the window, it says '5 items (1 selected)'.

	Topics	Prefix	Action
*	critical		echo
*	error		memory
*	info, !ovpn, !pppoe, ...		memory
	pptp, debug, packet		memory
*	warning		memory

<http://wiki.mikrotik.com/wiki/Manual:System/Log>

Use new Log messages

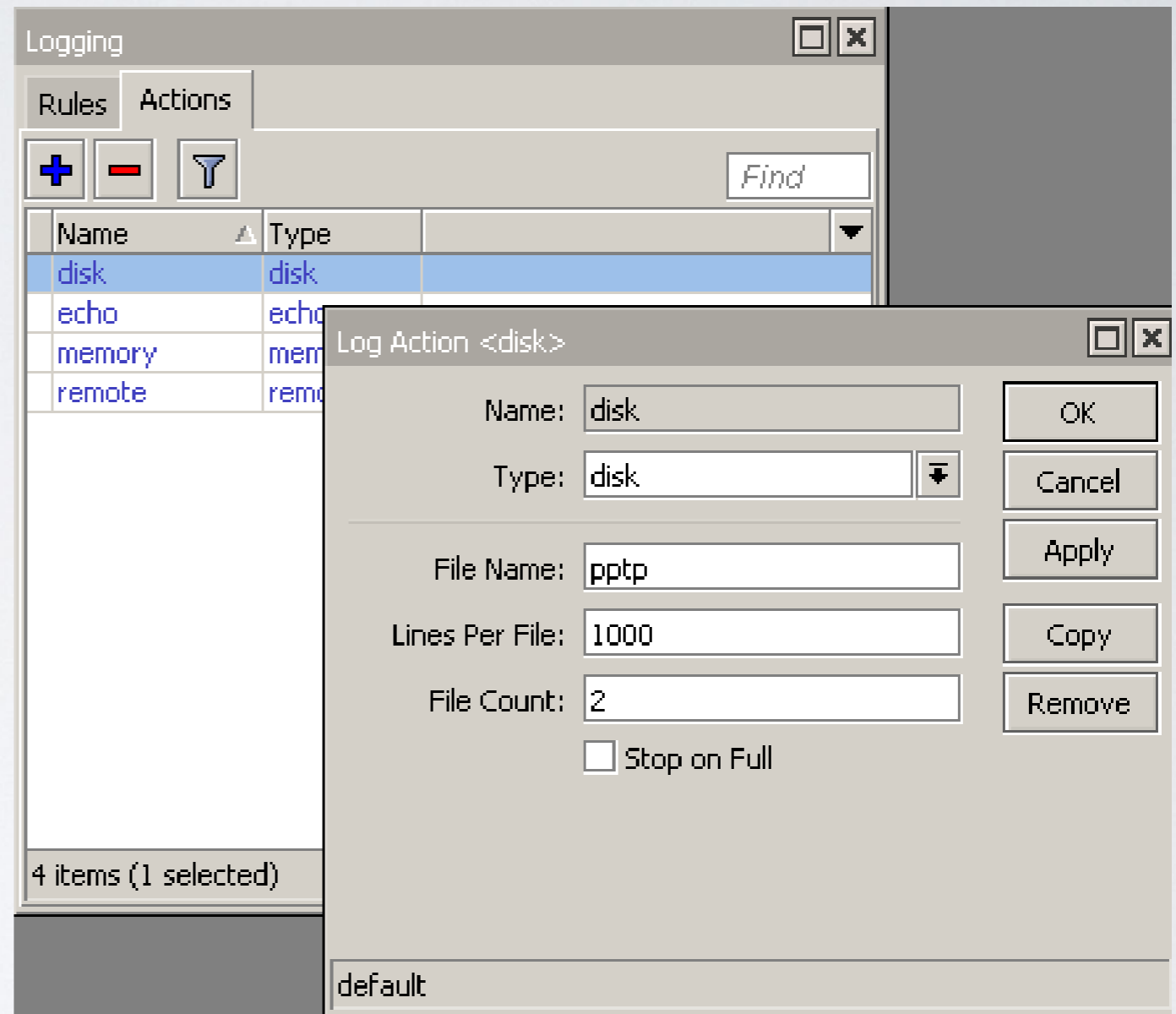
Log now shows also pptp,debug,packet messages

memory	pptp, ppp, debug, p...	<response len=49>
memory	pptp, ppp, debug, p...	<name pptp_test>
memory	pptp, ppp, debug, p...	pptp_test: rcvd CHAP Failure id=0x1
memory	pptp, ppp, debug, p...	E=691 R=0 C=B233773DC54093DD1A469F39A8030171 V=3 M=bad username or password
memory	pptp, ppp, debug, p...	pptp_test: sent LCP TermReq id=0x54
memory	pptp, ppp, debug, p...	failed to authenticate ourselves to peer
memory	pptp, ppp, debug, p...	pptp_test: rcvd LCP TermReq id=0x2
memory	pptp, ppp, debug, p...	user pptp_test authentication failed
memory	pptp, ppp, debug, p...	pptp_test: sent LCP TermAck id=0x2
memory	system, info	device changed by admin

<http://wiki.mikrotik.com/wiki/Manual:System/Log>

Log to file

System/Logging/Action



<http://wiki.mikrotik.com/wiki/Manual:System/Log>

- Router is not accessible
- Lost license key
- Debugging by using Log
- **Upgrade**
- support@mikrotik.com

Select version

- Legacy – RouterOS v5 latest version (5.26)
- Bugfix only – RouterOS v6 release which is considered as the most stable one (6.32.4)
- Current – RouterOS v6 latest full and tested release (6.35.2)
- Release candidate – RouterOS v6 version with all changes and fixes included (6.36rc)

<http://www.mikrotik.com/download>

Check changelog

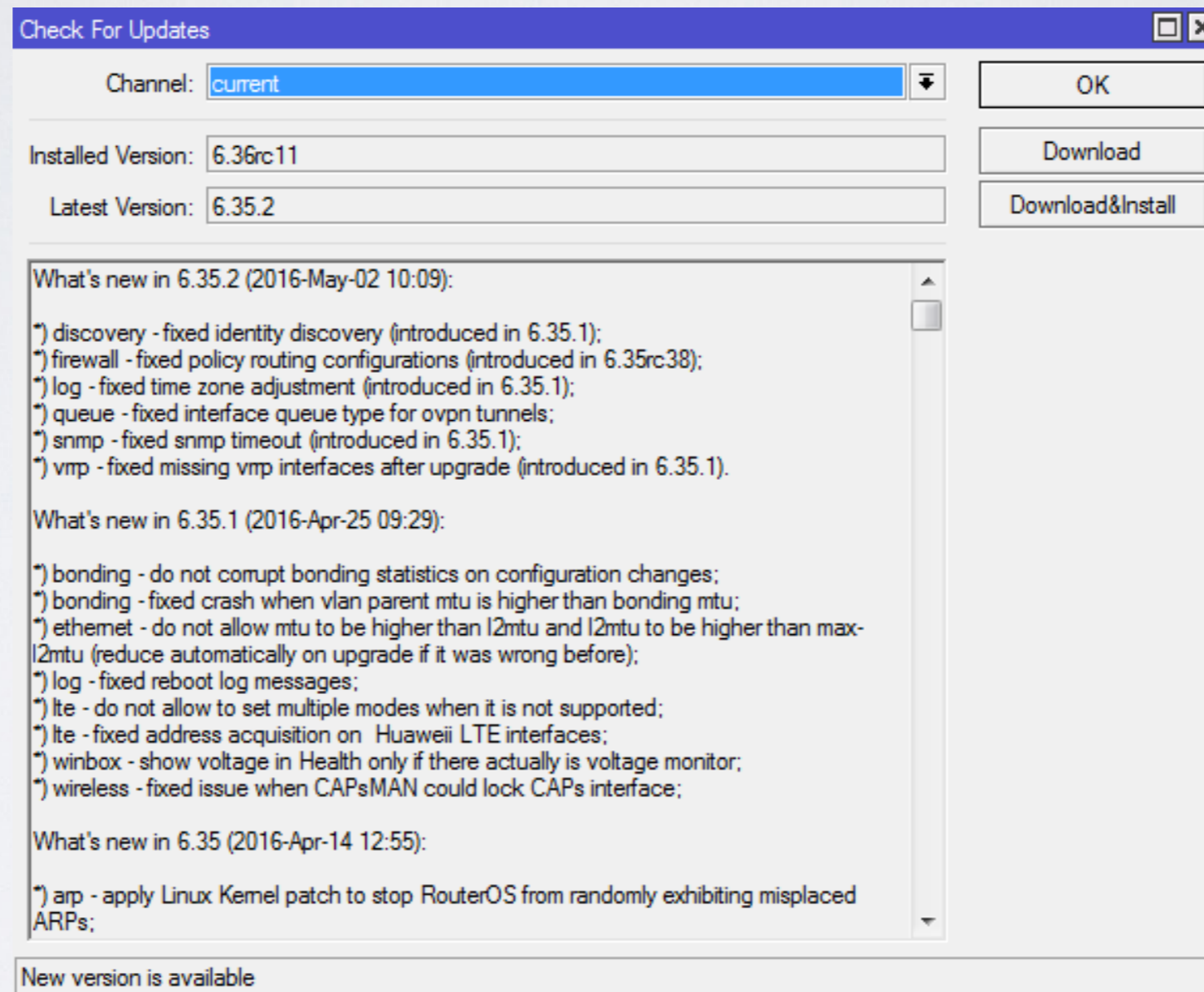
What's new in 6.35.2 (2016-May-02 10:09):

- *) discovery - fixed identity discovery (introduced in 6.35.1);
- *) firewall - fixed policy routing configurations (introduced in 6.35rc38);
- *) log - fixed time zone adjustment (introduced in 6.35.1);
- *) queue - fixed interface queue type for ovpn tunnels;
- *) snmp - fixed snmp timeout (introduced in 6.35.1);
- *) vrrp - fixed missing vrrp interfaces after upgrade (introduced in 6.35.1).

<http://www.mikrotik.com/download>

Perform upgrade

System/Package/Check For Updates



http://wiki.mikrotik.com/wiki/Manual:Upgrading_RouterOS

- Router is not accessible
- Lost license key
- Debugging by using Log
- Upgrade
- **support@mikrotik.com**

All is bad and you need help



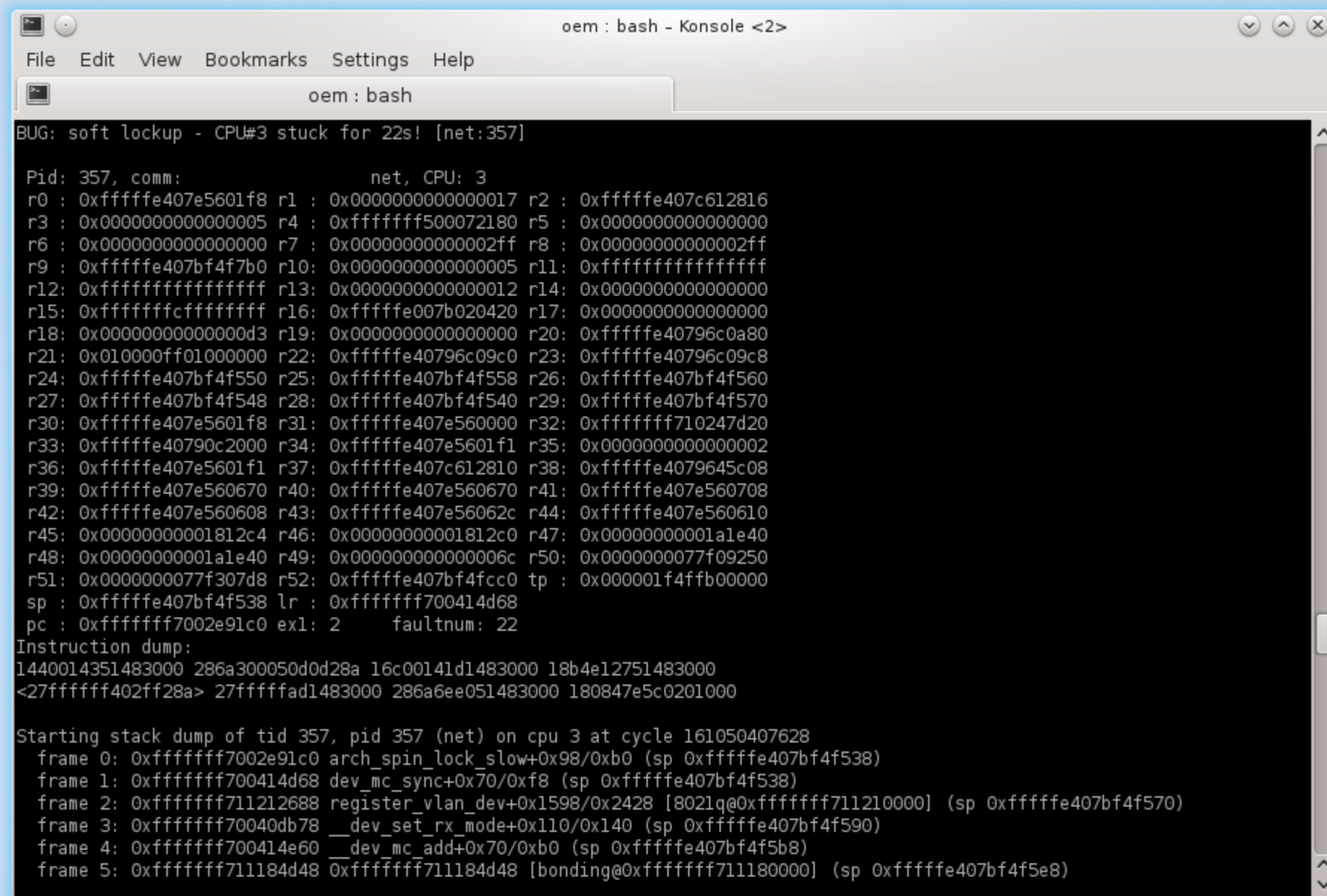
<http://www.mikrotik.com/support.html>

Router is rebooting itself

- Reboot because of power outage or without proper shutdown usually is caused by **hardware** issues or bad powering
- Reboot because of kernel failure or watchdog timeout usually is caused by **software**

Serial output

Upgrade device to the latest version!



```
oem : bash - Konsole <2>
File Edit View Bookmarks Settings Help
oem : bash
BUG: soft lockup - CPU#3 stuck for 22s! [net:357]

Pid: 357, comm: net, CPU: 3
r0 : 0xfffffe407e5601f8 r1 : 0x0000000000000017 r2 : 0xfffffe407c612816
r3 : 0x0000000000000005 r4 : 0xffffffff500072180 r5 : 0x0000000000000000
r6 : 0x0000000000000000 r7 : 0x00000000000002ff r8 : 0x00000000000002ff
r9 : 0xfffffe407bf4f7b0 r10: 0x0000000000000005 r11: 0xffffffffffffffff
r12: 0xffffffffffffffff r13: 0x0000000000000012 r14: 0x0000000000000000
r15: 0xffffffffcfffffff r16: 0xfffffe007b020420 r17: 0x0000000000000000
r18: 0x00000000000000d3 r19: 0x0000000000000000 r20: 0xfffffe40796c0a80
r21: 0x010000ff01000000 r22: 0xfffffe40796c09c0 r23: 0xfffffe40796c09c8
r24: 0xfffffe407bf4f550 r25: 0xfffffe407bf4f558 r26: 0xfffffe407bf4f560
r27: 0xfffffe407bf4f548 r28: 0xfffffe407bf4f540 r29: 0xfffffe407bf4f570
r30: 0xfffffe407e5601f8 r31: 0xfffffe407e560000 r32: 0xffffffff710247d20
r33: 0xfffffe40790c2000 r34: 0xfffffe407e5601f1 r35: 0x0000000000000002
r36: 0xfffffe407e5601f1 r37: 0xfffffe407c612810 r38: 0xfffffe4079645c08
r39: 0xfffffe407e560670 r40: 0xfffffe407e560670 r41: 0xfffffe407e560708
r42: 0xfffffe407e560608 r43: 0xfffffe407e56062c r44: 0xfffffe407e560610
r45: 0x00000000001812c4 r46: 0x00000000001812c0 r47: 0x00000000001a1e40
r48: 0x00000000001a1e40 r49: 0x000000000000006c r50: 0x0000000077f09250
r51: 0x0000000077f307d8 r52: 0xfffffe407bf4fcc0 tp : 0x000001f4ffb00000
sp : 0xfffffe407bf4f538 lr : 0xffffffff700414d68
pc : 0xffffffff7002e91c0 ex1: 2 faultnum: 22
Instruction dump:
1440014351483000 286a300050d0d28a 16c00141d1483000 18b4e12751483000
<27fffffff402ff28a> 27ffffffad1483000 286a6ee051483000 180847e5c0201000

Starting stack dump of tid 357, pid 357 (net) on cpu 3 at cycle 161050407628
frame 0: 0xffffffff7002e91c0 arch_spin_lock_slow+0x98/0xb0 (sp 0xfffffe407bf4f538)
frame 1: 0xffffffff700414d68 dev_mc_sync+0x70/0xf8 (sp 0xfffffe407bf4f538)
frame 2: 0xffffffff711212688 register_vlan_dev+0x1598/0x2428 [8021q@0xffffffff711210000] (sp 0xfffffe407bf4f570)
frame 3: 0xffffffff70040db78 __dev_set_rx_mode+0x110/0x140 (sp 0xfffffe407bf4f590)
frame 4: 0xffffffff700414e60 __dev_mc_add+0x70/0xb0 (sp 0xfffffe407bf4f5b8)
frame 5: 0xffffffff711184d48 0xffffffff711184d48 [bonding@0xffffffff711180000] (sp 0xfffffe407bf4f5e8)
```


Supout file

- Upgrade device to the latest version!
- Reproduce problem
- Generate supout file after crash no matter what
- Wait until file generation process is complete
- Download file from router (and autosupout.rif if you have one)
- Do not reboot device in the middle

Memory leak

- Upgrade device to the latest version
- Reboot router
- Wait for a while and generate supout file
- Monitor free RAM memory
- When it is low generate another file
- Do not reboot device in the middle

Configuration issue

- Upgrade device to the latest version
- Enable debug logs to file
- Reproduce problem so Log would be correct
- Generate supout file or files if multiple devices are involved

What to tell?

Please, Please, Please!!!

Make this your priority!!!

ASAP?

!!!!:@:@:@:@

URGENT!

Give me full configuration

I have 25 years of
experience

RouterOS is full of BUGS

What to tell?

- Briefly explain what has happened
- When it happens
- What did you do to make it happen

What to send?

- Supout files (always)
- Log files (always)
- Pictures and videos (always)
- Serial output (in case of reboot)
- Networking topology (configuration issue)

Automated reply

Hello,

Thanks for writing to support. We will try to help you as soon as possible. To receive an answer quicker, please make sure you have:

- 1) attempted to re-set your configuration and started from the beginning, following steps in the documentation
- 2) the latest RouterOS version installed on the router
<http://www.mikrotik.com/download.html>
- 3) attached the supout.rif file from the router in question
http://wiki.mikrotik.com/wiki/Manual:Support_Output_File
- 4) included a precise description of the problem - use network diagrams, screenshots, videos if necessary

If something from above is incomplete in your current email, please, send all additional information as a reply to this email.

While waiting for the reply of our support specialist you can:

- 1) search or ask in our forum for your problem solution
<http://forum.mikrotik.com>
- 2) recheck your configuration against examples in our manual:
<http://wiki.mikrotik.com>
- 3) If you have purchased your MikroTik product from a DEALER or RESELLER, please, contact them for support

This is an automated reply.

Thanks,
MikroTik Support

Reply with **same ticket number** in subject

Read and execute

- Do everything what is asked, if it is possible
- Make notes and document results
- Make new files after configuration changes
- Reply within same ticket and provide new information

Tips and Tricks

http://wiki.mikrotik.com/wiki/Tips_and_Tricks_for_Beginners_and_Experienced_Users_of_RouterOS

Enjoy the MUM!

The logo for MikroTik, featuring the word "Mikro" in a black, italicized, sans-serif font, followed by "Tik" in a bold, black, italicized, sans-serif font. Above the letter 'i' in "Mikro" are three curved lines that resemble a stylized signal or antenna.

MikroTik