

QoS

RouterOS v6



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About Me



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MikroTik Training Center

- The first MikroTik Training Center in Asia Pasific, has taught at least 1600 participants (94 classes).
- Mikrotik Academy Coordinator.



RouterOS v6 Full Release almost ready!

now v6rc11/12

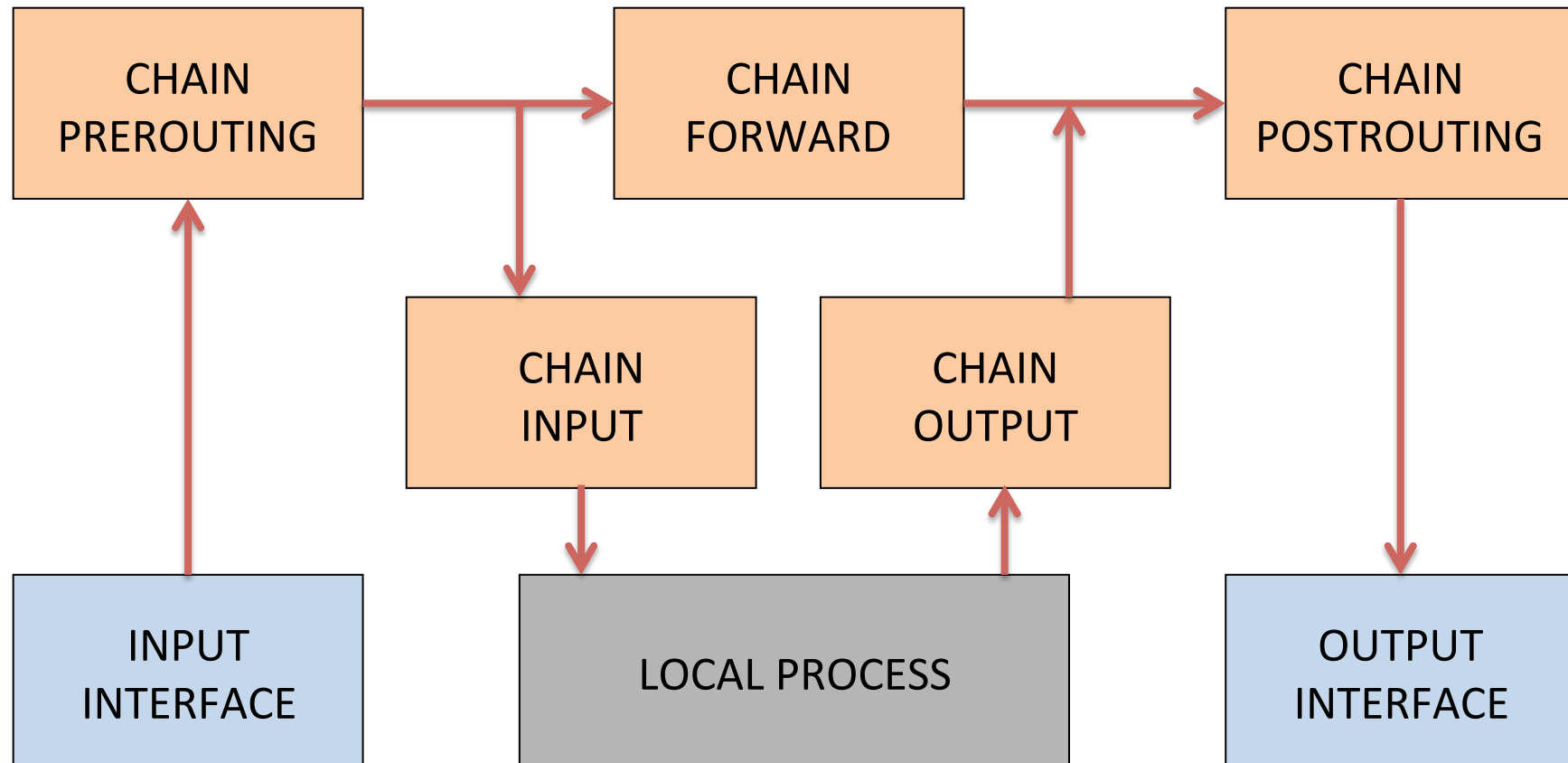
QoS

Some fundamental change
on RoS v6

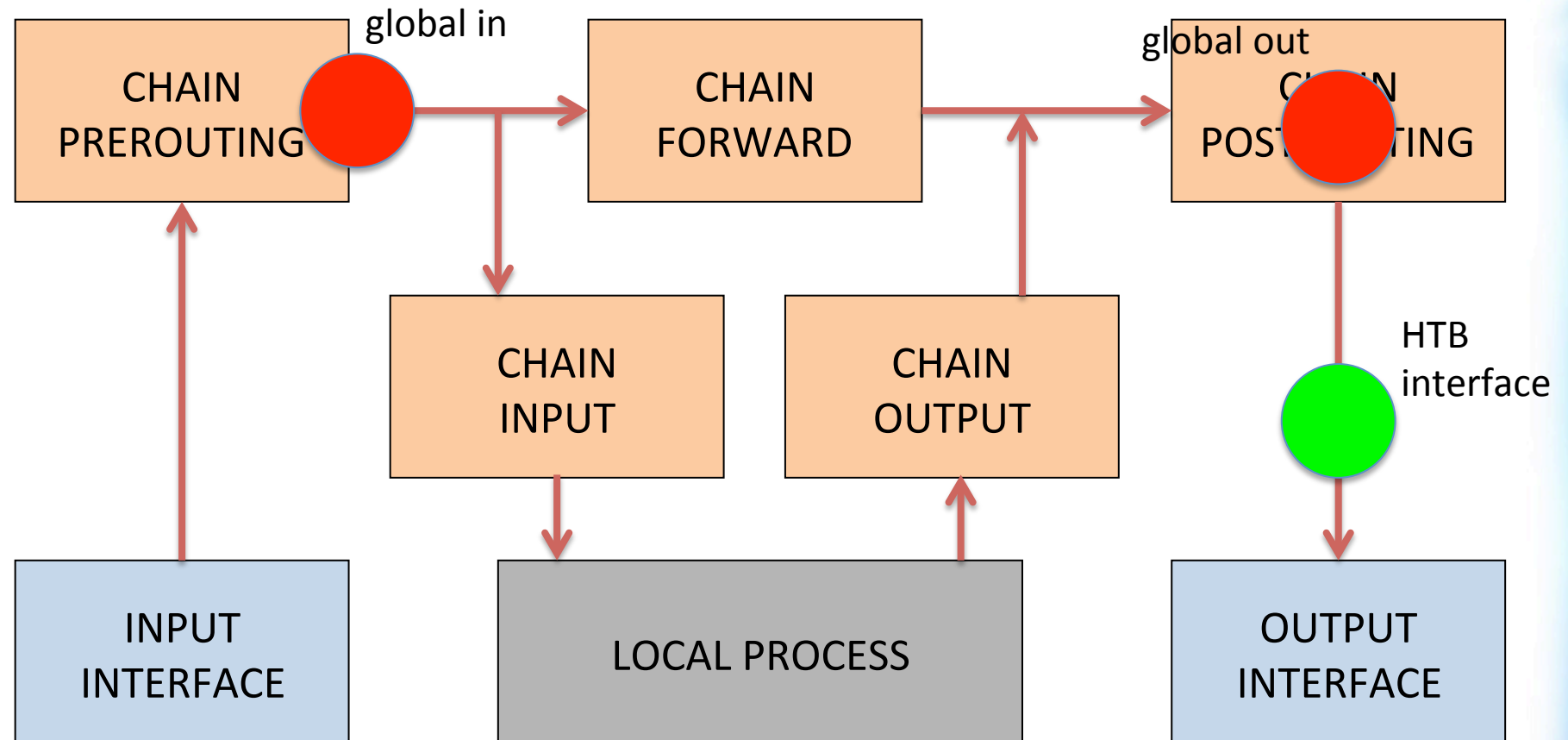
QoS di v5

- Simple Queue
 - queue will be done in global-in, global-out or global-total
- Queue Tree
 - queue on interface, or
 - in global-in, global-out or global-total

Packet Flow!



Packet Flow and QoS v5



QoS Problem in RoS v5

- No specific queue for traffic to the router, global-in will process the traffic into the router and the traffic through the router
- Two times queue processing (Global in and global out) for traffic through the router.

QoS Problem in RoS v5

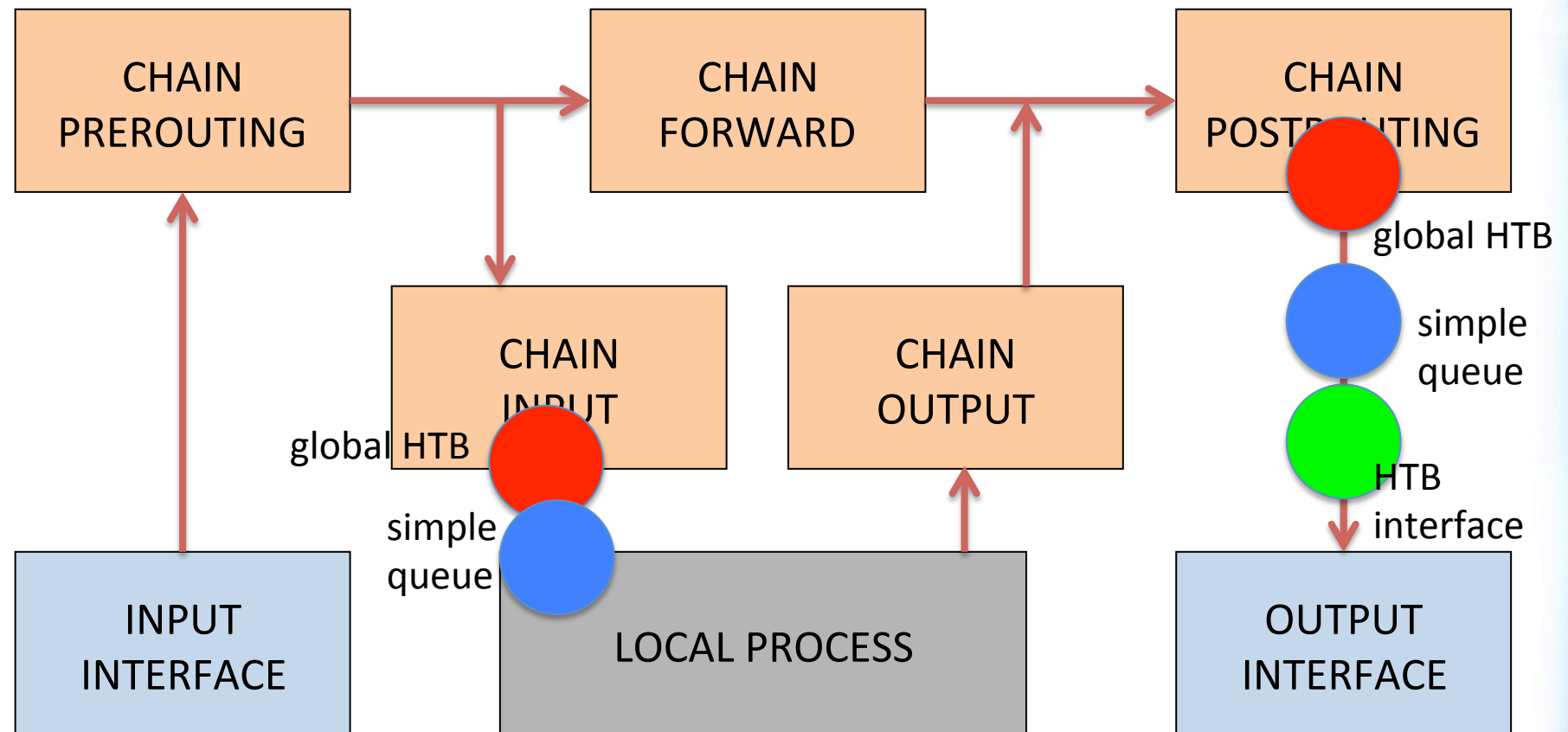
- Queue tree – PCQ on parent interface - natted network, queue for uplink traffic does not work perfectly, because PCQ done after src-nat
 - src-address already changed to router ip address in src-nat.
 - pcq see only one src-address

QoS RoS v6

No more **global-in** and **global-out**, replaced by a "global" located after the "input" and at global-out position.

Simple queue is a specific process, located after "global".

Packet Flow and QoS v6



Queue Tree v5 dan v6

New Queue

General Statistics

Name: queue1

Parent: global-in

Packet Marks: ether1, ether2, ether3, ether4, ether5

Queue Type: ether1, ether2, ether3, ether4, ether5

Priority: global-in, global-out, global-total

RoS v5

New Queue

General Statistics

Name: queue1

Parent: global

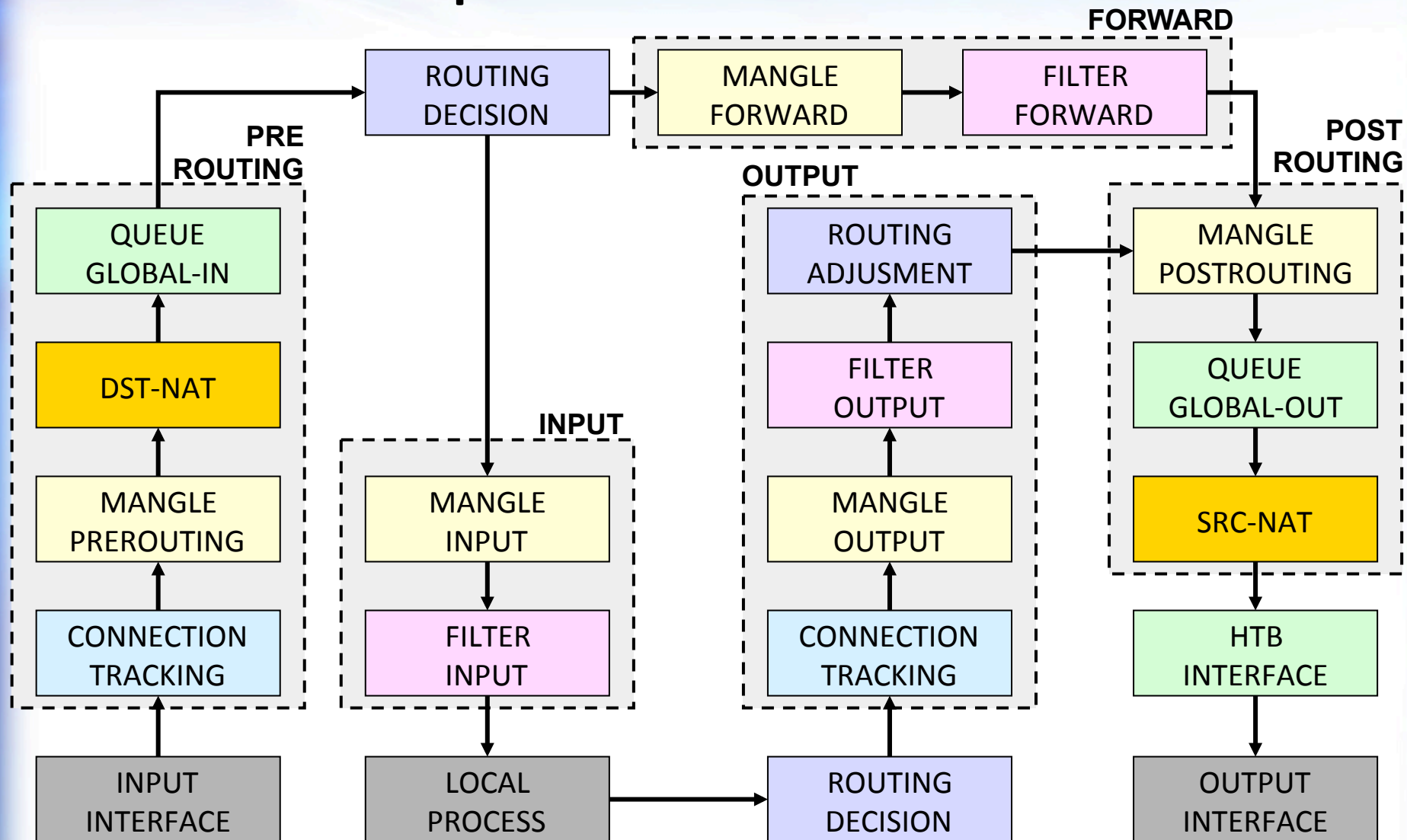
Packet Marks: ether1, ether2, ether3, ether4, ether5

Queue Type: ether1, ether2, ether3, ether4, ether5

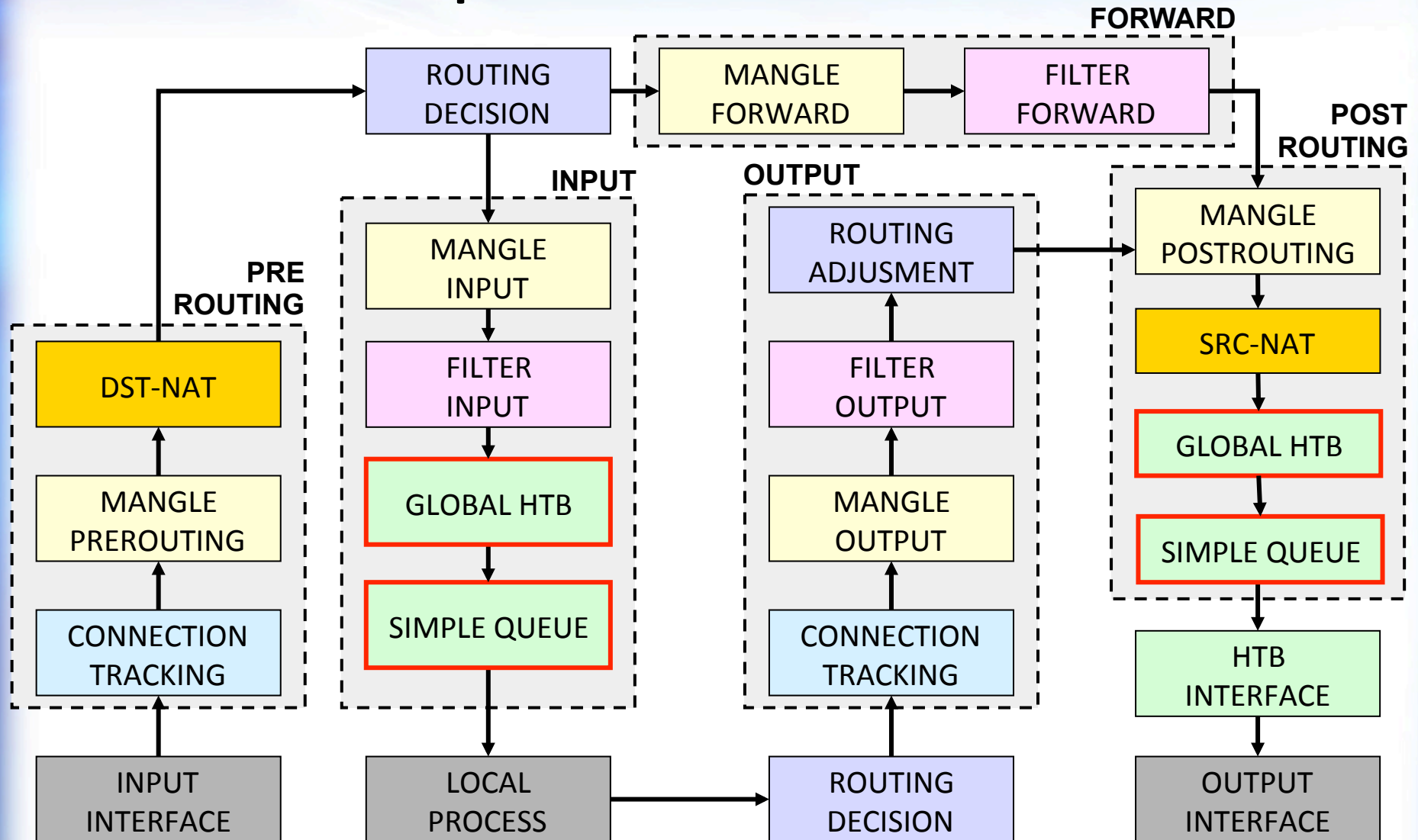
Priority: global, wlan1

RoS v6

Simple Packet Flow v5



Simple Packet Flow v6

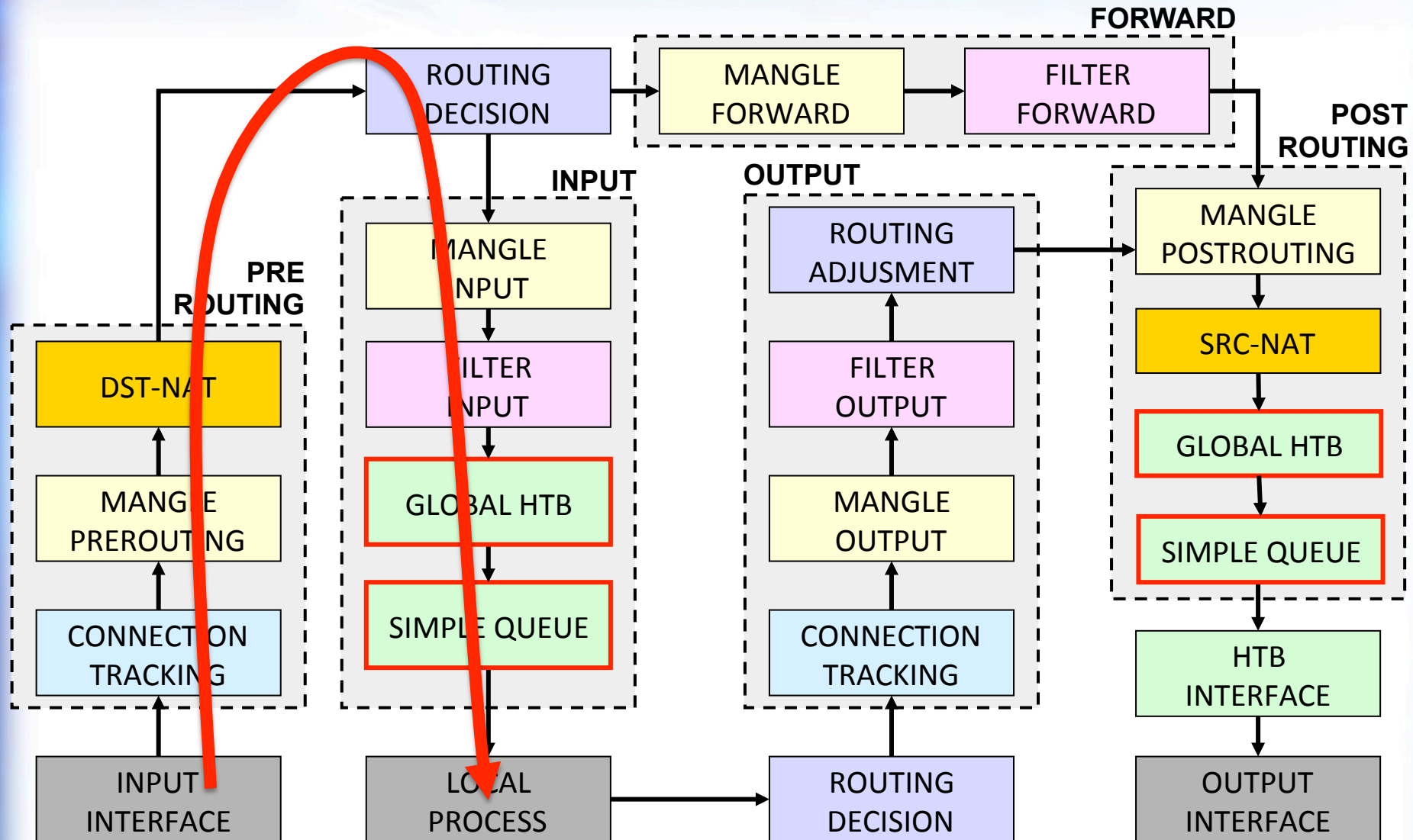


Mangle – Queue RoSv6

- Traffic to the router
 - we can do mangle (packet-mark) specifically on chain=input
 - queue tree with parent=global and packet mark
- Contoh

```
/ip firewall mangle add src-address=10.1.1.1
chain=input action=mark-packet mark-packet=p1
/queue tree add packet-mark=p1 parent=global
max-limit=1m
```

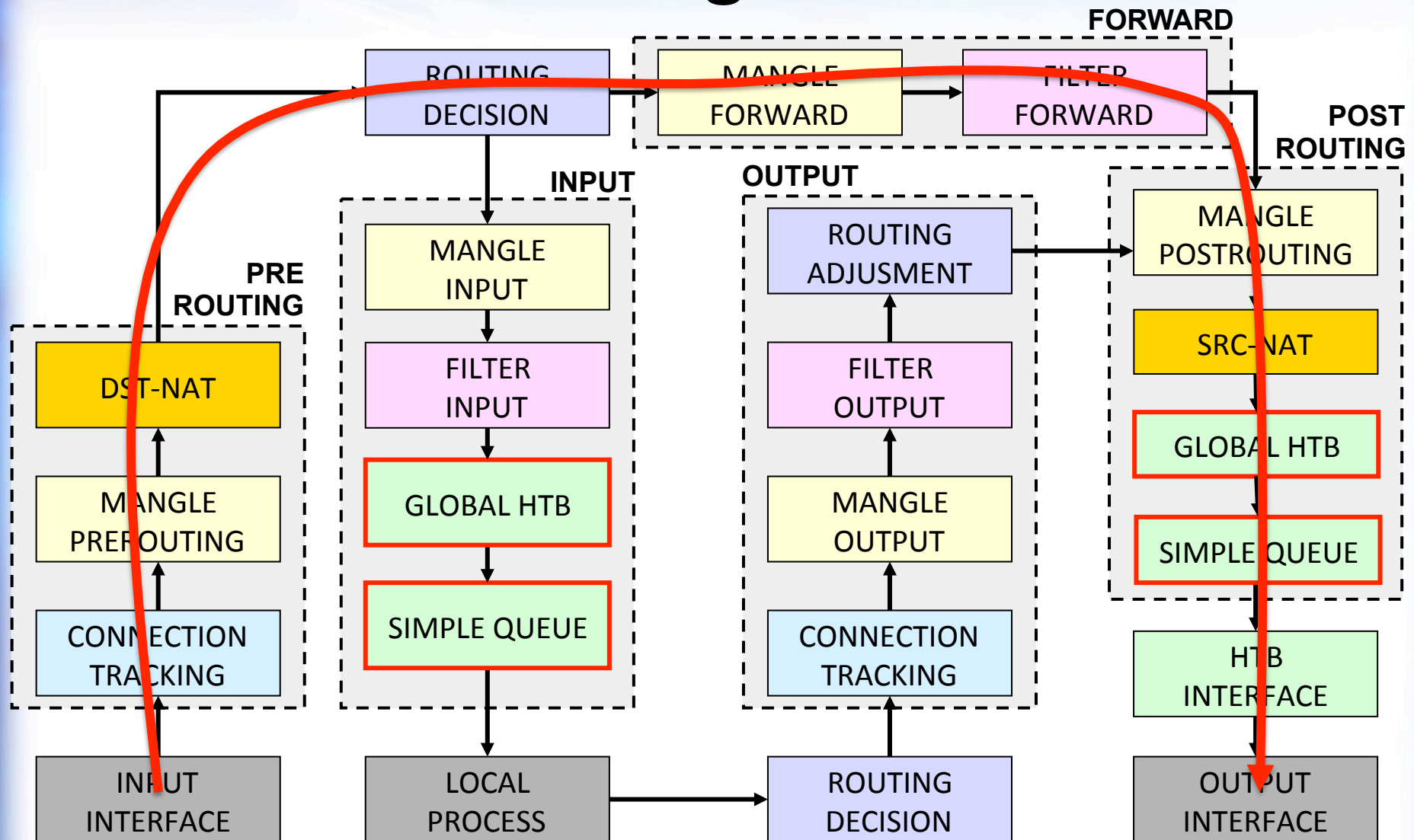
Traffic to the router



Mangle - Queue

- Traffic from the router
 - same as previous version
- Traffic through the router
 - mangle can be done specifically at chain=forward

Traffic through the router



Simple Queue di RoSv5

New Simple Queue

General | Advanced | Statistics | Traffic | Total | Total Statistics

Name: queue1

Target Address:

Target Upload Target Download

Max Limit: unlimited bits/s unlimited bits/s

Burst

Burst Limit: unlimited bits/s unlimited bits/s

Burst Threshold: unlimited bits/s unlimited bits/s

Burst Time: 0 s 0 s

Time

Time: 00:00:00 - 1d 00:00:00

sun mon tue wed thu fri sat

disabled

New Simple Queue

General | Advanced | Statistics | Traffic | Total | Total Statistics

P2P:

Packet Marks:

Dst. Address:

Interface: all

Target Upload Target Download

Limit At: unlimited bits/s unlimited bits/s

Queue Type: default-small default-small

Parent: none

Priority: 8

disabled

Simple Queue RoSv5

- There are 2 type of target: target address and interface
- Destination use only IP address (not interface)
- Same priority parameter for downlink and uplink

Simple Queue at RoSv6

New Simple Queue

General | Advanced | Statistics | Traffic | Total | ...

Name:

Target:

Dst.:

	Target Upload	Target Download
Max Limit:	<input type="text" value="unlimited"/> bits/s	<input type="text" value="unlimited"/> bits/s
Burst Limit:	<input type="text" value="unlimited"/> bits/s	<input type="text" value="unlimited"/> bits/s
Burst Threshold:	<input type="text" value="unlimited"/> bits/s	<input type="text" value="unlimited"/> bits/s
Burst Time:	<input type="text" value="0"/>	<input type="text" value="0"/> s

Time

enabled

New Simple Queue

General | Advanced | Statistics | Traffic | Total | ...

Packet Marks:

	Target Upload	Target Download
Limit At:	<input type="text" value="unlimited"/> bits/s	<input type="text" value="unlimited"/> bits/s
Priority:	<input type="text" value="8"/>	<input type="text" value="8"/>
Queue Type:	<input type="text" value="default-small"/>	<input type="text" value="default-small"/>

Parent:

enabled

Simple Queue v6

- Target address and interface combined to “target”
- dst-address changed to “dst”, can take IP address and also interface

Simple Queue in ROSv6

- Completely new algorithm, build in kernel, faster
- Still in sequential processing
- Target parameter is mandatory
- If target=0/0 in the first rule, no traffic for others queue

0 simple queue, 100 mbps, RB750G v5.21

The screenshot displays the Mikrotik WinBox v5.21 interface. The title bar reads "admin@172.20.99.2 (MikroTik) - WinBox v5.21 on RB750G (mipsbe)". The interface includes a "Safe Mode" button, a "CPU: 29%" indicator, and a "Hide Passwords" checkbox. A vertical sidebar on the left contains navigation options: Interfaces, Wireless, Bridge, PPP, Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Make Supout.rif, and Manual.

The "Interface List" window is open, showing a table of network interfaces:

Interface	Ethernet	EoIP Tunnel	IP Tunnel	GRE Tunnel	VLAN	VRRP	Bonding	LTE
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	R
R ether1	Ethernet	1520	1248 bps	91.4 Mbps	2	7 536	0	
R ether2	Ethernet	1520	91.6 Mbps	3.1 kbps	7 536	4	0	
R ether3	Ethernet	1520	0 bps	0 bps	0	0	0	
R ether4	Ethernet	1520	0 bps	0 bps	0	0	0	
R ether5	Ethernet	1520	42.3 kbps	7.2 kbps	7	9	0	

The "Queue List" window is also open, showing the "Simple Queues" tab. It includes buttons for "Reset Counters" and "Reset All Counters". The table below is currently empty:

#	Name	Target Ad...	Rx Max Limit	Tx Max Limit	Packet...
---	------	--------------	--------------	--------------	-----------

1000 simple queue, 100 mbps, RB750G v5.21

admin@172.20.99.2 (MikroTik) - WinBox v5.21 on RB750G (mipsbe)

Safe Mode CPU: 90% Hide Passwords

Interfaces

Wireless

Bridge

PPP

Switch

Mesh

IP

MPLS

Routing

System

Queues

Files

Log

Radius

Tools

New Terminal

MetaROUTER

Interface List

Interface	Ethernet	EoIP Tunnel	IP Tunnel	GRE Tunnel	VLAN	VRRP	Bonding	LTE
	<input type="text" value="Find"/>							
Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	R
R ether1	Ethernet	1520	0 bps	93.1 Mbps	0	7 670	0	
R ether2	Ethernet	1520	51.9 Mbps	0 bps	4 269	0	0	
R ether3	Ethernet	1520	0 bps	0 bps	0	0	0	
R ether4	Ethernet	1520	0 bps	0 bps	0	0	0	
R ether5	Ethernet	1520	1844.1 k...	40.6 kbps	161	57	0	

Queue List

Simple Queues	Interface Queues	Queue Tree	Queue Types			
	<input type="text" value="Find"/>					
#	Name	Target Ad...	Rx Max Limit	Tx Max Limit	Packet...	
984	q3_216	10.10.3.216	50M	50M		
985	q3_217	10.10.3.217	50M	50M		
986	q3_218	10.10.3.218	50M	50M		
987	q3_219	10.10.3.219	50M	50M		
988	q3_220	10.10.3.220	50M	50M		

1000 simple queue, 100 mbps, RB750G v6rc2

admin@172.20.99.2 (MikroTik) - WinBox v6.0rc2 on RB750G (mipsbe)

Time: 00:06:31 CPU: 43% Hide Passwords

Safe Mode

Interfaces

Wireless

Bridge

PPP

Switch

Mesh

IP

MPLS

Routing

System

Queues

Files

Log

Radius

Tools

Interface List

Interface	Ethernet	EoIP Tunnel	IP Tunnel	GRE Tunnel	VLAN	VRRP	Bonding	LTE
Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	R
R ether1	Ethernet	1520	7.8 kbps	91.1 Mbps	2	7 526	0	
R ether2	Ethernet	1520	50.7 Mbps	7.7 kbps	4 182	2	0	
ether3	Ethernet	1520	0 bps	0 bps	0	0	0	
ether4	Ethernet	1520	0 bps	0 bps	0	0	0	
R ether5	Ethernet	1520	44.4 kbps	7.7 kbps	9	10	0	

Queue List

#	Name	Target	Rx Max Limit	Tx Max Limit	Packet...
0	q0_0	10.10.0.0	50M	50M	
1	q0_1	10.10.0.1	50M	50M	
2	q0_2	10.10.0.2	50M	50M	
3	q0_3	10.10.0.3	50M	50M	
4	q0_4	10.10.0.4	50M	50M	

Faster at ROS 6.0rc12

Simple queue on multiple processors router will 9 times faster if there are at least 32 simple queue parents.

Upgrade from RoSv5

valens@192.168.88.1 (MikroTik) – WinBox v5.24 on RB751G-2HnD (mipsbe)

Queue List

Simple Queues | Interface Queues | Queue Tree | Queue Types

+ - ✓ ✗ 📁 📏 00 Reset Counters 00 Reset All Counters Find

Name	Parent	Pa...	Limi...	Max Li...	Avg. R...	Queued Bytes	Bytes	Packets
queue1	global-in			1M	0 bps	0 B	0 B	0
queue2	global-out			1M	0 bps	0 B	0 B	0
queue3	global-total			1M	0 bps	0 B	0 B	0

Queue tree with global-in, global-out, and global-total as parent at RoS v5.

Upgrade from RoSv5

valens@192.168.88.1 (MikroTik) - WinBox v6.0rc11 on RB751G-2HnD (mipsbe)

Queue List

Simple Queues

Interface Queues

Queue Tree

Queue Types



Reset Counters

Reset All Counters

	Name	Parent	Max Limit...	Avg. R...	Queued Bytes	Bytes	Packets
I	queue1	unknown		1M	0 bps	0 B	0 B	0
I	queue2	unknown		1M	0 bps	0 B	0 B	0
I	queue3	unknown		1M	0 bps	0 B	0 B	0

Queue tree with global-in, global-out, and global-total as parent at RoS v5 become invalid at Rosv6.

Simple queue upgrade

valens@192.168.88.1 (MikroTik) – WinBox v5.24 on RB751G-2HnD (m

Queue List

Simple Queues | Interface Queues | Queue Tree | Queue Types

+ − ✓ ✗ 📄 🗑️ ⚙️ Reset Counters 00 Reset All Counters

#	Name	Target Address	Packet Marks	Dst. Address	Interface	Priority
0	queue1	192.168.0.1	p1	192.168.88.5	bridge-local	8

valens@192.168.88.1 (MikroTik) – WinBox v6.0rc11 on RB751G-2HnD

Queue List

Simple Queues | Interface Queues | Queue Tree | Queue Types

+ − ✓ ✗ 📄 🗑️ ⚙️ Reset Counters 00 Reset All Counters

#	Name	Target	Dst.	Packet Marks
0	queue1	192.168.0.1, bridge-local	192.168.88.5	p1

Simple queue upgrade

valens@192.168.88.1 (MikroTik) – WinBox v5.24 on RB751G-2HnD (m

Queue List

Simple Queues | Interface Queues | Queue Tree | Queue Types

+ - ✓ ✗ 📄 📏 ⚙️ Reset Counters 00 Reset All Counters

#	Name	Target Address	Packet Marks	Dst. Address	Interface	Priority
0	queue1	192.168.0.1	p1	192.168.88.5	bridge-local	8

(Rosv5) Means: traffic for src-address 192.168.0.1 **AND** on interface bridge-local

Simple queue upgrade

valens@192.168.88.1 (MikroTik) - WinBox v6.0rc11 on RB751G-2HnD

Queue List

Simple Queues | Interface Queues | Queue Tree | Queue Types

+ - ✓ ✗ 📄 🏠 ⚙️ Reset Counters ⏏ Reset All Counters

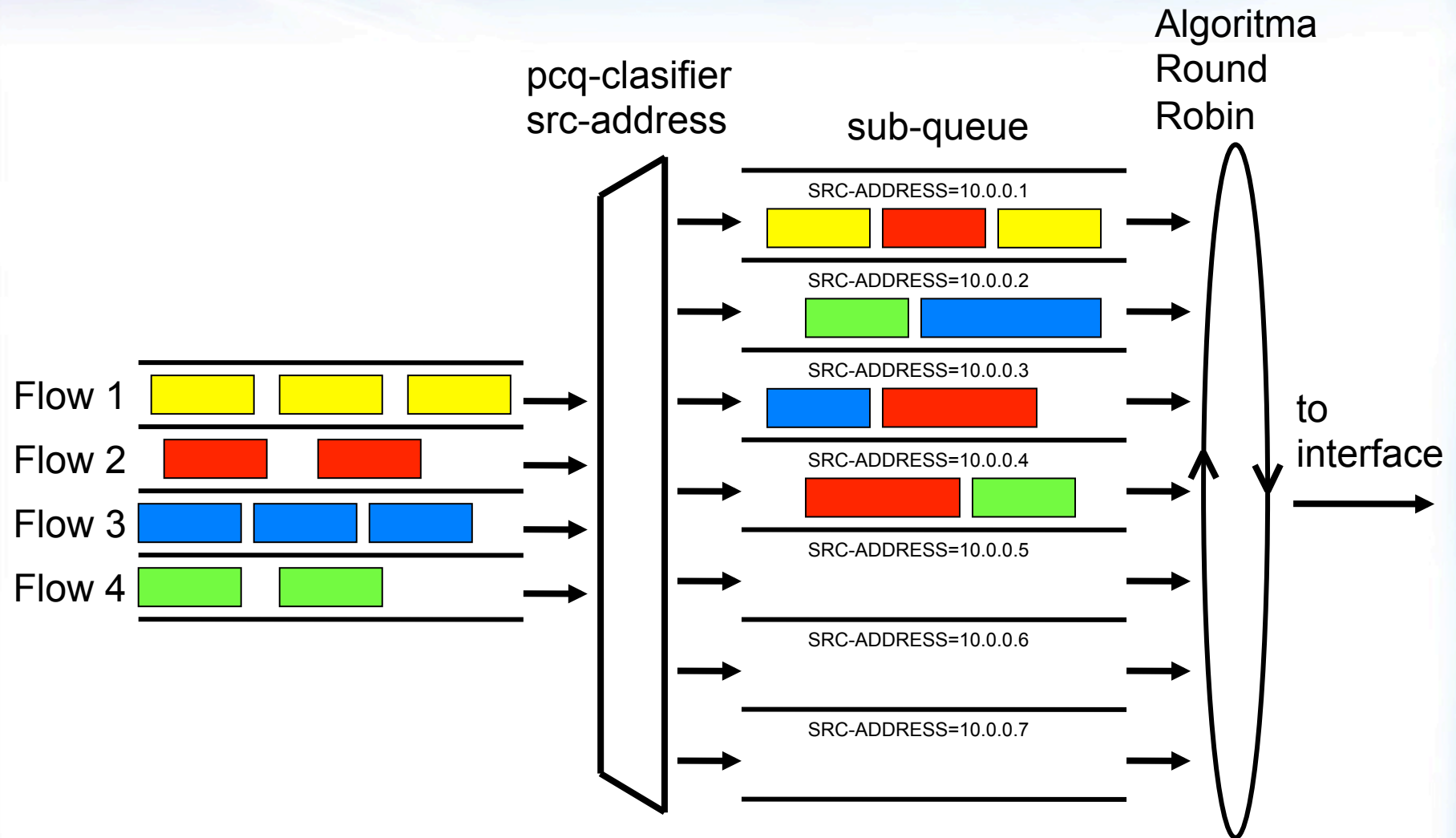
#	Name	Target	Dst.	Packet Marks
0	queue1	192.168.0.1, bridge-local	192.168.88.5	p1

(Rosv6) Means: traffic for src-address 192.168.0.1 **OR** on interface bridge-local

PCQ

- PCQ was introduced to optimize massive QoS systems, where most of the queues are exactly the same for different sub-streams.

PCQ



PCQ in ROS v6

- Take sub-stream parameter from Connection Tracking data.
- It is strongly advised to enable Connection Tracking.
- If connection tracking disabled, PCQ will calculate sub-stream in old way

Double QoS

- Is QoS method to do prioritization and client limitation in 1 ROS

http://mum.mikrotik.com/presentations/CZ09/QoS_Megis.pdf

- On RoS v6, we can not do double QoS with (both) queue tree any more.
- But, we still can do:
 - prioritization : queue tree & mangle forward
 - client limitation : simple queue with target ip address

Thank you

- Comments and suggestions:
 - Valens Riyadi (valens@mikrotik.co.id)

This presentation was developed and sourced from RouterOSv6 Presentation by Janis Megis (MUM-USA-2012).



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