
# How To Implement Wireless QoS with WMM And DSCP In Mikrotik

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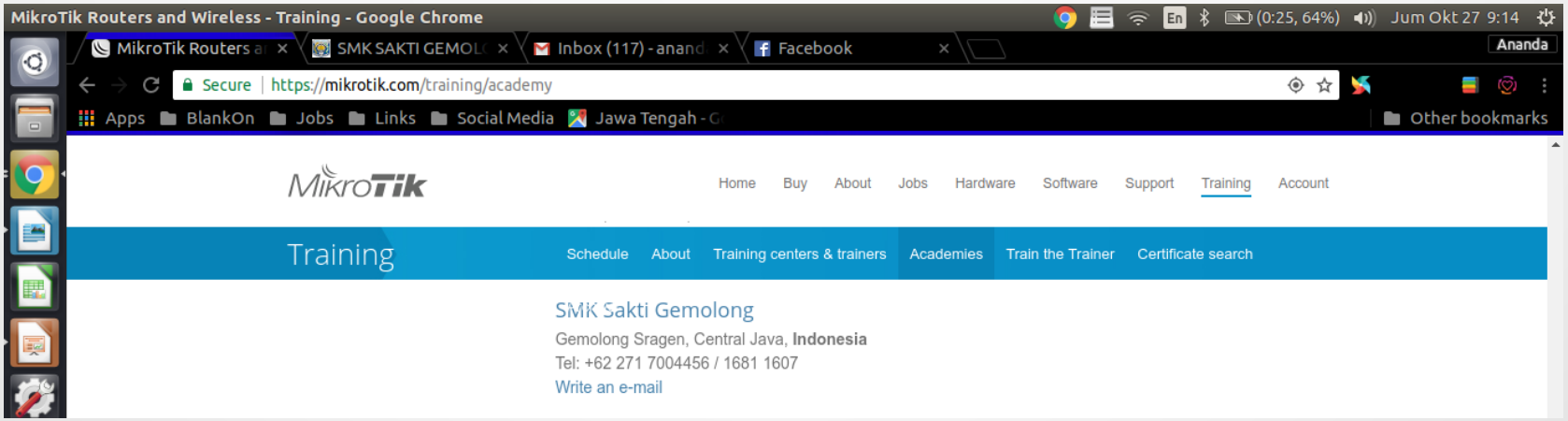
Mikrotik User Meeting
Yogyakarta, October 27–28 , 2017

# Ananda Dwi Rahmawati

- SMK Sakti Gemolong, Sragen, Jawa Tengah, Indonesia
- Mikrotik Academy SMK Sakti Gemolong, Sragen
- Mikrotik Certified MTCNA, 2016
- Developer at BlankOn Linux Indonesia ( https://github.com/BlankOn/wiki )
- Member of SAGOS ( SMK SAKTI Goes Open Source)

  (https://www.facebook.com/groups/sagos/ )
- 1st Winner of LKS Kab. Sragen 2017
- Internship at Btech ( https://www.btech.id/ ) , Bogor, Jawa Barat, Indonesia
- The only one female as presenter of MUM Indonesia 2017

# SMK Sakti Gemolong


"Thanks to SMK Sakti Gemolong"

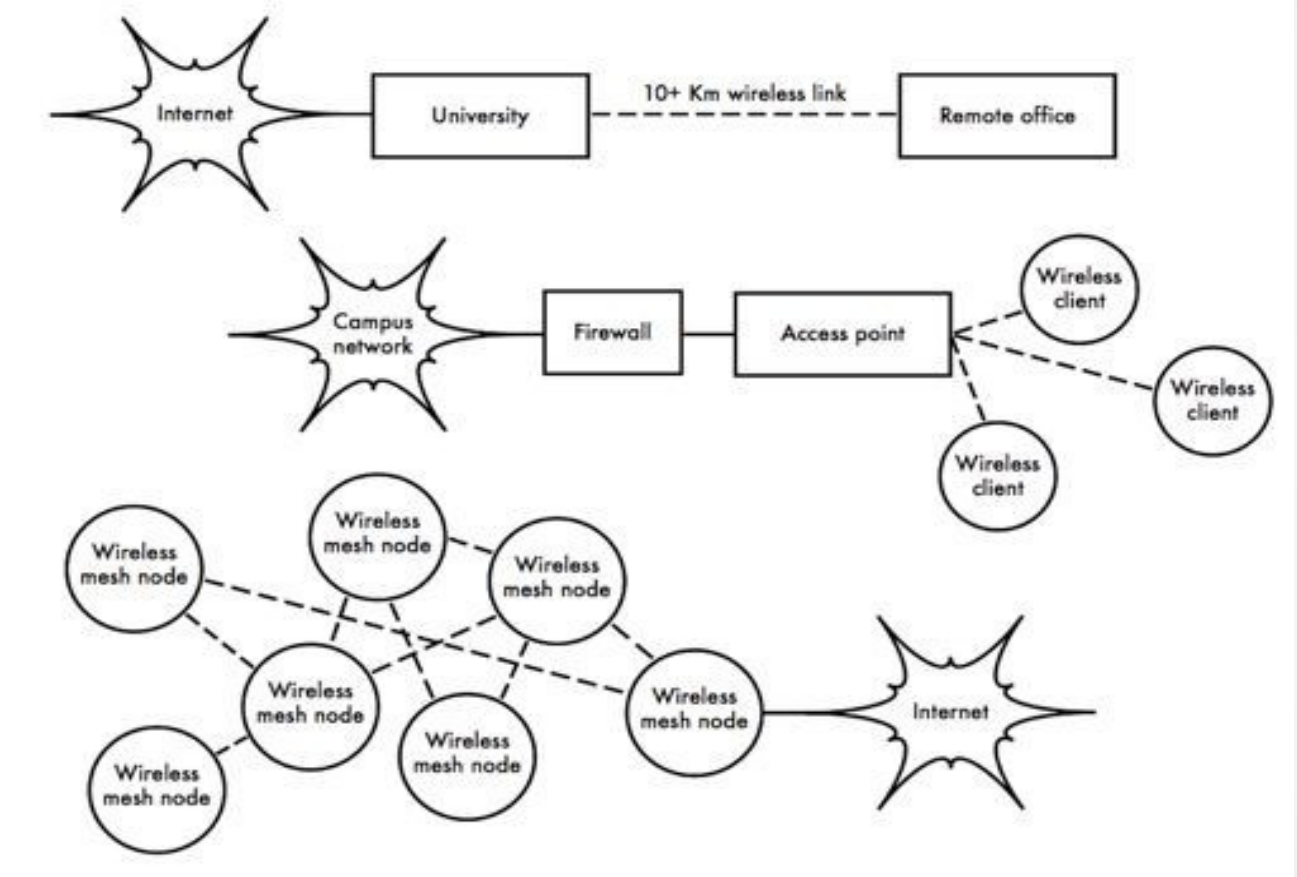
# Goals

- What is QoS?
- What is WMM (Wi-Fi Multimedia) ?
- What is DSCP (Differentiated Service Code Point) ?
- How it‘s work?
- How to impelement it with Mikrotik?

# Material

- Wireless
- Priority and services QoS
- WMM (*Wi-Fi Multimedia*)
- DSCP (*Differentiated Service Code Point*) and ToS (*The type of service*)
- Implementation

# Wireless




Source : http://wndw.net/

# Wireless

- Standard Protocol 802.11a/b/g/ac
- Low Up to 54 mbps ( depends upon standards 802.11g)
- Works on radio waves and microwaves
- Often visible to other wireless networks

# QoS

- The goal of QoS is to provide preferential delivery service for the applications that need it by ensuring sufficient bandwidth, controlling latency and jitter, and reducing data loss.

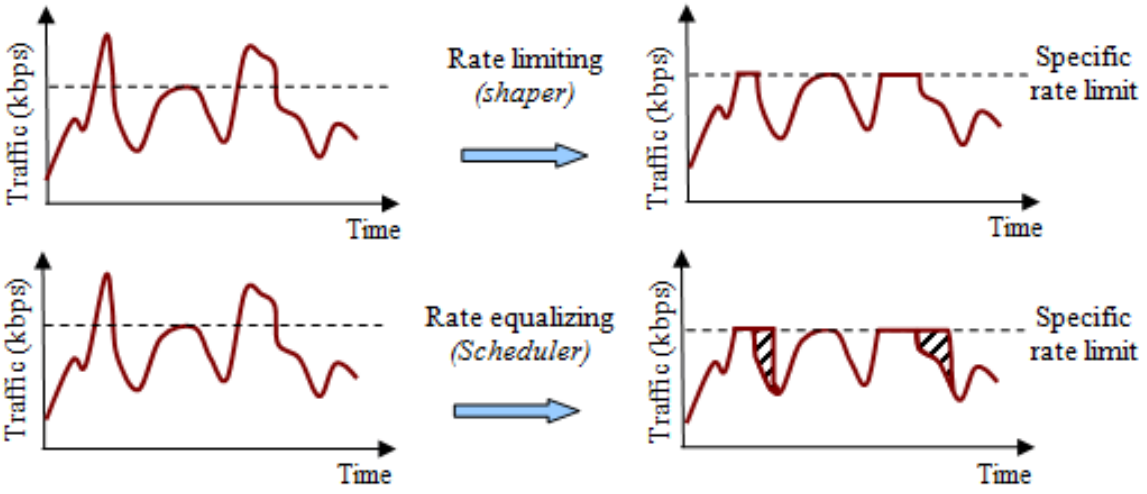



Figure 8.1. Principles of rate limiting and equalizing

Source : https://wiki.mikrotik.com/wiki/Manual:Queue

# QoS

- QoS settings are available for both Layer 2 and Layer 3 of TCP/IP protocols
  - Layer 2: IEEE 802.1p for Ethernet
  - Layer 2: WMM
  - Layer 3: DSCP
  - Layer 3: Other

# Priority and Services QoS

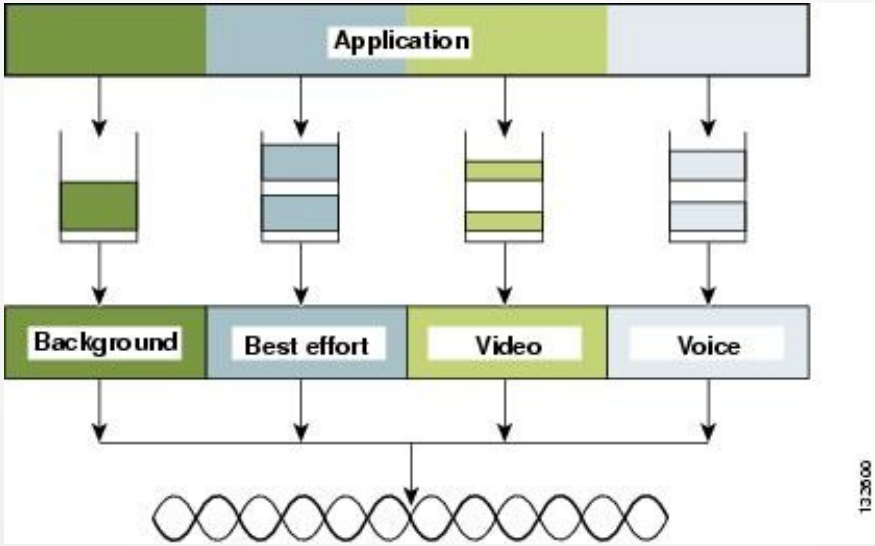
- Queues are used to limit and prioritize traffic:
  - Limit data rate for certain IP addresses, subnets, protocols, ports, and other parameters
  - Limit peer-to-peer traffic
  - Prioritize some packet flows over others
  - Configure traffic bursts for faster web browsing
  - Apply different limits based on time
  - Share available traffic among users equally, or depending on the load of the channel

# WMM (Wi-Fi Multimedia)

- Wi-Fi Multimedia (WMM), previously known as Wireless Multimedia Extensions (WME), is a subset of the 802.11e wireless LAN (WLAN) specification that enhances quality of service (QoS) on a network by prioritizing data packets according to four categories.
  - Voice
  - Video
  - Best effort
  - Background

# WMM (Wi-Fi Multimedia)

- WMM functionality requires that both the access point (AP) and the clients running applications that require QoS have WMM enabled.
- Priority level are not assigned by default



# WMM (Wi-Fi Multimedia)


802.1d 7, 6

5, 4

0, 3

2, 1

# Qos Priority

| PCP | Priority | Acronym | Traffic types |
|---|---|---|---|
| 1 | 0 (lowest) | BK | Background |
| 0 | 1 | BE | Best Effort |
| 2 | 2 | EE | Excellent Effort |
| 3 | 3 | CA | Critical Applications |
| 4 | 4 | VI | Video, < 100 ms latency and jitter |
| 5 | 5 | VO | Voice, < 10 ms latency and jitter |
| 6 | 6 | IC | Internetwork Control |
| 7 | 7 (highest) | NC | Network Control |

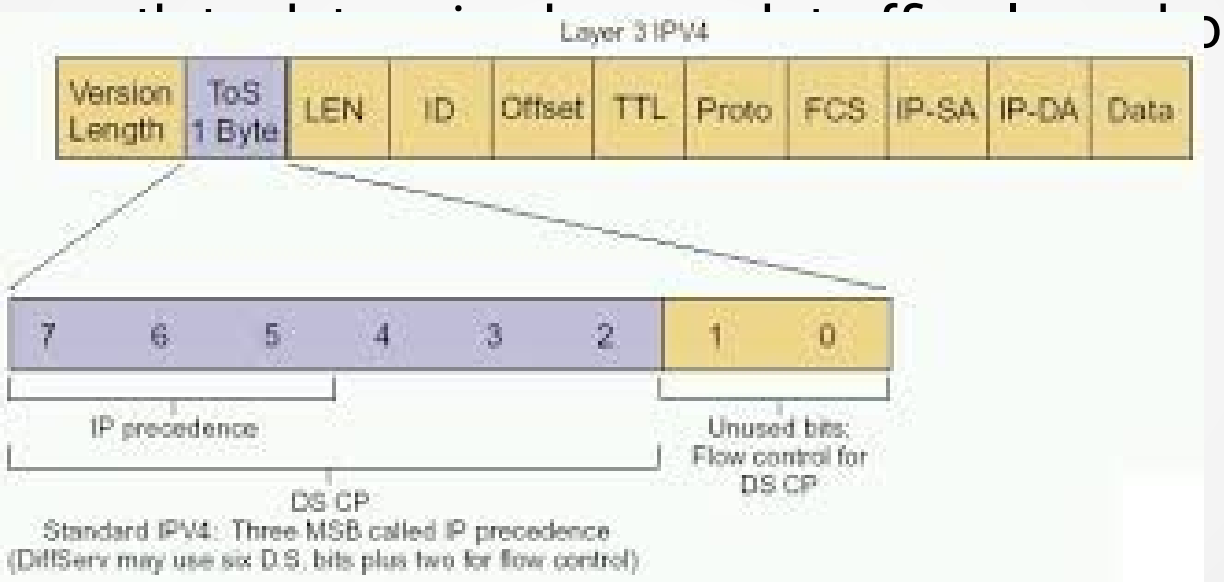
Source : http://us.profinet.com/qos/

# ToS and DSCP

- DSCP (ToS) byte of IP packet is used to trasport on the network the information regarding QoS
  - Advantage:
    - Set it only on the core router
    - Uses only 1 byte in the packet header
    - Can be done on VLAN
  - Disadvantage:
    - Cannot changed on encapsulated packets

# ToS and DSCP

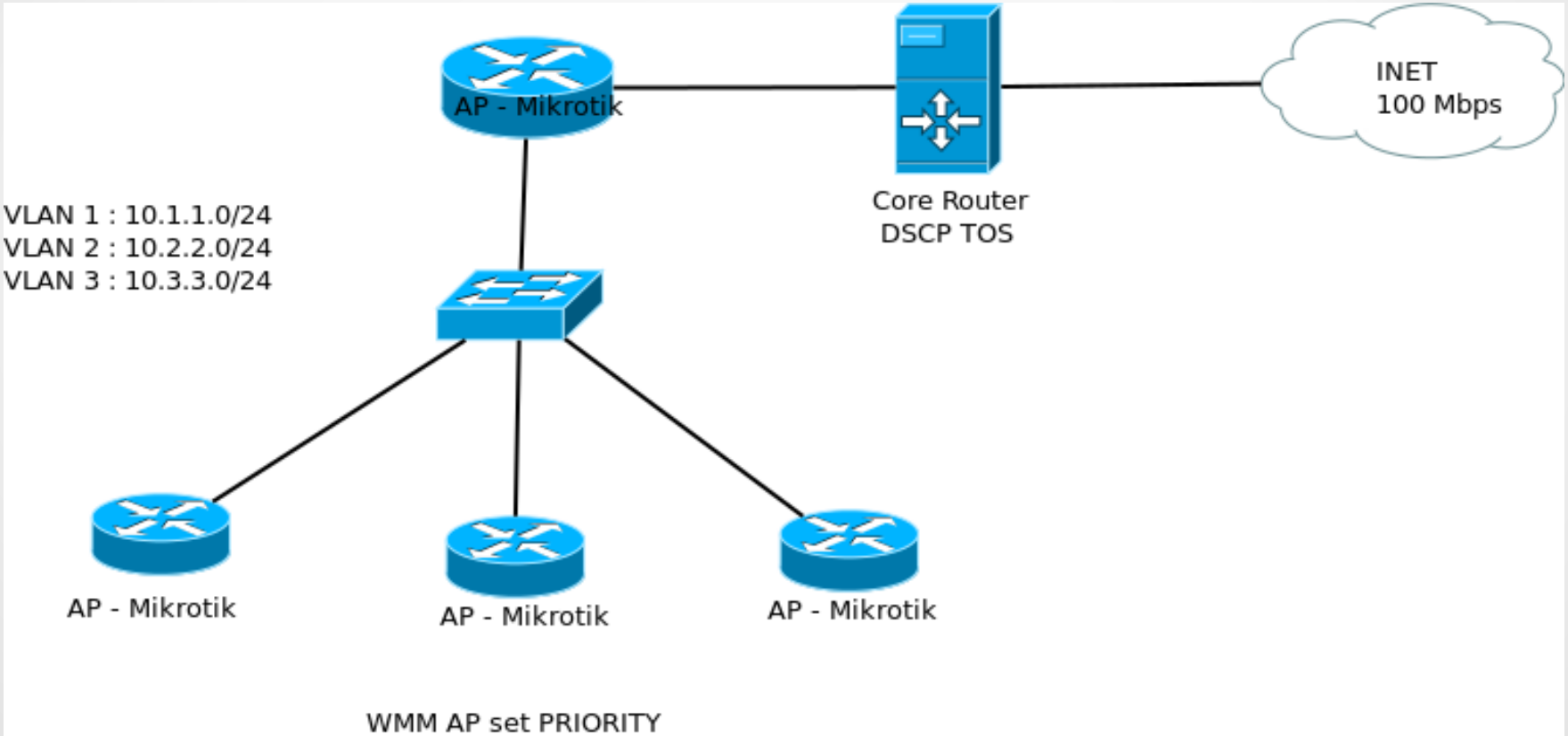
- Is meant to be administered in a per-hop-based way, allowing each router on [illegible] ould be prioritize




Source : http://www.cantore.com/refdocs/QoS-OV-Equiv.html

How To Implement It with Mikrotik?

# Implementation



# Implementation

- On the Gateway Router
- On the AP
- On the CPE client device

# Implementation

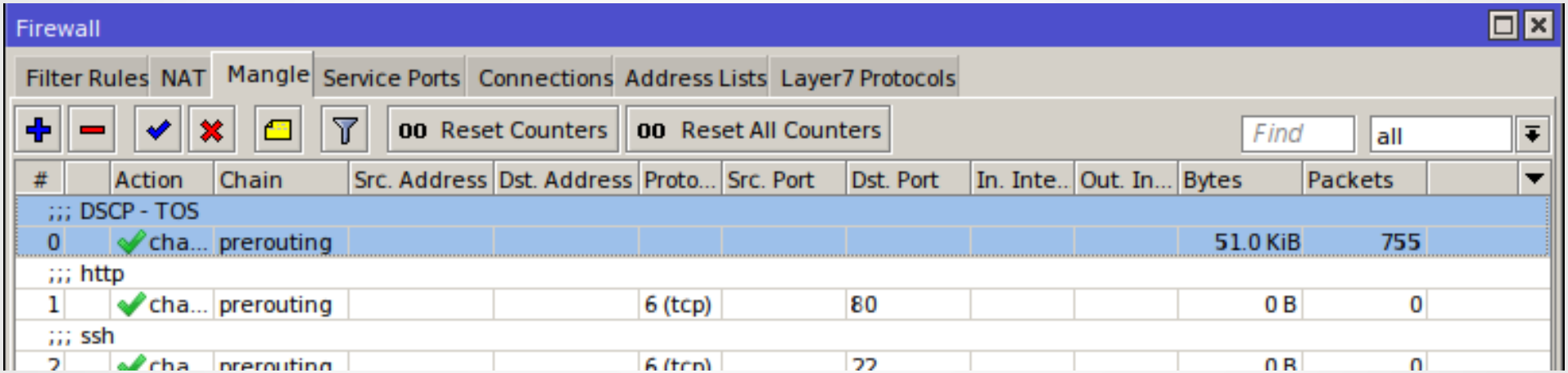
- DSCP ToS :
  - are applied by creat MANGLE rules on prerouting chain

```
[admin@Router-AP] /ip firewall mangle> add chain=prerouting
comment=DSCP-TOS protocol=tcp new-dscp=4 action=change-dscp
```

```
[admin@DSCP-TOS] > ip firewall mangle
[admin@DSCP-TOS] /ip firewall mangle> add chain=prerouting comment=DSCP-TOS protocol=tcp new-dscp=4
action=change-dscp
[admin@DSCP-TOS] /ip firewall mangle>
[admin@DSCP-TOS] /ip firewall mangle>
```

# Implementation

- DSCP ToS :



# Implementation

- On AP
  - Assigning priority from DSCP:

```
[admin@AP] > ip firewall mangle
[admin@AP] /ip firewall mangle> add action=set-priority chain=postrouting comment="DSCP into
 WMM Prorities" new-priority=from-dscp passthrough=yes
[admin@AP] /ip firewall mangle>
```

  - Matching DSCP value and change the priority :

```
[admin@AP] > ip firewall mangle
[admin@AP] /ip firewall mangle> add action=set-priority chain=postrouting comment="DSCP into
 WMM Priorites" dscp=46 new-priority=7 passthrough=yes
[admin@AP] /ip firewall mangle>
```

# Implementation

- WLAN wireless settings :

```
[admin@Mikrotik] /interfaces wireless set wlan1 wmm-
support=enabled
```

```
[admin@AP] > interface wireless
[admin@AP] /interface wireless> set wlan1 wmm-support=enabled
```

# Thanks for your attention !

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