MikroTik Nstreme Protocol

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General Information

Summary

The nstreme protocol is MikroTik proprietary wireless protocol created to improve point-to-point and point-to-multipoint wireless links. Nstreme2 works with a pair of wireless cards (Atheros AR5211 and AR5212 MAC chips only) - one for transmitting data and one for receiving.

Benefits of nstreme protocol:

• Client polling
• Very low protocol overhead per frame allowing super-high data rates
• No protocol limits on link distance
• No protocol speed degradation for long link distances
• dynamic protocol adjustment depending on traffic type and resource usage

Specifications

Packages required: wireless
License required: level4
Standards and Technologies: nstreme
Hardware usage: one radio for nstreme; two radios for nstreme2
Description

The nstreme protocol may be operated in three modes:

- **Point-to-Point mode** - controlled point-to-point mode with one radio on each side
- **Dual radio Point-to-Point mode (nstreme2)** - the protocol will use two radios on both sides simultaneously (one for transmitting data and one for receiving), allowing superfast point-to-point connection
- **Point-to-Multipoint** - controlled point-to-multipoint mode with client polling (like AP-controlled TokenRing)

nstreme settings

Home menu level: `/interface wireless`

Property Description

**mode** *(ap-bridge | bridge | station | alignment-only | nstreme-dual-slave; default: station)* - operating mode:
- **ap-bridge** - the interface is operating as an Access Point
- **bridge** - the interface is operating as a bridge
- **station** - the interface is operating as a client
- **alignment-only** - this mode is used for positioning antennas (to get the best direction)
- **nstreme-dual-slave** - enslave the card into nstreme2 group

Notes

If wireless interfaces are put in **nstreme-dual-slave** mode, all configuration will take place in `/interface wireless nstreme-dual` submenu described further on. In that case, configuration made in this submenu will be ignored.

Nstreme Settings

Home menu level: `/interface wireless nstreme`

Description

You can switch a wireless card to the nstreme mode. In that case the card will work only with nstreme clients.

Property Description

**name** *(name)* - reference name of the interface

**enable-nstreme** *(yes | no; default: no)* - whether to switch the card into the nstreme mode

**framer-policy** *(none | best-fit | exact-size | fast-frames; default: none)* - the method how to combine frames (like fast-frames setting in interface configuration). A number of frames may be combined
into one bigger one to reduce the amount of protocol overhead (and thus increase speed). The card
are not waiting for frames, but in case a number packets are queued for transmitting, they can be
combined. There are several methods of framing:

- **none** - do nothing special, do not combine packets
- **fast-frames** - use fast-frame mode of the radio card
- **best-fit** - put as much packets as possible in one frame, until the framer-limit limit is met, but
do not fragment packets
- **exact-size** - put as much packets as possible in one frame, until the framer-limit limit is met,
even if fragmentation will be needed (best performance)

**framer-limit** *(integer; default: 3200)* - maximal frame size

**Example**

To enable the nstreme protocol on the **wlan1** radio with exact-size framing:

```
[admin@MikroTik] interface wireless nstreme> print
0 name="wlan1" enable-nstreme=no framer-policy=none framer-limit=3200
[admin@MikroTik] interface wireless nstreme> set wlan1 enable-nstreme=yes \
... framer-policy=exact-size
```

**Nstreme2 Group Settings**

Home menu level: `/interface wireless nstreme-dual`

**Description**

Two radios in **nstreme-dual-slave** mode can be grouped together to make nstreme2 Point-to-Point
connection

**Property Description**

- **name** *(name)* - reference name of the interface
- **mtu** *(integer: 0..65536; default: 1500)* - Maximum Transmission Unit
- **mac-address** *(MAC address)* - MAC address of the receiving wireless card in the set
- **arp** *(disabled | enabled | proxy-arp | reply-only; default: enabled)* - Address Resolution Protocol
  setting
- **disable-running-check** *(yes | no)* - whether the interface should always be treated as running even
  if there is no connection to a remote peer
- **tx-radio** *(name)* - which radio should be used for transmitting frames
- **rx-radio** *(name)* - which radio should be used for receiving frames
- **remote-mac** *(MAC address; default: 00:00:00:00:00:00)* - which MAC address to connect to (this
  would be the remote receiver card's MAC address)
- **tx-band** - operating band of the transmitting radio
  - **2.4GHz-B** - IEEE 802.11b
  - **2.4GHz-G** - IEEE 802.11g
- **5GHz** - IEEE 802.11a up to 54 Mbit
- **5GHz-turbo** - IEEE 802.11a up to 108 Mbit

**rx-band** - operating band of the receiving radio
- **2.4GHz-B** - IEEE 802.11b
- **2.4GHz-G** - IEEE 802.11g
- **5GHz** - IEEE 802.11a up to 54 Mbit
- **5GHz-turbo** - IEEE 802.11a up to 108 Mbit

**tx-frequency** *(integer; default: 5180)* - Frequency to use for transmitting frames

**rx-frequency** *(integer; default: 5320)* - Frequency to use for receiving frames

**rates-a/g** *(multiple choice: 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps)*
- rates to be supported in 802.11a or 802.11g standard

**rates-b** *(multiple choice: 1Mbps, 2Mbps, 5.5Mbps, 11Mbps)* - rates to be supported in 802.11b standard

**framer-policy** *(none | best-fit | exact-size; default: none)* - the method how to combine frames (like fast-frames setting in interface configuration). A number of frames may be combined into one bigger one to reduce the amount of protocol overhead (and thus increase speed). The card are not waiting for frames, but in case a number packets are queued for transmitting, they can be combined. There are several methods of framing:

- **none** - do nothing special, do not combine packets
- **best-fit** - put as much packets as possible in one frame, until the framer-limit limit is met, but do not fragment packets
- **exact-size** - put as much packets as possible in one frame, until the framer-limit limit is met, even if fragmentation will be needed (best performance)

**framer-limit** *(integer; default: 4000)* - maximal frame size

### Example

To enable the nstreme2 protocol on a router:

1. Having two Atheros AR5212 based cards which are not used for anything else, to group them into a nstreme interface, switch both of them into nstreme-slave mode:

   ```
   [admin@MikroTik] interface wireless> print
   Flags: X - disabled, R - running
   0 name="wlan1" mtu=1500 mac-address=00:0B:6B:31:02:4F arp=enabled
disable-running-check=no interface-type=Atheros AR5212
radio-name="000B6B31024F" mode=station ssid="MikroTik" frequency=5180
band=5GHz scan-list=default-ism
supported-rates-b=1Mbps,2Mbps,5.5Mbps,11Mbps
supported-rates-a/g=6Mbps,9Mbps,12Mbps,18Mbps,24Mbps,36Mbps,48Mbps,54Mbps
basic-rates-b=1Mbps basic-rates-a/g=6Mbps max-station-count=2007
ack-timeout=dynamic tx-power=default noise-floor-threshold=default
burst-time=disabled fast-frames=no dfs-mode=none antenna-mode=ant-a
wds-mode=disabled wds-default-bridge=none
update-stats-interval=disabled default=default-authentication=yes
default-forwarding=yes hide-ssid=no 802.1x-mode=none
1 name="wlan2" mtu=1500 mac-address=00:0B:6B:30:B4:A4 arp=enabled
disable-running-check=no interface-type=Atheros AR5212
radio-name="000B6B30B4A4" mode=station ssid="MikroTik" frequency=5180
   ```
band=5GHz scan-list=default-ism
supported-rates-b=1Mbps,2Mbps,5.5Mbps,11Mbps
supported-rates-a/g=6Mbps,9Mbps,12Mbps,18Mbps,24Mbps,36Mbps,48Mbps,54Mbps
basic-rates-b=1Mbps basic-rates-a/g=6Mbps max-station-count-2007
ack-timeout(dynamic tx-power=default noise-floor-threshold=default
burst-time=disabled fast-frame=no dfs-mode=none antenna-mode=ant-a
wds-mode=disabled wds-default-bridge=none
update-stats-interval=disabled default-authentication=yes
default-forwarding=yes hide-ssid=no 802.1x-mode=none
[admin@MikroTik] interface wireless> set 0,1 mode=nstreme-dual-slave

2. Then add nstreme2 interface with exact-size framing:
[admin@MikroTik] interface wireless nstreme-dual> add \
... framer-policy=exact-size

3. And configure which card will be receiving, and which - transmitting
[admin@MikroTik] interface wireless nstreme-dual> print
Flags: X - disabled, R - running
0 X name="n-streme1" mtu=1500 mac-address=00:00:00:00:00:00 arp=enabled
disable-running-check=no tx-radio=(unknown) rx-radio=(unknown)
remote-mac=00:00:00:00:00:00 tx-band=5GHz tx-frequency=5180
rates-b=1Mbps,2Mbps,5.5Mbps,11Mbps
rates-a/g=6Mbps,9Mbps,12Mbps,18Mbps,24Mbps,36Mbps,48Mbps,54Mbps
rx-band=5GHz rx-frequency=5320 framer-policy=exact-size
framer-limit=4000
[admin@MikroTik] interface wireless nstreme-dual> set 0 disabled=no \
... tx-radio=wlan1 rx-radio=wlan2
[admin@MikroTik] interface wireless nstreme-dual>