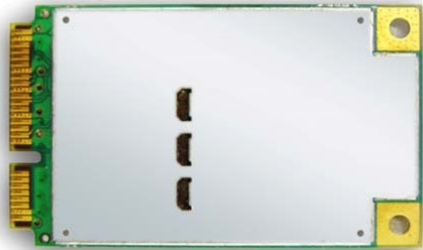


# 3G Applications on RouterOS

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# Overview of this Presentation

- Why 3G / GPRS
- M2M and why it's going to be BIG!
- New Features in RouterOS V4 for 3G
- Interface Types
- Real World Applications
- SMS Configuration
- PPP Configuration
- Live Demonstration



# Why 3G / GPRS?

- WiFi or wired Internet is not available
- Backup link, if the main link fails
- Out-of-band management of router systems
- Sending SMS from the router
- Receiving SMS and executing scripts
- 3G becomes faster and Internet access is more affordable

# 3G Applications

- Public Safety
- Rural Areas
- Mobile / Fixed Hotspots
- Bandwidth Backup / Redundancy
- Digital Signage
- Kiosks
- Remote Monitoring / Security
- Transportation
- M2M Applications





# M2M (Machine to Machine)

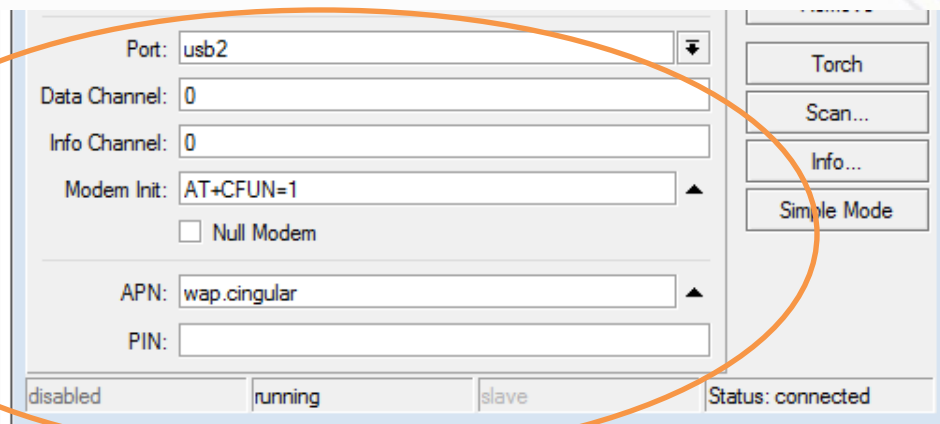
- M2M is the concept of a device sending data to another device
- Extreme competition in voice services is driving down revenue, carriers looking at data.
- Carriers starting to embrace having “embedded devices” on their network besides mobile phones.
- Meters, Appliances, Remote Access, Lighting, Medical, Retail Inventory, etc. --- Reducing Costs and saving energy.
- Wireless M2M will increase 73 million units in 2008 to 430 million units in 2013 worldwide (Harbor Research)

# New 3G RouterOS 4.0 Features

- Added the ability to talk to multiple channels within a USB connection at same time

Added PIN ability (so you can SIM Unlock within winbox)

Added APN (Access Point Name)



# Interface Types

- 3G Modems come in both USB and mPCIe cards using USB signals.
- USB Modems are easier to obtain, but protrude out in front of your router.
- mPCIe cards are slick, built-in and look like a WiFi Card, but are more expensive and support is harder to obtain.
- RB411u has mPCIe USB
- RB800 has mPCIe but no USB support



# USB Dongle Type Modems



# mPCIe Modules w/RB411U

- Some cards that have been tested:
  - Option GTM378
  - Sierra Wireless  
MC8775,8780  
8781,8790

See [wiki.mikrotik.com](http://wiki.mikrotik.com)  
For additional supported  
cards



# mPCIe Module Types

- Quadband GSM 850/900/1900/2100Mhz
- EVDO Rev A CDMA (3.1 Down / 1.8 Up)
- UMTS/HSDPA (7.2 Down / 2.0 Up)
- HSDPA+ 3.5G (28 Down / 5.8 Up)
- LTE (Long Term Evolution) (100 Down / 50 Up)
- LTE With 4x4 MIMO can Achieve 300Mbps!



# SMS Applications

- RouterOS Supports sending SMS messages by script to any mobile device.
- RouterOS can accept SMS messages and trigger scripts to run
- Applications Include:
  - Remote Router Reboot
  - Check Voltage or Signal Strength and SMS Back

# Sending SMS from the Router

- Command line example to send an SMS:
  - /tool sms send usb2 "29111222" channel=0 message="Help!"
- In RouterOS V4, SMS can be sent while the port is used by other service (PPP or terminal)

# Receiving SMS

- Turn on receiving the SMS
  - specify “port” and “channel”
  - set “secret” (required)
  - set “allowed-number” (optional)
- Received SMSs are stored in /tool sms inbox
- SMS message format
  - :cmd SECRET script NAME [[ VAR[=VAL] ] ... ]



```

[admin@MikroTik] /tool sms>
[admin@MikroTik] /tool sms> print
  receive-enabled: yes
      port: usb2
  channel: 2
  secret: "111"
  allowed-number: ""
  keep-max-sms: 10
[admin@MikroTik] /tool sms>

```

```

[admin@MikroTik] /tool sms> inbox
[admin@MikroTik] /tool sms inbox> pr
# SRC                TIMESTAMP                TEXT
0 16308540580        Nov/20/2009 01:23:21 GMT +26  :cmd 111 script log
[admin@MikroTik] /tool sms inbox>
[admin@MikroTik] /tool sms inbox>

```

Jan/02/1970 01:59:06	gsm read debug	+CMGL: 0,0,0,0
Jan/02/1970 01:59:06	gsm read debug	07913121139426F0040B816103580485F0000090 11021071704A13BA719B0C8AC562A0F9589E86 D341ECF719
Jan/02/1970 01:59:06	gsm read debug	OK
Jan/02/1970 01:59:06	gsm debug	running script: log
Jan/02/1970 01:59:06	script info	Hello This Works!
Jan/02/1970 01:59:06	gsm debug	keepMax exceeded, removing some mesages.
Jan/02/1970 01:59:06	gsm write debug	AT+CMGD=0
Jan/02/1970 01:59:06	gsm write debug	
Jan/02/1970 01:59:06	gsm read debug	AT+CMGD=0
Jan/02/1970 01:59:06	gsm read debug	OK
Jan/02/1970 01:59:11	gsm write debug	AT+CMGL=0

# PPP Config: Part 1 – Info Channel

```
[admin@MikroTik] /system> serial-terminal usb2 channel=2
```

```
[Ctrl-A is the prefix key]
```

```
ATi5
```

```
Manufacturer: Sierra Wireless, Inc.
```

```
Model: MC8781
```

```
Revision: F1_2_3_15AP C:/WS/FW/F1_2_3_15AP/MSM7200R3/SRC/AMSS 2008/07/09 13:02:11
```

```
IMEI: 356685011813019
```

```
IMEI SV: 13
```

```
FSN: D350558387911
```

```
3GPP Release 6
```

```
+GCAP: +CGSM,+DS,+ES
```

```
OK
```

```
[admin@MikroTik] /system> serial-terminal usb2 channel=0
```

```
[Ctrl-A is the prefix key]
```

```
Sierra Wireless, Inc.
```

```
MC8781
```

```
APP1
```

```
OK
```

# PPP Config: Part 2 – General Settings

Interface <ppp-out1>

General | PPP | Status | Traffic

Name: ppp-out1

Type: PPP Client

L2 MTU: 1500

Max MTU: 1500

Max MRU: 1500

MRRU: [dropdown]

Port: usb2

Data Channel: 0

Info Channel: 2

Modem Init: AT+CFUN=1

Null Modem

APN: wap.cingular

PIN: [text box]

OK

Cancel

Apply

Enable

Comment

Copy

Remove

Torch

Scan...

Info

Simple Mode

disabled | running | slave | Status: disabled



# PPP Config Part 3 – PPP Settings

Interface <ppp-out1>

General PPP Status Traffic

Phone: \*99#

Dial Command: ATDT

User:

Password:

Remote Address:

Profile: default

Dial On Demand

Add Default Route

Use Peer DNS

- Allow -

pap  chap

mschap1  mschap2

OK

Cancel

Apply

Enable

Comment

Copy

Remove

Torch

Scan...

Info...

Simple Mode

disabled running slave Status: disabled

# PPP Config Part 4 - Info

The image shows two overlapping windows from the Mikrotik WinBox interface. The top window is titled "Interface <ppp-out1>" and has tabs for "General", "PPP", "Status", and "Traffic". The "PPP" tab is active, showing fields for "Name: ppp-out1", "Type: PPP Client", "L2 MTU: 1500", and "Max MTU: 1500". To the right of this window is a vertical toolbar with buttons: OK, Cancel, Apply, Enable, Comment, Copy, Remove, Torch, Scan..., Info... (circled in orange), and Simple Mode. Below the toolbar, the status is "Status: disabled".

The bottom window is titled "PPP Info <ppp-out1>" and displays various status and hardware information:

- Status: ready
- PIN Status: no password required
- Functionality: minimum
- GPRS Class: A - GPRS & GSM simultaneous
- Manufacturer: Sierra Wireless, Inc.
- Model: MC8781
- Revision: F1\_2\_3\_15AP C:/WS/FW/F1\_2\_3\_15AP/MSM7200R3/SRC/AMSS 2008/07/09 13:02:...
- Serial Number: 356685011813019
- Current Operator: 'AT&T'@
- Access Technology: 3G
- Signal Strength: -97 dBm

An "OK" button is located to the right of the "Status" field in the PPP Info window.

# 3G Configuration Reminders

- Don't forget to add a SRC-NAT rule to Masquerade your ppp-out1 interface
- If your carrier charges for connect time, select that you want to dial on demand vs. always on
- Some carriers will give you private address space, depends on APN you connect to.
- Make sure you are using the default profile and not trying to do encryption



# Troubleshooting

- **Can you talk to the modem at all?**  
Try using serial terminal to talk to the modem!
- **Is the SIM card requiring the PIN?**  
Disable PIN request, or, enter your PIN in winbox!
- **Consult MikroTik Wiki** and any 3G/GPRS AT Command Reference!

# References / Live Demonstration

- [http://wiki.mikrotik.com/wiki/Supported\\_Hardware#3G\\_cards](http://wiki.mikrotik.com/wiki/Supported_Hardware#3G_cards)
- <http://www.option.com/>
- <http://www.sierrawireless.com/>
- <http://forum.mikrotik.com>
- <http://www.mikrotik.com>
- <http://www.balticnetworks.com>

Thank You!