3G Applications on RouterOS

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Overview of this Presentation

• Why 3G / 4G?
• M2M and why it’s going to be BIG!
• New Features in RouterOS V5 for 3G
• Interface Types
• Real World Applications
• SMS Configuration
• PPP Configuration
• Troubleshooting
• Live Demonstration
Why 3G / 4G?

- Need mobile internet access
- 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 reached 81.4 Millions Units at end of 2010 – Predicted to be 430 Million by 2013 (Berg Insight)
Cost’s are coming down!

• We sell 5MB data plans for $4.50 on the Sprint M2M network – No Contract.
• LTE/3G Modems are very cheap
• Routerboard hardware gets better/cheaper as time goes on!
• By 2012 - $100 RouterOS 3G Router complete!
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)
New 3G RouterOS 5.0 Features

• Additional Modem Support (Over 100 Supported)
• Added GOBI 2000 firmware download support
• LTE (4G) Currently being looked at
• Minor Winbox Tweaks
• Webfig Support added
RouterBOARD Interface Types

- RB/411u - mPCIe & USB
- RB/411UAHR – mPCIe & USB (No Power)
- RB/711UA-2HnD – USB w/802.11b/g/n
- RB/711UA-5HnD – USB w/802.11a/n
- RB/433UAH – USB x2
- RB/435G – USB x2
- RB/493G – USB
- RB/SXT - USB
- RB/800 has mPCIe but no USB support
- Some Models Support USB
mPCI-e Cards

• Harder to obtain – contact MFG
• Designed for dedicated applications
• Harsh environments – transportation
• Most used in M2M applications
• Require device certification in the USA by each carrier (Free to $50,000)
• Require external 3G antenna’s
• Cost more – but price coming down
• 4G modules currently sell for $125
USB Type Modems

- Easy to find on the open market
- FREE with most carrier contracts
- Protrude out of the RouterBOARD
- Greater Selection
- Include built-in antennas
USB Dongle Type Modems
mPCIe Modules w/RB411U

• Some cards that have been tested:
  – OPTION GTM378
  – Gobi 2000
  – Sierra Wireless
    MC8775,8780
    8781,8790

See wiki.mikrotik.com
For additional supported
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> print
receive-enabled: yes
    port: usb2
    channel: 2
    secret: "111"
    allowed-number: ""
    keep-max-sms: 10
[admin@MikroTik] /tool sms> exit

[admin@MikroTik] /tool sms> inbox
[admin@MikroTik] /tool sms inbox> pr

<table>
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<tr>
<th>#</th>
<th>SRC</th>
<th>TIMESTAMP</th>
<th>TEXT</th>
</tr>
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<td>0</td>
<td>16308540580</td>
<td>Nov/20/2009 01:23:21 GMT +26</td>
<td>cmd 111 script log</td>
</tr>
</tbody>
</table>

[admin@MikroTik] /tool sms inbox>
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
PPP Config Part 3 – PPP Settings
PPP Config Part 4 - Info
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://forum.mikrotik.com](http://forum.mikrotik.com)
- [http://www.mikrotik.com](http://www.mikrotik.com)
- [http://www.balticnetworks.com](http://www.balticnetworks.com)
- [http://www.maxxwave.com](http://www.maxxwave.com)

Thank You!