Application Note 20

Lock a TransPort to a single mobile provider

Digi Technical Support
June 2016
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1 INTRODUCTION

1.1 Outline

Some mobile providers allow their users to roam on to the networks of other providers. If users are away from their home country, this can sometimes cause a problem when a unit is located near a country border. Here, the TransPort’s modem module may attach to a bordering foreign network and incur expensive roaming charges.

This Application Note (AN) outlines:

(i) A way of ‘locking’ the TransPort to one mobile provider’s network.
(ii) Applying the resulting configuration change to other TransPorts.

1.2 Assumptions

This AN applies to:

Models shown: Digi Transport WR44v2

Other Compatible Models: All Digi TransPort products.

Firmware versions: All firmware versions.

Configuration: This AN assumes the devices are set to their factory default configurations. Most configuration commands are only shown if they differ from the factory default.

Users have access to the TransPort command line interface (via serial port or telnet) and also the web interface.

1.3 Corrections

Requests for corrections or amendments to this AN are welcome and should be addressed to: tech.support@digi.com

Requests for new ANs can be sent to the same address.

1.4 Version

<table>
<thead>
<tr>
<th>Version</th>
<th>Status</th>
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<tbody>
<tr>
<td>1.0</td>
<td>Published</td>
</tr>
<tr>
<td>1.1</td>
<td>Revision for new W-WAN usage in the web GUI post release 5.036.</td>
</tr>
<tr>
<td>2.0</td>
<td>Updated and rebranded</td>
</tr>
<tr>
<td>2.1</td>
<td>Completed and published</td>
</tr>
<tr>
<td>2.2</td>
<td>Updated screenshots and instructions for new web interface, rebranding (Jun 2016)</td>
</tr>
</tbody>
</table>
2 CONFIGURATION

2.1 Deactivate the PPP interface

In order to perform a successful scan of available networks, it is necessary to have the PPP session deactivated.

Navigate to: Configuration - Network > Interfaces > Advanced > PPP 0 - 9 > PPP 1 > Advanced

Remove the tick from the option Enable "Always On" mode of this interface so the PPP interface remains down while the scan takes place.

Click the Apply button.

Configuration - Network > Interfaces > Advanced > PPP 0 - 9 > PPP 1 > Advanced

Navigate to: Management - Network Status > Interfaces > Advanced > PPP > PPP 0 – 9 > PPP 1

Click the Drop Link button.
2.2 Scan for Networks

To detect all networks in range, navigate to: Management - Network Status > Interfaces > Mobile

Click the “Scan for networks” button.
After 1-2 minutes, the router will have scanned all the “visible” networks and populated these networks into the ‘Networks Detected’ table.
Look for the network that requires locking to and click the **Lock** button (refer to the above screenshot). This action sends an AT+COPS modem command to the cellular module (e.g. AT+COPS=1,2,310410) which will only allow the module to attach to the mobile network with the specified ID number.

Confirmation of Locking (note the “No Errors” message):

![Management - Network Status > Interfaces > Mobile](image)

2.3 **Re-Activate the PPP interface**

The PPP deactivation performed in step 2.1 needs to be reversed.

Navigate to: **Configuration - Network > Interfaces > Advanced > PPP 0 – 9 > PPP 1 > Advanced**

Insert a tick in the option **Enable "Always On" mode of this interface** so the PPP interface will automatically try and connect.

![Configuration - Network > Interfaces > Advanced > PPP 0 – 9 > PPP 1 > Advanced](image)

Click the **Apply** button.

2.4 **Save the configuration**

The AT+COPS command is not retained by the cellular module, so it is added to the current configuration of the TransPort to be issued every time the router attempts a mobile network connection. It is therefore now necessary to save the configuration.
2.5 Extract the configuration change and apply it to other TransPorts.

To avoid the necessity of using the web interface on every other TransPort that needs locking to the same network, the AT command to lock the network can be extracted from the configuration.

To read the value of the AT command, send the “modemcc 0 net_str ?” command:

```bash
modemcc 0 net_str ?
+COPS=1,2,310410
OK
```

Or enter the “config c show” command and look for “modemcc 0 net_str” in the output:

```bash
config c show
---cut---
modemcc 0 net_str "+COPS=1,2,310410"
---cut---
```

In order to lock other TransPorts to the same network, simply send the following commands, but replace the network numerical ID with the one seen in the previous steps output.

**NOTE:** Only the numbers shown in red should be altered; the “1,2,” should not be altered:

```bash
modemcc 0 net_str “+COPS=1,2,310410”
config 0 save
Please wait...
Power Up Profile: 0
OK
reboot
```
3 TESTING

3.1 Checking that the TransPort is locked to the correct network

After the changes are complete, the TransPort has rebooted (or PPP has been dropped then raised) and some time has been allowed for a connection to the cellular network to be established, navigate to:

Management - Network Status > Interfaces > Mobile

Check that the network registration shows the correct network number.

Management - Network Status > Interfaces > Mobile

Mobile Information
Results of Last Module Status Poll at 1 Feb 2016 10:14:34
Outcome: Got modem status OK

- SIM status: Ready (PIN checking disabled)
- Signal strength: -66 dBm
- Radio technology: UMTS
- Signal quality (UMTS): RSSI -66 dBm, Ec/Io -4.5 dB
- Radio band: WCDMA 850
- Channel: 4381
- Manufacturer: Sierra Wireless, Incorporated
- Model: MC7354
- IMEI: 359225051479608
- ESN: 6062D50E
- MEID: 35922505147960
- IMSI: 310410825281959
- MDN: 15337055232
- ICCID: 89014103278252819507

- Firmware: SWI9X15C_05.05.58.00 r27038 carmd-fwbuild
  2015/03/04 21:30:23
- Bootcode: SWI9X15C_05.05.58.00 r27038 carmd-fwbuild1
  2015/03/04 18:38:46

- Hardware version: 1.0
- Firmware Carrier ID: ATT_005.026_000
- GPRS Attachment Status: Attached
- GPRS Registration: Registered lac 07E0 ci:081C84CA
  Network: AT&T, 310410
- Preferred system: Auto

Note: any network lock/unlock actions only take effect after next data disconnect/reconnect
3.2 Checking that the correct command is sent to the module

The TransPort communicates with its wireless module via AT Style “modem” commands. The AT+COPS command sets the provider selection. This can be captured in the Analyser trace by enabling the “W-WAN” ASY source as seen below.

**NOTE:** You must follow these steps PRIOR to locking and re-activating of the PPP interface.

![Management - Analyser > Settings](image)

---

08-11-2011 10:45:11.490 -----
ASY 1 DCE to DTE:
F9 0F EF 25 41 54 2B 43 4F 50 53 3D 31 2C 32 2C y.o%AT+COPS=1,2,32 33 34 31 30 0D 4D F9 23415.My

---

08-11-2011 10:45:12.630 -----
ASY 1 DTE to DCE:
F9 0D EF 25 41 54 2B 43 4F 50 53 3D 31 2C 32 2C y.o%AT+COPS=1,2,32 33 34 31 30 0D 2C F9 F9 0D EF 0D 0D 0A 4F 4B 23415.,yy.o...OK 0D 0A 1A F9 ...

...y
### HARDWARE AND FIRMWARE DETAILS

#### 4.1 TransPort firmware versions

This is the firmware & hardware information from the unit used making this AN:

```
Command: ati5
Command result

Digi TransPort WR44-L500-NE1-SU Ser#:350462 HW Revision: 2202a
Software Build Ver5.2.13.4. Nov 20 2015 07:17:06 LW
ARM Bios Ver 7.56u v45 800MHz B995-M1003-F80-08140,0 MAC:00042d0558fe
Power Up Profile: 0
Async Driver              Revision: 1.19  Int clk
Wi-Fi                     Revision: 2.0
Ethernet Port Isolate Driver Revision: 1.11
Firewall                  Revision: 1.0
EventEdit                 Revision: 1.0
Timer Module              Revision: 1.1
(B)USBHOST                Revision: 1.0
L2TP                      Revision: 1.10
PPTP                      Revision: 1.00
TACPLUS                   Revision: 1.00
MODBUS                    Revision: 0.00
MySQL                     Revision: 0.01
RealPort                  Revision: 0.00
MultiTX                   Revision: 1.00
LAPB                      Revision: 1.12
X25 Layer                 Revision: 1.19
MACRO                     Revision: 1.0
PAD                       Revision: 1.4
X25 Switch                Revision: 1.7
V120                      Revision: 1.16
TPAD Interface            Revision: 1.12
GPS                       Revision: 1.0
TELITUPD                  Revision: 1.0
SCRIBATSK                 Revision: 1.0
BASTSK                    Revision: 1.0
PYTHON                    Revision: 1.0
CLOUDSMS                  Revision: 1.0
ARM Sync Driver           Revision: 1.18
TCP (HASH mode)           Revision: 1.14
TCP Utils                 Revision: 1.13
PPP                       Revision: 5.2
WEB                       Revision: 1.5
SMTP                      Revision: 1.1
FTP                       Revision: 1.5
FTP Client                Revision: 1.5
IKE                       Revision: 1.0
PollANS                   Revision: 1.2
PPPOE                     Revision: 1.0
BRIDGE                    Revision: 1.1
MODEM CC (SIERRA LTE)     Revision: 5.2
```
<table>
<thead>
<tr>
<th>Feature</th>
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