How to Configure Cisco Router 3G Cellular Connection

The cellular mobile network has evolved so much the last decades with improved coverage, speed and reliability. Therefore it is now possible to use the 3G/4G cellular mobile network as a reliable backup-up connection of your main connection line.

Cisco has several router devices that have either an embedded 3G/4G modem or a standalone HWIC (High-speed Wan Interface Card) that that can be attached to a modular router. Some of the routers currently in Cisco’s portfolio that are enabled for 3G connections are the following:

Cisco 881G-U
**Cisco 819G**

- Minimum IOS release: -15.3(G)M, recommend 15.3(G)M1
- Modern firmware releases:
  - FW v3.6.2 - WC7700 C4819-LTE-4G-V
  - FW v3.6.2 - WC7710 C4819-LTE-4G A
  - FW v3.6.19.4 - WC7700 C4819-LTE-4G G

**3G WAN interface Card**
Configuration

This tutorial will focus on the configuration of the 3G interface of Cisco 881G-U router.

The configuration below looks very similar with configuring old type dial-up modems. Those of us that have worked with these old-type modems will remember 😊.

**Step 1**: Configure a GSM profile, in this case 1. This command it is not done in configuration mode.

```
hostname#cellular 0 gsm profile create 1 [provider_APN] chap  username password ipv4
```

**NOTE**:  
For APN you must use the APN name provided by your cellular provider ex: internet, static, custom etc.  
For “username” and “password” you must use the credentials (if any) provided by your cellular provider.

**Step 2**: Configure the ATDT settings related to the created profile, in our case 1

```
hostname(config)#chat-script gsm "" ""ATDT*99*1#" TIMEOUT 30 "CONNECT"
```

**NOTES:**  
- On a 3G router you can define up to three 3G profiles with different APN names and credentials.  
- When using “ATDT*99*1#” you use the default profile (default is one). If you use “ATDT*98*2#” the IOS will choose the specified profile number, i.e #2
Step 3: Configure the cellular interface

```
interface Cellular0
ip address negotiated
encapsulation ppp
dialer in-band
dialer idle-timeout 0
dialer string gsm
dialer-group 1
async mode interactive
ppp chap hostname <username>
ppp chap password <password>
ppp ipcp dns request
```

**NOTE:** Username/password should be given by the mobile network provider.

Step 4: Configure the ACL for the dialer. This ACL defines the interesting traffic that will trigger the dialer.

```
access-list 1 permit any
dialer-list 1 protocol ip list 1
```

Step 5: Configure the line for 3G connectivity. You can execute “show line” first to see which one is used for your particular router model (in our case, line 3 is used).

```
line 3
exec-timeout 0 0
script dialer gsm
login
modem InOut
```
**no exec**

**transport input all**

**Verification Commands**

After you have applied the config above, you should have an IP address assigned by the provider.

### #show ip interface brief

<table>
<thead>
<tr>
<th>Interface</th>
<th>IP-Address</th>
<th>OK? Method Status</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellular0</td>
<td>172.17.100.100</td>
<td>YES IPCP</td>
<td>up</td>
</tr>
</tbody>
</table>

The following are some commands that can be used to verify or troubleshoot some aspects of the 3G connection. The output is pretty straight forward.

### #show cellular 0 network

- Current Service Status = Normal, Service Error = implicitly detached
- Current Service = Combined
- Packet Service = HSPA (Attached)
- Packet Session Status = Active
- Current Roaming Status = Home
- Network Selection Mode = Automatic
- Country = ROU, Network = Vodafone
- Mobile Country Code (MCC) = 226
- Mobile Network Code (MNC) = 5
- Location Area Code (LAC) = 7001
- Routing Area Code (RAC) = 120
- Cell ID = 10130
- Primary Scrambling Code = 219
- PLMN Selection = Automatic
- Registered PLMN = , Abbreviated =
- Service Provider = Vodafone
# show cellular 0 hardware

Modem Firmware Version = K2_0_7_44AP C:/WS/FW
Modem Firmware built = 09/10/10
Hardware Version = 1.0
International Mobile Subscriber Identity (IMSI) = 226050120154488
International Mobile Equipment Identity (IMEI) = 354226045216093
Integrated Circuit Card ID (ICCID) = 8940051108090544881
Mobile Subscriber International Subscriber IDentity Number (MSISDN) =
Factory Serial Number (FSN) = C9A290214351009
Modem Status = Online
Current Modem Temperature = 62 deg C, State = Normal
PRI SKU ID = 9993456, SKU Rev. = 1.3

# show cellular 0 connection

Data Transmitted = 119503320 bytes, Received = 123091979 bytes
Profile 1, Packet Session Status = ACTIVE
  IP address = 172.17.100.100
  Negotiated QOS Parameters:
  Precedence = High Priority, Delay = Class 4
  Reliability = Unack GTP, LLC, Ack RLC, Protected data
  Peak = 256 kB/sec, Mean = 50000 kB/hr
  Traffic Class = Background
  Uplink Max = 11.5Mbps, Guaranteed = Subscribed
  Downlink Max = 16Mbps, Guaranteed = Subscribed

# show cellular 0 radio

Radio power mode = ON
Current Band = WCDMA 2100, Channel Number = 10589
Current RSSI = -100 dBm
Band Selected = Auto
Number of nearby cells = 2
Cell 1
Primary Scrambling Code = 0xDB
RSCP = -103 dBm, ECIO = -11 dBm  < - this output is important because it shows the signal strength and quality

Cell 2
Primary Scrambling Code = 0x8C
RSCP = -105 dBm, ECIO = -15 dBm

If needed you can reset the cellular modem without resetting the router

```
hostname(config)# service internal
hostname (config)# exit
hostname # test cellular 0 modem-power-cycle  < ------ for rebooting
hostname # test cellular 0 modem-reset  < -------------- for resetting
```

Debugging can be done by issuing the following commands

```
debug chat
debug modem
debug dialer
debug ppp negotiation
debug ppp authentication
```

Some notes regarding the usage of the cellular interface:

- The cellular interface will not come up if there is no traffic across it, so if this connection is used for back-up you have to generate some traffic through the cellular interface. You can route a class and generate a ping, it is not required to have reply, just to send packets.
- If you have a GRE tunnel configured through the cellular network be sure to route the end point of the GRE tunnel through the cellular interface, otherwise the tunnel will be down because the router detects recursive routing.
- If you use the 3G connection for back-up with a GRE tunnel and a routing protocol enabled I have found out that in some cases the cellular interface will “loose” the IP address because there is no traffic over the link (the hello messages of the routing protocol will not help) and because of this I recommend using IPSLA to generate traffic over the link so it is always up.

```
ip route 8.8.8.8 255.255.255.255 Cellular0
ip sla 1
  icmp-echo 8.8.8.8 source-interface Cellular0
  threshold 1000
  timeout 1000
  frequency 1
  ip sla schedule 1 life forever start-time now
```

About the Author

Harris Andrea is a Cisco Certified Professional with more than 18 years of experience working with Cisco network technologies. He is the author of two Cisco Books (“Cisco ASA Firewall Fundamentals” and “Cisco VPN Configuration Guide”) which have been embraced by thousands of Cisco professionals all over the world. You can find more Cisco configuration guides and tutorials on his blog here [http://www.networkstraining.com](http://www.networkstraining.com)