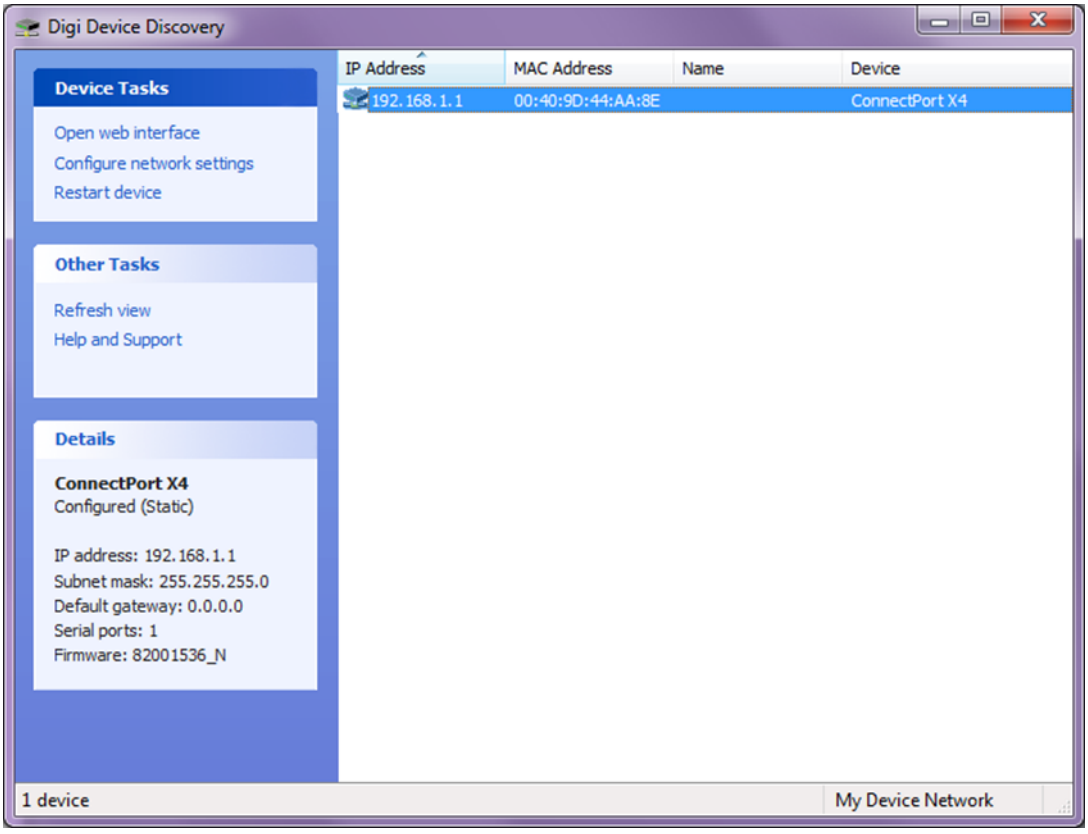
How to Program A Cellular Gateway

Version Notes:

- New gateway driver files: dia.yml and dia.zip.
- Supports Sleep Network.
- Updated gateway firmware version 2.17.6.4 (82001536_R1.bin)
- Firmware prevents bug to disable Verizon CDMA
- Digimesh Network works for agrisensors.net ONLY.

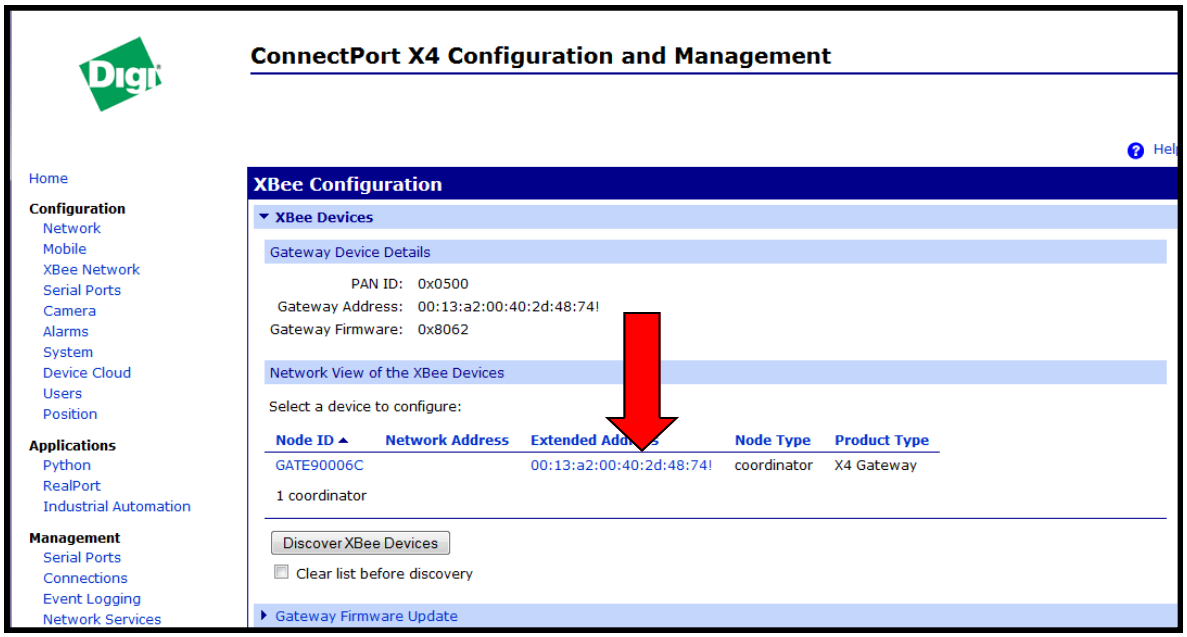
1. Discovery Gateway:

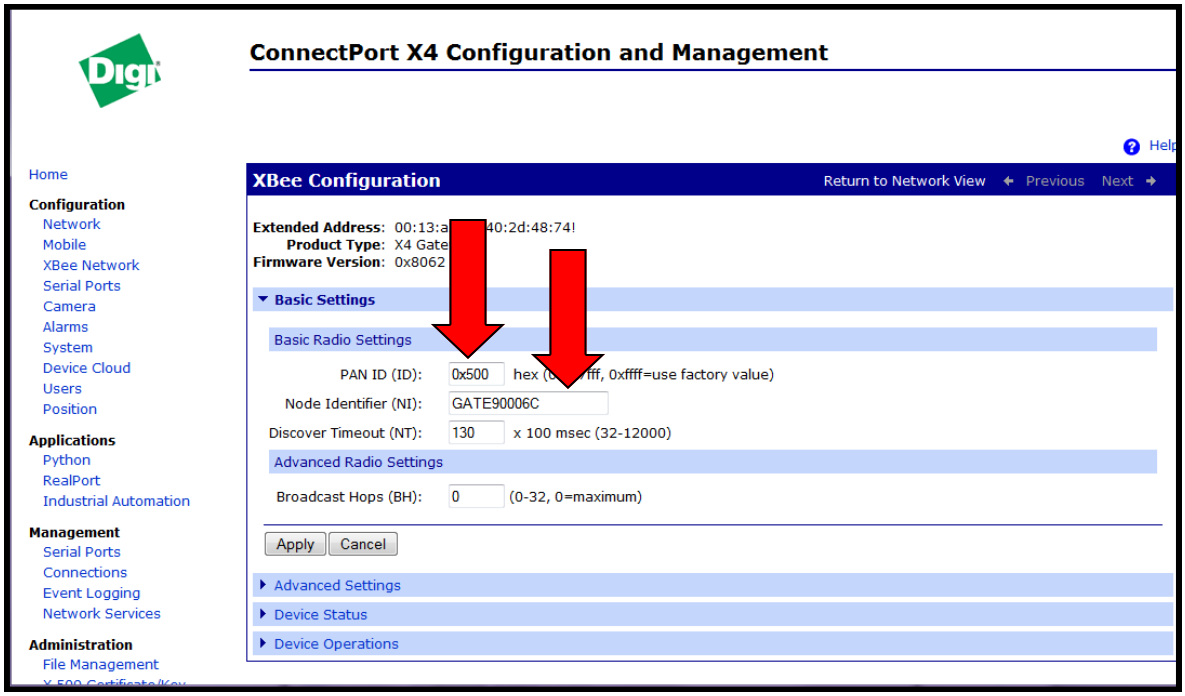
1) Connect gateway to your PC using a LAN network cable labeled as “CROSSOVER”. Power up gateway and wait for one minute.
2) Double click on Device Discovery shortcut on your desktop. You may download the program **here**.
3) Click “Refresh View” under “Other Tasks”.
4) Within 30 seconds, an IP address of 192.168.1.1 will appear in the list with device’s MAC address.
5) Select the IP then click “Open web interface” from “Device Tasks”.



2. XBee Configuration:

1) Go to “Configuration” - “XBee Network” - “XBee Devices”.
2) Click on “Extended Address” to go to “Basic Settings”.
3) Change PAN ID to “0x500” (0x400 for 2.4 GHz gateway).
4) Declare Node Identifier “Gate90xxxC” (24xxxC for 2.4 GHz gateway).

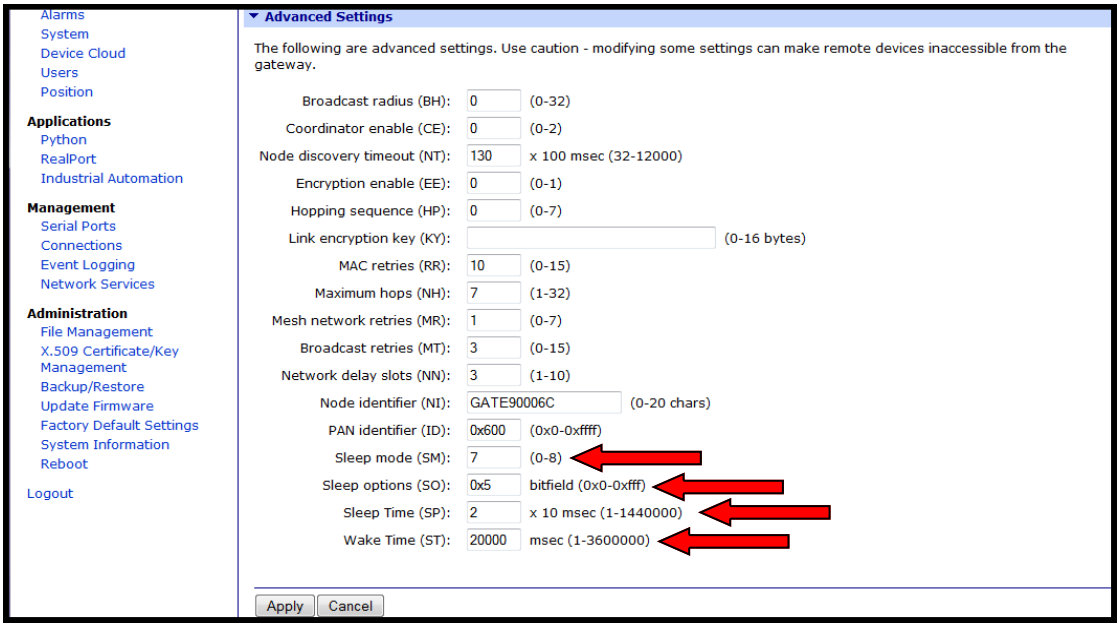




2. Xbee Configuration (Continued):

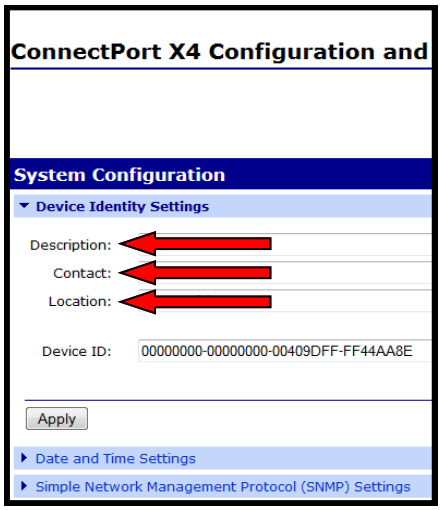
1) Stay on “XBee Configuration” and go to “Advanced Settings”.

2) Change Sleep Mode = 7, Sleep Option = 0x5, Sleep Time = 2 (x10 ms), Wake Time = 20000 (ms).



3. System Configuration:

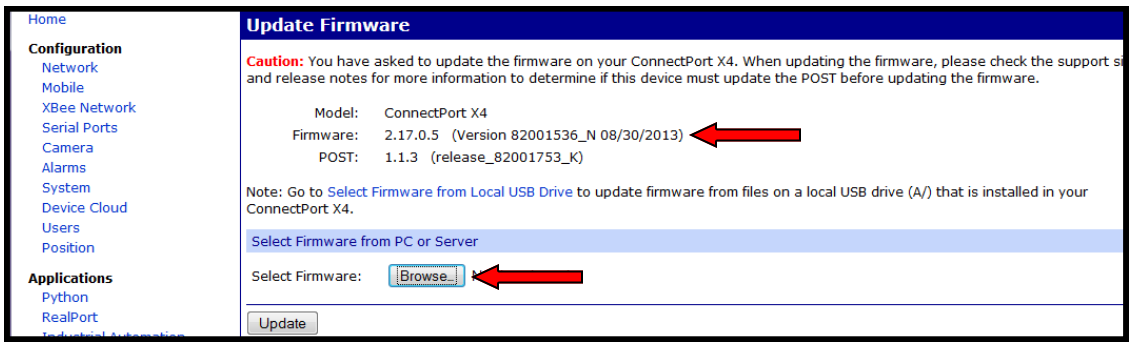
1) Go to “Configuration” - “System”.
2) Update “Device Identity Settings” with new description, contact, location.
3) Stay on “System Configuration” page and go to “Date and Time Settings”.
4) Set local “offset from UTC” and click “Apply”.
5) Set “Time Source Settings” with 4 different national clock servers. Click “Apply” when done.
    - Sntp server—on—10—60—0.time.devicecloud.com
    - Sntp server—on—20—3600—0.idigi.pool.ntp.org
    - Sntp server—on—100—3600—my.idigi.com
    - Sntp server—on—10—86400—uncnist2.colorado.edu
    - Sntp server—on—100—60—time.nist.gove

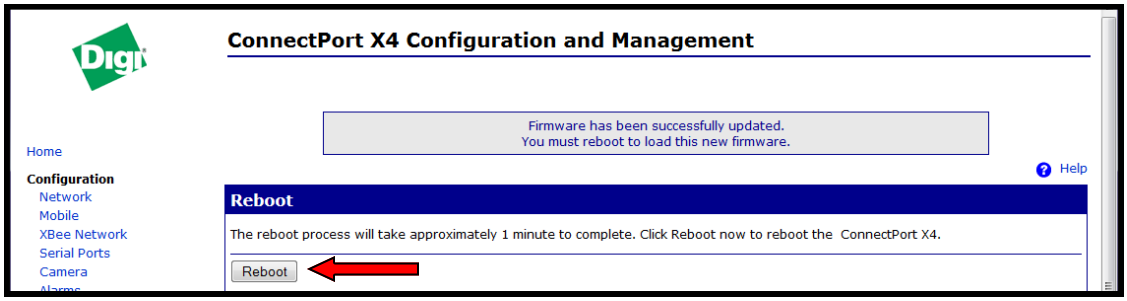


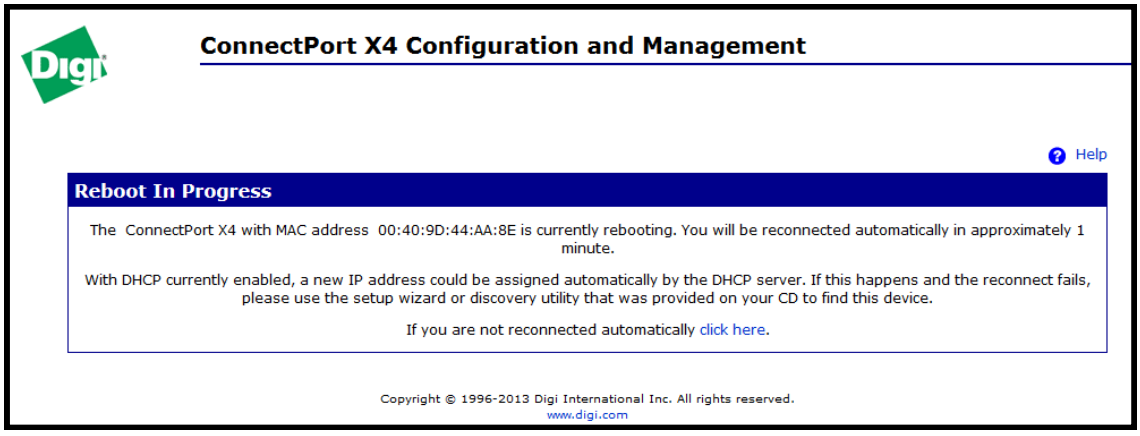
Index	Type	State	Ranking	Interval	FQDN
1	sntp server	on	10	60	0.time.devicecloud.com
2	sntp server	on	20	3600	0.idigi.pool.ntp.org
3	sntp server	on	100	3600	my.idigi.com
4	sntp server	on	10	86400	utcnist2.colorado.edu
5	sntp server	on	100	60	time.nist.gov
	real-time clock	on	50	n/a	n/a

4. Gateway Firmware Update:

1) Go to “Administration” - “Firmware Update” and check current firmware version.
2) If Firmware: 2.17.6.4 presents, skip Step 4. If not, click on “Browse” and locate the firmware file on your PC. You can download the file **here**. Click on “Update”.
3) This will take approximately one minute to complete.
4) Reboot is required after updating firmware successfully. It will take approximately one minute for the gateway to reboot and configuration page will be refreshed automatically.

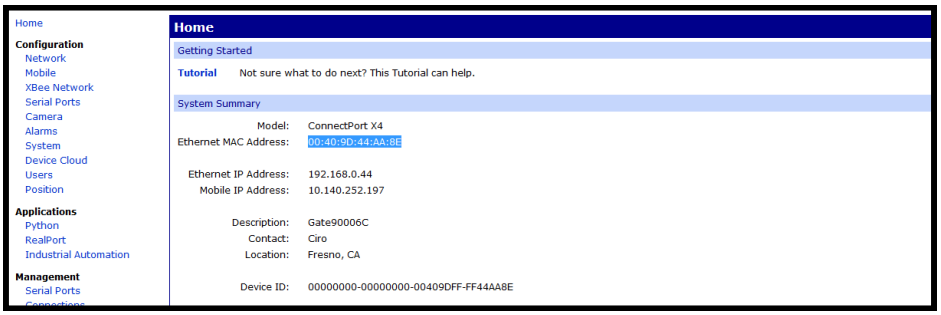


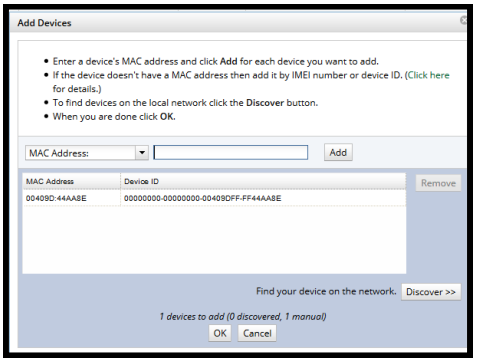


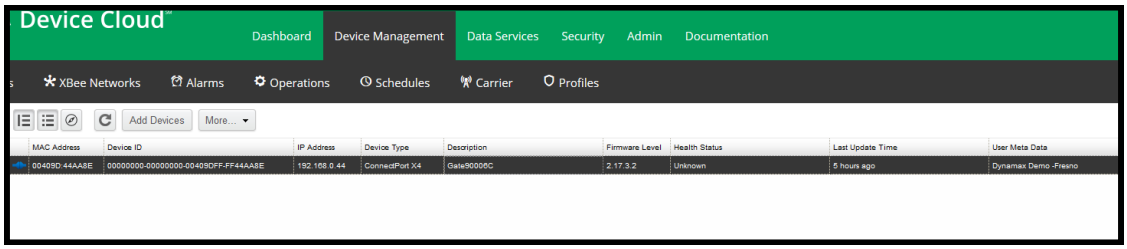


5. Add Gateway to Digi Device Cloud Server:

1) Browse to my.idigi.com and login.
2) Under “Device Management”, click “Add Device” and copy/paste in the MAC address located at home page of Device Discovery.
3) Add the MAC to the list and click “OK”.
4) Gateway is added to Device Cloud Server.

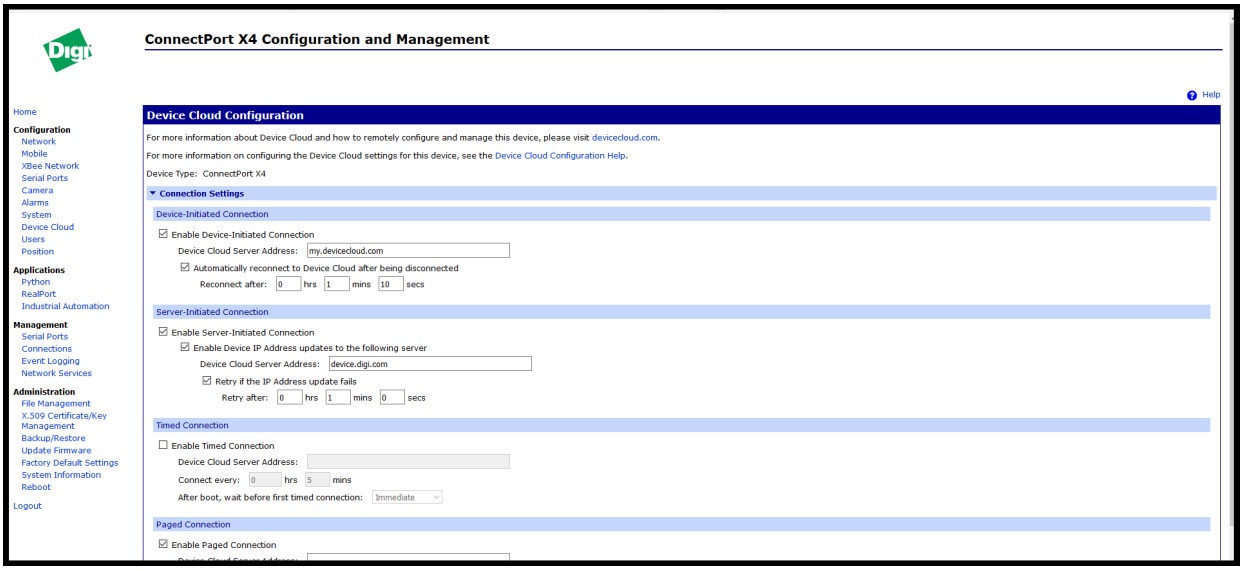


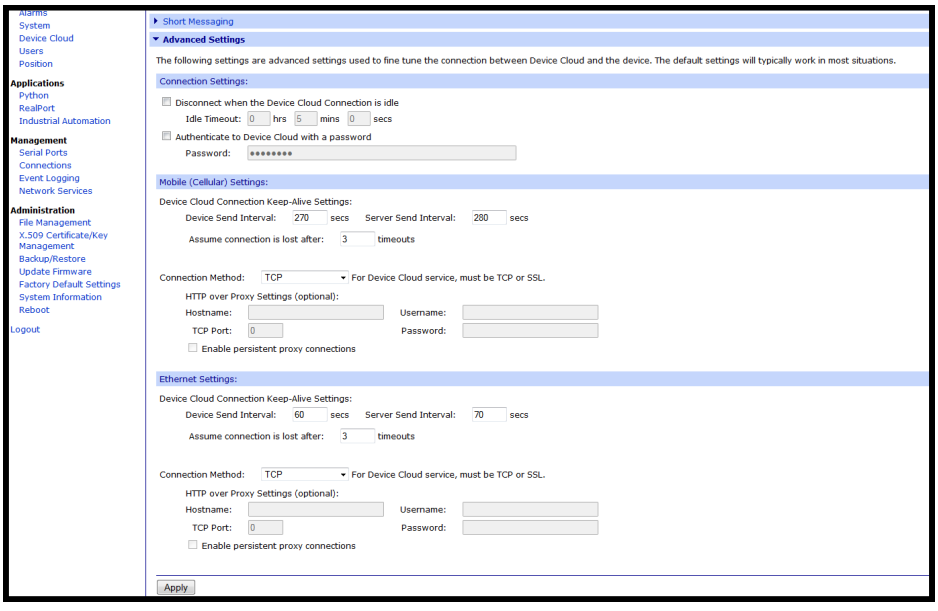




6. Cloud Server Setting:

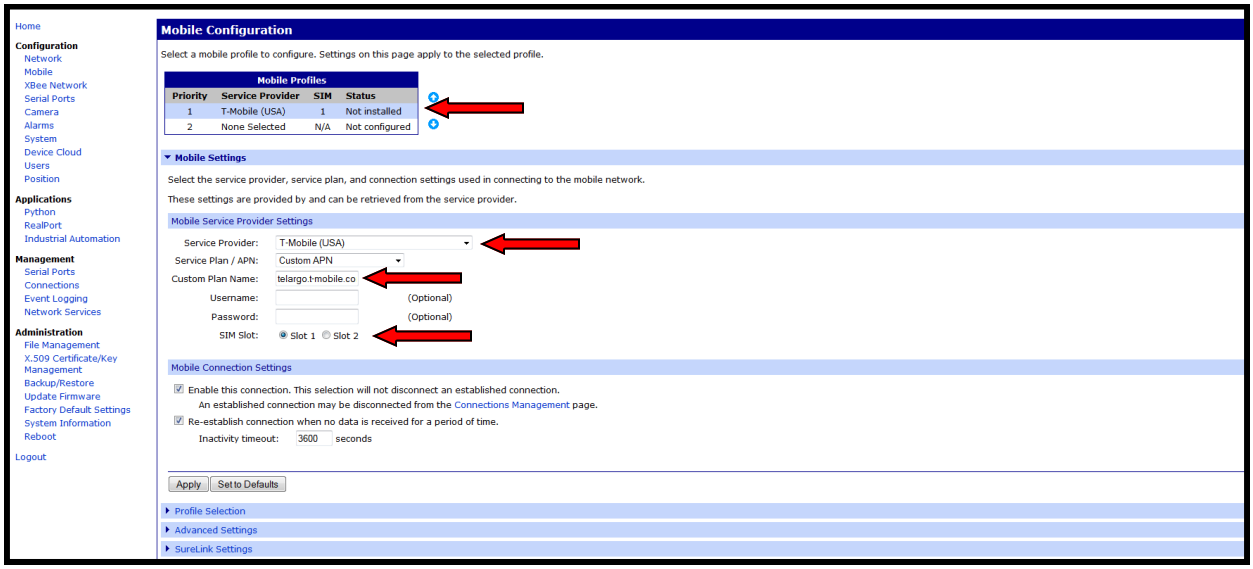
1) Go to “Configuration” - “Device Cloud” - “Connection Settings”.
2) Under “Device-Initiated Connection”, check “Enable Device-Initiated Connection”.
3) Type “my.devicecloud.com” in “Device Cloud Server Address”.
4) Check “Automatically reconnect to Device Cloud after being disconnected” and update Reconnect time to 0 hrs 1 mins 10 secs. Click “Apply”.
5) Go to “Advanced Settings” - “Mobile (Cellular) Settings.
6) Change “Connection Method” to “TCP”. Change “Device Cloud Connection Keep-Alive Settings” to “Device Send Interval” 270 secs, “Server Send Interval” 280 secs.
7) Go to “Ethernet Settings”. Change “Connection Method” to “TCP”. Change “Device Cloud Connection Keep-Alive Settings” to “Device Send Interval” 60 secs, “Server Send Interval” 70 secs.

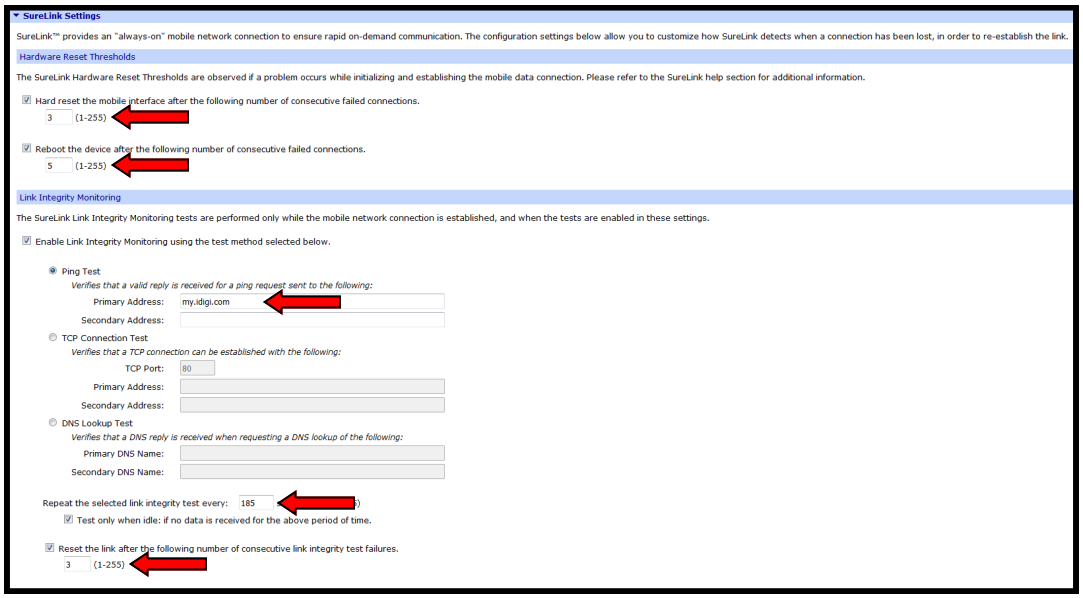




7. Mobile Settings:

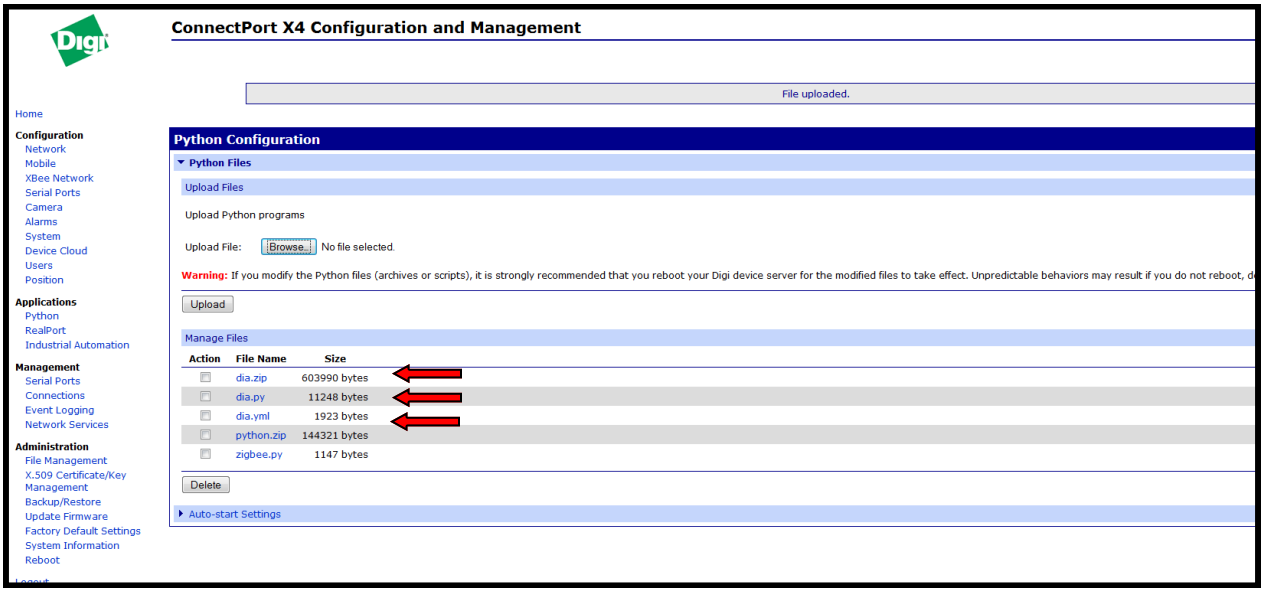
1) Go to “Configuration” - “Mobile” - “Mobile Settings”.
2) Under “Mobile Service Provider Settings”, select “SIM Slot” - Slot 1. “Service Provider” set to “T-Mobile (USA)”. Under “Custom Plan Name”, type in “telargo.t-mobile.com”. Click “Apply”.
3) Note: Verizon Wireless service requires “Provision Device” to activate the gateway cellular service which may take several days to complete.
4) Stay on “Mobile Configuration”, go to “SureLink Settings”. Under “Hardware Reset Thresholds”, check both selections, and set hard reset to 3 and reboot to 5.
5) Under “Link Integrity Monitoring”, check “Enable Link Integrity Monitoring…” and select “Ping Test” to “my.idigi.com”.
6) Set “Repeat the selected link integrity test every: 185 seconds. Check both selections below and set the reset after test failures to 3.

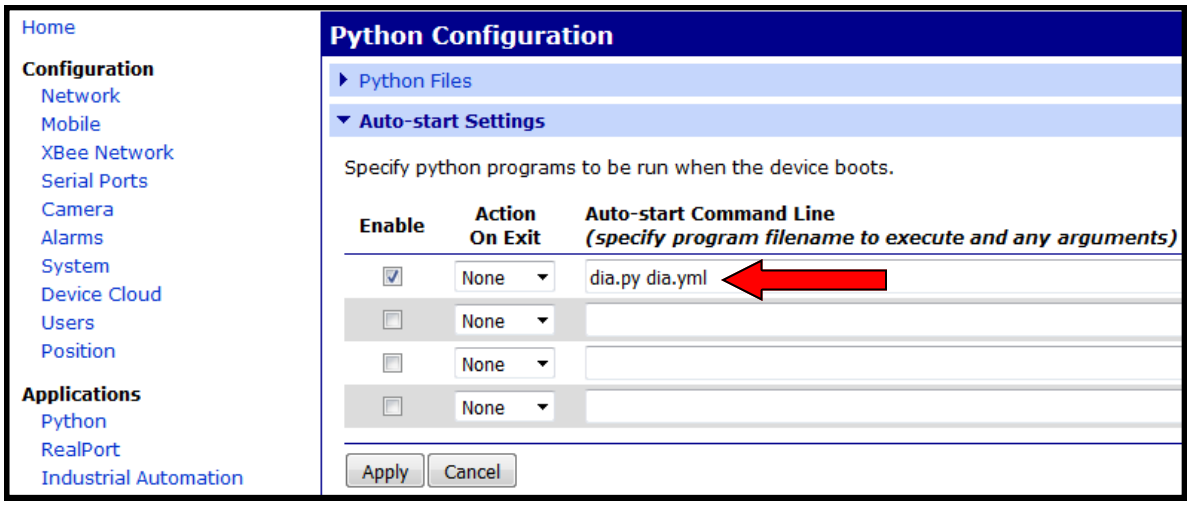




8. Load Gateway Driver:

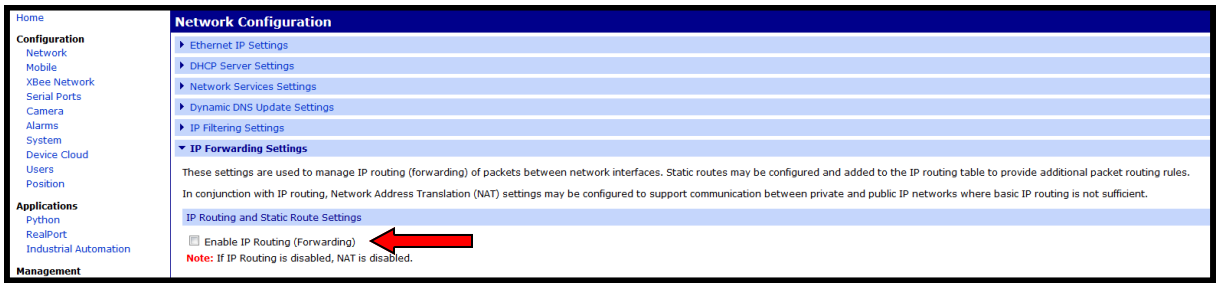
1) Go to “Application” - “Python” - “Python Files”.
2) Browse and Upload “dia.py”, “dia.yml”, “dia.zip”.
3) Note: use version 3.8 driver files.
4) Stay on “Python” and go to “Auto-start Settings”.
5) Check 1st selection and type in “dia.py dia.yml” (Note: there is a space between dia.py and dia.yml).
6) Click “Apply”.

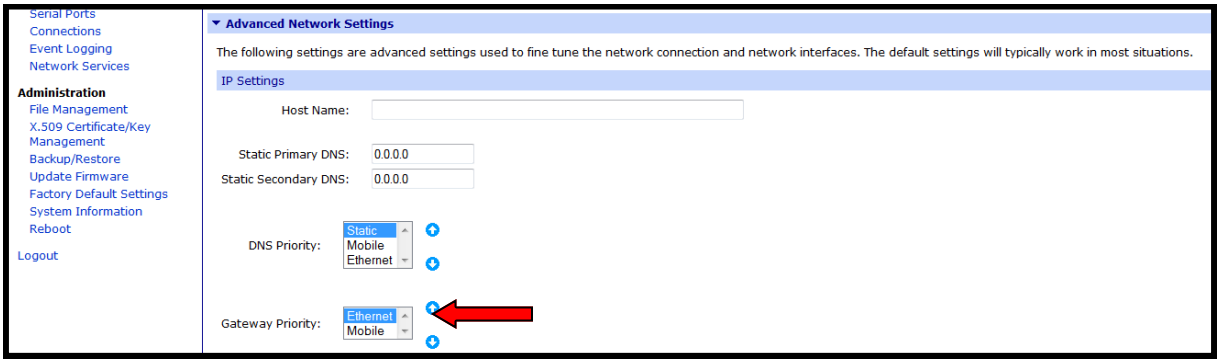


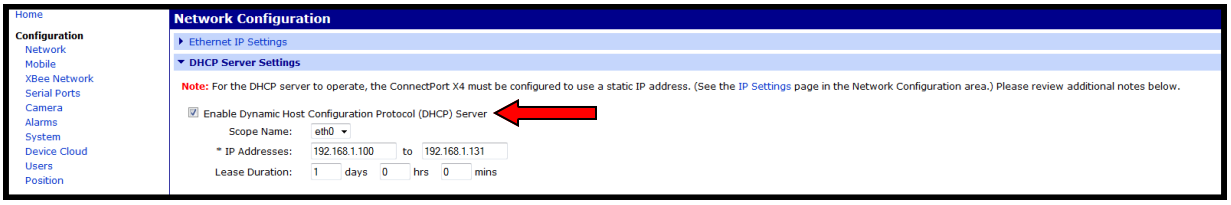


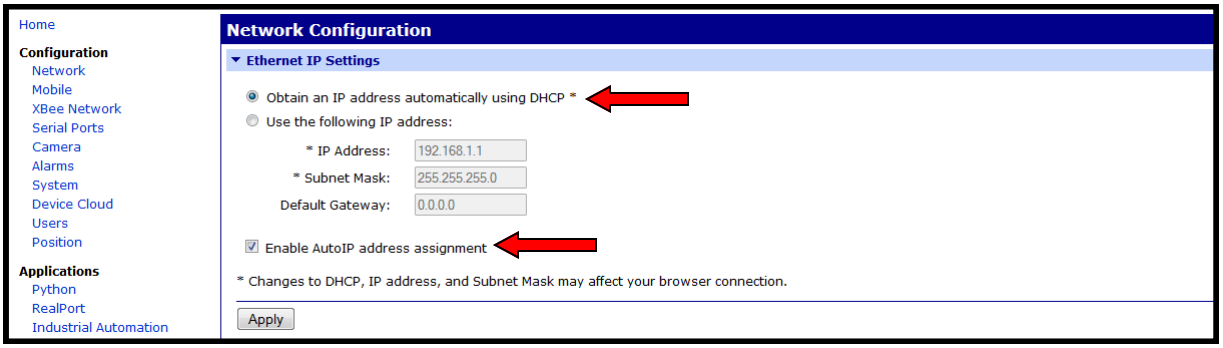
9. Network Configuration:

1) Go to “Configuration” - “Network” - “IP Forwarding Settings”.
2) Uncheck “Enable IP Routing (Forwarding)”. Click “Apply”.
3) Stay on “Network Configuration”, and go to “Advanced Network Settings”.
4) Under “Gateway Priority”, select “Ethernet” and click “Apply”.
5) Stay on “Network Configuration”, and go to “DHCP Server Settings”.
6) Check selection “Enable DHCP Server”. Click “Apply”.
7) Stay on “Network Configuration”, and go to “Ehternet IP Settings”.
8) Change to “Obtain an IP address automatically using DHCP”, and check selection “Enable AutoIP address assignment”. Click “Apply”. Note: After this step, the gateway will be reconfigured for its new network setting and will require reboot.







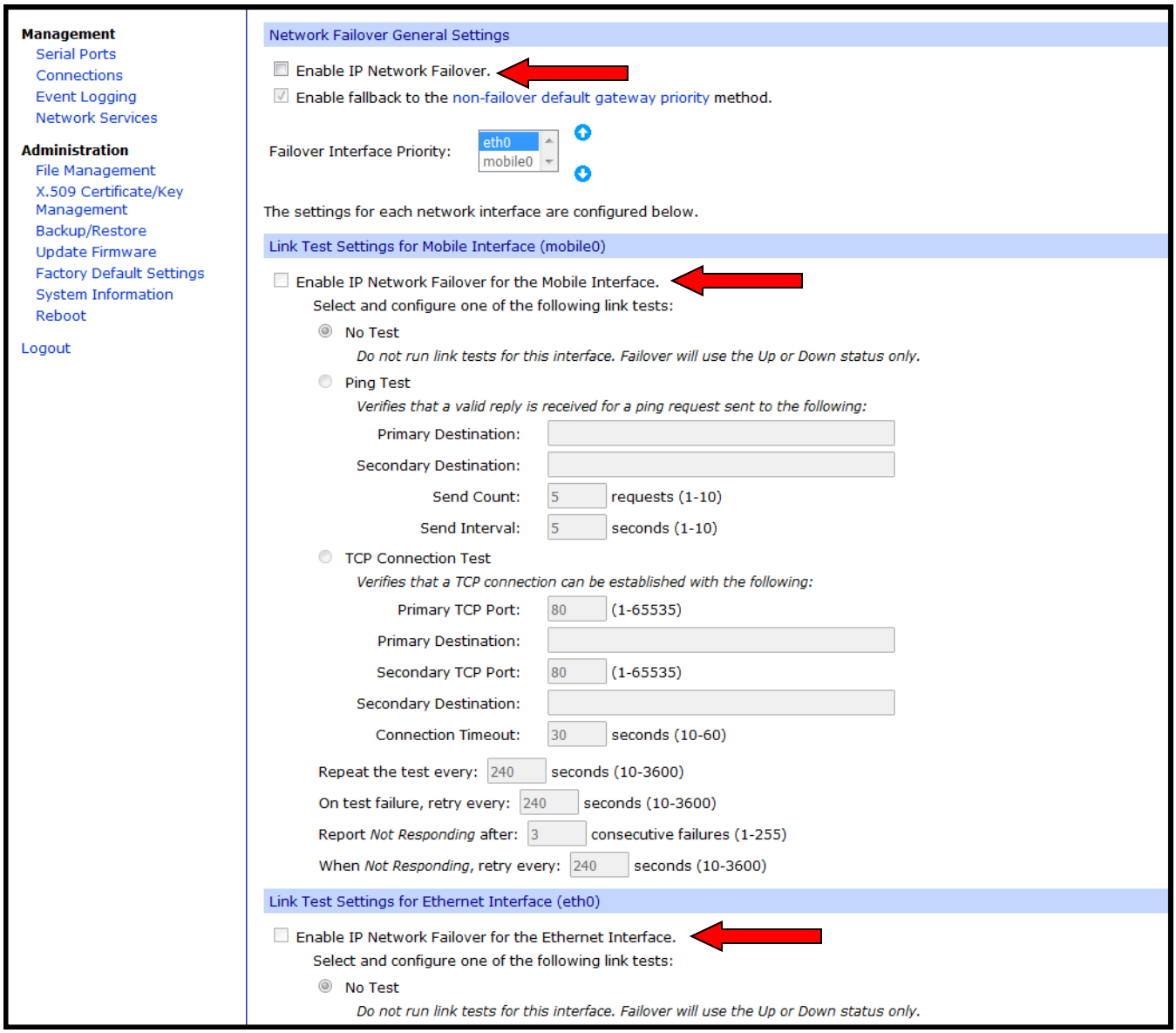


9. Network Configuration (continue):

9) Go to “Configuration” - “Network” - “IP Network Failover Settings”.

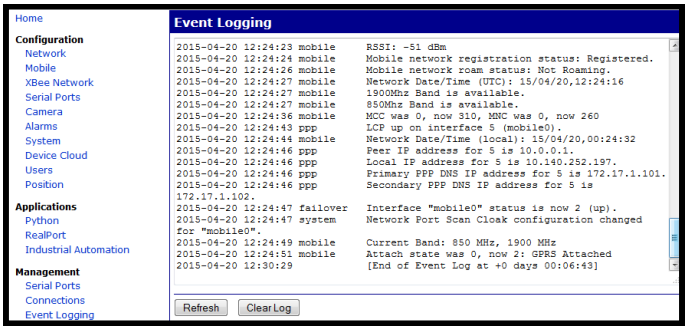
10) Uncheck “Enable IP Network Failover”. Click “Apply”.

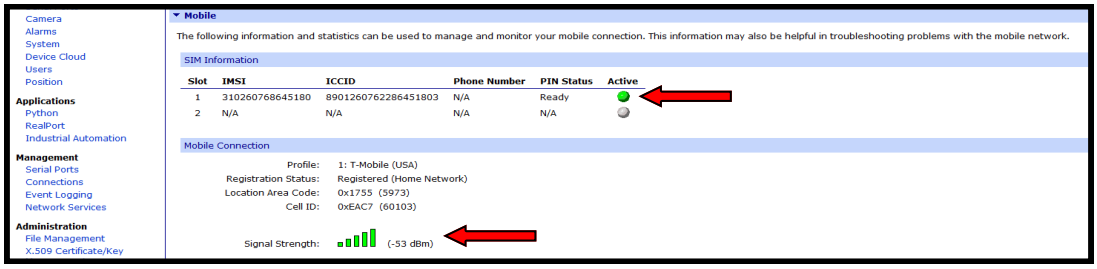
11) Under Link Test Settings, both Mobile and Ethernet Interface should be unchecked as well.

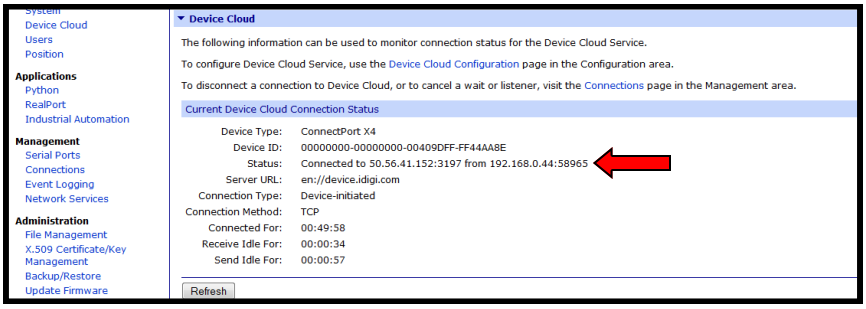


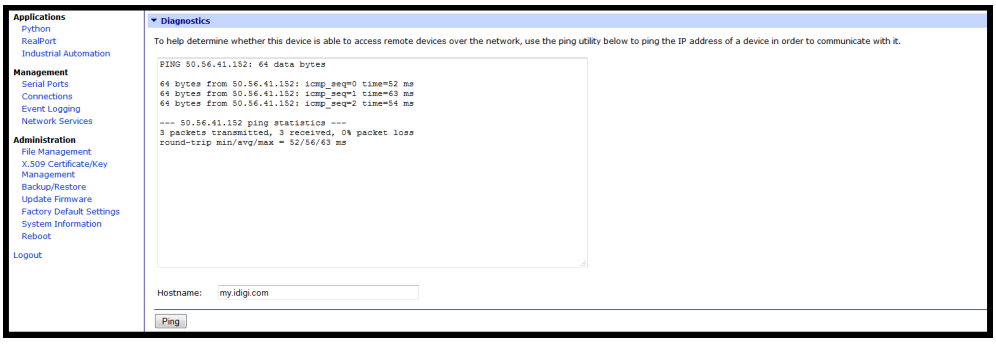
10. Operation Verification:

1) Unplug gateway from your computer and connect it to local LAN network.
2) Go to “Management” - “Event Logging” and monitor the cellular network registration.
3) Insert SIM card into Slot 1 and connect Cell Antenna (Included in the package box) to the gateway.
4) Go to “Administration” - “System Information” - “Mobile” and check Cellular Signal Strength.
5) Stay on “system Information”, go to “Device Cloud”. Check “Status”.
6) Stay on “system Information”, go to “Diagnostics”. Type in “my.idigi.com”, click Ping. All 3 packets transmitted should be received and 0% packet loss. This confirms the system is up and running.



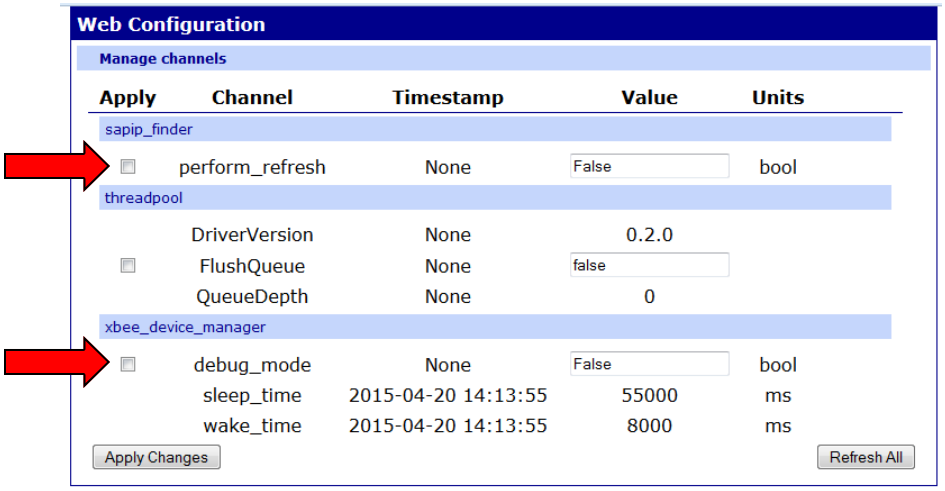






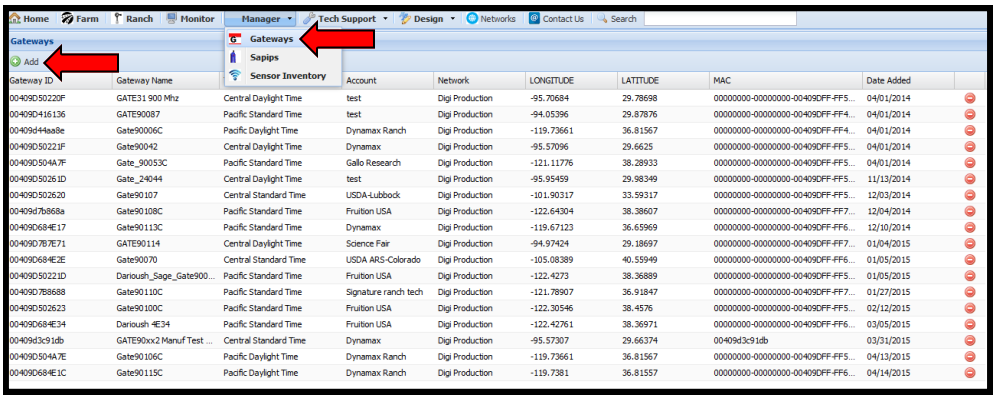
11. Dia Presentation Page:

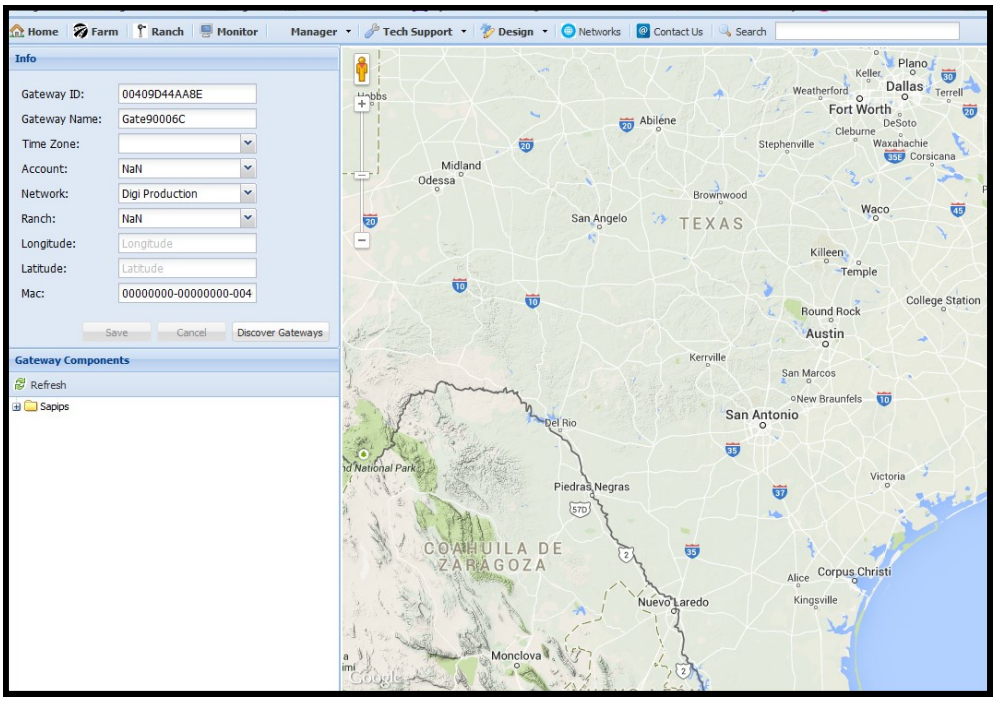
1) Make sure gateway started at least 15 minutes and dia drivers are running.
2) **Remove SIM card from the gateway and wait for 2 minutes.**
3) Type in “http://192.168.0.44/idigi_dia.html” in the browser where “192.168.0.44” is the Ethernet IP address of the gateway.
4) Check “debug_mode” and change value to “TRUE”. Click “Apply Changes”. This is to change sleep network to awake status in order to issue commands.
5) Check “perform_refresh” and change value to “TRUE”. Click “Apply Changes”. This is to issue awake command to the entire network in order to wake up all SAPIP nodes.
6) Wait for as many as 2 munites for the entire network to be awake before issuing commands.



12. Agrisensors.net:

1) Browse to web address “72.52.168.29” and login.
2) Go to “Manage” - “Gateways”. Click “Add” to add new gateway to the list.
3) Select Network “Digi Production” and click “Discover Gateways”.
4) In the popup window, select the new gateway added to Digi Cloud Server then click “Select”.
5) Choose “Time Zone”, “Account”, “Ranch”, and GPS coordinates. Click “Save”.

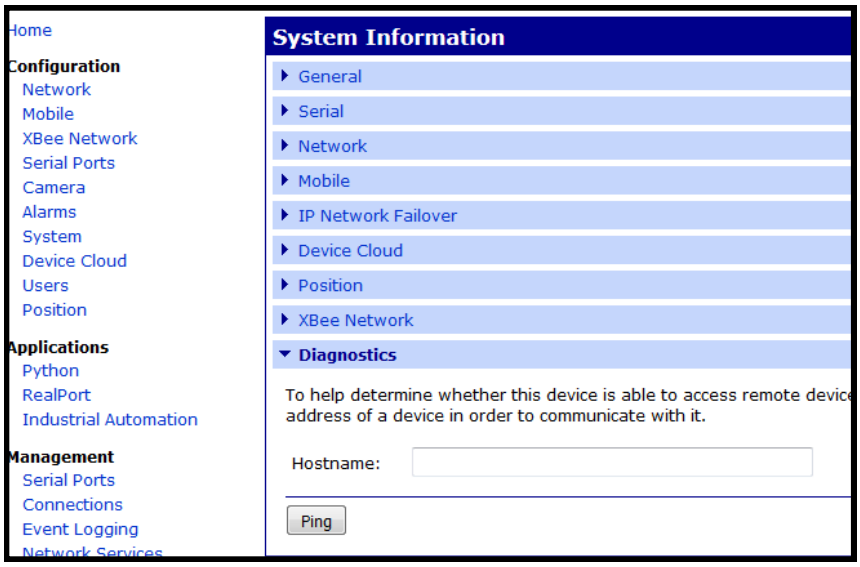




13. Diagnose the Gateway Locally:

1) Use Device Discovery tool to access the gateway.

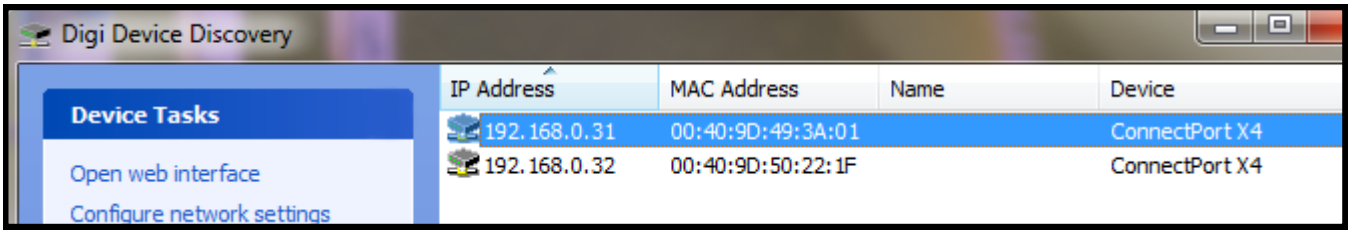
2) Go to Administration—System Infor—Diagnostics to ping a website from the gateway.

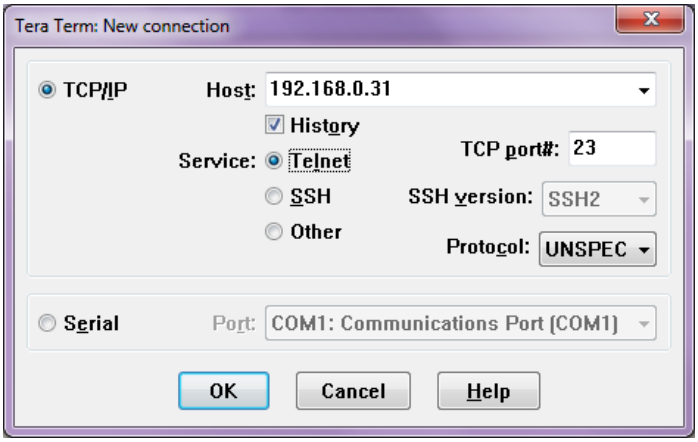


3) Use TeraTerm to access the gateway.

4) Start TeraTerm program, choose “TCP/IP”, select “Telnet”, type in host IP address (obtain this address from Digi Device Discovery), use TCP port #23. Click “OK” button.

5) To display network list, type “Display Xbee”. To display gateway setting, type “Display Xbee Address”. To ping SapIPs, type “xbee ping sapipxxxxx” (or repipxxxxx for repeaters).



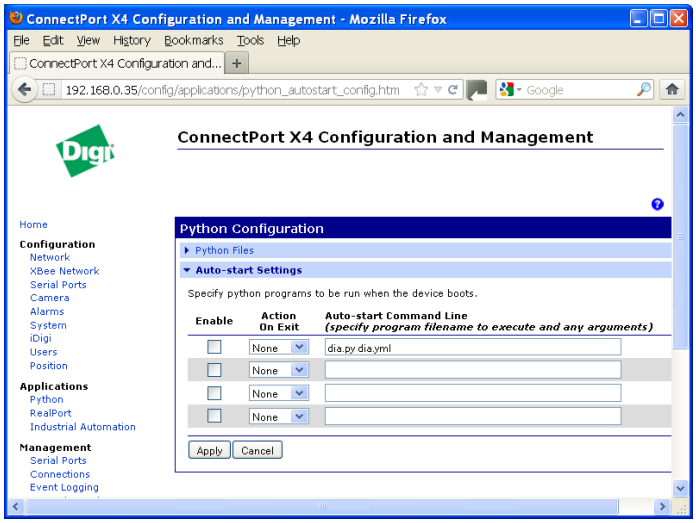


Telnet to debug the Gateway with Trace on the SapIP Driver.

This information was on the original 3.4 release, and now it is repeated to ensure that two debug screens are available, ONE ON TERATERM, AND ONE ON THE sapip Driver:

Update the firmware, but make sure that no previous python is running to do this.

You MUST uncheck the autostart, under python and **reboot the Gate.**



Use the file upload under Python to upgrade or load the latest SapIP drivers, dia.zip. Dia.py, Dia.yml (does not change very often, but in this case we need to update).

Reboot to change all settings, and reload the software.

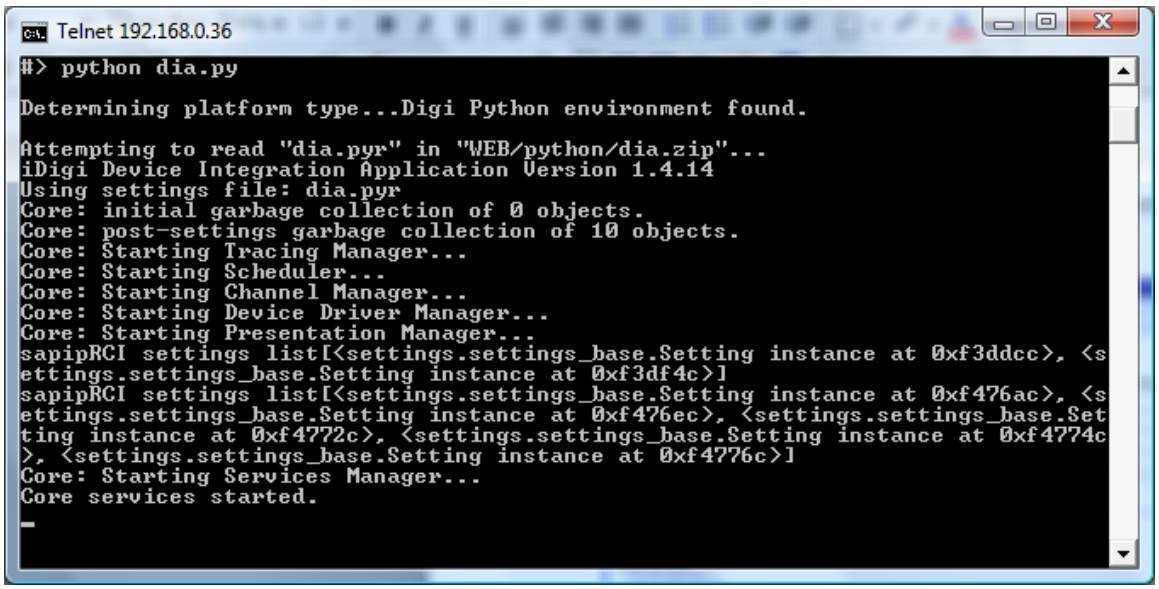
Look up your ip address. Bring up a DOS console, or use the run cmd line . Or use the TeratERM, and set the port to IP address / Port 23

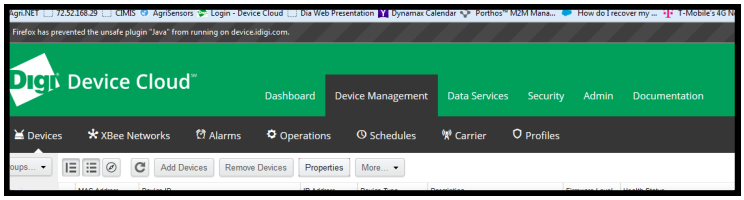
Telnet 192.168.0.xx 23

After prompt #> python dia.py dia.yml

----- will start the application

If you need to do debug or want to watch progress of the device driver. You must start with a telner session, and





14. Diagnose the Gateway Remotely:

1) Log in to Digi Device Cloud Server, device.idigi.com.
2) Navigate to “Device Manager” - “Devices”.
3) Locate the gateway by searching for gateway name or MAC address,
4) Highlight the gateway and click on “Properties”.
5) Navigate to “Command Line Interface”.
3) To display network list, type “Display Xbee”.
4) To display gateway setting, type “Display Xbee Address”.
5) To ping SapIPs, type “xbee ping sapipxxxxx”

(or repipxxxxx for repeaters).