Raspberry Pi Cirrig Installation Guide

1. Install rpi OS:
   - http://qdosmsq.dunbar-it.co.uk/blog/2013/06/noobs-for-raspberry-pi/
   - Download NOOBS .zip file
   - If necessary, format micro SD card and create FAT32 partition (usually not).
   - Unzip NOOBS onto SD card and unmount SD card
   - Insert mircoSD card into pi, connect keyboard, mouse, ethernet, monitor, and lastly power.
   - From the OS menu, select Raspbian OS to install
2. Configure Raspbian and install additional software
   - > passwd
     - Change password using the passwd command. It will ask you to confirm the current (default) password of raspberry then will ask you to enter a new password and confirm it.
   - > sudo apt-get update
     - update repositories using this command
   - Download weewx – open the web browser, do a search for "weewx", click on the Weewx home page. Click on Download and then download the .deb file listed. Current version (9/23/16) is 3.5. It will be saved to your Downloads directory.
   - > sudo dpkg -i Downloads/weewx_3.5.0-1_all.deb
     - You will have a blue screen pop up to ask you for a location name (default Santa's Workshop, North Pole), longitude and latitude, elevation, and weather station type (use Simulation if not hooked up to anything at the moment, Vantage otherwise).
     - It will then fail to install due to dependency issues but these will be resolved momentarily.
   - > sudo apt-get install python-configobj python-cheetah python-pil python-usb
     - This will install the listed packages and weewx
   - > sudo apt-get install subversion tcsh vim vim-runtime telnet ntpdate sqlite3 mysql-common mariadb-client mariadb-server apache2 python-numpy python-scipy python-pyfits python-pip
     - Hit 'y' and enter to confirm. This will install numerous packages.
     - It will also ask you for a root password for mysql. Use the same password as the login password.
   - > sudo apt-get install vim vim-common vim-syntax-gtk
     - This will install a few additional packages (used for programming). Hit 'y' and enter to confirm.
   - > nano .cshrc
     - This uses the "nano" editor to create a file .cshrc which is a global configuration file. Paste the following into the file and then hit CTRL+x to save. Hit 'y' and enter to confirm and then enter again to accept the filename as .cshrc.

```
setenv BMPINSTALL /home/pi/bmpinstall
setenv UFMMTINSTALL /home/pi/bmpinstall
set autolist on

if (-e ${BMPINSTALL}/.ufcshrc) source ${BMPINSTALL}/.ufcshrc
set os = `/bin/uname`
```

alias ls 'ls --color=auto'
alias grep 'grep --color=auto'
alias fgrep 'fgrep --color=auto'
alias egrep 'egrep –color=auto'

- > nano .vimrc
  - Again use the nano editor to create a file .vimrc, which is a configuration file for the vim text editor. Paste the following into the file and then hit CTRL+x to save. Hit ‘y’ and enter to confirm and then enter again to accept the filename as .vimrc

syntax on

- > sudo nano /etc/hosts
  - Again use the nano editor, this time to edit the file /etc/hosts. Change raspberrypi in the line starting 127.0.0.1 to whatever you want the host name to be, e.g. pi-uf, pi-battery, pi-ctlf.
  - Hit CTRL+x to save, then confirm and accept the filename as /etc/hosts.
- > sudo nano /etc/hostname
  - Again use the nano editor, this time to edit the file /etc/hostname. Change raspberrypi to the same hostname you selected in the previous step.
  - Hit CTRL+x to save, then confirm and accept the filename as /etc/hostname.
- > sudo /etc/init.d/hostname.sh
  - This causes the changes you just made to take effect. Don’t worry if you see the message “sudo: unable to resolve host raspberrypi”
- Click on the menu => Preferences => Raspberry Pi Configuration. Then select the Localization tab. Click “Set Locale” and change the country to US. Click “Set Timezone” and change the Area to US and Location to Eastern. Click “Set Keyboard” and set Country to US and Variant to English (US) (you might have to scroll up to see that entry at the top). Click “Set Wifi Country” and select US.
- Click OK and it will prompt you that a reboot is necessary for the changes to take effect. Click Yes to reboot now.

3. After reboot, install BMPToolbox software
   - > tcsh
     - Enter tcsh mode. You’ll see the prompt change. You can type
       - > echo $BMPINSTALL
     - and you should see it reply /home/pi/bmpinstall. If so, you have your .cshrc file correct.
   - > svn checkout svn+ssh://mybmp@bmptoolbox.org/home/mybmp/svn/bmpRCS
     - This will check out the BMPToolbox software to the directory /home/pi/bmpRCS. You may need to type the whole word ‘yes’ and hit enter to confirm and then you will need to enter the server password twice. You will see a list of files that are checked out.
   - > cd bmpRCS
     - Change into the bmpRCS directory
   - > make init
     - Perform setup for install
   - > make install
     - Perform the actual install. This will take a couple of minutes.
   - > source .ufcshrc
   - > rehash
     - Make Linux see all the new software that has been installed

- > ufbmpstop -l
  - Test if everything installed properly. If so, you will get “Currently running agents and servers: UID PID PPID C STIME TTY TIME CMD” spread across 2 lines. If not, you will get “ufbmpstop: Command not found.”

4. Configure BMPToolbox software
   - > cd /home/pi/bmpRCS/scripts/
   - > ./patchWeewx.sh
     - These two command will change directories and then run the script that patches the weewx startup script to only start if the internet is connected.
   - > mkdir /home/pi/bmplogs
     - Create directory for log files
5. Set up a weather station
   - If starting a new weather station config on an existing pi, make sure you are using tcsh as your shell and stop any currently running weewx by typing
     - > tcsh
     - > sudo service weewx stop
   - If configuring a new weather station on an existing pi, run the weewx config tool. Note: this can be skipped if you entered the station name, longitude, latitude, type, etc when installing weewx in section 2.
     - > sudo wee_config --reconfigure
       You will be prompted for a name for the weather station (e.g. CLTF), then an altitude (number then a comma then units, e.g. 30, meter). Then you'll be asked for longitude and latitude, us or metric units (us), and finally the driver to use. Select the number next to Vantage. You will also select the default port - /dev/usb0.
     - > sudo wee_device --set-interval=300 will set the default interval to 300 seconds (5 minutes) if it is set to a different value.
   - Start weewx:
     - > sudo service weewx start
       Then wait until the next 5 minute interval has finished and check that it is working:
     - > sudo service weewx status
       If its working, the message should have the status as running and should list “manager: added record” at the most recent 5 minute interval:
       pi@pi-uf:~ $ sudo service weewx status
       ● weewx.service - LSB: weewx weather system
       Loaded: loaded (/etc/init.d/weewx)
       Active: active (running) since Fri 2018-06-08 15:12:17 EDT; 1 months 16 days ago
       Process: 1612 ExecStart=/etc/init.d/weewx start (code=exited, status=0/SUCCESS)
       CGroup: /system.slice/weewx.service
       └─1638 python /usr/bin/weewxd --daemon –pidfile=/var/run/weewx.pi…

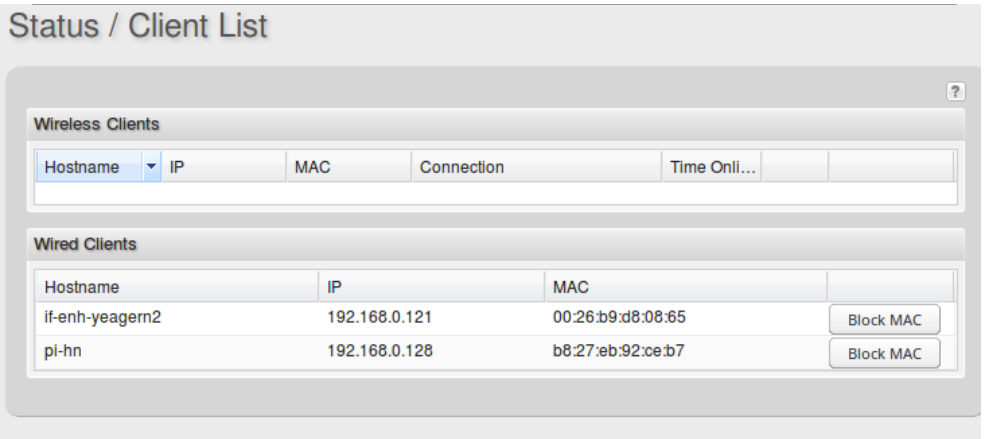
       Jul 26 00:25:16 pi-uf weewx[1638]: manager: added record 2018-07-26 00:25:0...b'
       Jul 26 00:25:16 pi-uf weewx[1638]: manager: added record 2018-07-26 00:25:0...b'
   - If it is running but you don’t see any messages about adding records, its possible there’s a clock discrepancy between the weather station unit and the weewx software. In this case, you want to dump all the memory of the weather station and then clear it and everything should then restart normally.
     - > sudo service weewx stop

        - > sudo wee_device --dump
        - > sudo wee_device --clear
        - > sudo service weewx start
    - Once weewx is running, you'll want to configure the weewx agent:
        - > ufWeewxConfig
          Enter your username, password, and either a weather station name or id to configure the weewx agent.
6. Set up scheduled tasks
    - > crontab -e
        - Edit the "crontab", which is the automatic task scheduler. Press 1 (or whatever number is next to nano) and enter to use nano as your text editor for setting up the crontab. Scroll down to the bottom of the file and paste the following 4 lines:

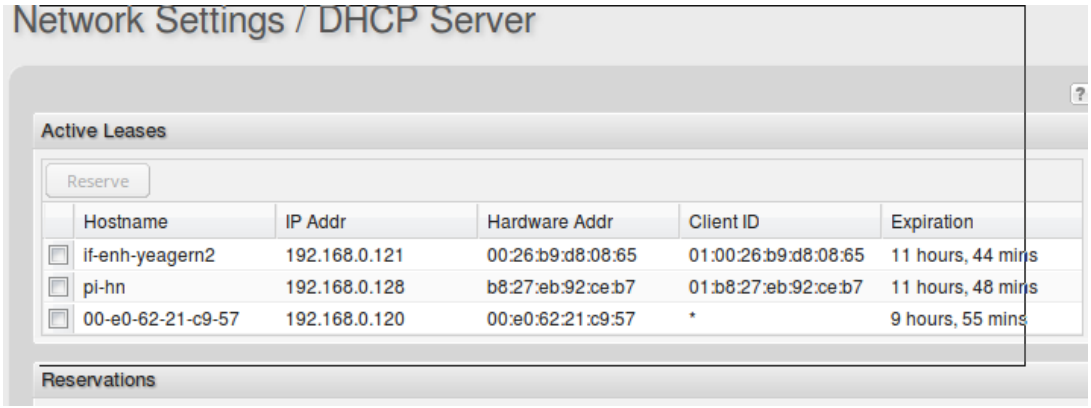
0 0 1 * * /home/pi/bmpinstall/bin/archiveIrrigHis.py
* * * * * /home/pi/bmpinstall/bin/checkCirrigPlc
* * * * * /home/pi/bmpinstall/bin/checkWeewxAgent
* * * * * /home/pi/bmpinstall/bin/checkWeewxDaemon

        - Hit CTRL+x to save, hit 'y' and enter to accept changes and hit enter to accept the filename given.
    - > crontab -l
        - You should see the same 4 lines you just entered at the bottom of the response to confirm that you properly saved the crontab. The lines mean that on the 1st day of every month at midnight (hour = 0, minute = 0), archiveIrrigHis.py will run – this archives the irrigHistory logs. And at every minute of every day, it will run scripts to check the status of the cirrigAgent, weewxAgent, and weewx program itself and make sure they are all running.
    - Reboot the pi and you are good to go!
6. Setting up a Cradlepoint MBR95
    - If Basic Mode is displayed at top left, click to select Advanced Mode

- Click Status→ Client List and/or Network Settings → DHCP Server to see local IP addresses for devices connected including the pi and plc.

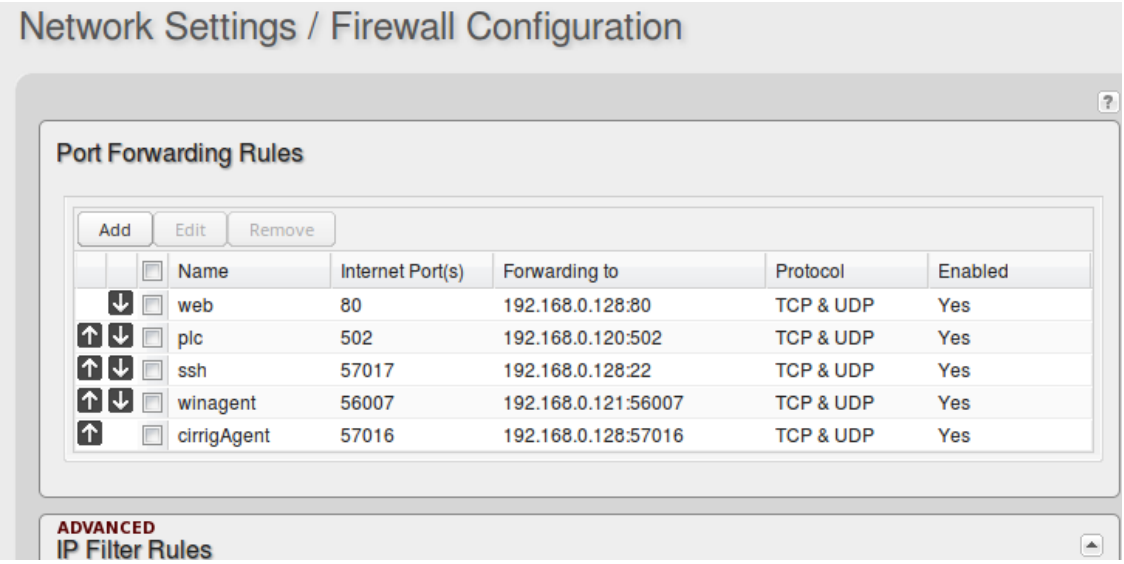


The Client List shows a laptop and a pi connected but for some reason doesn't display the PLC.

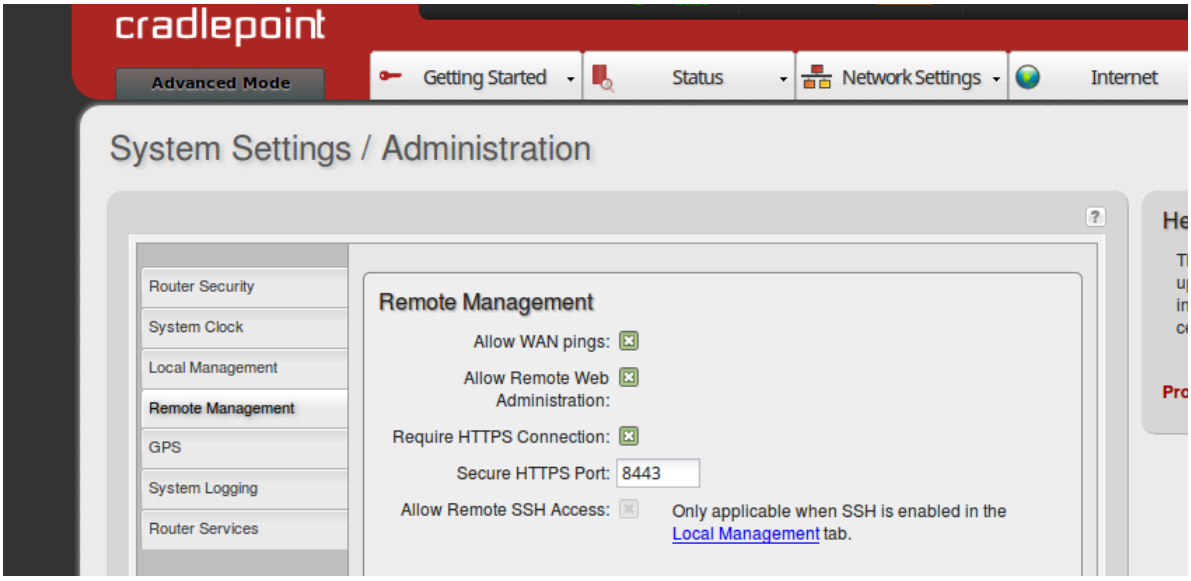


The DHCP Server menu shows the PLC (.120) as well

- Click Network Settings→Firewall

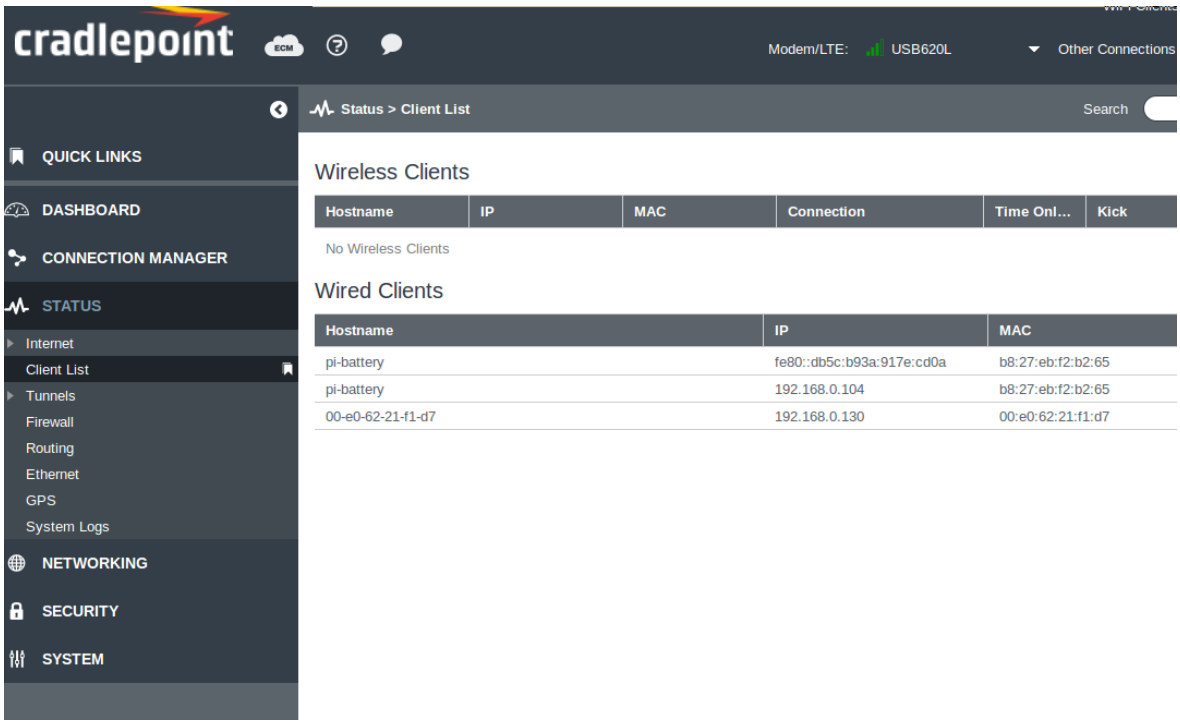


- Add the following port forwarding rules for the pi:
  - Name: ssh, Internet Port(s): 57017, Local Computer: pi local IP, Local Port(s): 22
  - Name: cirrig, Internet Port(s): 57016, Local Computer: pi local IP, Local Port(s): 57016
  - Name: http, Internet Port(s): 80, Local Computer: pi local IP, Local Port(s): 80
- If PLC is connected, add the following port forwarding rule:
  - Name: plc, Internet Port(s): 502, Local Computer: plc local IP, Local Port(s): 502
- If a Win laptop is connected, add the following port forwarding rule:
  - Name: winagent, Internet Port(s): 56007, Local Computer: laptop local IP, Local Port(s): 56007
- Click System Settings → Administration → Remote Management

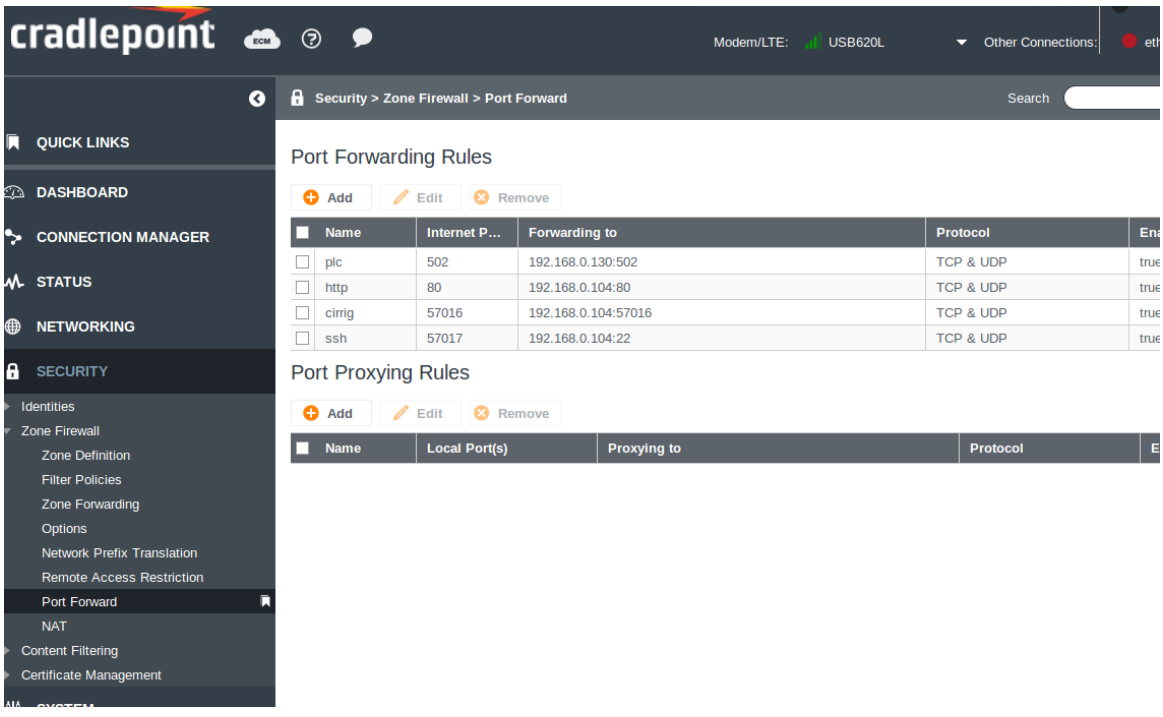


- Configure the Cradlepoint to allow remote web administration, require HTTPS connection, and use secure HTTPS port 8443

7. Setting up Cradlepoint MBR1200b

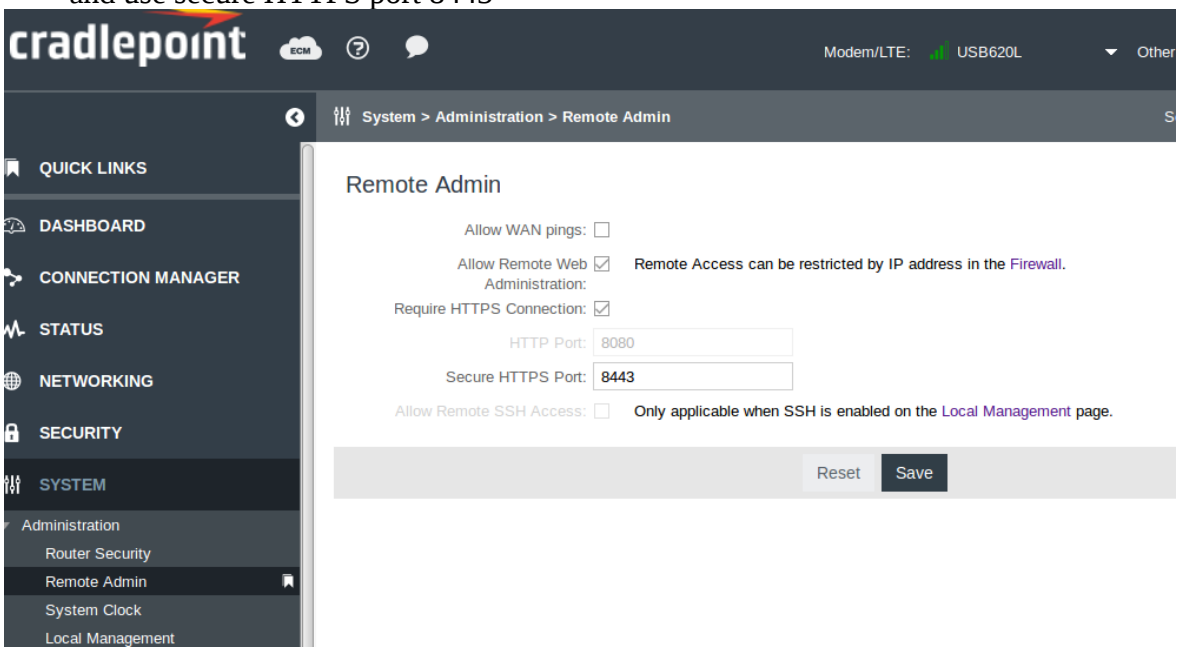


- Click Status → Client List or Networking → Local Networks → DHCP Server to see local IP addresses for devices including pi and plc
- Click Security→ Zone Firewall → Port Forward



- Add the following port forwarding rules for the pi:
  - Name: ssh, Internet Port(s): 57017 → 57017, Local Computer: pi local IP, Local Port(s): 22 → 22
  - Name: cirrig, Internet Port(s): 57016 → 57016, Local Computer: pi local IP, Local Port(s): 57016 → 57016

        - Name: http, Internet Port(s): 80 → 80, Local Computer: pi local IP, Local Port(s): 80 → 80
    - If PLC is connected, add the following port forwarding rule:
        - Name: plc, Internet Port(s): 502 → 502, Local Computer: plc local IP, Local Port(s): 502 → 502
    - If Win laptop is connected, add the following port forwarding rule:
        - Name: winagent, Internet Port(s): 56007 → 56007, Local Computer: laptop local IP, Local Port(s): 56007 → 56007
    - Click System → Administration → Remote Admin
    - Configure the Cradlepoint to allow remote web administration, require HTTPS connection, and use secure HTTPS port 8443



8.