

Setup 802.11 Application Framework

Install required Software packages on PC/Laptop

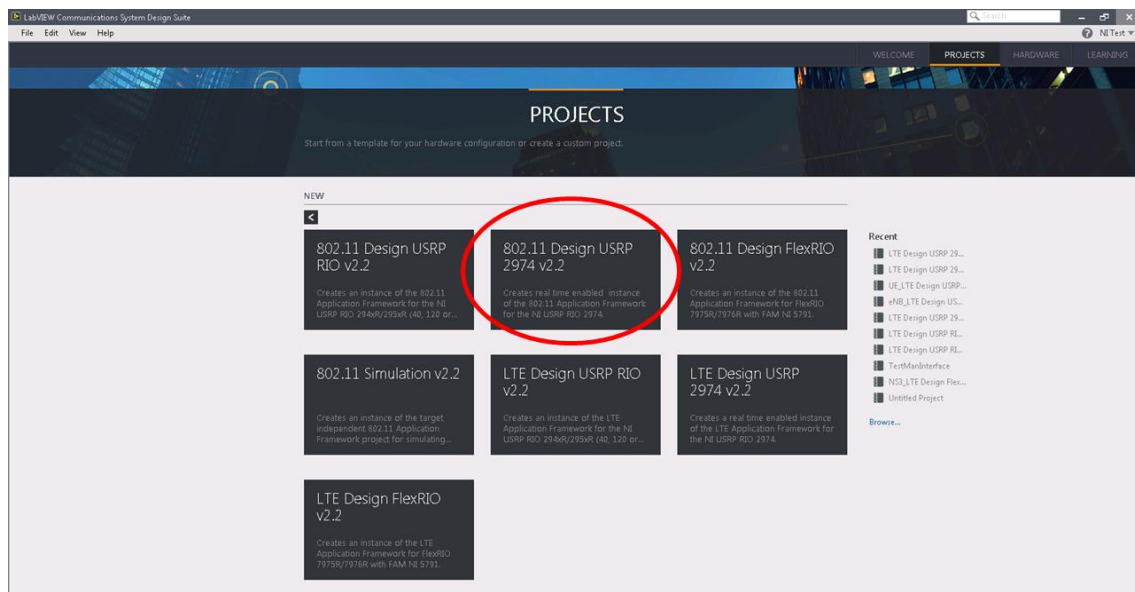
Note: The following steps must be done for each of the device (AP and STA)

- Install LabVIEW Communications System Design Suite 2.0
 - Download installer from webpage given on github starting page under *Supported Hardware and Software*
 - Install LabVIEW Communications System Design Suite 2.0
- Install NI-USRP 17.2 Driver
 - Download installer from webpage given on github starting page under *Supported Hardware and Software*
 - Install NI-USRP 17.2 Driver
- Install LabVIEW Communications 802.11 Application Framework 2.2
 - Download installer from webpage given on github starting page under *Supported Hardware and Software*
 - Install LabVIEW Communications 802.11 Application Framework 2.2

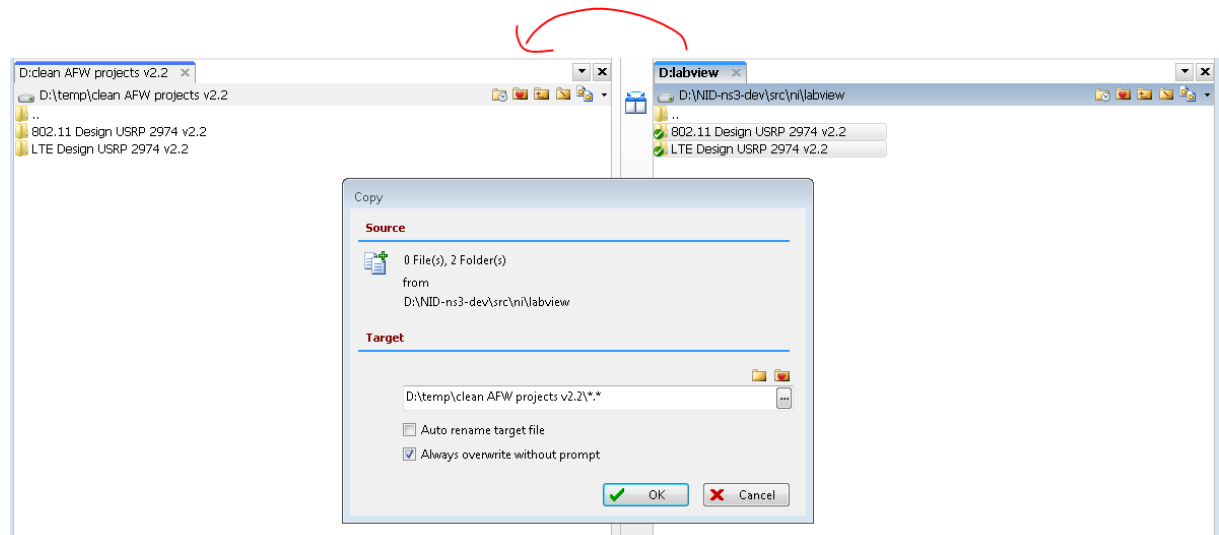
802.11 Application Framework Settings

Note: The following steps must be done for each of the device (AP and STA)

- Open LV Comms 2.0
- In the Projects tab, click on 'Application Frameworks'
- Create new 802.11 Application Framework project (802.11 Design USRP 2974 v2.2) and save this project to a known folder. Now close LabVIEW.

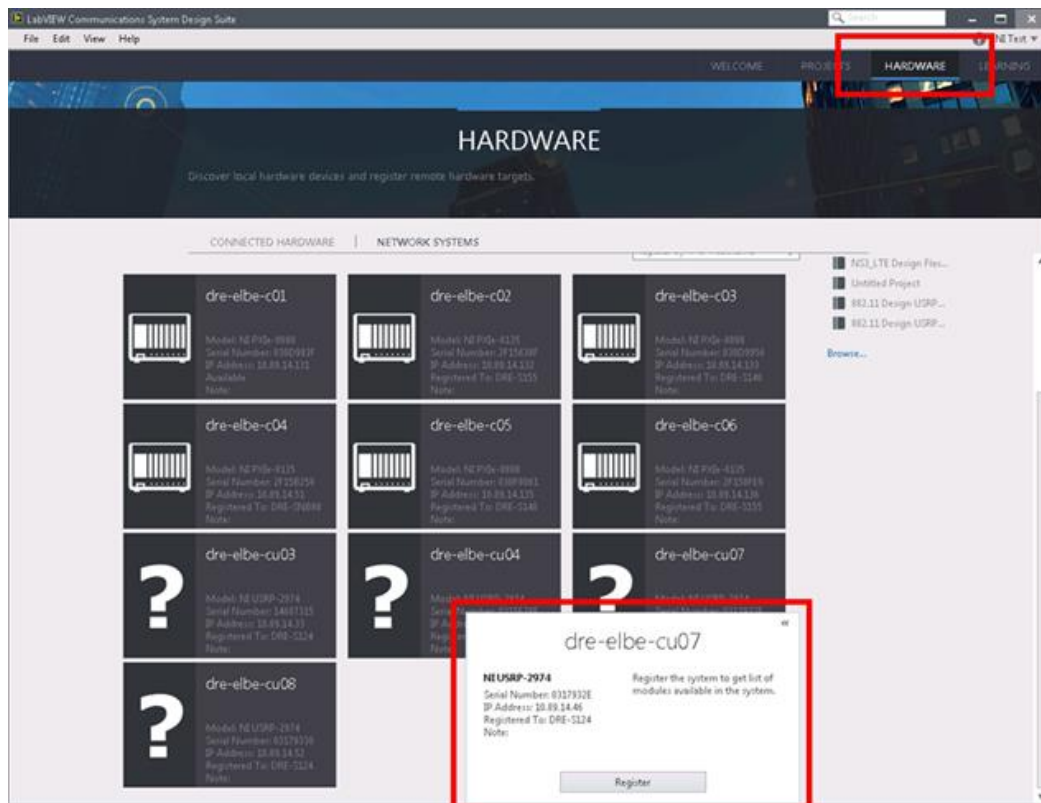


- Clone LabVIEW code from <https://github.com/ni/NI-ns3-ApplicationExample-LV-Code.git> to a temporary folder.
- Copy (and replace) additional LabVIEW files located in src\ of temporary folder to aforementioned newly generated LabVIEW 802.11 Application Framework project

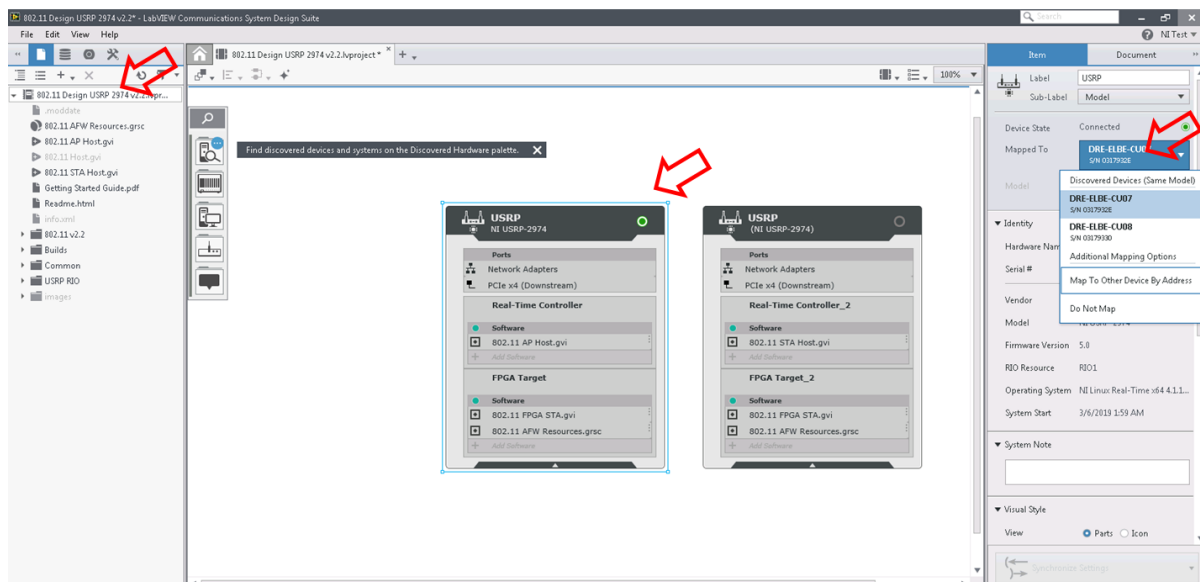


- Open modified 802.11 Application Framework project (802.11 Design USRP 2974 v2.2.lvproject)
- Register the targeted device (e.g. USRP-2974) in the hardware manager
 - Go into the LabVIEW **HARDWARE** tab, and under the **NETWORK SYSTEMS** tab, select the USRP-2974 hardware resources to be used for the project (AP or STA) by selecting this and clicking “Register” (Note: Default username: root, no password)

Note: If the desired USRP-2974 device is not listed, enter the IP address of the device in the ‘Register by IP or Hotsname’ textbox to register.



- In the LabVIEW project file (doubleclick at leftmost red arrow below), click on the block for USRP-2974 (middle red arrow - IMPORTANT: Please select the block that corresponds either to AP or STA depending on which device you are setting up) and open the right item bar to map the discovered and registered network device to the project (rightmost red arrow).



Run the 802.11 Application Example

Note: For the 802.11 Application Example, the ns3 code will be called from the terminal of the Linux RT on the respective USRP-2974 while the 802.11 Application Framework is running continuously.

- Open **802.11 AP Host.gvi** on control computer of AP
 - Check for correct RIO Device setting according to chosen hardware
 - Start the VI and when “Device Ready” indicator is highlighted, switch on AP by switching on “Enable Station”
- Open **802.11 STA Host.gvi** on control computer of STA
 - Check for correct RIO Device setting according to chosen hardware
 - Start the VI and when “Device Ready” indicator is highlighted, switch on AP by switching on “Enable Station”
- Connect remotely via ssh (under Linux or putty under Windows) to the USRP-2974 which is running the **AP** and run the following command:
 - `ns3.26-ni-wifi-simple-optimized --numPackets=100 --simTime=120 --niApiWifiDevMode="NIAPI_AP" --niApiEnableLogging="true" --niApiWifiEnabled="true"`
- Connect remotely via ssh (under Linux or putty under Windows) to the USRP-2974 which is running the **STA** and run the following command:
 - `ns3.26-ni-wifi-simple-optimized --numPackets=100 --simTime=120 --niApiWifiDevMode="NIAPI_STA" --niApiEnableLogging="true" --niApiWifiEnabled="true"`
- The ns3 stack (ns3.26-ni-wifi-simple-optimized) will be started from the terminal and connect to the Application Frameworks. The progress of transmission can be observed in the respective terminals (see below). The example transmits 100 packets from a client in a remote host at AP side towards a server running on the STA side.

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```
De-init NI modules ...
---- Program end! ----
root@DRE-ELBE-CU07:~/ELBE-ns3-dev#
```

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```
De-init NI modules ...
---- Program end! ----
root@DRE-ELBE-CU08:~/ELBE-ns3-dev#
```