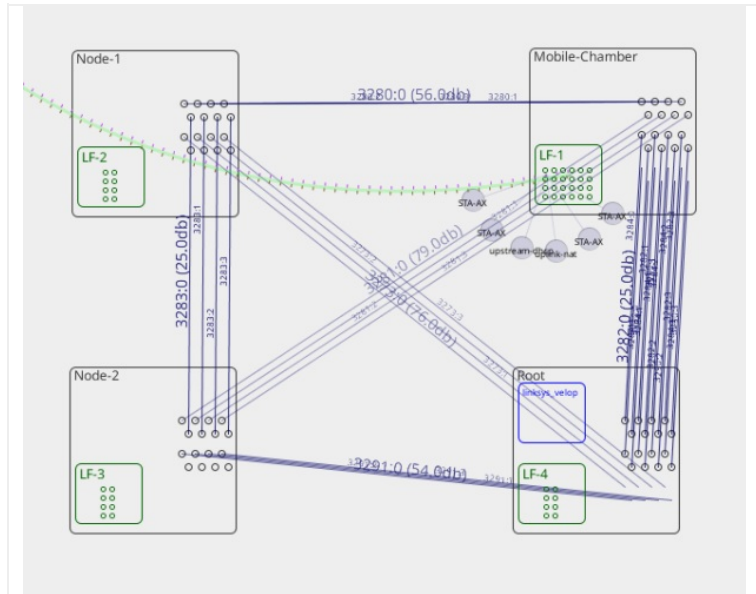


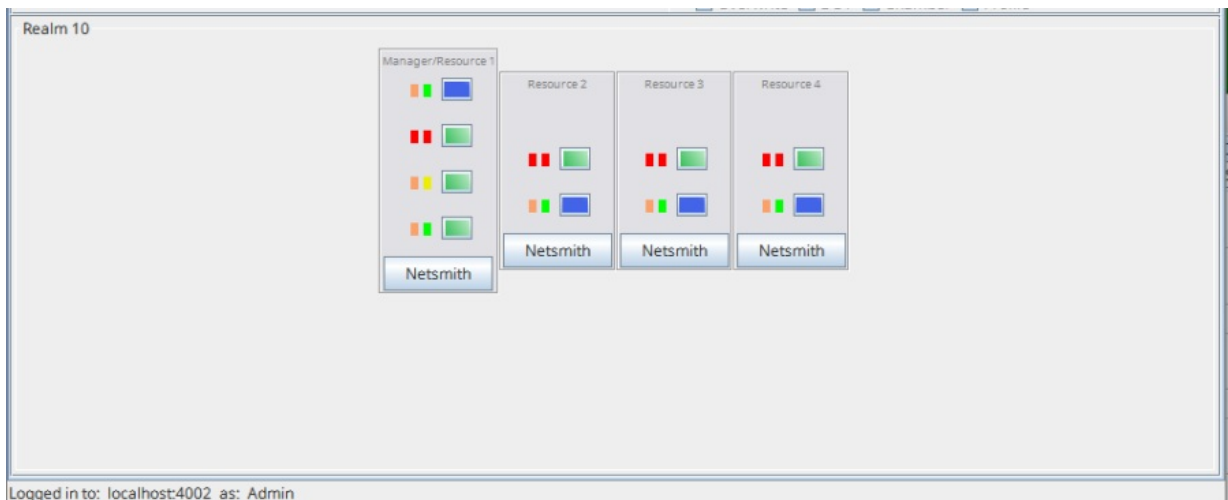
Setting up Attenuator Connections in LANforge

Goal: Configure the connections between chambers in Chamber View to match the physical cables connecting RF chambers in actuality.

This Chamber View setup will replicate the physical cabled attenuator setup configuration. The Chamber View connections created with this cookbook will allow accurate frequency attenuation in the physical multi-chamber setup during tests such as TR-398, Mesh and other LANforge tests. The physical chamber used in the example below is a 4-RF Chamber setup.

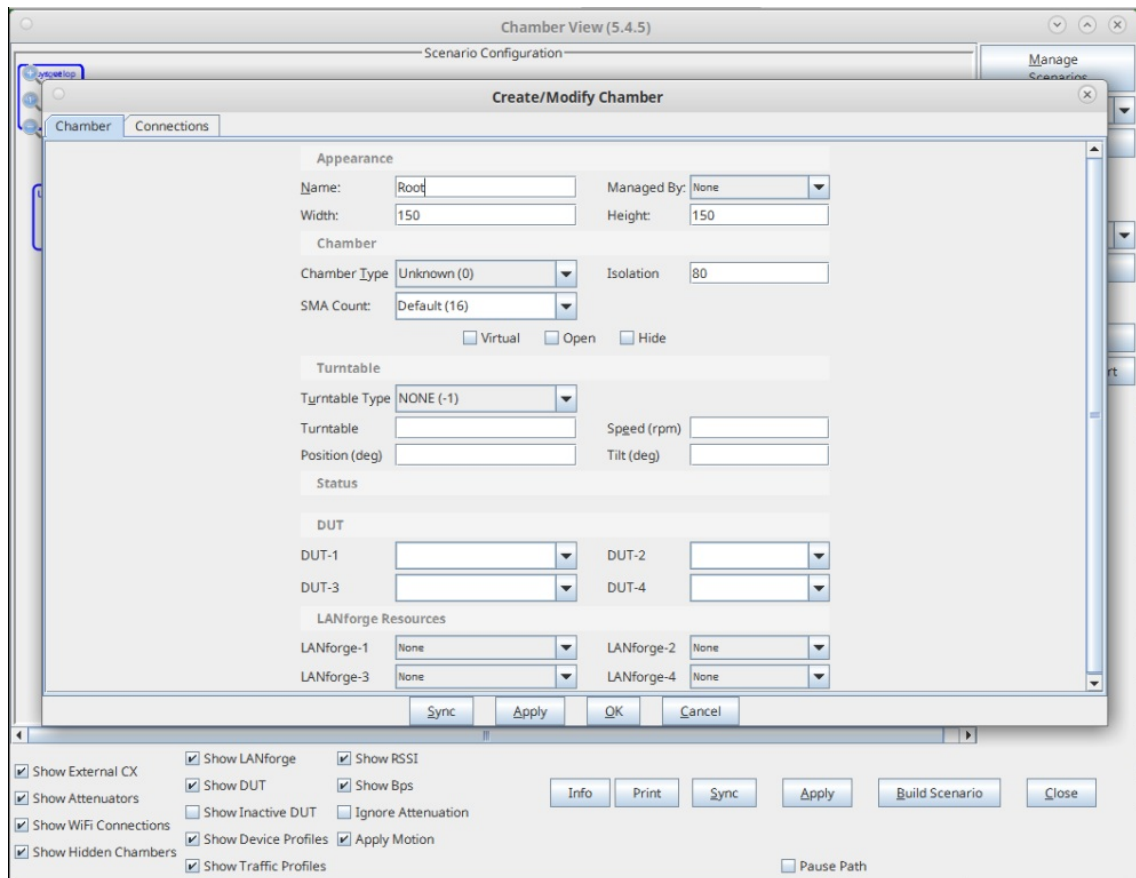


1. If the final testbed to be setup has multiple LANforges, check if they need to be clustered and cluster them. Please contact support@candelatech.com to help configure the cluster. Example below is the status tab of the manager of a set of clustered systems.

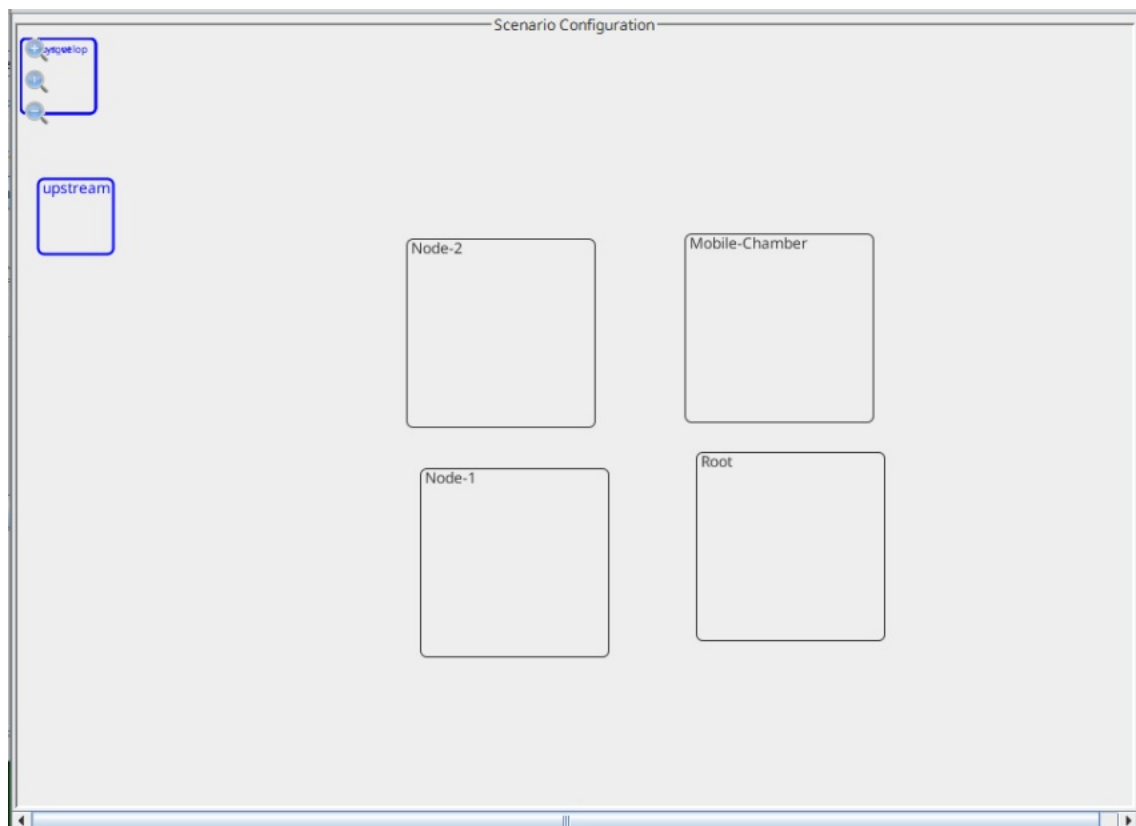


2. Create chambers in Chamber View that match your testbed setup. The example below is for 4 chambers. If your Chamber View scenario is all setup and ready for attenuator connection setup, skip to step 3.

- A. Open Chamber View by clicking on the **Chamber View** button in the LANforge-GUI. If you have an appropriate scenario already created, then skip to the next section, otherwise you will need to build a scenario that matches your system. Right-click in Chamber View to create various objects (and the chambers for this example).

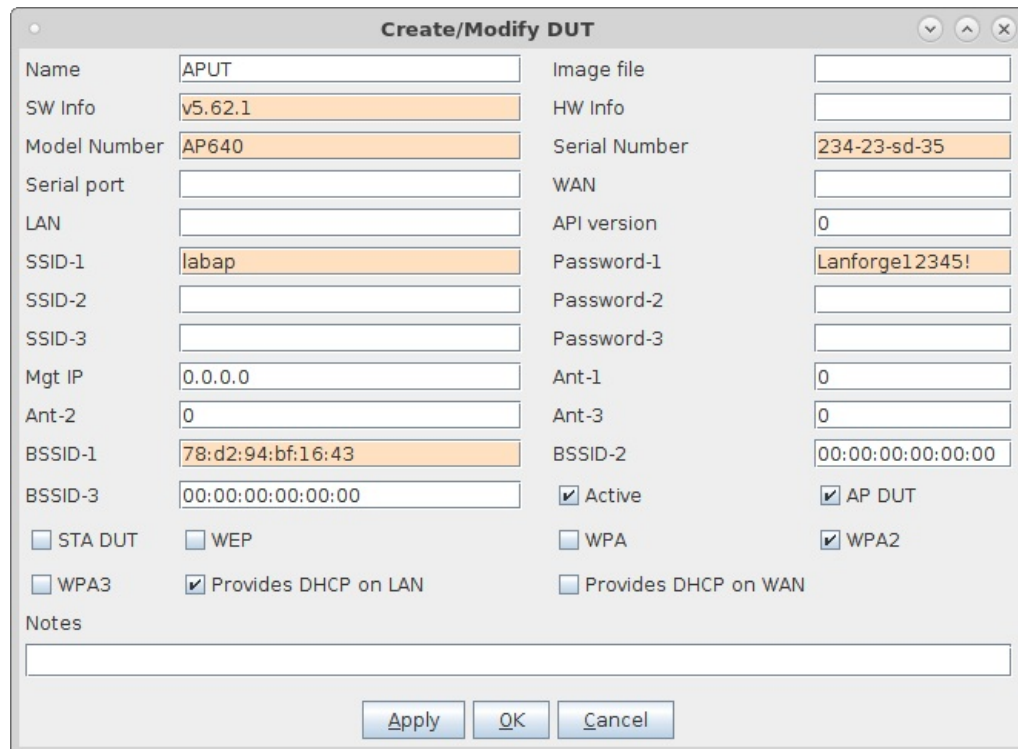


- B. Once the 4 chambers are created, the Chamber View window should look similar to below.



3. Add LANforge(s) and DUT(s) in their appropriate chambers.

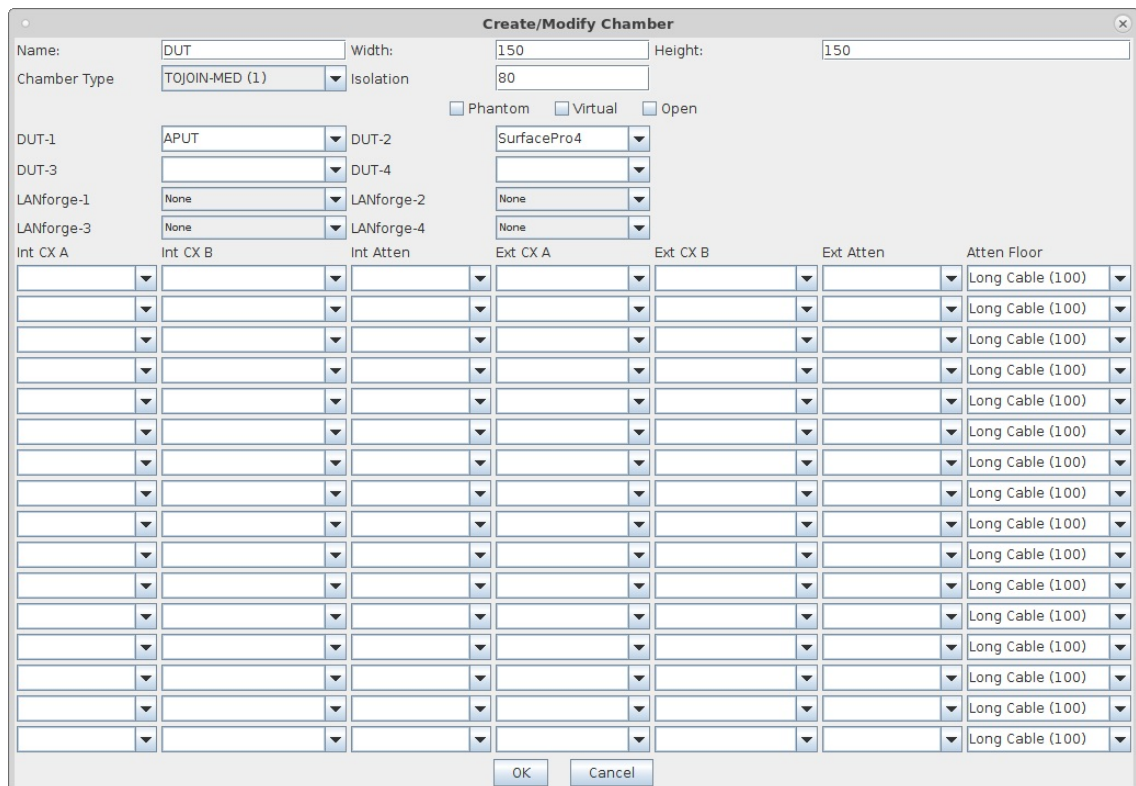
- A. Create a Device Under Test (DUT) Profile that matches your AP. The BSSID is important to configured so that LANforge knows when it is connected to the correct AP.



The 'Create/Modify DUT' dialog box is used to configure a Device Under Test profile. It contains the following fields and options:

- Name:** APUT
- SW Info:** v5.62.1
- Model Number:** AP640
- Serial port:** (empty)
- LAN:** (empty)
- SSID-1:** labap
- SSID-2:** (empty)
- SSID-3:** (empty)
- Mgt IP:** 0.0.0.0
- Ant-2:** 0
- BSSID-1:** 78:d2:94:bf:16:43
- BSSID-3:** 00:00:00:00:00:00
- Image file:** (empty)
- HW Info:** (empty)
- Serial Number:** 234-23-sd-35
- WAN:** (empty)
- API version:** 0
- Password-1:** Lanforge12345!
- Password-2:** (empty)
- Password-3:** (empty)
- Ant-1:** 0
- Ant-3:** 0
- BSSID-2:** 00:00:00:00:00:00
- Active:** ☒
- AP DUT:** ☒
- STA DUT:** ☐
- WEP:** ☐
- WPA:** ☐
- WPA2:** ☒
- Provides DHCP on LAN:** ☒
- Provides DHCP on WAN:** ☐
- Notes:** (empty text area)
- Buttons:** Apply, OK, Cancel

- B. Add the DUT to the chamber object by double-clicking the specified chamber that requires the DUT and selecting the DUT from the dropdown under the DUT section of the window. If there are no chambers, a fake chamber a chamber can be made, but the test will not be isolated and may not function as desired.



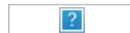
The 'Create/Modify Chamber' dialog box is used to configure a chamber object. It contains the following fields and options:

- Name:** DUT
- Width:** 150
- Height:** 150
- Chamber Type:** TOJOIN-MED (1)
- Isolation:** 80
- Options:** ☐ Phantom, ☐ Virtual, ☐ Open
- DUT-1:** APUT
- DUT-2:** SurfacePro4
- DUT-3:** (empty)
- DUT-4:** (empty)
- LANforge-1:** None
- LANforge-2:** None
- LANforge-3:** None
- LANforge-4:** None
- Int CX A:** (empty)
- Int CX B:** (empty)
- Int Atten:** (empty)
- Ext CX A:** (empty)
- Ext CX B:** (empty)
- Ext Atten:** (empty)
- Atten Floor:** Long Cable (100)
- Buttons:** OK, Cancel

- C. Add the LANforge to a chamber object. Double-click the specified chamber that requires the LANforge and select the hostname from the dropdown under the LANforge Resources tab.

4. Gather notes for your attenuator connections.

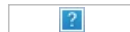
- A. Looking at the attenuator diagram of the testbed setup, identify where each attenuator goes to. Below is an example of an attenuator diagram of a 4-chamber setup. Another name for the Node-3 Chamber is the Root chamber.



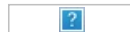
- B. Below is a closer look at the bottom right box of the attenuator diagram in the step above.



- C. Gather the serial numbers of the attenuators on the stack and make sure the attenuators are stacked in the same order as on the paper.



- D. Trace each attenuator out to the end chambers. In this example, the attenuators are stacked in the same order as the diagram, so we can assume that each name on the diagram (such a B3) corresponds to the according attenuator in the physical stack. On the diagram, B3 is both in Node 2 and Node 3/Root. On the sticky note, B3 has lines to both Root and Node 2.



5. Create all the connections for each chamber.

- C. Once the first set of ports are used for a chamber, do not reuse those ports (ports 0-3 were used above for Mobile Stations, Node 1 and Attenuator A1). Attenuator A2 (serial 3281) is the next attenuator to be entered in. In the notes gathered, A2 is between Mobile-Stations and Node 2. Each of the chambers has 4 connections to the attenuator, so those are also added to 'Connections' tab within the Mobile Stations chamber. Those connections can also be added to the Node 2 chamber instead, (but not in both). Notice on the A-side, the next port added was Chamber.Mobile-Chamber.4, since 0-3 are already used up. Since none of the SMA ports are used in Node-2, the SMA ports start at 0 and go til 3. None of the attenuator 3281's SMA ports are used so far, ports 0 to 3 are used. Click Apply to save data and OK to save data only and close window.

Ext CX A	Ext CX B	Ext Atten	Atten Floor	Zero-Atten RSSI 2.4Ghz	Zero-Atten RSSI 5Ghz
Chamber.Mobile-Chamber.0	Chamber.Node-1.0	1.1.3280.0	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Mobile-Chamber.1	Chamber.Node-1.1	1.1.3280.1	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Mobile-Chamber.2	Chamber.Node-1.2	1.1.3280.2	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Mobile-Chamber.3	Chamber.Node-1.3	1.1.3280.3	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Mobile-Chamber.4	Chamber.Node-2.0	1.1.3281.0	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Mobile-Chamber.5	Chamber.Node-2.1	1.1.3281.1	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Mobile-Chamber.6	Chamber.Node-2.2	1.1.3281.2	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Mobile-Chamber.7	Chamber.Node-2.3	1.1.3281.3	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)

- D. Last example is connections for attenuator A3/T1, which goes from root to mobile chamber. These connections are being added in the Root chamber now. Since no ports (in all chambers of all connections) are used from the Root chamber, ports 0-3 are used on A side. B side (mobile) already has 0-7 ports used in the Mobile chamber, so this example starts with port 8. Click Apply to save data and OK to save data only and close window.

Ext CX A	Ext CX B	Ext Atten	Atten Floor	Zero-Atten RSSI 2.4Ghz	Zero-Atten RSSI 5Ghz
Chamber.Root.0	Chamber.Mobile-Chamber.8	1.1.3284.0	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Root.1	Chamber.Mobile-Chamber.9	1.1.3284.1	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Root.2	Chamber.Mobile-Chamber.10	1.1.3284.2	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
Chamber.Root.3	Chamber.Mobile-Chamber.11	1.1.3282.3	OTA (0 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)
None	None		Cable (100 ddB)	None (0 ddB)	None (0 ddB)