Lab 2: Managing Templates, Firmware, and Network Troubleshooting

ABOUT THIS LAB

Goals

In this lab you will do the following:

- Create and save a configuration template locally
- Perform a factory reset locally on the XR Series router
- Deploy a configuration template locally
- Perform a software upgrade locally and back out of an upgrade
- Capture log files locally
- Use the network troubleshooting tools in AirLink OS

Items Needed

This lab is a hands-on exercise, and you need the following items to complete it:

- A computer
- An internet connection, preferably with a router or switch
- Two network* cables and available port in a wired router or switch (optional, preferred)
- An XR80 or XR90 production router (activated SIM cards and antennas are optional but beneficial)

*If working on a laptop or tablet without an Ethernet RJ45 port, you can use a data-capable USB-C cable for LAN connection to your router.

Procedure

Download the Lab Submission document from the Training Portal and paste the screen shots described in this lab procedure document in the proper locations in the submission document.

In the Lab section of the training course in the Sierra Wireless Training Portal, follow the instructions to upload your completed lab submission document in Word or PDF format. Make sure you include your name and the email address used to register you for the XRSA training course.

NOTE *Please ensure that you have completed the lab exercises below **BEFORE** gathering screenshots for submission. The lab exercises are a requirement and must be submitted to successfully complete the homework assignment for this lab.*

LAB NOTES

Your XR router should already be configured with a few basic settings which include changes to the default LAN subnet address, Wi-Fi client (STA) and AP modes, voltage threshold, and location reporting. This lab will now guide you through creating and saving a local AirLink OS (AOS) template on your XR series router. It will then walk you through how to factory reset it and re-deploy your saved template. Finally, it will then finish off with network diagnostics testing as well capturing AOS log files locally.

PREREQUISITE UNDERSTANDING

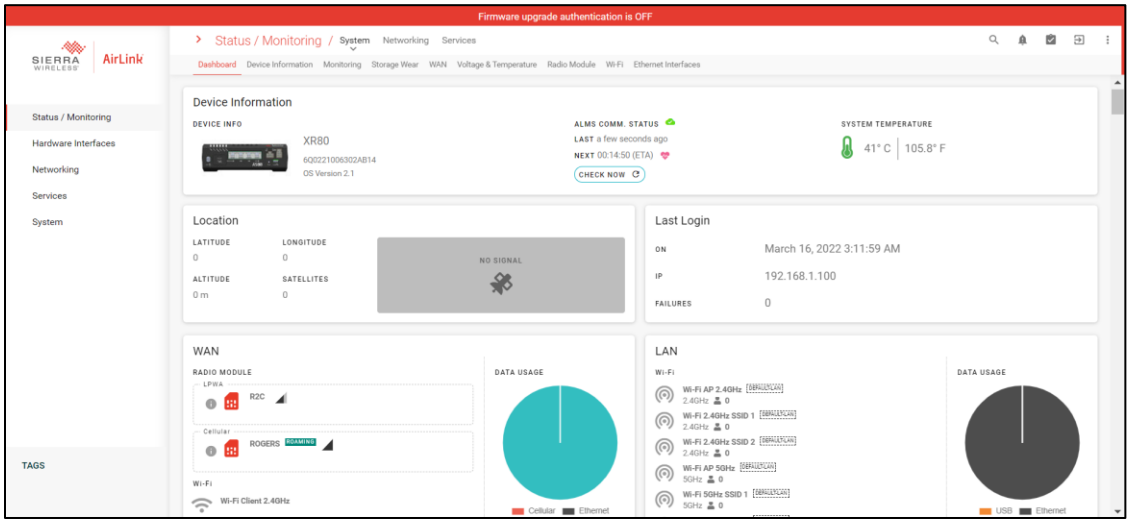
Please ensure that you have followed along with the XR Solution Administrator (XRSA) certification training program and have completed previous labs before starting this one.

Create and Save a Configuration Template Locally

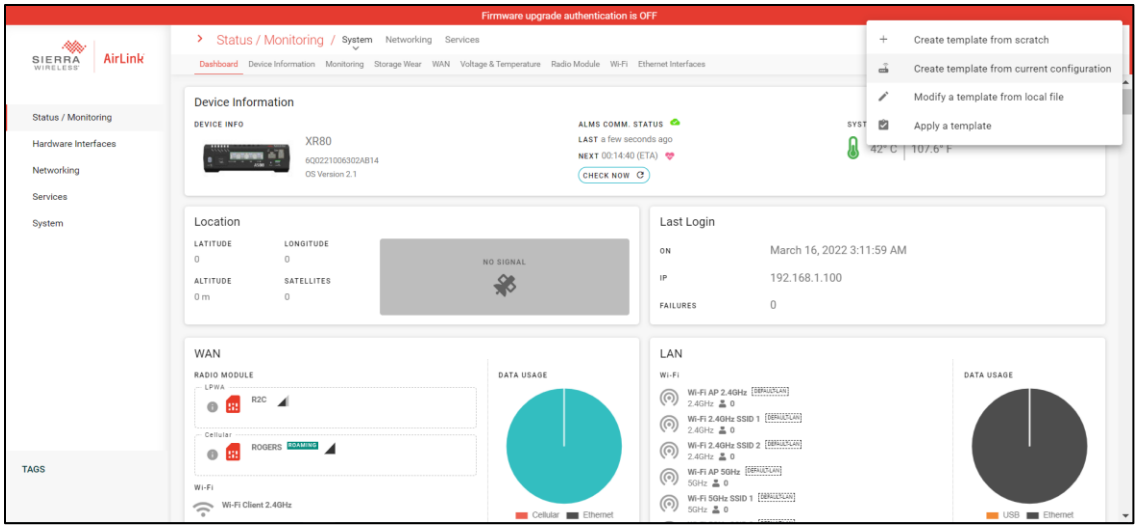
A configuration template is a snapshot of the changes you have made on your XR router, which is stored in JSON format and can be used as a backup or to stage subsequent XR devices of the same model and operating firmware. Unlike previous Sierra Wireless ALEOS/MGOS devices, saved templates only retain config changes made from its original system default values, reducing overhead and potential processing issues with full templates.

This part of the lab will guide you through how to create and save a local configuration template in the AOS UI.

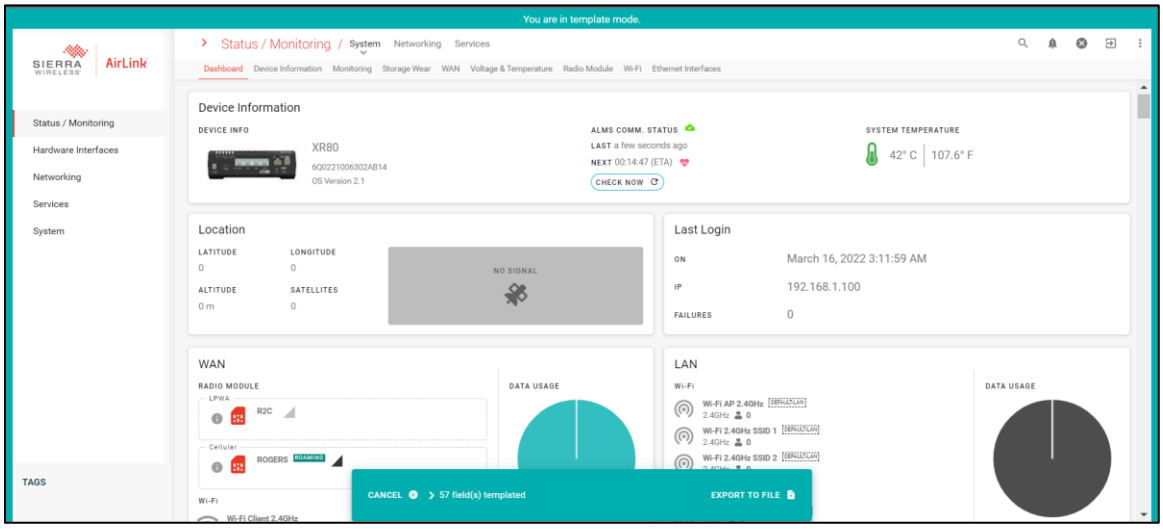
1) Click the *template* icon located at the top-right of the AOS UI.



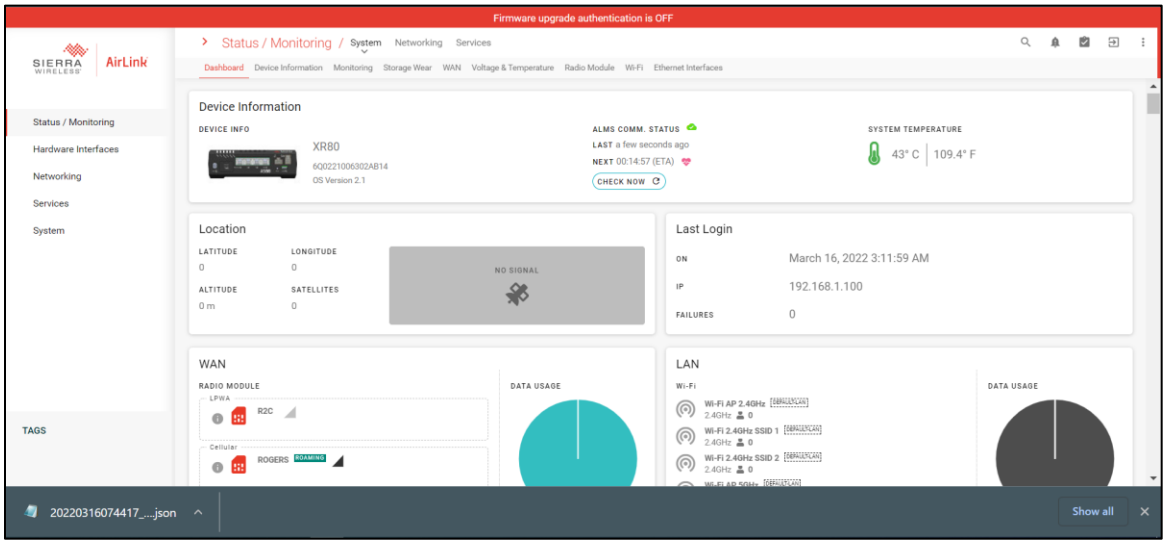
2) Select **Create template from current configuration**.

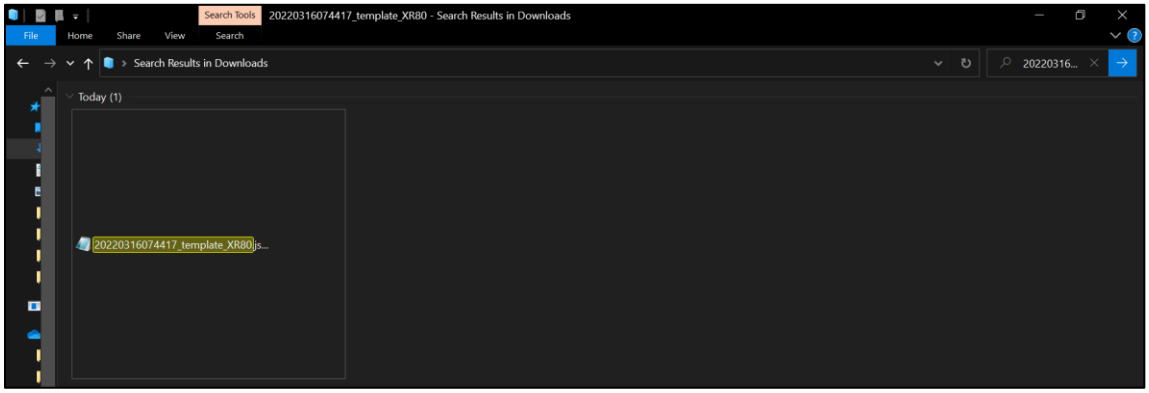


3) Notice that you will be put into template mode, as mentioned on the top of the AOS UI. It will also provide you with the number of fields corresponding to the setting that will be saved in the configuration template.



4) Click **Export to file**. This will automatically save a snapshot of the system and user-defined configuration changes.





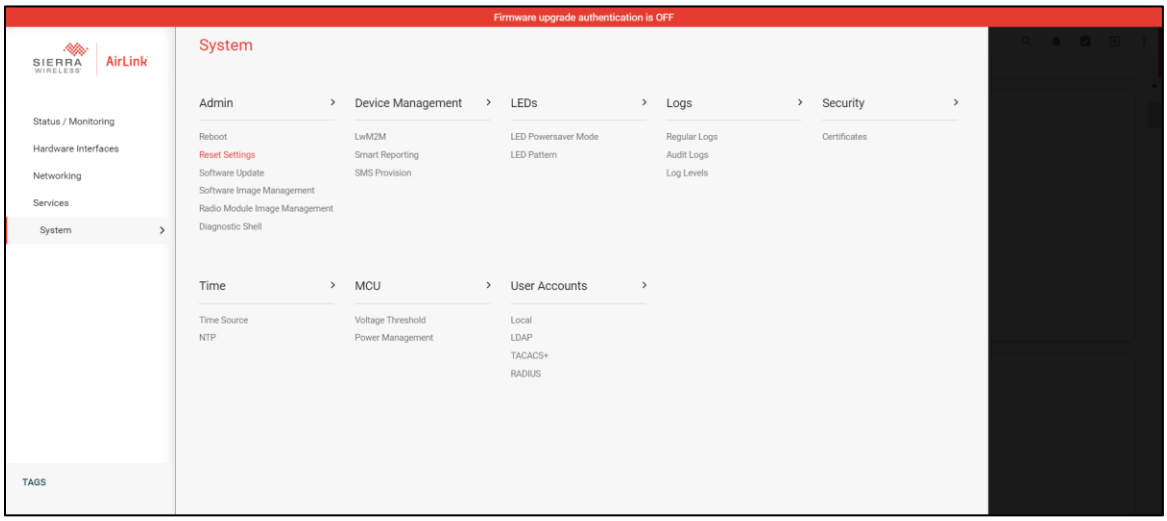
Perform a Factory Reset Locally

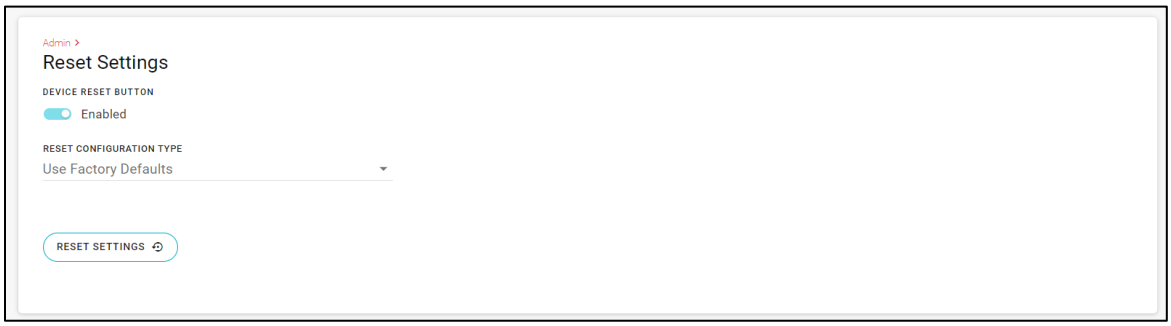
Factory resetting a device is the process of clearing any user-defined configurations back to its original system default values. It enables the device to start at a clean-slate, and to resolve potential problems with device operation.

This part of the lab will guide you through how to factory reset your device through the AOS UI.

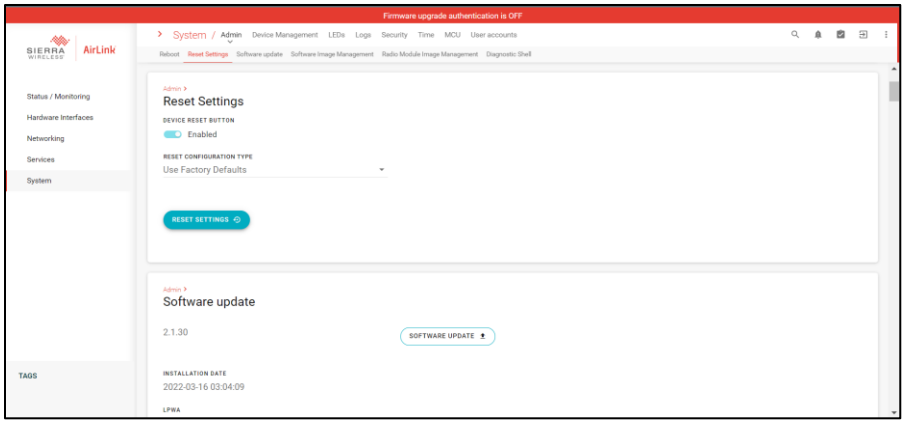
NOTE *Before proceeding, ensure that you have saved your template as detailed in the section above.*

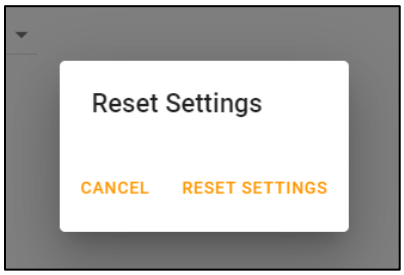
1) Select **Reset Settings** under **System > Admin**.

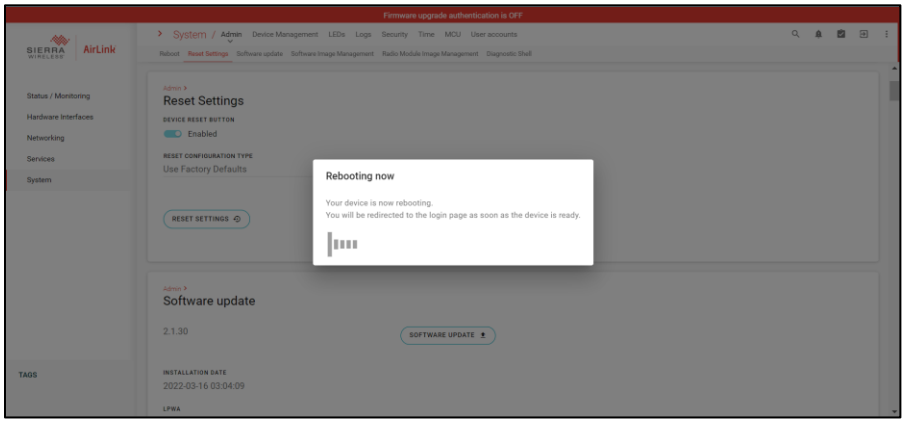




2) Click **Reset Settings**. You will be prompted to confirm this option. Confirm the factory reset by selecting **Reset Settings**. The factory reset process will begin. You will be taken back to the login screen after a couple of minutes.







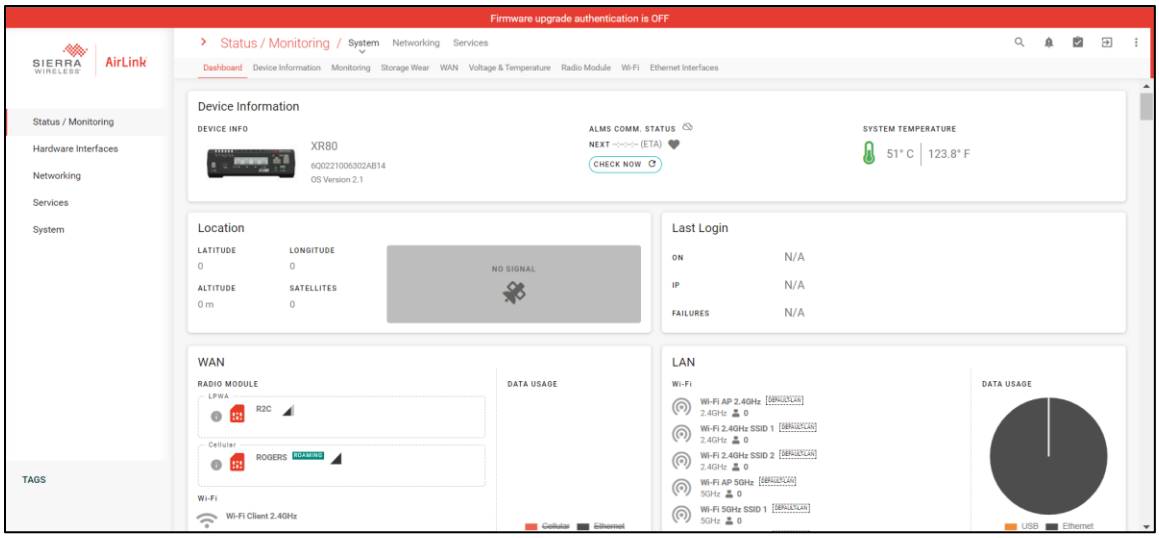
NOTE *Your XR router's default password needs to be used to login.*

Deploy a Configuration Template Locally

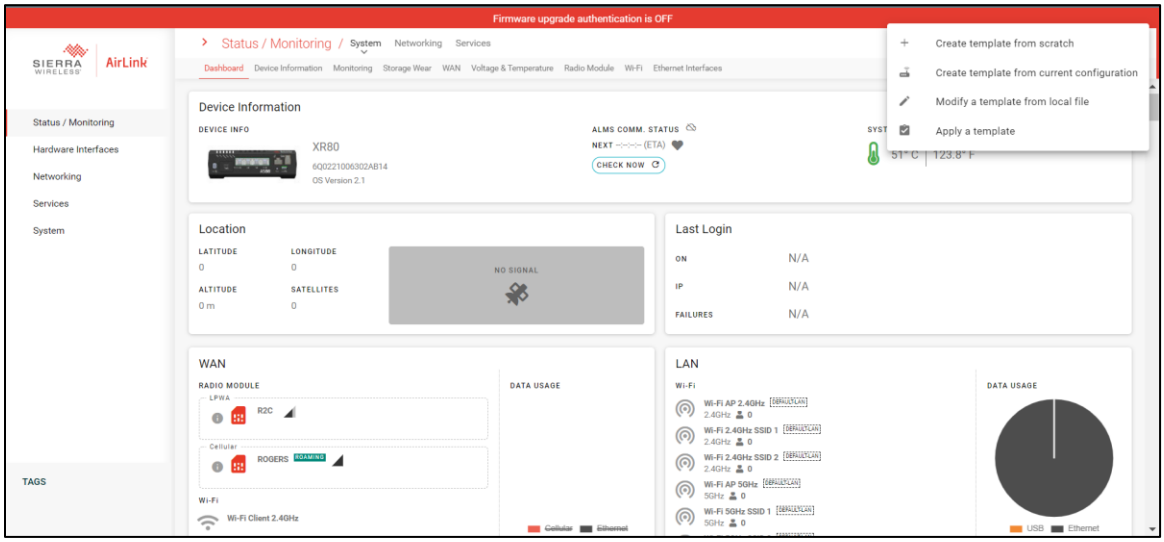
This process will walk you through how to deploy/upload a save JSON configuration file to your XR series router. Please ensure templates are only deployed to devices that are the same model and operating firmware that the template originated from to avoid unexpected configuration and operational issues.

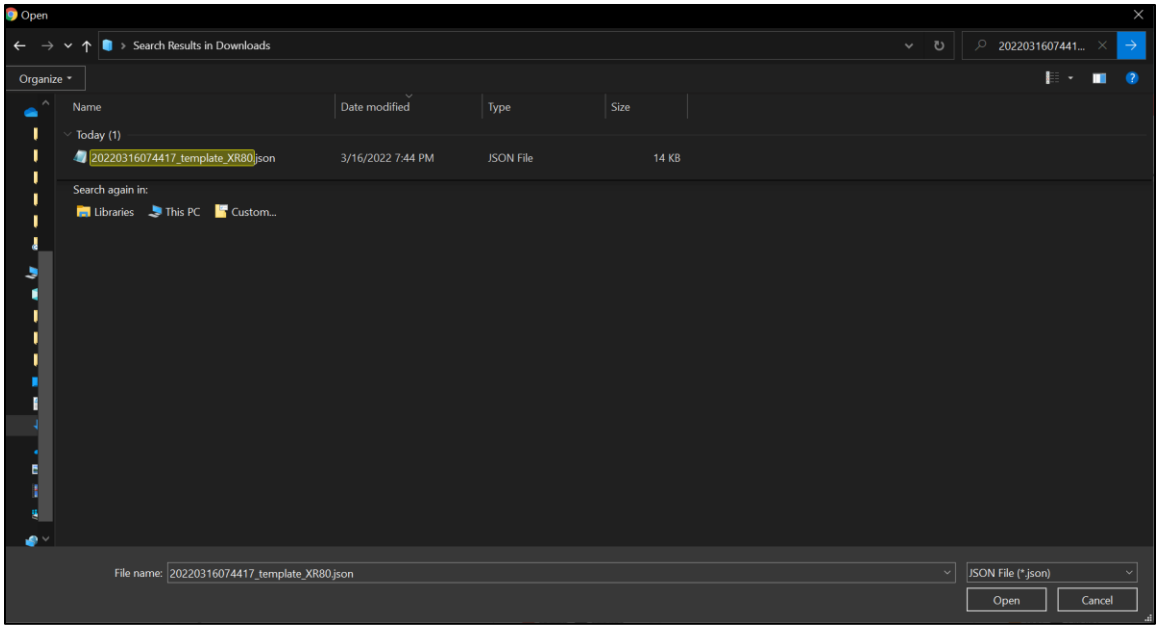
This part of the lab will guide you through how to deploy a saved AOS configuration template.

1) Click the template icon located at the top-right of the AOS UI.

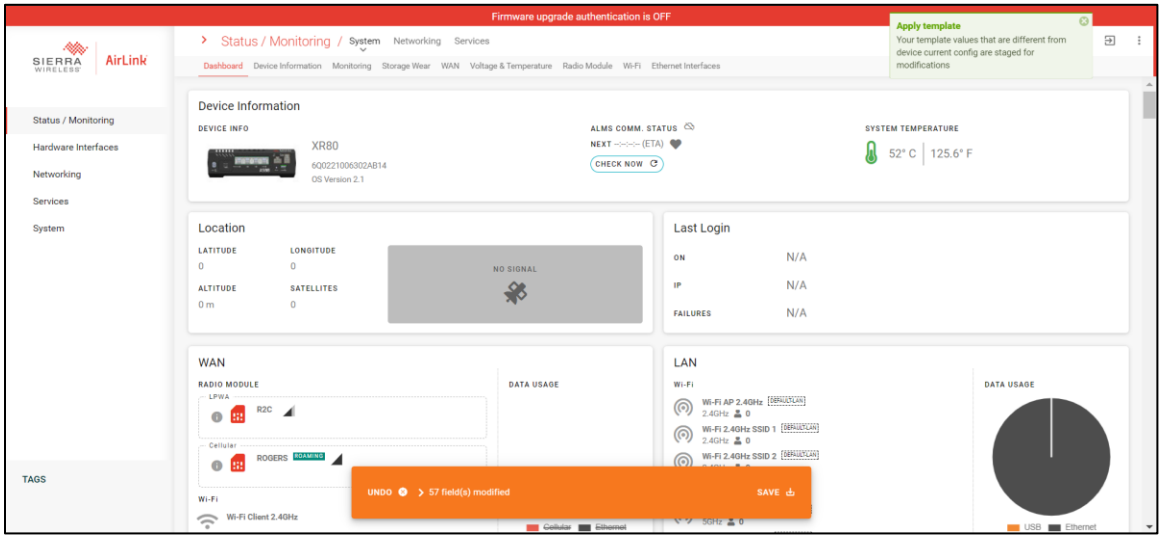


2) Select **Apply Template**. Choose the template that you created earlier on your local computer.





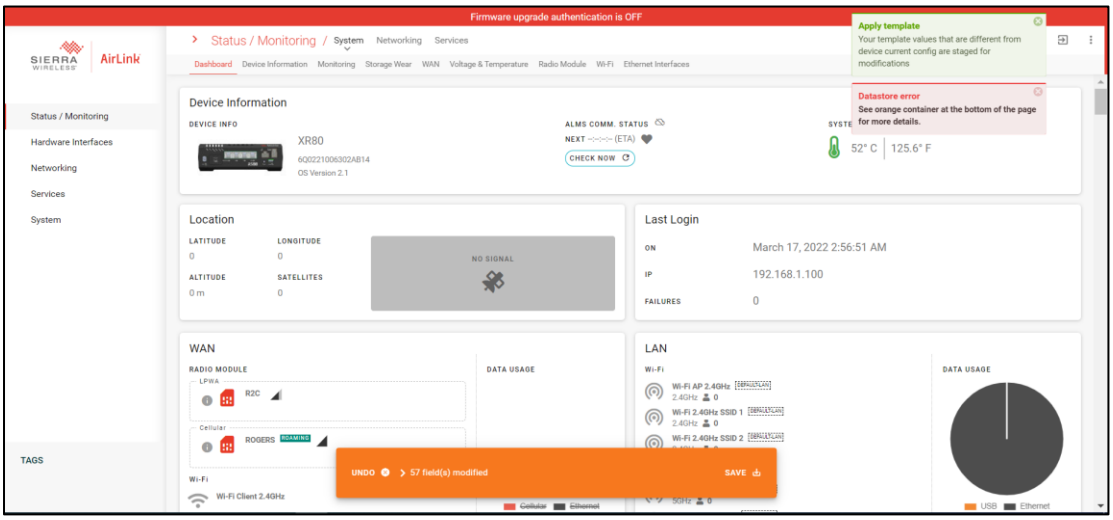
3) A notification will appear stating that your config is stage and is now ready to be applied/deployed. Click **Save**.



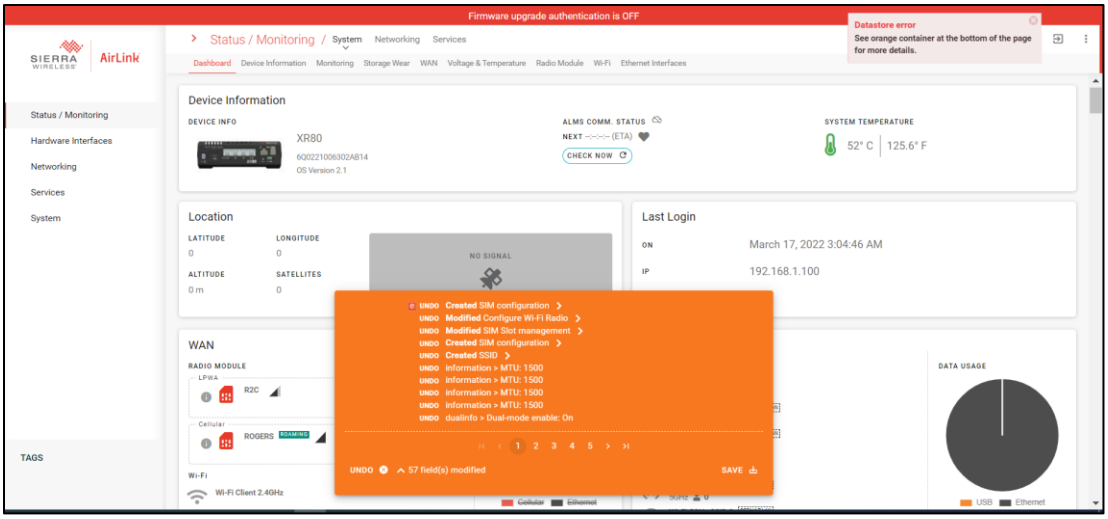
Deploy a Template Generates a "Database Error" (if applicable)

If you run into issues deploying the template, it is probably because AOS is disagreeing with your attempt to change a setting as per your template. In this case, it will ask you to verify the modified settings. ***Skip to step 4 if this section does not apply to you.***

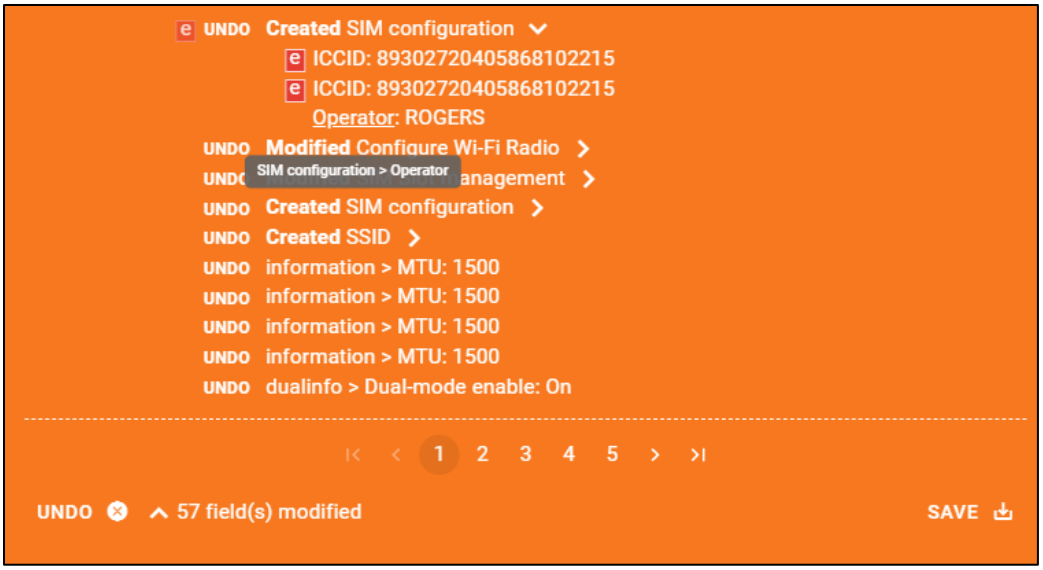
Click the > symbol in the orange container below.

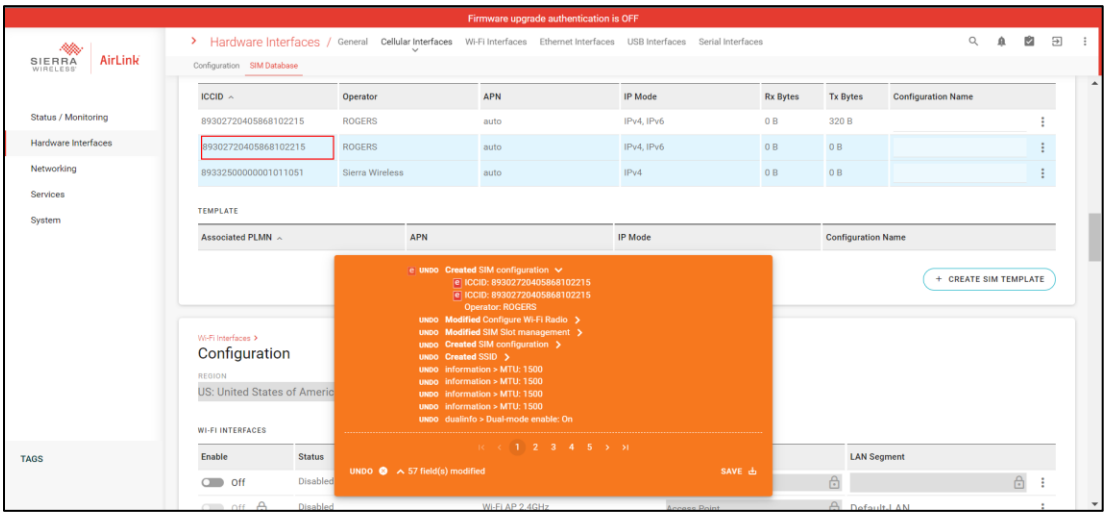


It will expand the settings (and the location of those settings in AOS) you had intended to change as per your template. In this example, there is a SIM Configuration error denoted by the  *icon. Click the > symbol to expand* ***SIM Configuration****.*

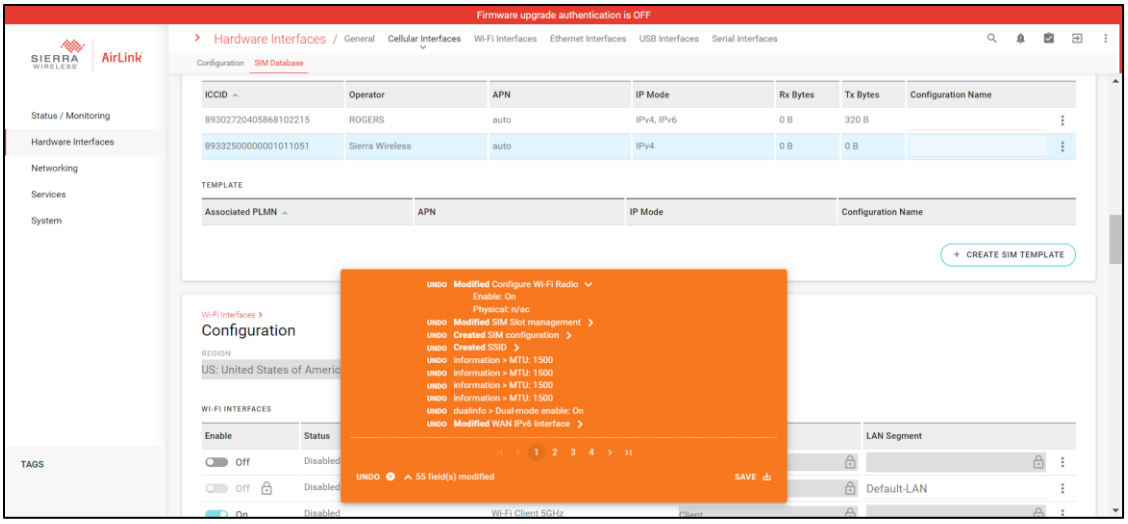


Hovering your cursor over the ***Operator*** *hyperlink will display the path/location of the value you are intending to change, in this case, the ICCIDs are the same, which is why AOS is not permitting the config change (in other words, there is a duplicate ICCID in the SIM database).*



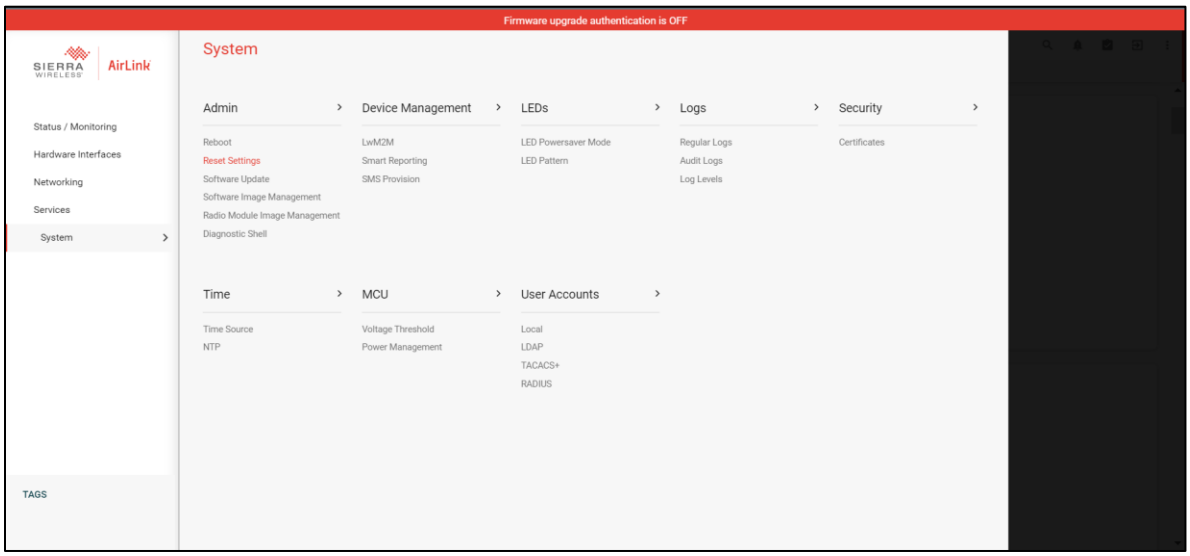


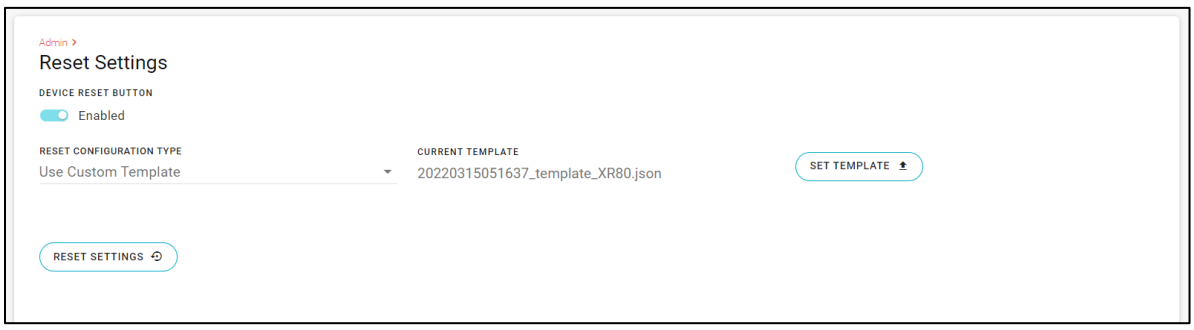
*To resolve this, select the **Undo** option beside the error. It will prevent AOS from applying the setting in question. You can then select **Save**.*



Continue here to deploy a configuration template.

4) Confirm that the template was deployed successfully by selecting **Reset Settings** under **System > Admin**. It should display the name of the template file name under the Current Template field.





Perform a software upgrade locally

The XR series router supports local firmware upgrades right through the AOS user interface. It also keeps a backup image you can safely roll back to when it comes to testing new releases. If you are satisfied with the current firmware, you can synchronize it to override the backup firmware with active firmware.

This part of the lab will explain how to perform a software upgrade and switch to backup firmware.

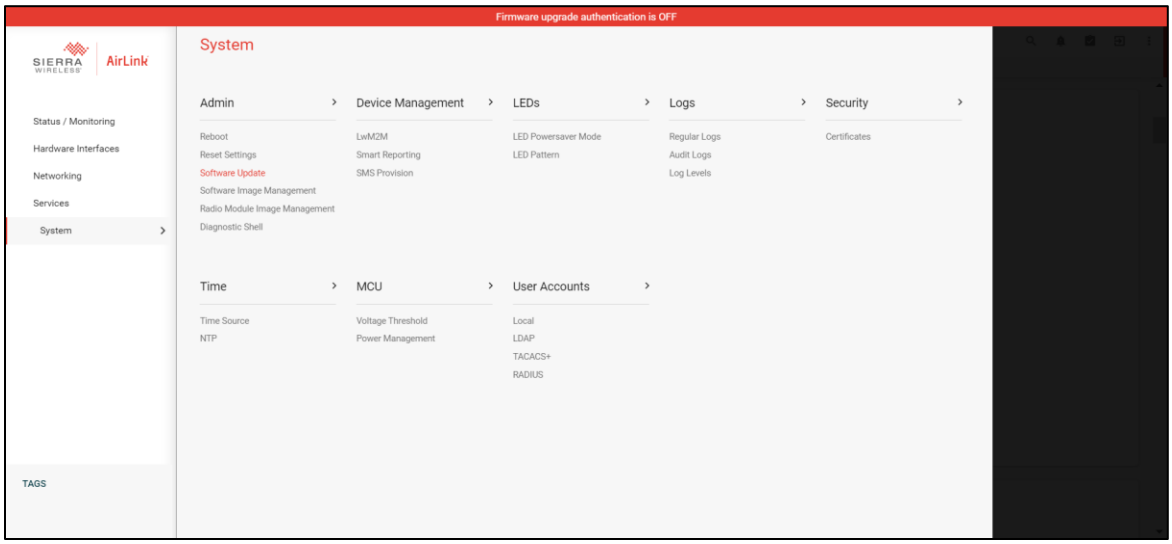
The Sierra Wireless Source page is the hub for downloading device firmware, user manuals, hardware documentation and accessing the public forums. As such, an account is required to download AOS firmware. For new users, you can create an account here: https://www.sierrawireless.com/sso/signup

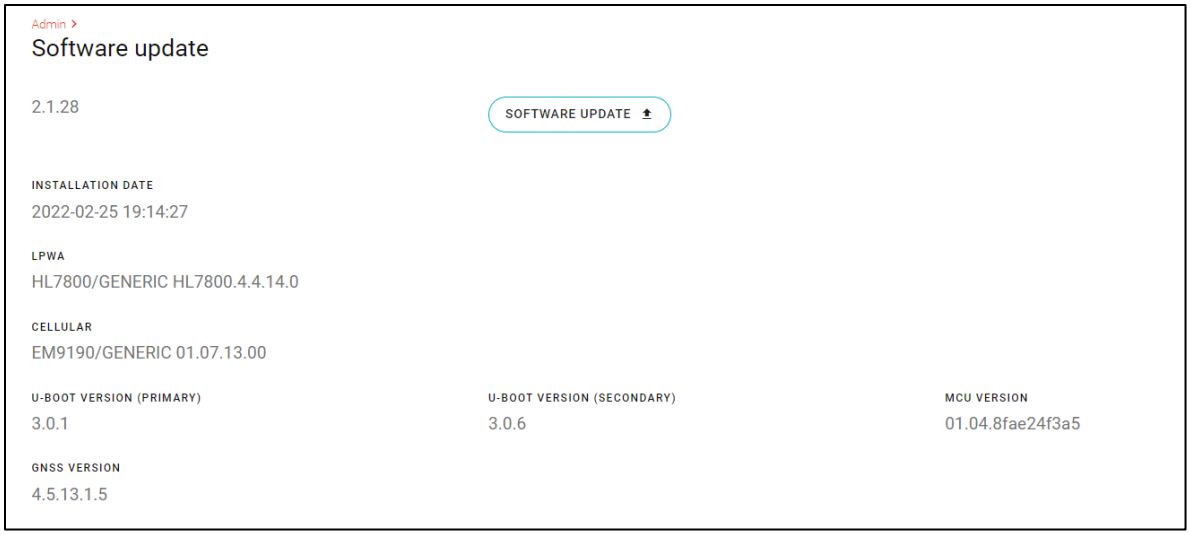
Local firmware upgrades require an AOS .ufw file which can be found on the Sierra Wireless Source page.

XR80: https://source.sierrawireless.com/resources/airlink/software_downloads/xr80/xr80-firmware-list/#sthash.Jx5oWQwt.dpbs

XR90: https://source.sierrawireless.com/resources/airlink/software_downloads/xr90/xr90-firmware-list/#sthash.yp1t7OLH.dpbs

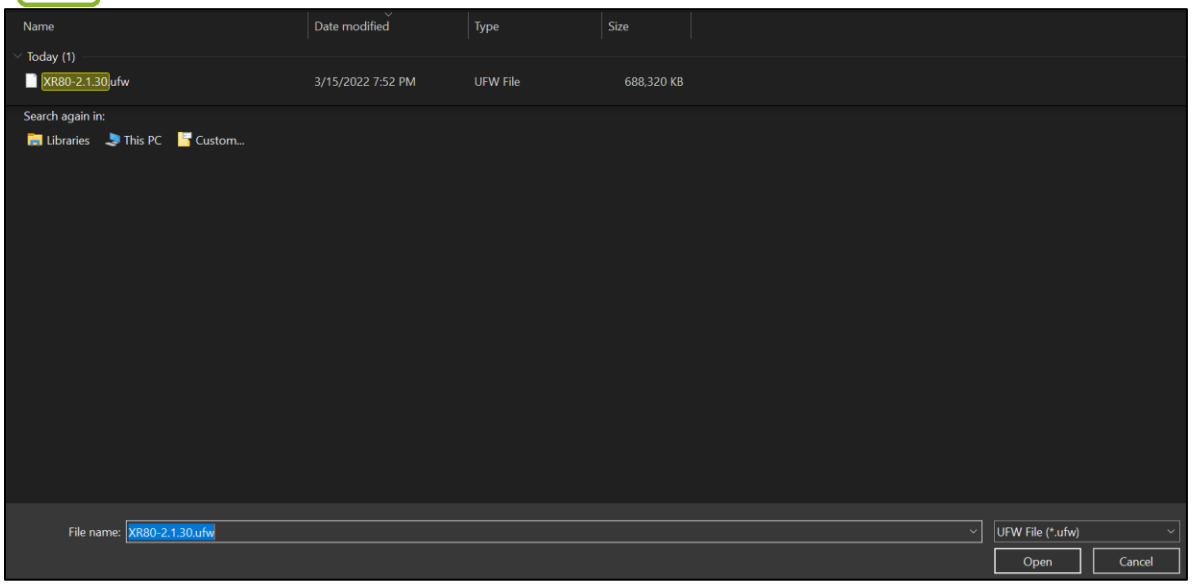
1) Verify your current operating firmware by selecting **Software Update** under **System > Admin**.

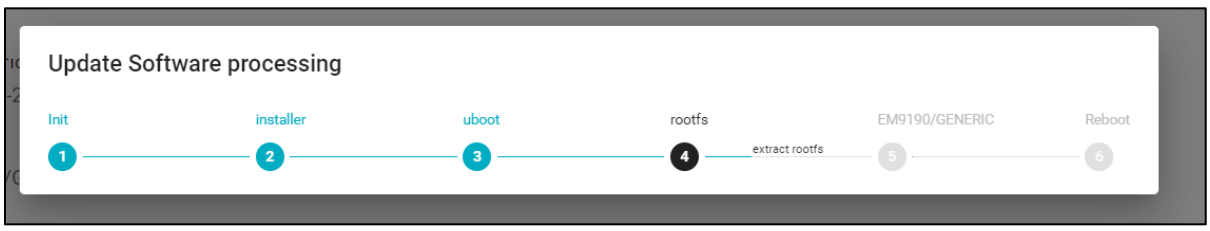


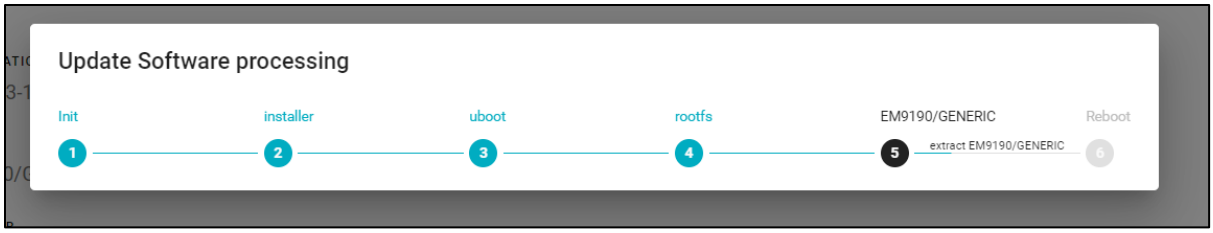


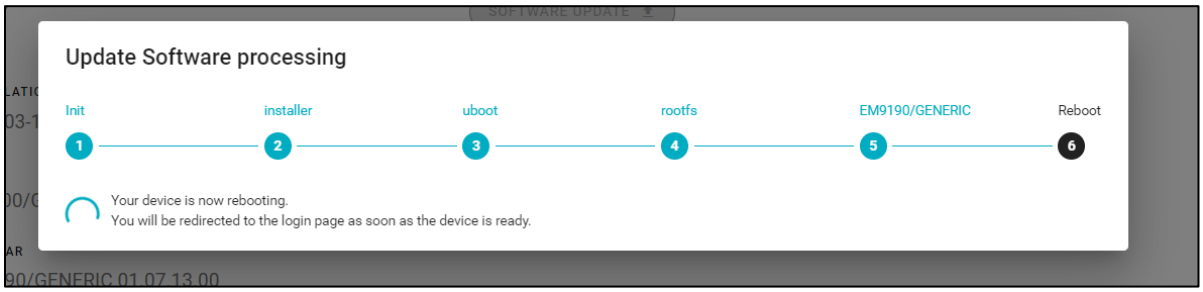
2) Click the **Software Update** option and choose the appropriate AOS .ufw firmware file for your XR router. This will automatically start the updating process.

NOTE *At the time of writing, the latest GA release for the XR is AOS 2.1.30.*







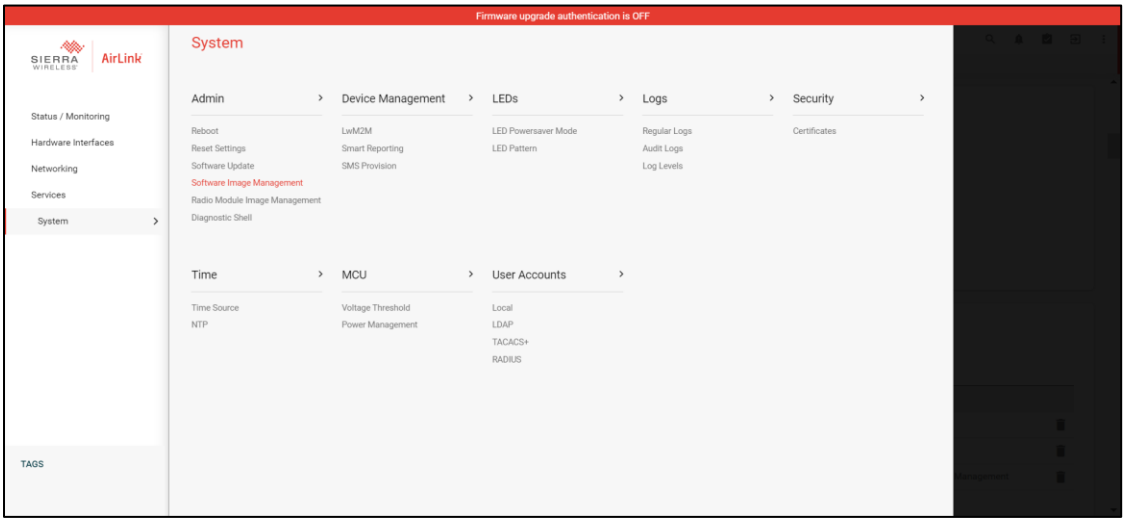


3) Once complete, your device will automatically reboot, and you will be prompted to log back in. You can then verify the software version under the **Software Update** section.

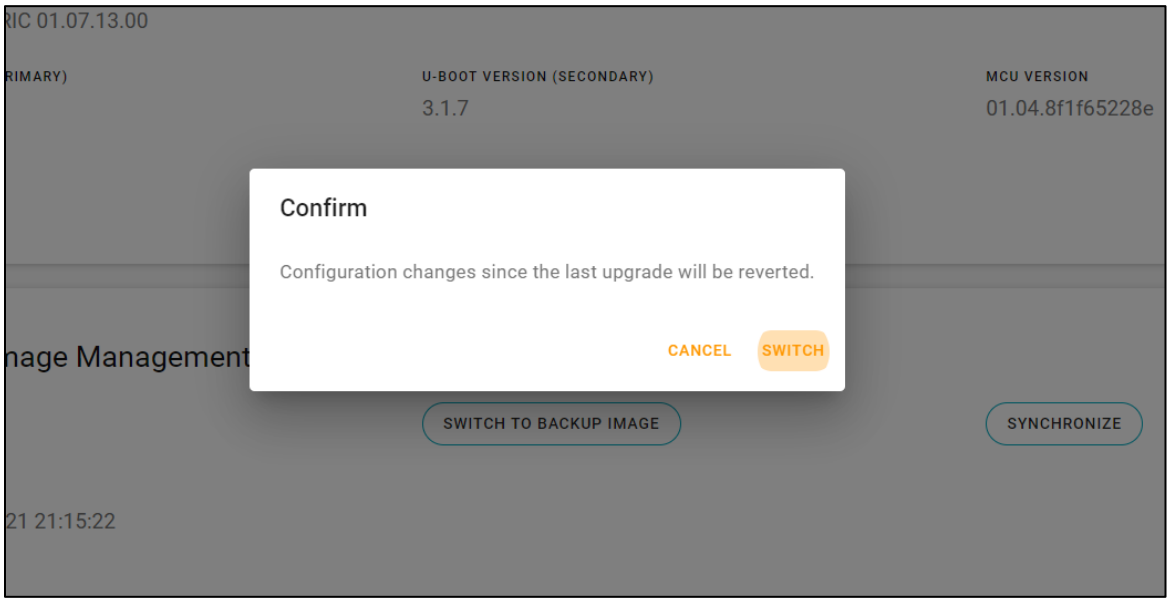
Backout of a Firmware Upgrade

Even after you have upgraded your firmware file, a backup of the previous version is stored as a candidate to be used if you want to revert to it.

1) Select **Software Image Management** under **System > Admin**.

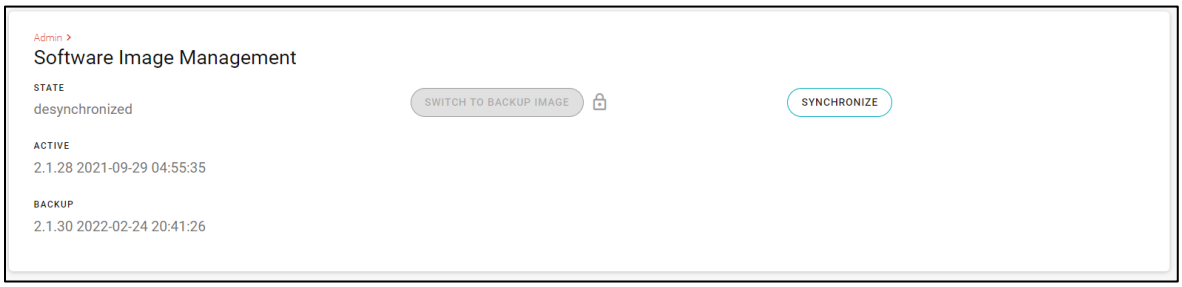


2) Select **Switch to Backup Image**. Click **Switch** if you would like to revert to the previous firmware version.



It will take a couple of minutes to switch the AOS firmware to the backup image.

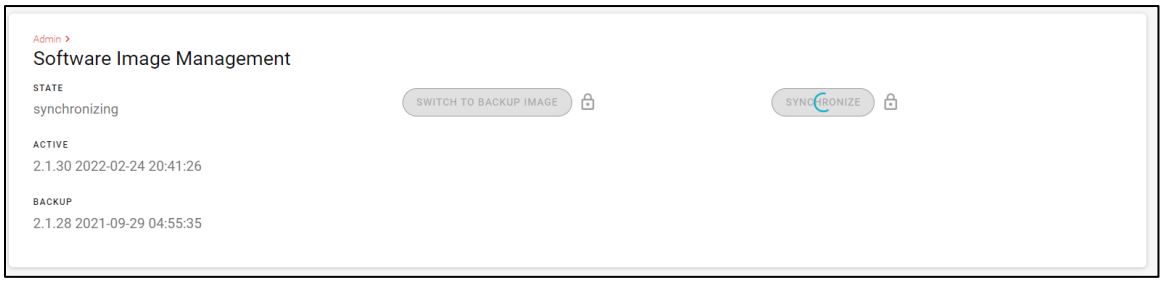
3) Notice that your **Active** firmware is now the previous firmware version you originally had before the upgrade.



Synchronize Firmware

Synchronizing the firmware will purge the backup image from storage. This option can be selected if the user is satisfied with the new firmware version.

1) *Select **Synchronize**.*



NOTE *This process may take several minutes to complete.*

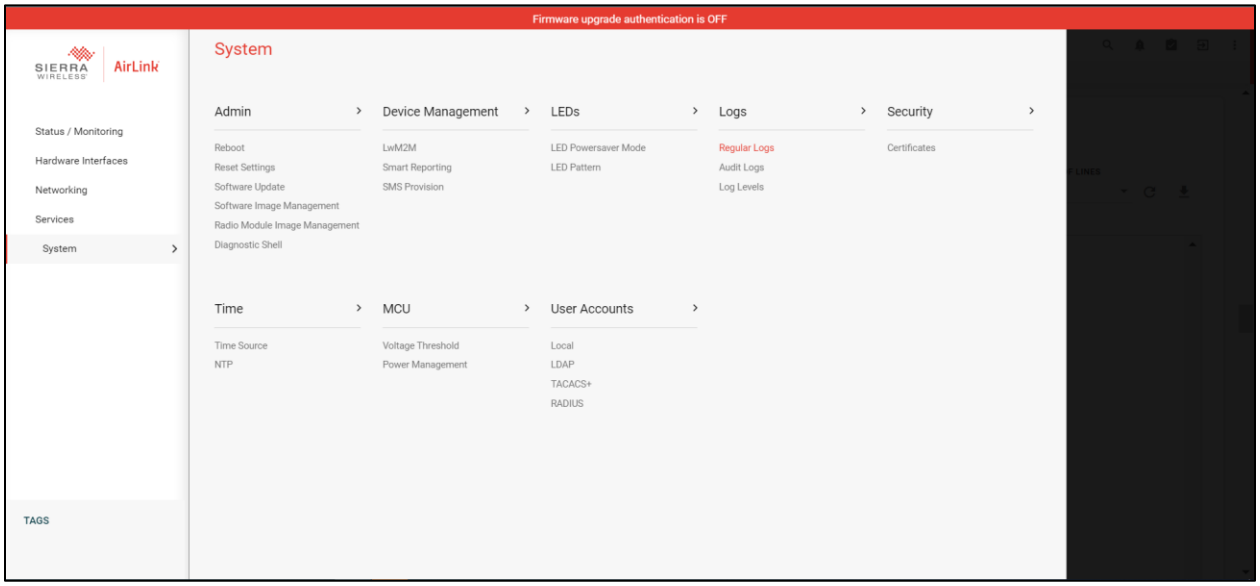
Capture Log Files Locally

Device log files can be a helpful tool when it comes to troubleshooting connectivity issues pertaining to cellular, GPS, Ethernet, Wi-Fi, and USB. It can also be used to troubleshoot network services such as NTP and ALMS. AOS also keeps a record of audit logs for connection attempts to the AOS UI locally or via LDAP authentication.

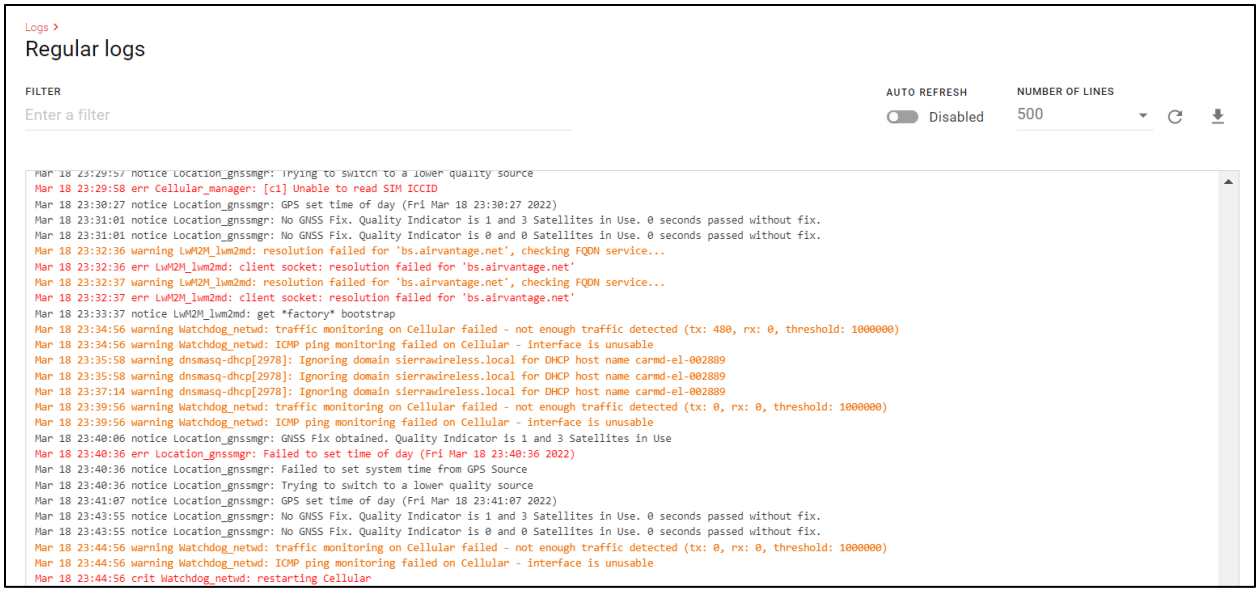
NOTE *Log Levels can be defined in AOS, but we highly recommend leaving it as the default verbosity level of "Notice" for all subsystems. This enables the Engineering teams at Sierra Wireless to troubleshoot potential device issues more efficiently and quickly.*

This part of the lab will guide you through how to capture/save log files locally to a computer.

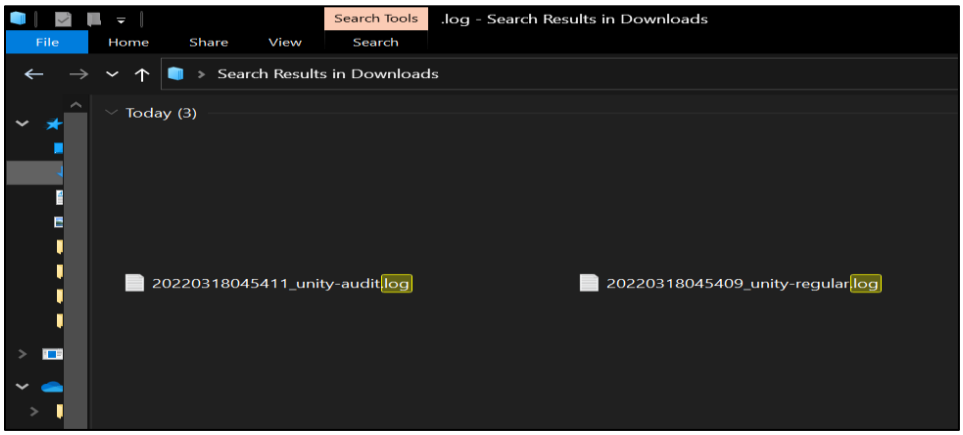
1) Select **Regular Logs** under **System > Logs**.



2) Download the **Regular Logs** by selecting the button. The same procedure can be followed to download **Audit Logs**.



3) Both files will appear downloaded on your local computer.



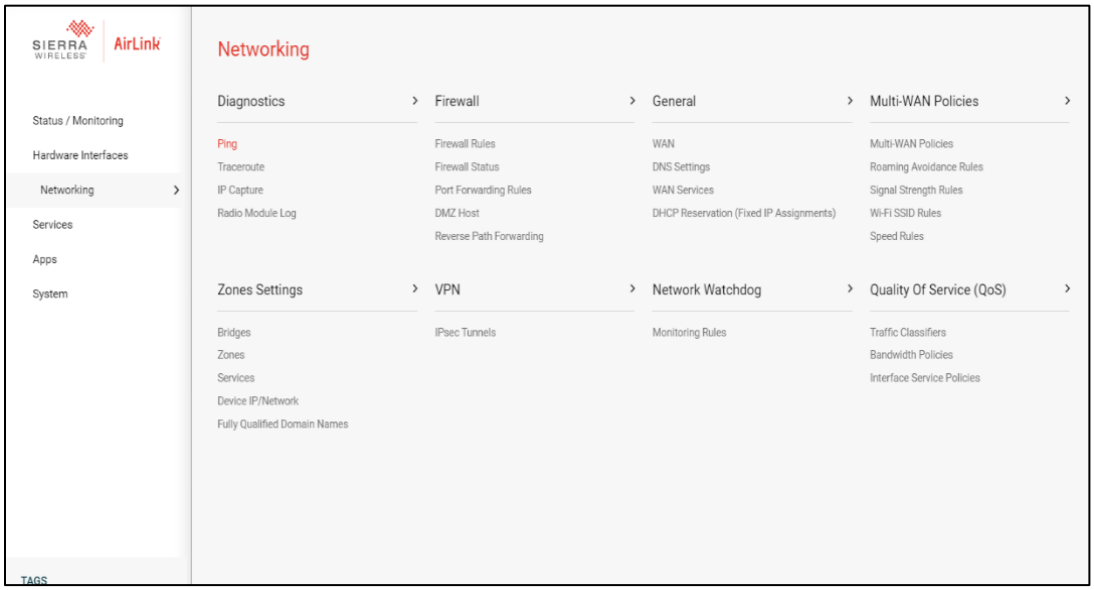
Use the Network Diagnostic Tools in AOS

AOS includes a few helpful network troubleshooting tools such as Ping, Tracert, and IP Capture (tcpdump). This part of the lab will guide you through how to leverage Ping and the IP Capture tool to troubleshoot LAN/WAN routing and connectivity issues.

NOTE *You will be asked to simulate a WAN network outage by disabling the active Wi-Fi WAN, Ethernet WAN, and Cellular interfaces. (as well as the Ethernet WAN interface if being used).*

Ping

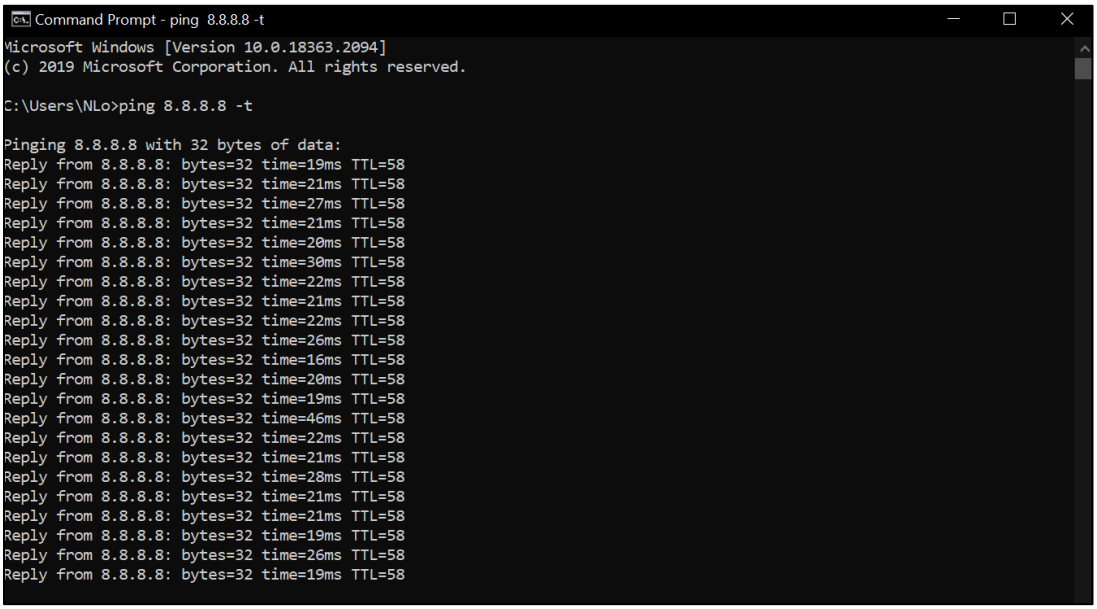
1) Select **Ping** under **Networking > Diagnostics**.



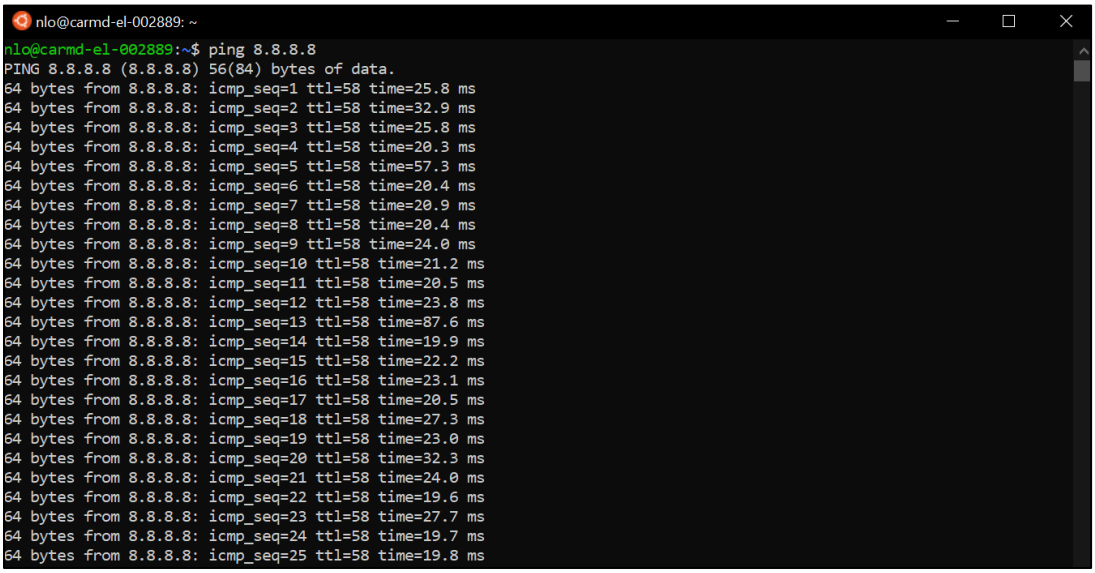
2) Type *8.8.8.8* in the Destination field. Click **Ping**. You should see 3 packets transmitted and 3 packets received successfully

IP Capture (tcpdump)

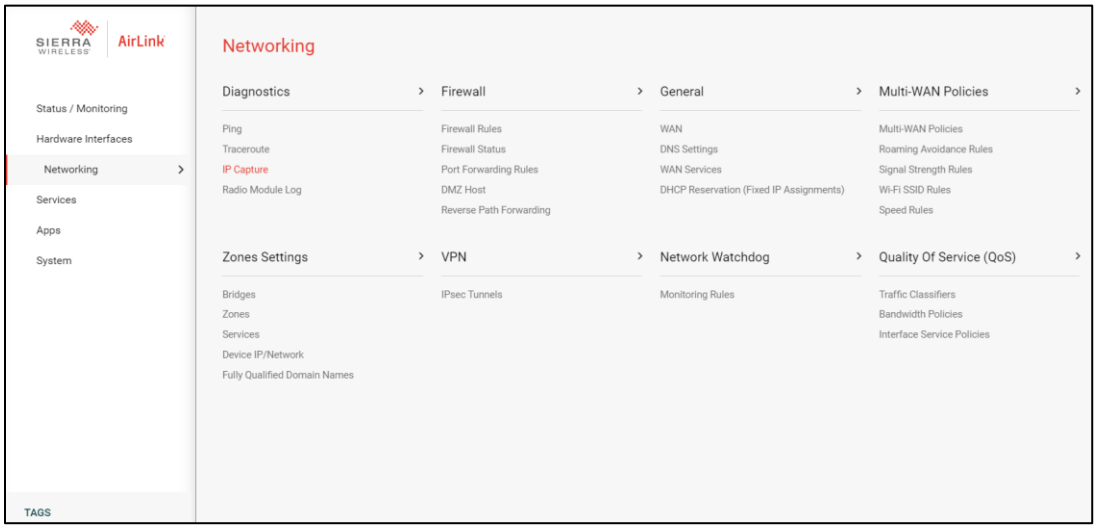
1) Start a continuous ping on your computer.
    a. For Windows users
        i. Open a command prompt. Type in “ping 8.8.8.8 -t” (without quotes). Hit Enter.



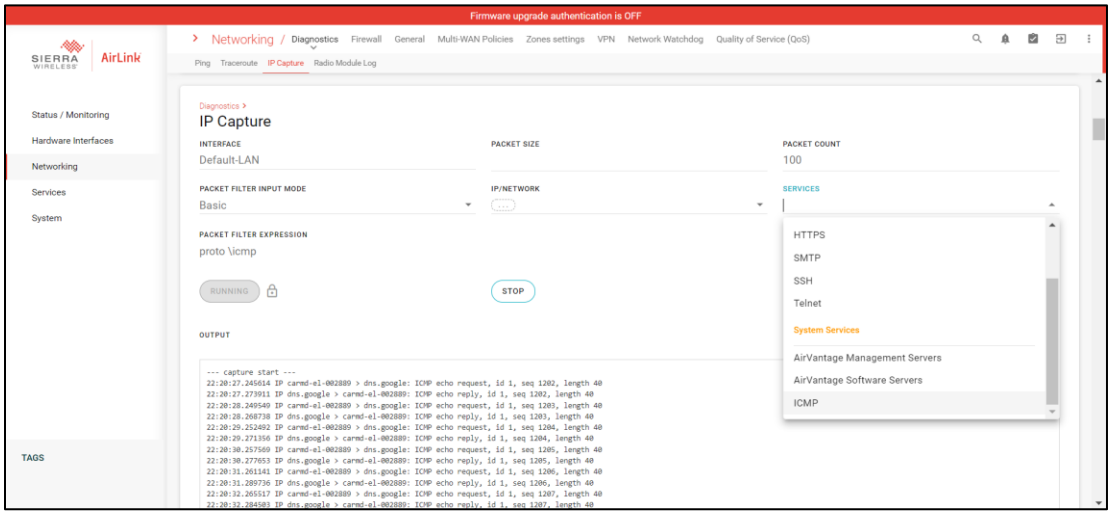
    b. For Linux/Mac users
        i. Open a terminal window. Type in “ping 8.8.8.8” (without quotes). Hit Enter.



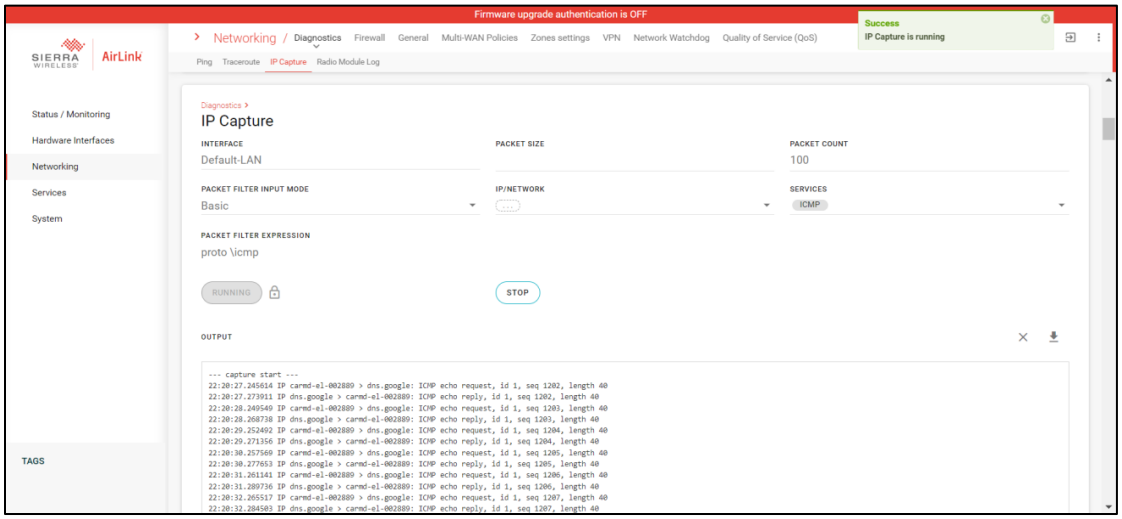
2) Scroll down to the IP Capture section or from the menu, you can select **IP Capture** under **Networking > Diagnostics**.



3) Under **Services**, select **ICMP**. Ensure the Interface is set to **Default-LAN**. The Packet Filter Input Mode should also be set to **Basic**.



4) Click **Start**. This will capture incoming/outgoing ICMP packets on any interface (including the bridge and Wi-Fi Client interfaces). You should see some generated from your computer.



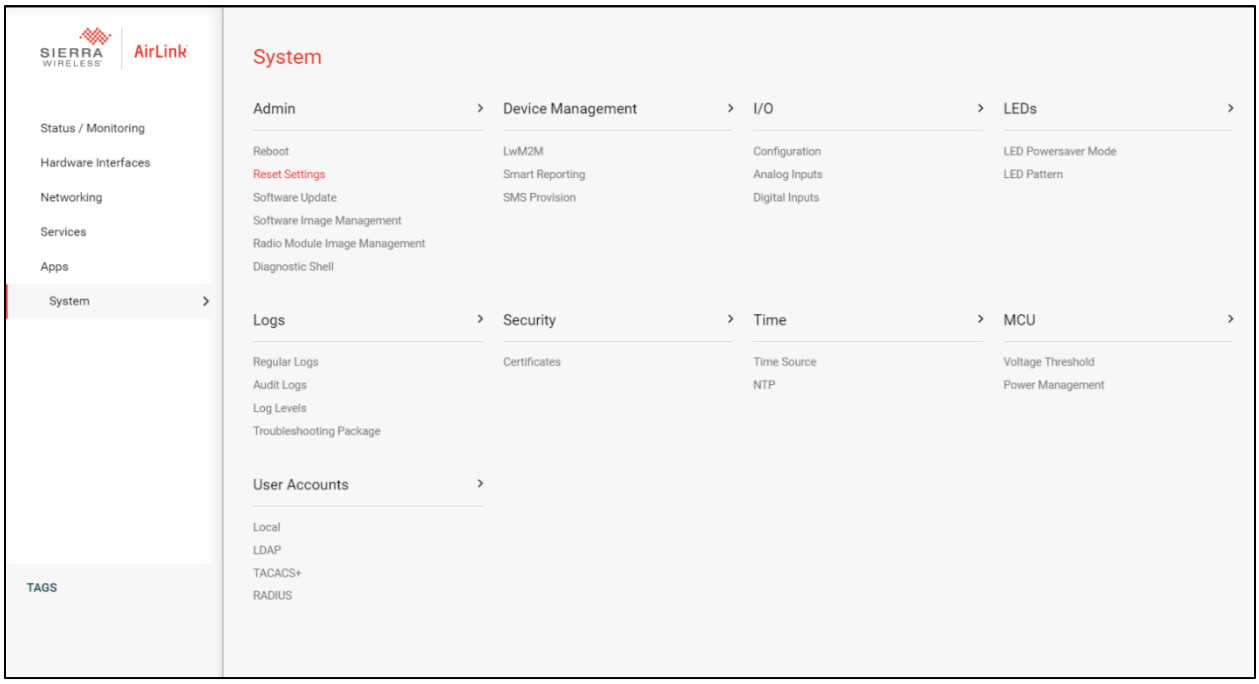
5) **Stop** the capture and continuous ping.

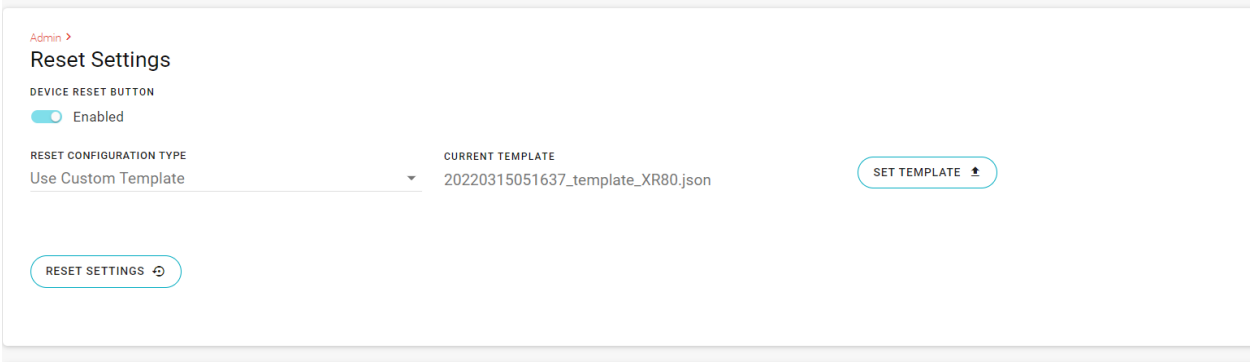
LAB EXERCISES

Please ensure that you have followed the procedure detailed in this document before following through with the lab exercises.

Capture Screenshot #1 – Deploy a Template

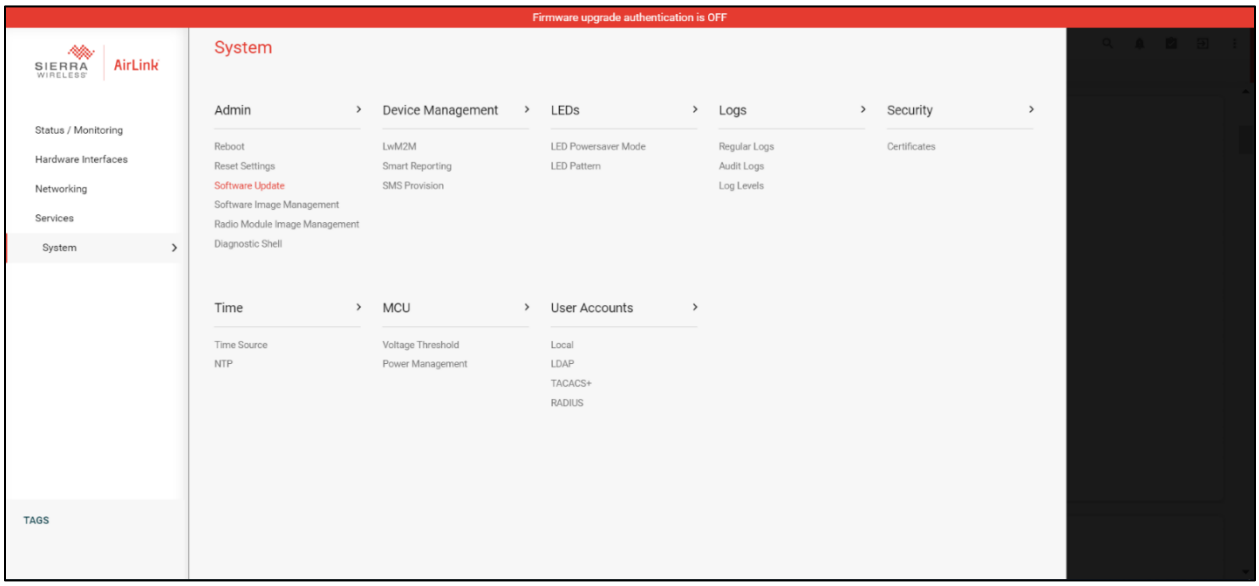
Select **Reset Settings** under **System > Admin**. If a template has been successfully deployed, you should see the Current Template field populated with the template's file name. Please provide a screenshot showing the name of the current template that has been applied.

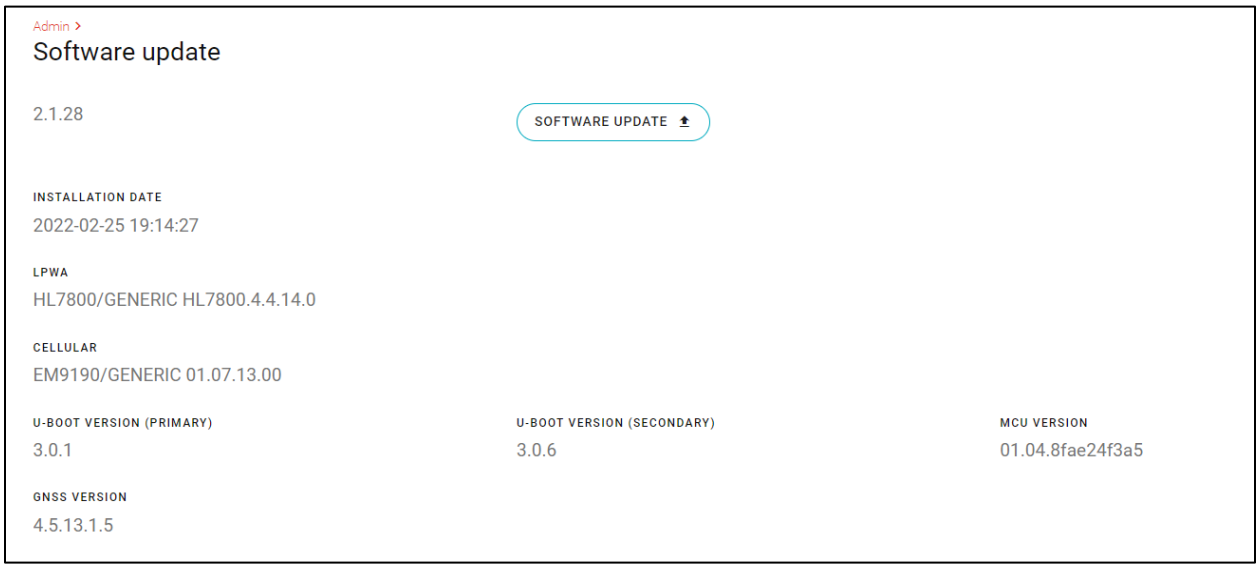


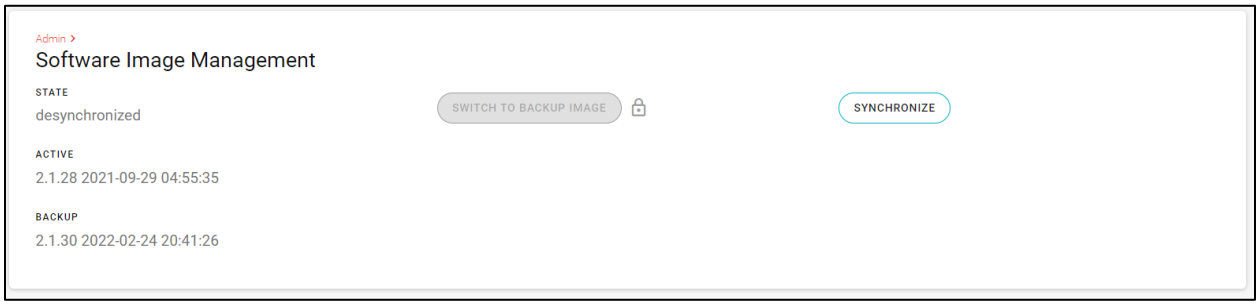


Capture Screenshot #2 – Determine your Current XR AOS firmware

Select **Software Update** under **System > Admin**. Take a screenshot of the current AOS firmware running on your device. Please also provide a screenshot of the Software Image Management that displays the Active and Backup images. Your backup image should be running 2.1.30 (or later firmware).

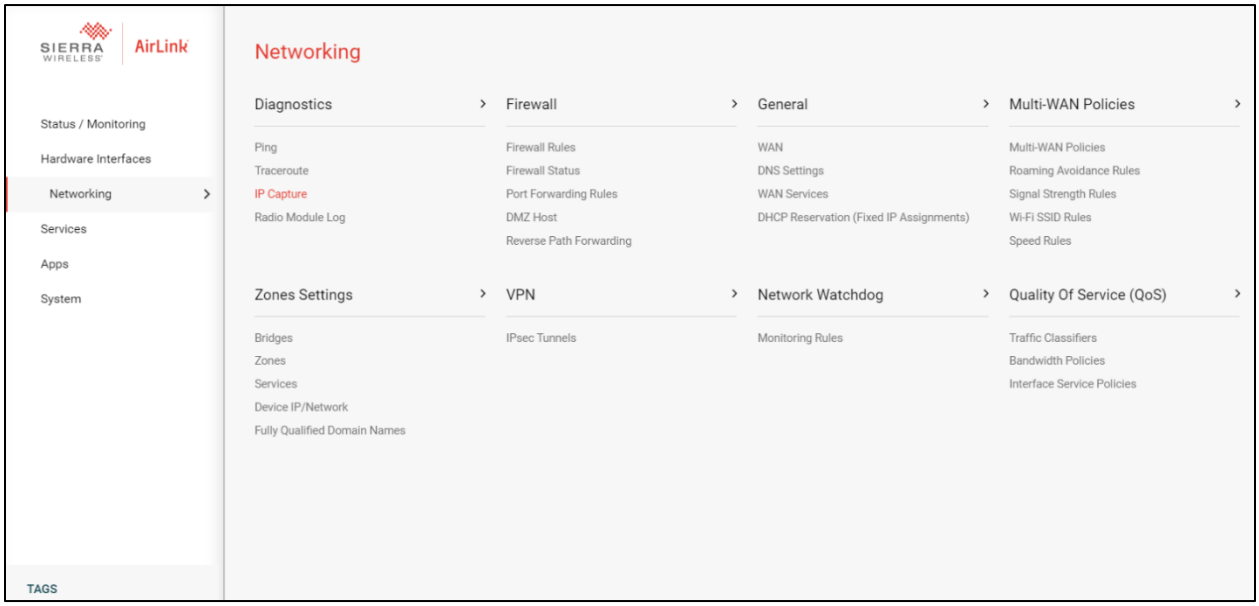


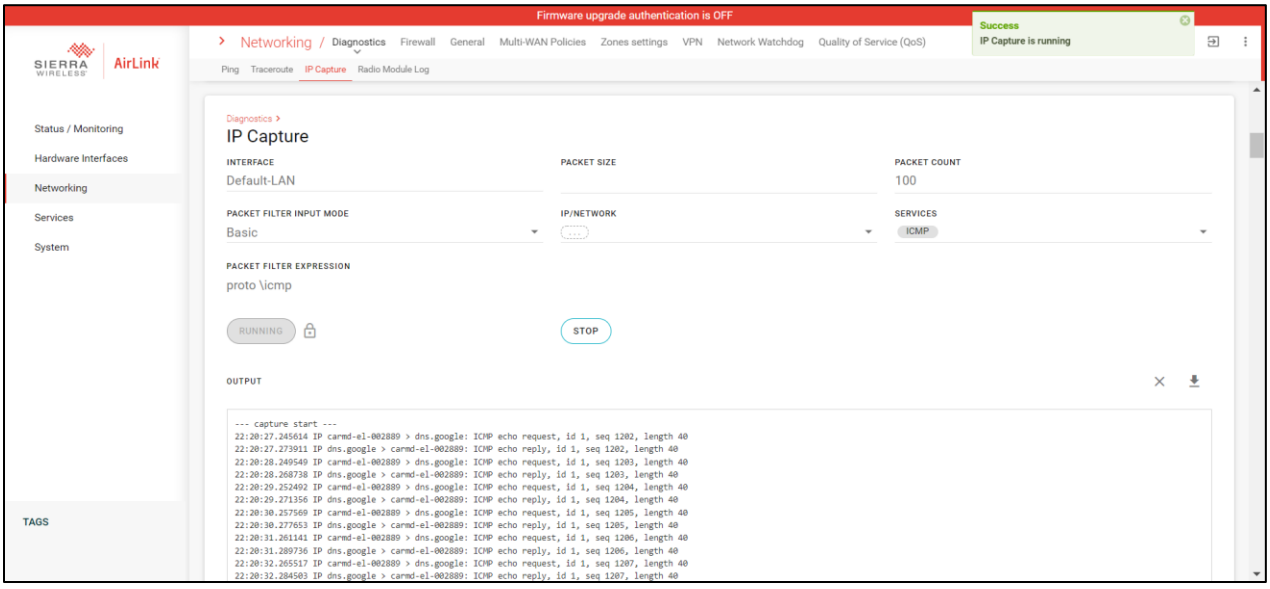




Capture Screenshot #3 – Capture Ping Packets

Start a continuous ping to Google DNS (8.8.8.8) from your computer. Select **IP Capture** under **Networking > Diagnostics**. Click Start. You should notice that the ICMP Echo Request and ICMP Echo Replies are being captured in the Output window. You can now stop the continuous ping from your computer. Please provide a screenshot of your results from the IP Capture window.





Please download the “XRSA-Lab2 Submission Document.docx” file in the Training portal to get started.