

Lab 5: Cybersecurity

The idea here is that the student version will only need to remove the setup and takedown sections.

Background:

Lab Goal/Learning Outcomes:

Equipment:

Hardware

- 1x SEL-3622
- 1x SEL-3622 15 Vdc Power Supply (SPP)
- 1-4x SEL-849
- 1x Network switch (including power cable, if applicable)
- 1x Laptop/Computer with an ethernet port
- 1x SEL C273A cable (SC)
- 2x 3-prong AC power cable (3PC)
- 2x 14 AWG wires (SW)
- 3x Cat5/Cat5e network cable (these can be patch cables)

Software

- SEL-5030 AcSELeRator QuickSet.
- PuTTY or an equivalent terminal based software
- Web browser of any kind.

Setup

1. Connect devices together.
 - i. Note: This is a verification step if this is not the first lab section.
 - b. Cut back the casing on the C273A cable, exposing the 9 interior wires, leaving one side intact.
 - c. Cut back the casing on the 3-prong AC power cables, exposing the 3 interior wires, leaving the male side intact.
 - d. Strip back each of the individual wires on the (1) C273A cable, (2) 3-prong AC power cables, and (3) 14 AWG wires by approximately ¼”.
 - e. Attach each cable according to the following table.

Wire Name	Device	Connection 1	Connection 2
3PC Black 1	SEL-849	A3	
3PC White 1	SEL-849	A2	
3PC Green 1	SEL-849	Ground Screw	
3PC Black 2	SPP	H/+	
3PC White 2	SPP	H/-	
3PC Green 2	SPP	GND	
SW 1	SPP/SEL-3622	SPP +15V	SEL-3622 Power +

SW2	SPP/SEL-3622	SPP RET	SEL-3622 Power -
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f. Connect the SEL-849 to the C273A separated wires according to the following table.

- i. Note: The ends on the C273A cable are not symmetric, so if one configuration does not work, use the other.

SEL-849 Pin #	Configuration 1	Configuration 2
D1	Red	Orange
D2	Green	White
D3	Orange	Red
D4	White	Green
D5	Black	Black

- g. Plug the unaltered end of the C273A cable into COM01 on the SEL-3622.
h. Connect the network switch to (1) SEL-3622 Eth F, (2) SEL-849 Port 2A, (3) Laptop.
i. Plug the (1) network switch, (2) SEL-849, and (3) SPP into a 120 Vac power source.

2. Commission the SEL-3622.

- a. Set the IPv4 address on the laptop to [REDACTED] and the subnet mask to [REDACTED].
i. Note: The IP address can be any number between [REDACTED] and [REDACTED] but [REDACTED] is suggested.
b. Go to https://[REDACTED] using a web browser of any kind.
i. Note: Connection to The Internet connection is not necessary as a physical connection is already made.
c. Commission the device with the following information. Leave the other fields blank.

Username	[REDACTED]
Password	[REDACTED]
Hostname	[REDACTED]
Default Ethernet Port	[REDACTED]

- d. Click submit. This should automatically redirect to the main login page.
e. Log in with the above username and password.
3. Create a second user on the SEL-3622.
a. Click on User>Accounts.
b. Click "Add User".
c. Give the user the username: quickset and the same password as admin1.
d. Click submit.
4. Verify connectivity with AcSElerator QuickSet.
a. Open QuickSet.
b. Open the Device Manager.

- i. Caution: The default username for QuickSet is “admin” with a blank password. Do not change this.
- c. Right click in “Connection Explorer” and navigate to Add>Device>SEL-3622.
- d. Open the SEL-3622 Configuration by double clicking on the device.
- e. Click “Edit” at the bottom right of the newly opened page.
- f. Check the box “Is Managed” in the Device tab.
- g. Change the Device Name and Global ID to SEL-3622-ECE-444-544.
- h. Change the Connection Type on the Connection tab to Network.
- i. Set the Host IP Address to [REDACTED] and leave the rest of the fields as their default.
- j. Click Apply.
- k. Right click on SEL-3622-ECE-444-544 in the Connection Explorer and navigate to Add>Device>SEL-849.
- l. Click “Edit” at the bottom right of the newly opened page.
- m. Change the Device Name and Global ID to SEL-849_SER# where # increments from 1 to 4 for each SEL-849 being connected to the SEL-3622.
- n. Change the Pass Through Port on the Connection tab to match #.
- o. Click Apply.
- p. Repeat steps k-o for each SEL-849 being used.
- q. Right Click on SEL-3622-ECE-444-544 in the Connection Explorer and navigate to Device Tasks>Send.
- r. Enter the credentials for the user quickset.

Main Procedure

1. Add new users and local groups to the server.
 - a. Go to the SEL-3622 web server at https://[REDACTED]
 - b. Click on User>Accounts.
 - c. Click Add User.
 - d. Create 3 accounts each for supervisors, engineers, and IT.
 - e. Click on User>Local Groups.
 - f. Create one local group each for supervisors, engineers, and IT. Add the corresponding 3 users to each group.
2. Add QuickSet Permissions.
 - a. Open AcSELeRator QuickSet.
 - b. Navigate to Tools>Device Manager>Users.
 - c. Right click on Local Users and select Add.
 - d. Create user accounts for each of the accounts just created on the web server.
 - e. Right click on Local Groups and select Add.
 - f. Create local groups for each of the groups just created on the web server.
 - g. Add the corresponding members to each group.
 - h. Double click on SEL-849_SER# in the Connection Explorer.
 - i. Click “Edit” at the bottom right of the newly opened page.
 - j. Add the local groups just created in the Permissions tab.
 - k. Give Supervisors all access, Engineers access to Connect, ACC, and 2AC, and IT access to only Connect.

- l. Click Apply.
 - m. Right Click on SEL-3622-ECE-444-544 in the Connection Explorer.
 - n. Navigate to Device Tasks>Send.
 - o. Enter any of the credentials created previously.
3. Create a Scripting-Enabled Master Port (SMP) and test terminal connectivity.
 - a. Go to the SEL-3622 web server.
 - b. Click on Serial Port>Port Mappings.
 - c. Click on Add Group. The alias should be ECE 444-544-# where # is the lab section.
 - d. Click Add Device in the newly created group. The type is Ethernet Listen Local.
 - e. In the next dialog set Alias: SMP, Port: [REDACTED] Protocol: SSH.
 - f. Check the boxes Master Port and Allow Script.
 - g. Click Submit.
 - h. Open PuTTY.
 - i. Set the Host Name: [REDACTED], Port [REDACTED] Connection Type: SSH.
 - j. Click Open.
 - k. Click "Yes" if a dialog box pops up.
 - l. Log in with supervisor credentials created previously.
 - m. Type WHO and press enter. This will display available devices.
 - n. Type SEL # and press enter, where # is whichever device was connected to the SMP in a previous step.
 - o. Type ACC and press enter.
 - p. Type 2AC and press enter.
 - i. Note: Each of these access level elevations could take up to 30 seconds to complete.
 - q. Type SET TID and enter a new TID.
 - r. Type END.
 - s. Type Y.
 - t. Exit the terminal.

Cleanup/Takedown

1. Go to the SEL-3622 web server.
2. Click on System>Device Reset.
3. Click Reset.
 - a. Note: A factory reset could take anywhere from 1-10 minutes.