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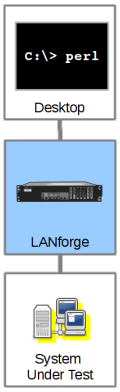
Creating Endpoint Hunt Scripts with CLI API

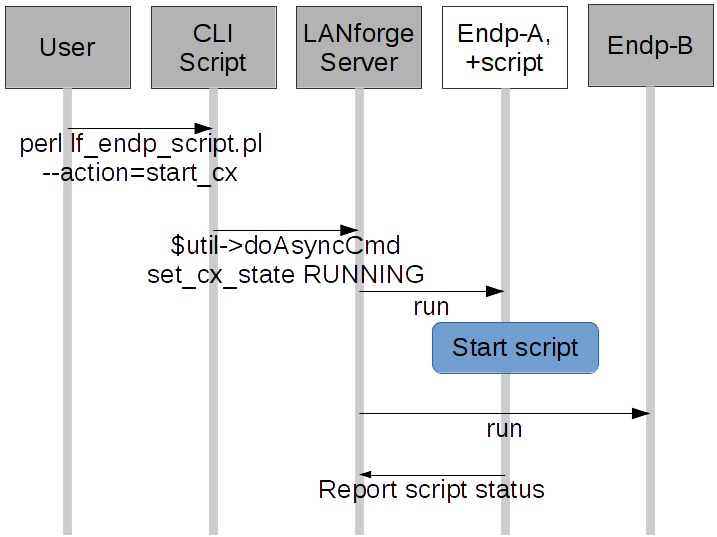
Goal: Use the the CLI to operate the Endpoint Scripting features of the Layer-3 Endpoints you create. Layer-3 endpoints can manipulate their own transmission parameters using a variety of internal scripts, known as *Endpoint Scripts*. Using the `lf_endp_script.pl` CLI script, you can operate those internal endpoints behaviours.



*This cookbook talks about Endpoint Scripts and CLI scripts at the same time. In this chapter, if the term **script** is used, assume **Endpoint Script**.* Additionally, the terms operating and running can also be confusing. To keep the activities distinct, a LANforge *user* will **operate** a CLI script from a terminal. The LANforge *server* will **run** the Endpoint Script. A **CLI script** is a user-space perl script that issues CLI commands to a LANforge server. A **CLI command** is an instruction obeyed by the LANforge server.

The Forces at Play

There are a number of subsystems running while we operate an automated Endpoint Script, so let's review them:

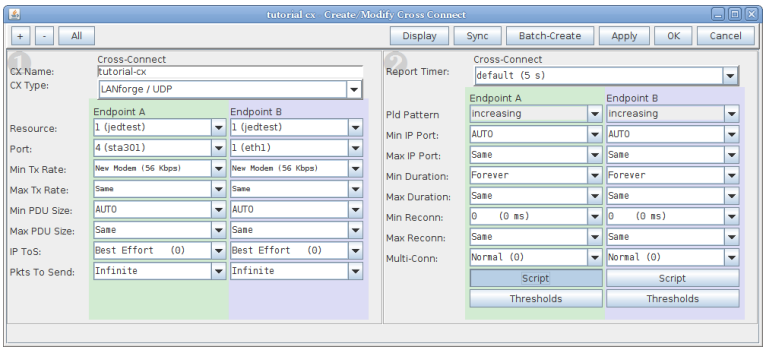


- There will be Layer-3 connect constructed using `lf_firemod.pl`. (Don't forget: create the endpoints before creating the cross connect.)
- A *managed endpoint* of that connection will be configured with an Endpoint Script.
- The attending engineer will operate a CLI script that changes state the Layer-3 connection to Running
- The Layer-3 connection starts both endpoints transmitting, one of them starts running it's Endpoint Script that sets it's transmit parameters.
- Remember: Endpoint Scripts run inside the LANforge server process. CLI scripts run from the client side.

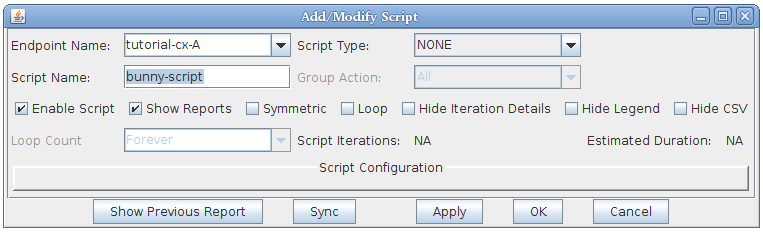
Let's Walk Thru Putting One Together

We recommend starting your first script off by the LANforge GUI to save an endpoint with an Endpoint Script. Next, inspect the LANforge database on the server for the script parameters. Take those parameters and adapt them to the operator's CLI script.

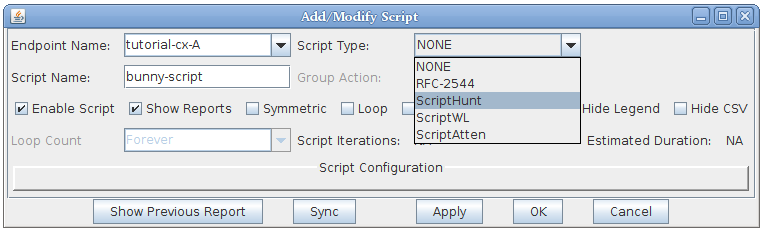
1. From the *Layer-3* tab, open a connection **tutorial-cx**, and navigate to **box 2**. Click on the **Script** button.



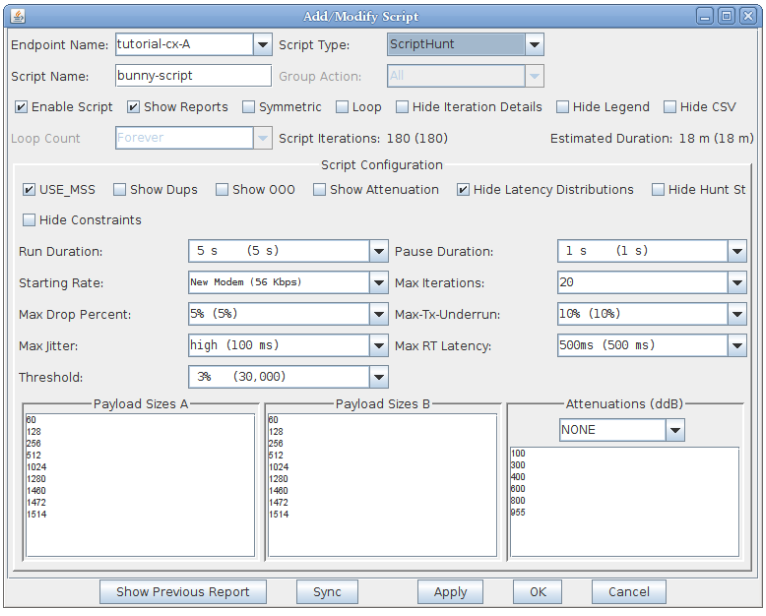
2. Name your script



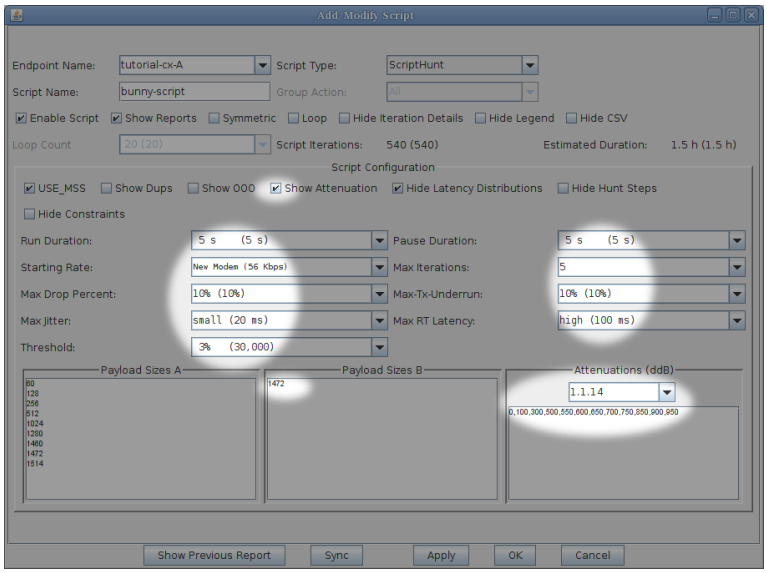
3. Select your Script type, here we choose **ScriptHunt**



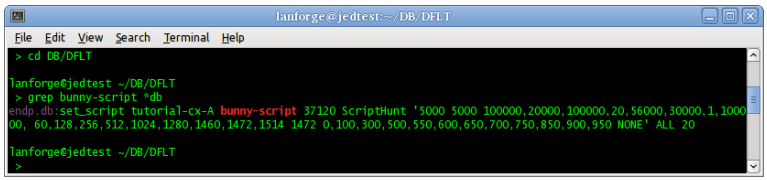
4. We immediately see the parameters for the script:

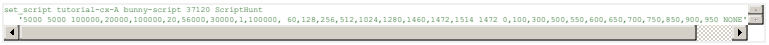


5. Let's modify the parameters to match our CLI command example below:



6. In a LANforge terminal, let's look at at `/home/lanforge/DB/DFLT/endps.db` We will search for `bunny-script` and we'll inspect the resulting CLI command.





7. Now we can craft this command into a CLI script. In a CMD window, we can write the formatted CLI script arguments:

```
C:\> .\lf_endp_script.pl --mgr jedtest --resource 1 ^
 --action set_script --script_type Hunt --script_name bunny-script ^
 --endp_name tutorial-CX-A -loops 1 --flags 37120 ^
 --private "5000 5000 100000,20000,100000,20,56000,30000,1,100000, 60,128,256,512,1024,1280,1460,1472,1514 1472 0,100,300,
```

> In the CMD window, use double-quotes `"` for quoted script arguments. Using single-quotes will break your command.

In a Linux terminal, we can use double `"` or single `'` quotes:

```
$ ./lf_endp_script.pl --mgr jedtest --resource 1 \
 --action set_script --script_type Hunt --script_name bunny-script \
 --endp_name tutorial-CX-A -loops 1 --flags 37120 \
 --private '5000 5000 100000,20000,100000,20,56000,30000,1,100000, 60,128,256,512,1024,1280,1460,1472,1514 1472 0,100,300,
```

8. We can start the connection and the Endpoint Script will immediately begin running:

```
lf_endp_script --mgr jedtest --resource 1 --action start_cx --cx_name tutorial-CX
```

9. If the number of loops is fixed, it will eventually quiesce and stop itself. If we need to stop it and let in-flight packets come to rest, we can quiesce it:

```
lf_endp_script --mgr jedtest --resource 1 --action quiesce_cx --cx_name tutorial-CX
```

We could also use action `stop_cx` to immediately stop the connection.

10. If you have a LANforge GUI running, the Endpoint Script report will automatically display in a GUI window as soon as the connection starts. To display it to the terminal, you need to enable debug output:

```
lf_endp_script.pl --action show_report --endp_name tutorial-CX-A --quiet no
```

Or to save it to a text file:

```
lf_endp_script.pl --action show_report --endp_name tutorial-CX-A --quiet no > /home/lanforge/Documents/report.txt
```

11. To remove the script:

```
lf_endp_script.pl --action remove_script --endp_name tutorial-CX-A
```

At the CLI Command Level

Review of the `set_script` CLI command

We have covered creating endpoints in earlier cookbooks. The perl script `lf_endp_script.pl` was created to modify endpoints and operate their Endpoint Scripts. That script is using the `set_script` CLI command (documented here). A call to it looks like:

```
set_script tutorial-cx-A bunny-script 37120 ScriptHunt '...' ALL 20
```

Endpoint Scripting Uses Large Parameters

That vague `'...'` section is the **private** parameter which is a parameter list each script type requires. The private parameter combines a series of constraints (sub-parameters). For the ScriptHunt, we might use:

```
run_duration pause_duration constraints payload_sizes_a payload_sizes_b attenuations attenuator
 5000         |              |             |                |              |           |
            5000             |             |                |              |           |
100000,20000,100000,20,56000,30000,1,100000  |                |              |           |
                 | 60,128,256,512,1024,1280,1460,1472,1514     |              |           |
                 |                                          1472            |           |
                 |                    0,100,300,500,550,600,650,700,750,850,900,950      |
                 v                                                                      1.1.14
     drops,jitter_us,latency_us,max_steps,start_rate,accuracy,is_bps,max_tx_slowdown
```

Accuracy is also Threshold, max_tx_slowdown is also Underrun. The result is a very long line that has to be surrounded the the CLI level by one pair of single quotes:

```
'5000 5000 100000,20000,100000,20,56000,30000,1,100000, 60,128,256,512,1024,1280,1460,1472,1514 1472 0,100,300,500,550,600,650,700,750,850,900,950 NONE'
```

> Write these parameters very carefully! Your first mistake is likely going to involve misplaced apostrophes.