

Querying the LANforge GUI for JSON Data

Goal: The LANforge GUI now has an embedded webserver and a headless mode of operation. Read on for how to configure and query the client for JSON formatted data.

Updated 2019-11-21: *New features in 5.4.1.*

- Some of the CLI API parameter names have changed. Notably: `nc_show_ports` flags changed to `probe_flags`. Be aware that older scripts might break on upgrade.

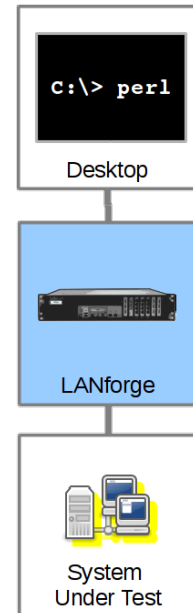
Updated 2018-07-24: *New features in 5.3.8.*

The LANforge GUI (as of release 5.3.6) can be configured to start an embedded web server that can provide data about ports and layer-3 connections. This service can be queried with with any browser or AJAX connection. We're going to increasingly refer to it as the LANforge **client**. This feature provides these benefits:

- More rapid polling: using CLI scripts to poll ports on the LANforge manager can add stress and contention to the LANforge manager; polling the GUI will not tax your test scenario.
- Expanded array of data: the views found in the GUI, like Port Mgr and Layer-3 tabs, contain synthesized data columns not available through the CLI scripting API. Most of these columns can be returned in JSON format.
- Reduced effort when integrating with third party test libraries: many other testing libraries expect JSON formatted input.
- Web socket delivery of event data allows real-time reporting of interface changes and station scan results. This is also a channel for querying additional diagnostic data.
- There is a /help web page that allows you to build POST commands.
- A headless `-daemon` mode that will run the client without any GUI windows. This requires much less memory and has been queried for weeks at a time without crashing or memory leaks.

Present and potential drawbacks of the JSON feature:

- Actively being developed: the JSON views/schema of the objects is at a demonstration state. URLs and JSON structures have changed in 5.3.8.
- Now no longer possible to create Groovy plugins to add JSON features if you want to use the headless mode. JSON Features are compiled into the LANforge GUI from Java sources.
- In 5.3.8 we have limited the view of ports, have added URLs to post direct CLI commands, and have applied HTML `application/x-www-form-urlencoded` form posting submissions in name/value pairs. There is no `multipart/form-data` JSON submission at this time.



Client Settings

The LANforge GUI is started using a script (`lfclient.bash` or `lfclient.bat`). From a terminal, we call that script with the `-httpd` switch. By default the GUI will listen on port 8080:

```
$ cd /home/lanforge
$ ./lfclient.bash -httpd
```

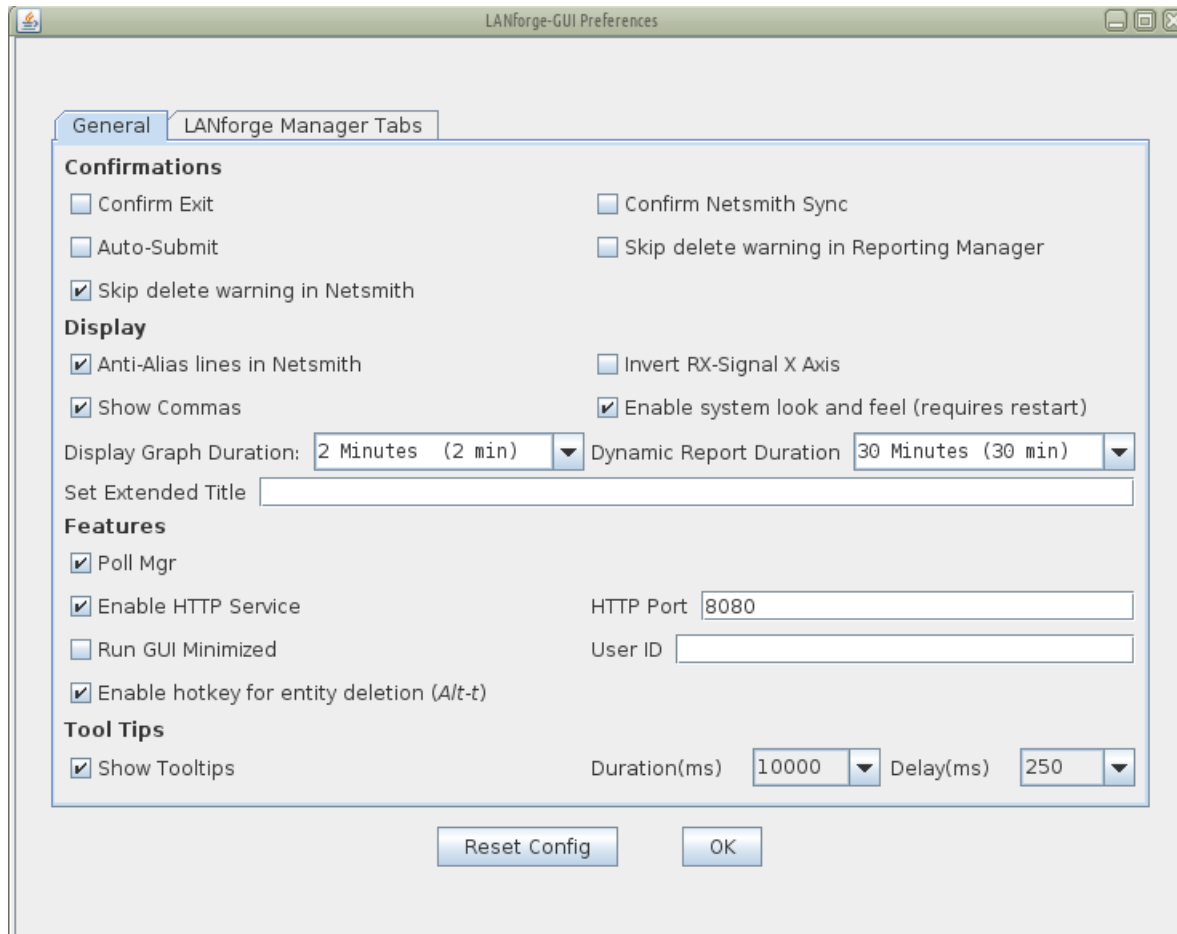
You can specify the port to listen on:

```
$ ./lfclient.bash -httpd 3210
```

You can run the client headless with the `-daemon` switch as well:

```
$ ./lfcclient.bash -httpd -daemon
```

There is a setting in the 5.3.8 *Control*→*Preferences* menu for setting a *minimized mode* and the HTTP port number as well.

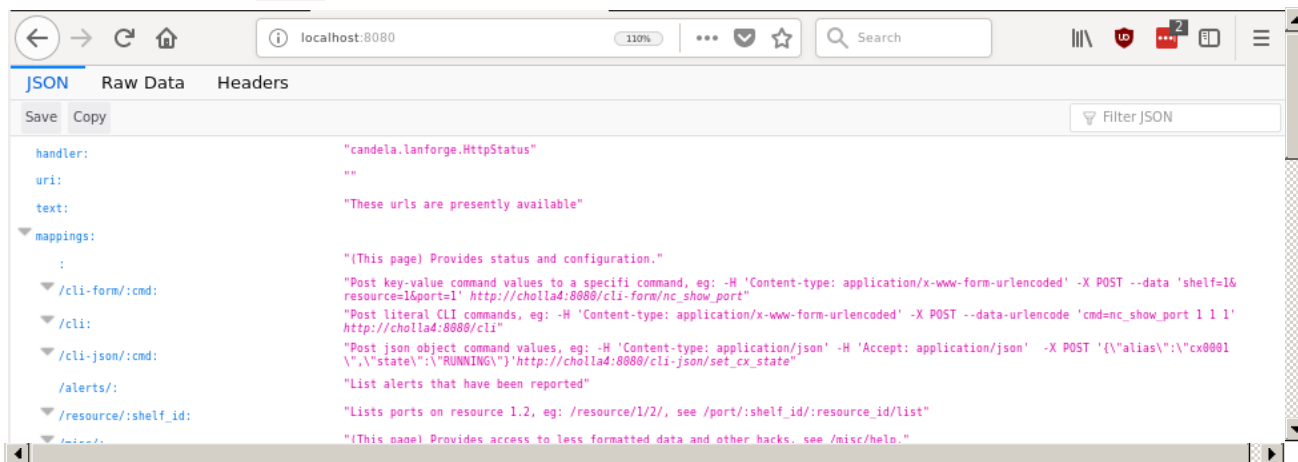


Making Queries

From the terminal we can query the port to find a basic message from the GUI:

```
$ curl -sq http://localhost:8080/
```

This first page (`/`) will give you a JSON list of the resource URLs available. Most URLs will provide JSON as their default content type. Notably, `/help` defaults to HTML.



By default, most URLs will treat a default `Accept: */*` header as `text/html`. Compare the two techniques below:

JSON Output

```
$ curl -sqv -H 'Accept: application/json' http://localhost:8080/resource/1/1
{"handler":"candela.lanforge.HttpResource$JsonResponse","uri":"resource","candela.lanforge.HttpResource$JsonResponse":{"duration":1}}
```

Clearly, the JSON output is difficult to read. We cover formatting output below.

HTML Output

Most of the queries to the client will return JSON by default. The notable exception is the `/help` URL. To get HTML output in the terminal, you have to specify `Accept: text/html` to curl:

```
$ curl -sqv -H 'Accept: text/html' http://localhost:8080/port/1/1/1
!DOCTYPE html>
<html>
<head><title>/port</title>
</head>
<body>
<table border='1'><thead><tr><th>EID</th><th>AP</th><th>Activity</th><th>Channel</th><th>Device</th></tr></thead><tbody>
<tr><td>1.1.1</td><td></td><td>0.0</td><td></td><td>eth1</td><td>>false</td><td>0.0.0.0</td><td></td></tr></tbody></table><hr />
</body>
</html>
```

Formatting Results

JSON formatted text is pretty difficult to read, there are a few different utilities that can help you look at it: `jq`, `json_pp`, `json_reformat`, `tidy`, `xmllint`, `yajl` and `jsonlint`.

Example of installing formatters

On Fedora, install:

```
$ sudo dnf install -y jq perl-JSON-PP tidy libxml2 yajl
```

On Ubuntu, install:

```
$ sudo apt install -y jq libjson-pp-perl perltidy xmllint libxml2-utils yajl-tools
```

Now we can perform a query:

```
$ curl -sq /port/1/1/1
{
  "candela.lanforge.HttpPort" : {
    "duration" : "1"
  },
  "handler" : "candela.lanforge.HttpPort$JsonResponse",
  "interface" : {
    "stuff":...
  },
  "uri" : "port/:shelf_id/:resource_id/:port_id"
}
```

Notice that the URI object list paths with colon-tagged positions in them, e.g.: `/cli-form/:cmd`. These are interpreted as URL parameters and not query string parameters, they cannot be moved into the query string.

Making your shell friendly

To save you typing, you might want to add this function to your `.bash_aliases` file:

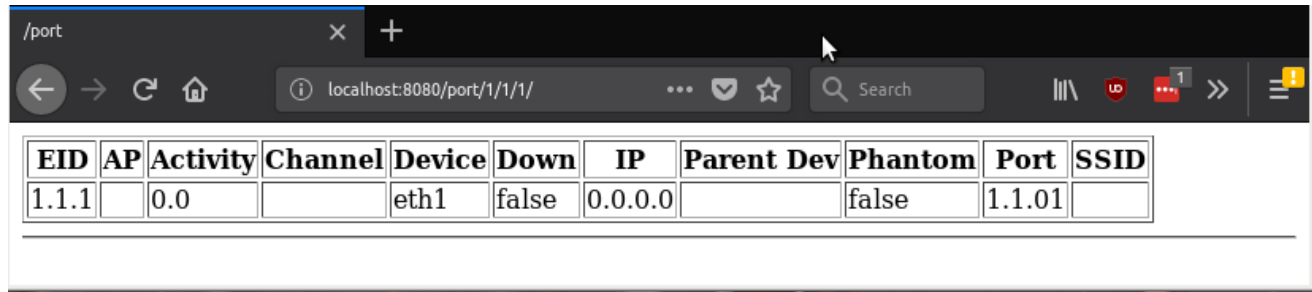
```
function Json() {
  curl -sqv -H 'Accept: application/json' "http://localhost:8080${@}" \
  | json_reformat | less
}
```

Then you can make your calls this way:

```
$ Json /port/1/1/1
```

Browsing results in table format

We can view a URL in a browser as well:



The screenshot shows a web browser window with the address bar displaying 'localhost:8080/port/1/1/1/'. Below the browser, a table is displayed with the following columns and data:

EID	AP	Activity	Channel	Device	Down	IP	Parent Dev	Phantom	Port	SSID
1.1.1		0.0		eth1	false	0.0.0.0		false	1.1.01	

Viewing Alerts and Events

You can both view and stream event data. Querying events and alerts are both quite similar:

```
$ Json /events
{
  "handler" : "candela.lanforge.HttpEvents$FixedJsonResponder",
  "events" : [
    {
      "2249259" : {
        "event" : "Connect",
        "_links" : "/events/2249259",
        "entity id" : "NA"
      }
    },
    ....
  ]
}
```

A busy LANforge system will generate hundreds of thousands of events. Only the last few thousand can be recalled.

You can inspect a singular event:

```
$ Json /events/2249259
{
  "handler": "candela.lanforge.HttpEvents$FixedJsonResponder",
  "uri": "events/:event_id",
  "candela.lanforge.HttpEvents": {
    "duration": "0"
  },
  "event": {
    "eid": "1.3.21",
    "entity id": "NA",
    "event": "Connect",
    "event description": "sta3106 (phy #1): connected to 00:0e:8e:d5:fa:e6",
    "id": "2249259",
    "name": "sta3106",
    "priority": " Info",
    "time-stamp": "2018-07-24 14:39:33.776",
    "type": "Port"
  }
}
```

We can view `/alerts` similarly.

```
$ Json /alerts/92
{
  "handler" : "candela.lanforge.HttpEvents$FixedJsonResponder",
  "uri" : "alerts/:event_id",
  "alert" : {
    "name" : "wlan0",
    "time-stamp" : "2018-07-02 16:23:30.880",
    "entity id" : "NA",
    "id" : "92",
    "eid" : "1.1.5",
    "event description" : "Port wlan0 has no WiFi SSID Configured.",
  }
}
```

Streaming Events

Continually polling the `/events` URL is not as effective as streaming a websocket providing the same data. We need a web socket client. Websockets are built into modern browsers and there are python and perl utilities for the job as well. An easy to use python client is `wsdump`.

Installing wsdump

There is a useful python utility called `wsdump` (or `wsdump.py`). Try to install the `python-websocket` package to get it. There are many similar matches, but there is not one dedicated package that provides it. On Fedora:

```
root@fedora$ dnf whatprovides `which wsdump`
root@fedora$ dnf install -y python3-websocket-client
```

```
root@ubuntu$ ls -l /usr/bin/wsdump
/usr/bin/wsdump -> /etc/alternatives/wsdump
root@ubuntu$ ls -l /etc/alternatives/wsdump
/etc/alternatives/wsdump -> /usr/bin/python2-wsdump
root@ubuntu$ dpkg-query -S /usr/bin/python2-wsdump
python-websocket: /usr/bin/python2-wsdump

root@ubuntu$ sudo apt install python-websocket
```

You might need to install pip, and that might be in the `python3-pip` package. Then you can install via:

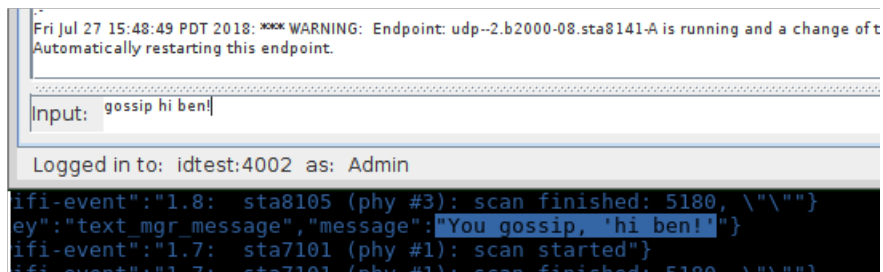
```
$ sudo apt install python-pip # or sudo dnf install python-pip
$ sudo pip install --upgrade pip
$ pip search websocket
$ sudo pip install websocket-client
```

Streaming Using wsdump

Here's an example of `wsdump` below. Don't forget you are now using the `ws://` schema and not the `http://` schema!

```
$ /usr/bin/wsdump ws://localhost:8081/
```

It might take a few second to start showing results if your system is not very active. You should be able to prompt output by executing this message in the **Messages** tab: `gossip hi ben!`



```

Fri Jul 27 15:48:49 PDT 2018: *** WARNING: Endpoint: udp--2.b2000-08.sta8141-A is running and a change of t
Automatically restarting this endpoint.
-----
Input: gossip hi ben!
-----
Logged in to: idtest:4002 as: Admin
ifi-event": "1.8: sta8105 (phy #3): scan finished: 5180, \\""}
ey": "text_mgr_message", "message": "You gossip, 'hi ben!'"
ifi-event": "1.7: sta7101 (phy #1): scan started"}
ifi-event": "1.7: sta7101 (phy #1): scan finished: 5180, \\""}

```

Streaming Using javascript

You can also use a web page to follow events because websockets are built into modern browsers. This is a screenshot of the

WebSocket Test

URL (ws://)

```

{"wifi-event": "1.3: IFNAME=sta3120 <3>CTRL-EVENT-CONNECTED - Connection to 00:0e:8e:d5:fa:e6 completed [id=0 id_str=]"}
{"wifi-event": "1.1: vap1000: del station 00:0e:8e:a1:7d:45"}
{"flags": 0, "event_type": 0, "event_id": 400895, "eid_type": 2, "shelf": 1, "resource": 3, "port": 33, "endp": 0, "extra": 0, "pri
sta3120 is Link DOWN.", "name": "sta3120", "eid": "1.3.33", "event_eid": {"type": 11, "event_id": 400895, "index": -
1, "flags": 0, "is_alert": true}, "is_alert": true}
{"deleted-alert": 400895}
{"flags": 0, "event_type": 0, "event_id": 400896, "eid_type": 2, "shelf": 1, "resource": 3, "port": 33, "endp": 0, "extra": 0, "pri
sta3120 is Link DOWN.", "name": "sta3120", "eid": "1.3.33", "event_eid": {"type": 11, "event_id": 400896, "index": -
1, "flags": 0, "is_alert": true}, "is_alert": true}
{"flags": 0, "event_type": 0, "event_id": 1023429, "eid_type": 2, "shelf": 1, "resource": 3, "port": 33, "endp": 0, "extra": 0, "pri
sta3120 is Link DOWN.", "name": "sta3120", "eid": "1.3.33", "event_eid": {"type": 11, "event_id": 1023429, "index": -
1, "flags": 0, "is_alert": false}, "is_alert": false}
{"wifi-event": "1.3: sta3120: del station 00:0e:8e:d5:fa:e6"}
{"wifi-event": "1.3: sta3120 (phy #1): deauth 00:0e:8e:a1:7d:45 -> 00:0e:8e:d5:fa:e6 reason 3: Deauthenticated
because sending station is leaving (or has left) the IBSS or ESS"}
{"flags": 0, "event_type": 7, "event_id": 1023430, "eid_type": 2, "shelf": 1, "resource": 3, "port": 33, "endp": 0, "extra": 0, "pri
(phy #1): disconnected (local request) reason: 3: Deauthenticated
becau", "name": "sta3120", "eid": "1.3.33", "event_eid": {"type": 11, "event_id": 1023430, "index": -
1, "flags": 0, "is_alert": false}, "is_alert": false}
{"wifi-event": "1.3: sta3120 (phy #1): disconnected (local request) reason: 3: Deauthenticated because sending
station is leaving (or has left) the IBSS or ESS"}
{"flags": 0, "event_type": 50, "event_id": 1023431, "eid_type": 2, "shelf": 1, "resource": 3, "port": 32, "endp": 0, "extra": 0, "pri
sta3119 IP changed from 0.0.0.0 to 10.41.13.111", "name": "sta3119", "eid": "1.3.32", "event_eid":
{"type": 11, "event_id": 1023431, "index": -1, "flags": 0, "is_alert": false}, "is_alert": false}
DISCONNECTED
  
```

Data Views

URLs

`/shelf`

The `/shelf/1/` URL provides a list of resources in your realm:

```

$ Json /shelf/1
{
  "handler": "candela.lanforge.HttpResource$JsonResponse",
  "uri": "shelf/:shelf_id",
  "candela.lanforge.HttpResource": {
    "duration": "0"
  },
  "resources": [
    {
      "1.1": {
        "_links": "/resource/1/1",
        "hostname": "idtest.candelatech.com"
      }
    },
    {
      "1.2": {
        "_links": "/resource/1/2",
        "hostname": "hedtest"
      }
    }
  ]
}
  
```



/shelf/1/

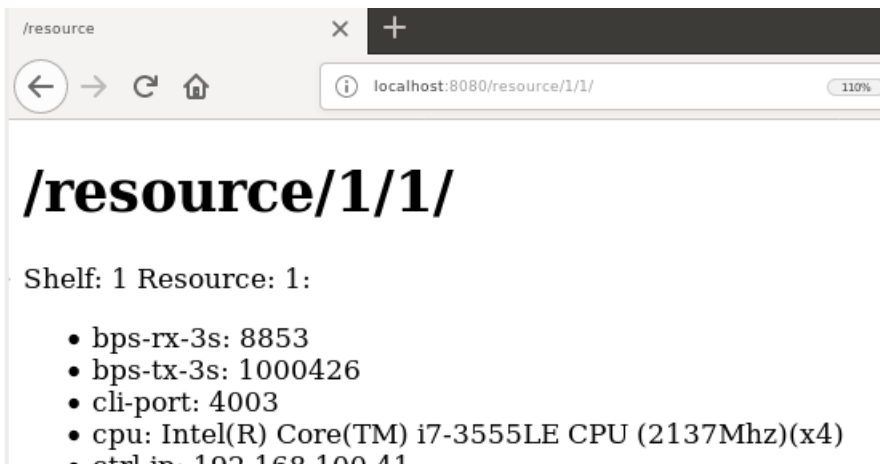
- [Resource 1](#)
 - [Resource 2](#)
 - [Resource 3](#)
 - [Resource 4](#)
 - [Resource 5](#)
 - [Resource 6](#)
 - [Resource 7](#)
 - [Resource 8](#)
-

/resource

The `/resource` URL provides a digest of ports available at the requested resource.

```
$ Json /resource/1/1
{
  "handler" : "candela.lanforge.HttpResource$JsonResponse",
  "resource" : {
    "free swap" : 526332,
    "free mem" : 4634228,
    "load" : 0.4,
    "bps-rx-3s" : 7850,
    "sw version" : " 5.3.8 64bit",
    "entity id" : "NA",
    "tx bytes" : 40533976395,
    "phantom" : false,
    "eid" : "1.1",
    "hostname" : "idtest.candelatech.com",
    "hw version" : "Linux/x86-64",
    "mem" : 8057280,
    "cpu" : "Intel(R) Core(TM) i7-3555LE CPU (2137Mhz)(x4)",

```



/port

The `/port` URL provides a digest of ports and their state. You can request multiple ports by ID on this resource by appending the port IDs with commas. You can list ports on a resource:

```
$ Json /port/1/5/list
{
  "handler" : "candela.lanforge.HttpPort$JsonResponse",
  "uri" : "port/:shelf_id/:resource_id/:port_id",
  "interfaces" : [
    {
      "1.5.b5000" : {
        "entity id" : "NA",
        "_links" : "/port/1/5/7",
        "alias" : "b5000"
      }
    },
    {
      "1.5.eth0" : {
        "alias" : "eth0",
        "_links" : "/port/1/5/0",
        "entity id" : "NA"
      }
    }
  ]
}
```

We can query multiple ports at a time by their number or their name by placing a comma between the specifiers. Additionally, we can query for just the fields we desire. All field names are lower-case: `?fields=tx+crr,rx+fifo`.

```
$ Json '/port/1/5/wiphy0,wiphy1?fields=device,phantom,tx+bytes,mode'
{
  "interfaces" : [
    {
      "1.5.wiphy0" : {
        "tx bytes" : 401236186,
        "mode" : "802.11abgn",
        "device" : "wiphy0",
        "phantom" : false
      }
    },
    {
      "1.5.wiphy1" : {
        "phantom" : false,
        "device" : "wiphy1",
        "mode" : "802.11abgn",
        "tx bytes" : 403975812
      }
    }
  ]
}
```

localhost:8080/port/1/1/3,4/

EID	4Way Time	ANQP Time	AP	Activity	Alias	Beacon	Bytes RX LL	Bytes TX LL	CX Ago	CX Time	Channel	Collisions	Connections	Crypt	DHCP (ms)	Device	Down	Gr	

/cx

The `/cx` URL allows us to query Layer-3 connection information.

```
$ Json /cx
{
  "uri" : "cx",
  "handler" : "candela.lanforge.GenericJsonResponder",
  "connections" : [
    "41.1" : {
      "entity id" : "NA",
      "name" : "udp:r3r2:3000",
      "_links" : "/cx/41"
    },
    "50.1" : {
      "name" : "udp:r3r2:3009",
      "entity id" : "NA",
      "_links" : "/cx/50"
    }
  ]
}
```

And individual connections:


```
$ Json /cx/udp:r3r2:3000$ Json 'cx/udp:r3r2:3000'
{
  "uri" : "cx:/cx_id",
  "41.1" : {
    "drop pkts b" : 0,
    "type" : "LF/UDP",
    "rx drop % a" : 0,
    "rpt timer" : "1000",
    "pkt rx a" : 0,
    "avg rtt" : 0,
    "rx drop % b" : 0,
    "name" : "udp:r3r2:3000",
    "endpoints (a ↔ b)" : "udp:r3r2:3000-A <=> udp:r3r2:3000-B",
    "drop pkts a" : 0,
    "entity id" : "NA",
    "bps rx a" : 0,
    "eid" : "1.41",
  }
}
```

i Technically, colons in URLs need to be encoded as `%3A`, so the above URL should be `/cx/udp%3Ar3r2%3A3000`, but `curl` is pretty darned forgiving.

/endp

Endpoints may be listed and inspected:

```
$ Json /endp/
{
  "uri" : "endp",
  "handler" : "candela.lanforge.HttpEndp$JsonResponse",
  "candela.lanforge.HttpEndp" : {
    "duration" : "4"
  },
  "endpoint" : [
    {
      "1.2.8.55.2" : {
        "_links" : "/endp/55",
        "entity id" : "NA",
        "name" : "sta3000-ep-B"
      }
    },
    {
      "1.2.8.57.1" : {

```

```
$ Json /endp/sta3000-ep-B
{
  "candela.lanforge.HttpEndp" : {
    "duration" : "1"
  },
  "uri" : "endp:/endp_id",
  "endpoint" : {
    "rx rate ll" : 0,
    "pdu/s tx" : 0,
    "bursty" : false,
    "rx rate" : 0,
    "tx pkts ll" : 0,
    "rx bytes" : 0,
    "run" : false,
    "tcp rtx" : 0,
    "min pdu" : 1460,
    "pps rx ll" : 0,
  }
}
```

Creating Ports

It is possible to create ports and connections by using the **CLI commands**. Your LANforge test scenarios (located in the `/home/lanforge/DB/` directory) contain all the CLI commands that create your ports and connections. You can submit **those commands** over HTTP in two ways:

- `/cli-json/$command` An example of using the `gossip` command:

```
curl -X POST -H 'Content-type: application/json' \
  -d '{"message":"hello world"}' http://localhost:8080/cli-json/gossip
```

Then check your LANforge GUI messages.

- `/cli-form/$command` An example of using the `gossip` command:

```
curl -X POST -d 'message=hello+world' http://localhost:8080/cli/gossip
```

Then check your LANforge GUI messages.

- `/cli/`: use this method to submit a raw URL-encoded command. This might be useful if you are copying commands directly out of a database:

```
curl -X POST -d 'cmd=gossip hello' http://localhost:8080/cli/
```

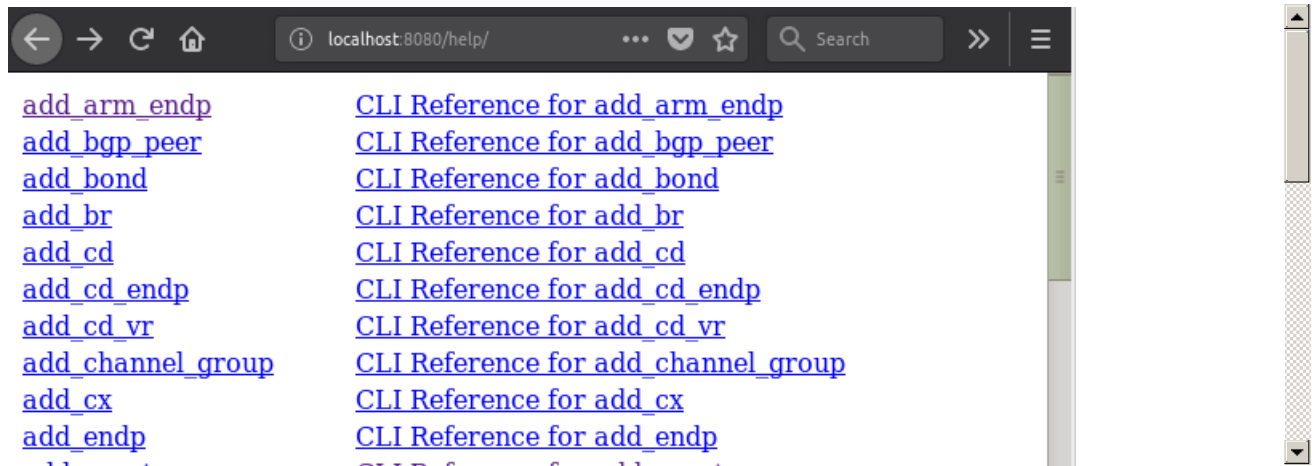
Except for `/cli-json`, these methods accept `application/x-www-form-urlencoded` content type submissions. This is default for the NanoHttp library and default for `curl`.

These CLI commands do not return data, only a result code. All data that the Perl scripts would collect from command line queries is sent directly to the GUI. Some CLI commands send data over the websocket, like the `diag` command.

Command help

Commands are often complex and include a number of bitwise flags to set the state and features of ports. There is presently no tag-substitution for port flags, but there is a help utility that can help you compute them.

```
http://localhost:8080/help/
```



Select a command to see the field helper screen:

```
http://localhost:8080/help/set_port
```

Type values into the field inputs and the CLI command will be refreshed:



Click the **Parse Command** button and the values in the command box will be displayed in the curl command and the field inputs. (Notice this form is doing a GET request.)

This is the curl command:

```
$ echo 'shelf=1&resource=3&port=sta3000&current_flags=2147483649&interest=16384&report_timer=3' > /tmp/curl_data
$ curl -sqv -H 'Accept: application/json' -X POST -d '@/tmp/curl_data' http://atlas:8080/cli-form/set_port
```

This is the CLI command:

```
1 3 sta3000 NA NA NA NA 2147483649 NA NA NA NA 16384 3 NA NA NA NA NA NA NA NA NA
NA NA NA NA NA NA NA NA NA
```

Parse Command

You may find a list of flag fields that are organized by field names. The text area below the selection list is the sum of the selected fields. Copy the flag values into the input field above to incorporate it into your command.

```
current.advert-flow-control
current.auto-negotiate
flags2.BYPASS_DISCONNECT
flags2.BYPASS_ENABLED
flags2.BYPASS_POWER_DOWN
flags2.BYPASS_POWER_ON
flags2.SUPPORTS_BYPASS
flags2.USE_STP
interest.AUX-MGT
interest.Alias
interest.BRIDGE
interest.BYPASS
interest.CPU_MASK
interest.DHCP
interest.DHCP-RLS
interest.DHCPv6
interest.GEN_OFFLOAD
interest.IFDOWN
interest.INTERNAL_USE
interest.IPV6_ADDRS
```

Creating a WiFi Station

Please refer to the scripts `1f_associate_ap.pl` and `1f_vue_mod.sh` for examples of how to produce lists of CLI commands involved in creating stations. Please refer to:

1. [Learn CLI Commands used to operate WiFi stations](#)
2. and [Changing Station WiFi SSID with the CLI API](#)

These will provide ways of collecting the CLI commands in log files for you to place into the command `/help/` page.

- Use ssh to log into your LANforge manager. Use the `1f_vue_mod.sh` script to create a station:

```
$ cd scripts
$ ./1f_vue_mod.sh --mgr localhost --resource 3 --create_sta --name sta3101 \
  --radio wiphy1 --ssid idtest-1000-open --passphrase '[BLANK]' \
  --log_cli /tmp/clilog.txt

$ cat /tmp/clilog.txt
set_wifi_radio 1 3 wiphy1 NA -1 NA NA NA NA NA NA NA NA 0x1 NA
add_sta 1 3 wiphy1 sta3101 1024 idtest-1000-open NA [BLANK] AUTO NA 00:0e:8e:c1:df:45 8 N
set_port 1 3 sta3101 0.0.0.0 255.255.0.0 0.0.0.0 NA 2147483648 00:0e:8e:c1:df:45 NA NA NA
```

- Enter each command into the your browser toolbar by altering the command into a url:

```
http://localhost:8080/help/set_wifi_radio?cli=1 3 wiphy1 NA -1 NA NA NA NA NA NA
```

Produces:

```
$ echo 'shelf=1&resource=3&radio=wiphy1&channel=-1&flags=0x1' > /tmp/curl_data
$ curl -sqv -H 'Accept: application/json' -X POST -d '@/tmp/curl_data' \
http://localhost:8080/cli-form/set_wifi_radio
```

```
http://localhost:8080/help/add_sta?cli=1 3 wiphy1 sta3101 1024 idtest-1000-open N
```

Produces:

```
$ echo 'shelf=1&resource=3&radio=wiphy1&sta_name=sta3101&flags=1024&ssid=idtest'
$ curl -sqv -H 'Accept: application/json' -X POST -d '@/tmp/curl_data' \
http://localhost:8080/cli-form/add_sta
```

```
http://localhost:8080/help/set_port?cli=1 3 sta3101 0.0.0.0 255.255.0.0 0.0.0.0 N
```

Produces:

```
$ echo 'shelf=1&resource=3&port=sta3101&ip_addr=0.0.0.0&netmask=255.255.0.0&gat'
$ curl -sqv -H 'Accept: application/json' -X POST -d '@/tmp/curl_data' \
http://localhost:8080/cli-form/set_port
```

- Verify with the LANforge GUI the changes you wish to make.

Creating Connections

Using the `/cli-json/add_endp` and `/cli-json/add_cx` URLs, it is possible to create Layer-3 connections. Create the Layer-3 endpoints first, of course.

Create L3 Endpoints

Construct your command using the `/help/add_endp` page. For an example, use these parameters:

alias	enter udp1000-A
shelf	1
resource	2
port	b2000
type	select type.lf_udp
min_rate	1000000 (1 Mbps)
max_rate	SAME
payload_pattern	select payload_pattern.increasing

Command Composer [add_endp]

This is the curl command:

```
$ echo 'alias=udp1000-A&shelf=1&resource=2&port=b2000&type=lf_udp&min_rate=1000000&payload_pattern=increasing' > /tmp/curl_data
$ curl -sqv -H 'Accept: application/json' -X POST -d '@/tmp/curl_data' http://atlas:8080/cli-form/add_endp
```

This is the CLI command:

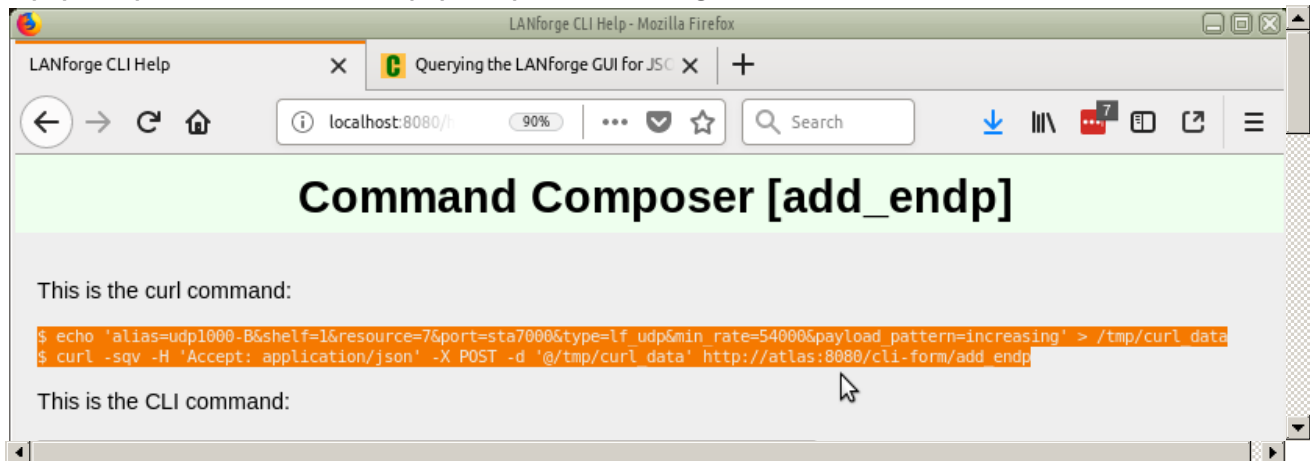
```
udp1000-A 1 2 b2000 lf_udp NA NA 1000000 NA NA NA NA increasing NA NA NA NA
```

Click **Parse Command** and copy the resulting `curl` command into a text editor:

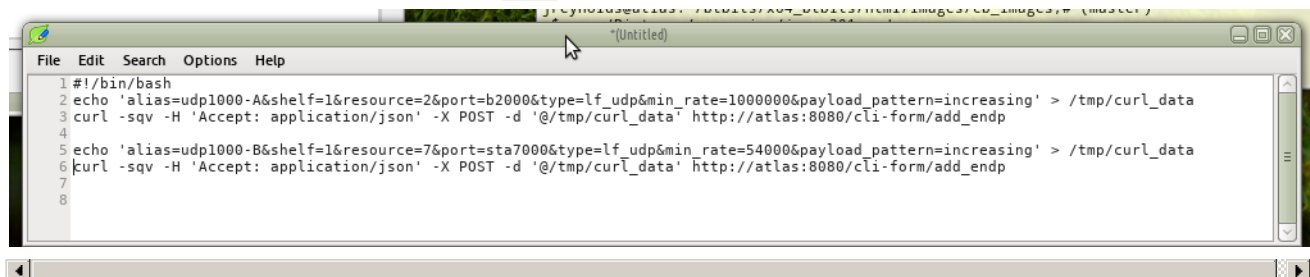
```
File Edit Search Options Help
1 #!/bin/bash
2 echo 'alias=udp1000-A&shelf=1&resource=2&port=b2000&type=lf_udp&min_rate=1000000&payload_pattern=increasing' > /tmp/curl_data
3 curl -sqv -H 'Accept: application/json' -X POST -d '@/tmp/curl_data' http://atlas:8080/cli-form/add_endp
4
5
6
7
```

And for the **B** endpoint, choose a station:

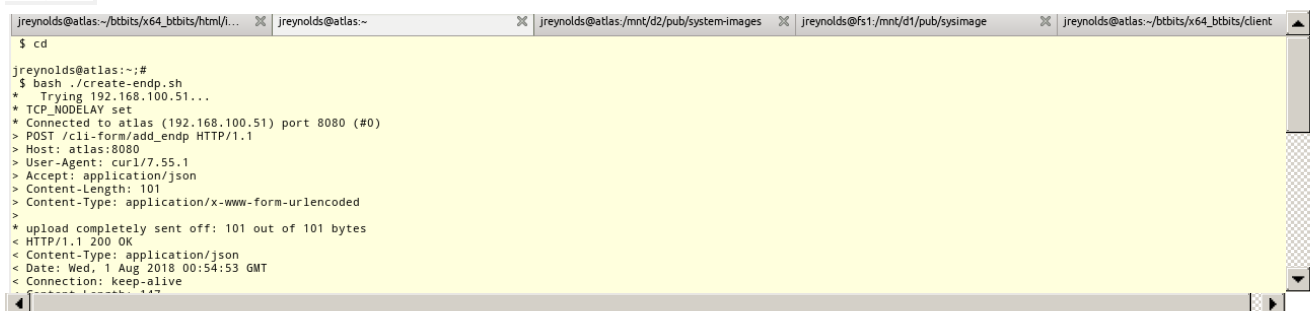
alias enter udp1000-B
shelf 1
resource 7
port sta7000
type select **type.lf_udp**
min_rate 54000 (54 Kbps)
max_rate SAME
payload_pattern select **payload_pattern.increasing**



Click **Parse Command** and copy the resulting `curl` command into a text editor:



We'll save this file as a shell script: `~/create-endp.sh` We can then run it from our terminal like so: `bash -x create-endp.sh`



We should see the endpoints we've created in the LANforge GUI **Endps** tab:

LANforge Manager Version(5.3.8)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

Layer-4 Generic Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr vAP Stations Messages

Status Layer-3 L3 Endps VoIP/RTP VoIP/RTP Endps WanLinks Attenuators RF-Generator File-IO

Min PDU Size AUTO Go Max PDU Size Same Go Start Stop Quiesce Clear

MIN Tx Rate New Modem (56 Kbps) Go MAX Tx Rate Same Go

View 0 - 1000 Go Display Create Modify Batch Modify Delete

All Endpoints

Name	EID	Run	Mng	Script	Tx Rate	Tx Rate (1 min)	Tx Rate (last)	Tx Rate LL	Rx Rate	Rx (1
udp--2.b2000-08.sta8261-B	1.2.8.440	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None	0	0	0	0	0	
udp--2.b2000-08.sta8262-A	1.8.272...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None	6,082	4,908	0	0	62,573	
udp--2.b2000-08.sta8262-B	1.2.8.446	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None	112,799	92,467	0	0	6,055	
udp1000-A	1.2.8.596	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None	0	0	0	0	0	
udp1000-B	1.7.10....	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None	0	0	0	0	0	
udp:r3r2:3000-A	1.3.13.28	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None	55,806	56,155	54,602	60,802	47,109	
udp:r3r2:3000-B	1.2.8.29	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None	55,082	55,425	54,772	56,749	55,082	
udp:r3r2:3001-A	1.2.14.20	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None	55,800	56,004	50,516	60,964	50,002	

Logged in to: idtest:4002 as: Admin

Create L3 Connection

With the creation of two endpoints, we can proceed with creating a Layer 3 cross-connect. This is much simpler, it really only takes the names of the two endpoints we created above. We'll choose `default_tm` for the test manager.

localhost: 90%

Command Composer [add_cx]

This is the curl command:

```
$ echo '' > /tmp/curl_data
$ curl -sqv -H 'Accept: application/json' -X POST -d '@/tmp/curl_data' http://atlas:8080/cli-form/add_cx
```

This is the CLI command:

Parse Command

Fields for the command will update when you change them:

01: alias	NA
02: test_mgr	NA
03: tx_endp	NA
04: rx_endp	NA

alias udp1000

test_mgr default_tm

tx_endp udp1000-A

rx_endp udp1000-B

Click the **Parse Command** button and copy the resulting `curl` command into your editor with the shell script. Run the script again. It doesn't hurt to re-create the endpoints.

LANforge Manager Version(5.3.8)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

Layer-4 Generic Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr vAP Stations Messages

Status Layer-3 L3 Endps VoIP/RTP VoIP/RTP Endps WanLinks Attenuators RF-Generator File-I/O

Rpt Timer: fast (1 s) Go Test Manager all Select All Start Stop Quiesce Clear

View 0 - 500 Display Create Modify Delete

Cross Connects for Selected Test Manager

Name	Type	State	Pkt Rx A	Pkt Rx B	Bps Rx A	Bps Rx B	Rx Drop % A	Rx Drop % B	Drop Pkts A	Drop Pkts B	Avg RTT
udp--2.b2000-08.s...	LF/UDP	Run	2,250,983	211,913	64,536	6,075	42.966	0.357	1,695,749	759	1.01
udp--2.b2000-08.s...	LF/UDP	Stopped	0	0	0	0	0	0	0	0	
udp--2.b2000-08.s...	LF/UDP	Stopped	1,576,746	152,583	62,573	6,055	44.527	0.452	1,265,599	693	67
udp1000	LF/UDP	Stopped	0	0	0	0	0	0	0	0	
udp:r3r2:3000	LF/UDP	Stopped	68	74	50,623	55,090	8.108	0	6	0	1.74
udp:r3r2:3001	LF/UDP	Stopped	40	77	28,802	55,445	48.052	0	37	0	1.71
udp:r3r2:3002	LF/UDP	Stopped	62	77	45,282	55,460	18.182	0	14	0	2.16

Logged in to: idtest:4002 as: Admin

Toggleing the Connection

Cross connects have three good state: STOPPED, RUNNING, and QUIESCE. The command to change them is `set_cx_state`. You will have no trouble creating the command:

```
test_mgr
default_tm
cx_name
udp1000
cx_state
RUNNING
```

Command Composer [set_cx_state]

This is the curl command:

```
$ echo '' > /tmp/curl_data
$ curl -sqv -H 'Accept: application/json' -X POST -d '@/tmp/curl_data' http://atlas:8080/cli-form/set_cx_state
```

This is the CLI command:

```
default_tm udp1000 RUNNING
```

Parse Command

Fields for the command will update when you change them:

01: test_mgr	default_tm
02: cx_name	udp1000
03: cx_state	RUNNING

Flag Fields for command will be computed when you select them, but you might need to actually write modified values into some fields (when you see token values like [string] or [name]).

```
cx_state.DELETED
cx_state QUIESCE
cx_state RUNNING
cx_state STOPPED
cx_state SWITCH
```

The following numbers are only valid for signed 64 bit values, so not all flags can be calculated as positive unsigned integers. If you see a negative number, first check that the Java flag was not entered as an int.

Click **Parse Command** and then you can paste the resulting command into your editor.

Command Composer [set_cx_state]

This is the curl command:

```
$ echo 'test_mgr=default_tm&cx_name=udp1000&cx_state=RUNNING' > /tmp/curl_data  
$ curl -sqv -H 'Accept: application/json' -X POST -d '@/tmp/curl_data' http://atlas:8080/cli-form/set_cx_state
```

This is the CLI command:

```
default_tm udp1000 RUNNING
```

Parse Command

Fields for the command will update when you change them:

01: test_mgr	default_tm
02: cx_name	udp1000
03: cx_state	RUNNING

Flag Fields for command will be computed when you select them, but you might need to actually write modified values into some fields (when you see token values like [string] or [name]).

cx_state.DELETED
cx_state.QUIESCE
cx_state.RUNNING
cx_state.STOPPED
cx_state.SWITCH

The following numbers are only valid for signed 64 bit values, so not all flags can be calculated as positive unsigned integers. If you see a negative number, first check that the Java flag was not entered as an int.

Advanced Techniques

You can make JSON submissions and you can also submit Base64 encoded values in both form an and JSON submission URLs.

Submitting Base64

Field names that end in `-64` are interpreted as base64 encoded values. From a linux terminal, you can convert text to base64 encoded value using the `base64` command:

```
$ echo "RUNNING" | base 64  
U1VOTk1ORwo=
```

Below is a CLI command example. **You typically would not care to spend the effort doing this unless the data you need to express is difficult to URL encode.**

```
$ echo 'test_mgr-64=YW55Cg==&cx_name-64=dWRwMTAwMAo=&cx_state-64=U1VOTk1ORwo=' > /tmp/curl_data  
$ curl -A 'Accept: application/json' -X POST -d '@/tmp/curl_data' http://host/cli-form?set_cx_state
```

Submitting JSON

Instead of posting to `/cli-form`, you can post to `/cli-json` and your submission will be parsed as a json object. The parameter names stay the same. The base64 name extensions are also available! You **need** to specify that your **Content-type** in the POST is `application/json`.

```
$ echo '{"test_mgr":"default_tm","cx_name":"udp1000","cx_state":"RUNNING"}' > /tmp/curl_data  
$ curl -sq -H 'Content-type: application-json' -H 'Accept: application/json' \  
-X POST -d@/tmp/curl_data http://localhost:8080/cli-json/set_cx_state
```

Handling Mismatched Column Errors

(This should be fixed as of 2018/08/14) When the LANforge cliet is in GUI mode, the **columns** of data that are returned match the GUI **table columns** displayed. You can use the *Right-click→Add/Remove Table Columns* menu item to change this. **We do not recommend doing this** for querying JSON data though, because the table columns definitions will not match up to the data the webserver expects to return.

LANforge Manager Version(5.3.8)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager

Generic Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr vAP Stations Messages

Status Layer-3 L3 Endps VoIP/RTP VoIP/RTP Endps WanLinks Attenuators File

Disp: 192.168.100.51:0.0 Sniff Packets Clear Counters Reset Port Delete

Rpt Timer: medium (8 s) Apply VRF View Details Create Modify

All Ethernet Interfaces (Ports) for all Resources.

Port	Pha...	Down	Parent Dev	Channel	Device	SSID	AP	IP	Activity
1.1.00					eth0			192.168.100.41	0
1.1.01					eth1			0.0.0.0	0
1.1.02		<input checked="" type="checkbox"/>		36	wiphy0			0.0.0.0	0
1.1.03		<input checked="" type="checkbox"/>		44	wiphy1			0.0.0.0	0
1.1.04		<input type="checkbox"/>		48	wiphy2			0.0.0.0	0
1.1.05		<input checked="" type="checkbox"/>	wiphy0	36	wlan0		Not-Associated	0.0.0.0	0

```
$ curl -sq http://localhost:8080/port | json_pp
{
  "error_list" : [
    "names_to_col_ids map is not going to work:\n[tx abort][25 > 4]\n[cx time (us)][48 > 4]\n"
  ],
  "status" : "INTERNAL_ERROR"
}
```

The terminal you started the LANforge client on will also give a similar error:

```
1532480073953: names_to_col_ids size:71
java.lang.IllegalArgumentException: names_to_col_ids map is not going to work:
1532480073953: lfj_table columns:10
```

Reset the Table Layout

1. Right-clicking the Port Mgr and selecting **Add/Remove Table Columns** will allow you to change this.

Alerts Port Mgr vAP Stations Messages

RTP Endps WanLinks Attenuators File

Clear Counters Reset Port Delete

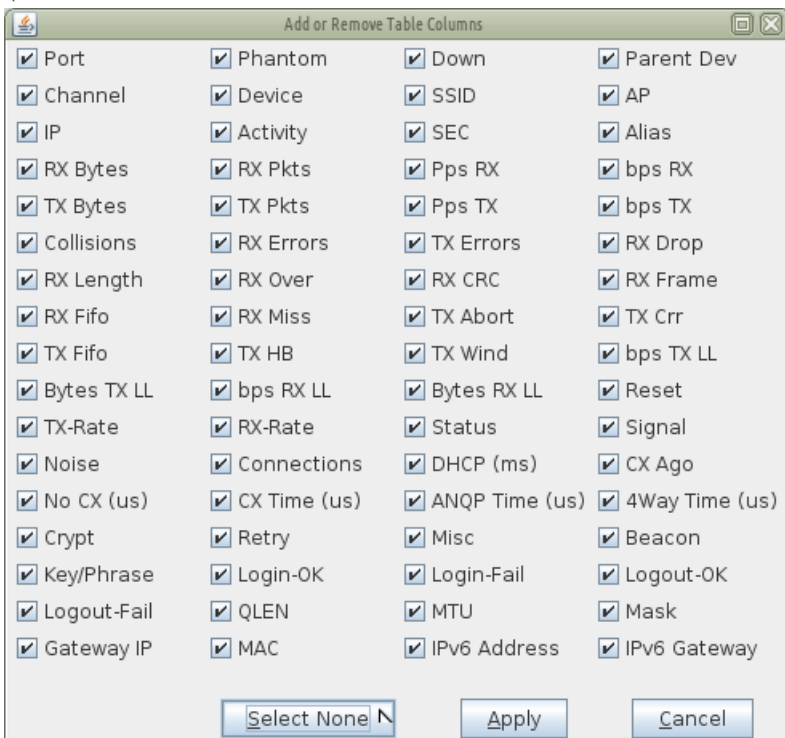
View Details Create Modify

es (Ports) for all Resources.

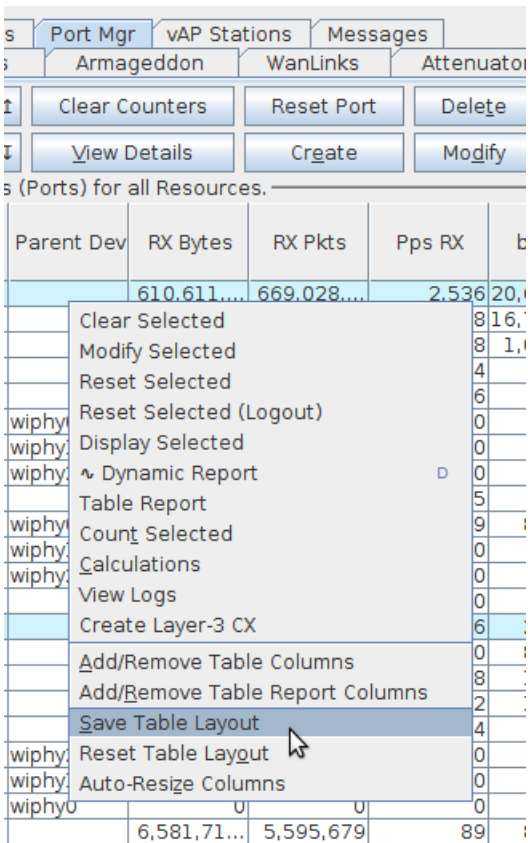
AP	IP	Activity
	192.168.100.41	0
	0.0.0.0	0
	0.0.0.0	0
	0.0.0.0	0
	0.0.0.0	0

- Clear Selected
- Modify Selected
- Reset Selected
- Reset Selected (Logout)
- Display Selected
- Dynamic Report
- Table Report
- Count Selected
- Calculations
- View Logs
- Create Layer-3 CX
- Add/Remove Table Columns**
- Add/Remove Table Report Columns
- Save Table Layout
- Reset Table Layout
- Auto-Resize Columns

- Clicking the **Select All/None** button and then **Apply** will get all the columns displayed, and returned in your queries.



- Make sure to **Right-Click** → **Save Table Layout** so that your next session will show all the data.



- Restart the LANforge client