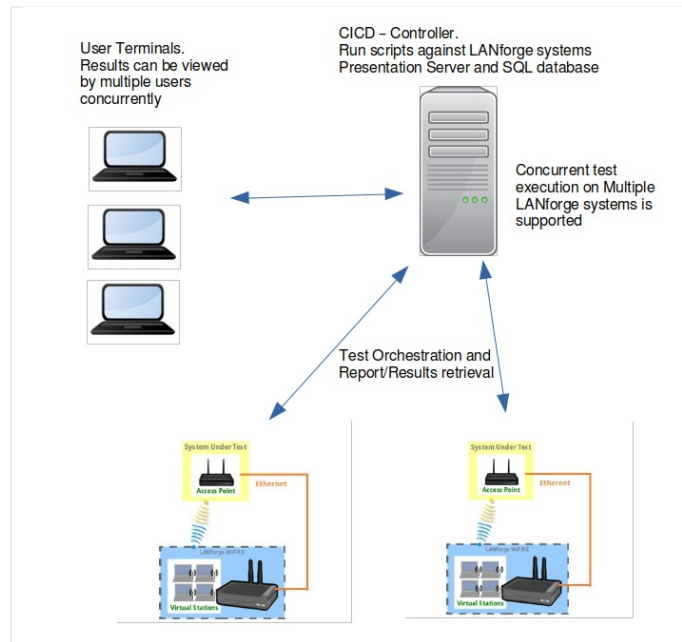


Basic CICD AP Testing with LANforge

Goal: Set up Basic CICD a LANforge system, Regression Automation and Reporting with data from previous runs.

The LANforge CICD framework provides an ability to execute a suite of tests and report results.



1. The following steps are discussed

- A. Set Up CICD Controller and Environment
- B. Set Up The JSON Configuration Files
- C. Test Execution
- D. Test Results

2. Set Up CICD Controller and Environment

- A. clone lanforge-scripts from <https://github.com/greearb/lanforge-scripts>
- B. run `/lanforge-scripts/py-scripts/update_dependencies.py` to install python packages for generating output
- C. Install web server:
The web server is to allow for viewing of results from User Terminals
The CICD - Controller is not dependent on a web server, results may be viewed locally on CICD - Controller
 - A. **LANforge** LANforge installation using `kininstall.pl` installs a web server on LANforge
LANforge installation installs an `httpd` server, LANforge may be used for storing and displaying results.
For the following example a separate LANforge system (Fedora) was used as the CICD - Controller and `httpd` web server.
 - B. **Fedora** install `httpd` and configure server `$ sudo dnf install httpd`
 - C. **Ubuntu** install `apache2` and configure server `$ sudo apt install apache2`
- D. Install mail service for email of links to results
For the example below Linux `mailx` program was used
Installation of mail services is dependent on the environment in which the CICD - Controller is installed.
The CICD - Controller is not dependent on email services
- E. Install database `sqlite3`
 - A. **Fedora** `$ sudo dnf install sqlite3`
 - B. **Ubuntu** `$ sudo apt-get update` `$ sudo apt-get install sqlite3`
- F. Create a `html-reports` directory. On lanforge `/home/lanforge/html-reports`
- G. Determine `sqlite3` database name and location, `sqlite3` db will be created. `./tools/qa_sqlite3.db`

3. Set Up The JSON Configuration Files

A. There are three JSON configuration input files described below. For all the JSON configuration files the CAPITALIZED parameters allow for a value to be entered into one location and used in multiple areas of the CICD framework. For example in ssid_idx=1 the SSID_USED is set to asus11ax-5. For the test suite below the SSID_USED may be entered instead of asus11ax-5, thus if the SSID changes, the SSID will need to be modified in ct_AX88U_dut, the ct_tests.json will remain untouched. This reduces the need to modify the ct_test.json for SSID changes that would affect multiple tests

- A. **--json_rig test_rig.json** this JSON file describes LANforge test rig, [Example ct_test_rig.json](#)
The test_rig.json describes the LANforge system and test parameters for the CICD - Controller
- B. **--json_dut ct_AX88U_dut.json** this JSON file describes the AP, [Example ct_AX88U_dut.json](#)
the ct_AX88U_dut.json describes the device under test parameters, DUT_SET_NAME: DUT_NAME ASUSRT-AX88U for example is used by Chamberview Tests
- C. **--json_test ct_tests.json** this JSON file describes the tests, [Example ct_tests.json](#)
The tests may use the CAPITALIZED variables or may be entered with the command line arguments as they would be entered on the command line.
The tests are not limited to only python tests

B. **test_rig.json**

```
{
  "test_rig":{
    "Notes":[
      "This JSON file describes LANforge system and test run configuration"
    ]
  },
  "test_rig_parameters":{
    "TEST_BED": "CT-TEST-001",
    "TEST_RIG": "CT-TEST-001",
    "DATABASE_SQLITE": ".tools/qa_sqlite3.db",
    "LF_MGR_IP": "192.168.100.116",
    "LF_MGR_PORT": "8080",
    "LF_MGR_USER": "lanforge",
    "LF_MGR_PASS": "lanforge",
    "UPSTREAM_PORT": "1.1.eth2",
    "TEST_TIMEOUT": 600,
    "EMAIL_LIST_PRODUCTION": "support@candelatech.com",
    "EMAIL_LIST_TEST": "support@candelatech.com",
    "EMAIL_TITLE_TXT": "Lanforge QA Testing",
    "EMAIL_TXT": "Lanforge QA Testing"
  }
}
```

C. **ct_AX88U_dut.json**

```
{
  "ct_AX88U_dut":{
    "Notes":[
      "The device undertest configuration is contained in this file"
    ]
  },
  "test_dut":{
    "DUT_SET_NAME": "DUT_NAME ASUSRT-AX88U",
    "USE_DUT_NAME": "ASUSRT-AX88U",
    "wireless_network dict":{
      "ssid_idx=0":{"ssid_idx":"0","SSID_USED":"asus11ax-2","SSID_PW_USED":"hello123","BSSID":"3c:7c:3f:55:4d:60","SE
      "ssid_idx=1":{"ssid_idx":"1","SSID_USED":"asus11ax-5","SSID_PW_USED":"hello123","BSSID":"3c:7c:3f:55:4d:64","SE
    }
  }
}
```

```

D. ct_tests.json
{
  "ct_tests_001":{
    "Notes":[
      "This JSON file describes tests to be run by LANforge system"
    ]
  },
  "test_suites":{
    "suite_wc":{
      "create_chamberview_dut_wc":{
        "enabled":"TRUE",
        "load_db":"skip",
        "command":"create_chamberview_dut.py",
        "args": "",
        "args_list":[
          "--lfmgr LF_MGR_IP --port LF_MGR_PORT --dut_name DUT_NAME",
          "--ssid 'ssid_idx=0 ssid=SSID_USED security=SECURITY_USED password=SSID_PW_USED bssid=BSSID'",
          "--ssid 'ssid_idx=1 ssid=SSID_USED security=SECURITY_USED password=SSID_PW_USED bssid=BSSID'",
          "--sw_version DUT_SW --hw_version DUT_HW --serial_num DUT_SERIAL --model_num DUT_NAME"
        ]
      },
      "create_chamberview_wc":{
        "enabled":"TRUE",
        "load_db":"skip",
        "command":"create_chamberview.py",
        "args": "",
        "args_list":[
          "--lfmgr LF_MGR_IP --port LF_MGR_PORT --delete_scenario",
          "--create_scenario scenario_wpa2_wc",
          "--raw_line \"profile_link 1.1 STA-AC 19 'DUT: DUT_NAME Radio-1' NA wiphy7,AUTO -1 NA\" ",
          "--raw_line \"profile_link 1.1 upstream-dhcp 1 NA NA UPSTREAM_PORT,AUTO -1 NA\""
        ]
      },
      "wifi_capacity":{
        "enabled":"TRUE",
        "timeout":"600",
        "iterations":"1",
        "load_db":"skip",
        "command":"lf_wifi_capacity_test.py",
        "args": "",
        "args_list":[
          "--mgr LF_MGR_IP --port LF_MGR_PORT --lf_user LF_MGR_USER --lf_password LF_MGR_PASS --instance_name sc",
          "--upstream UPSTREAM_PORT --batch_size 1,10,19 --loop_iter 1 --protocol UDP-IPv4 --duration 6000",
          "--pull_report --local_lf_report_dir REPORT_PATH --test_tag 'wpa2_wc'",
          "--test_rig TEST_RIG",
          "--set DUT_SET_NAME"
        ]
      },
      "lf_qa":{
        "enabled":"TRUE",
        "timeout":"600",
        "load_db":"skip",
        "command":"./tools/lf_qa.py",
        "args": "",
        "args_list":[
          "--path REPORT_PATH --store --png --database DATABASE_SQLITE"
        ]
      }
    }
  }
}

```

E. sample command with above data:

```

./lf_check.py --json_rig ct_test_rig.json \
--json_dut ct_AX88U_dut.json \
--json_test ct_tests.json \
--suite "suite_wc" \
--path '/home/lanforge/html-reports/ct_results_directory'

```

4. Set Up The JSON Configuration Files

- A. The lf_check.py is run from the lanforge-scripts/py-scripts/tools directory
- B. lf_check.py uses three JSON files as input:
For Example:
ct_test_rig.json - describes the LANforge test rig configuration
ct_AX88U_dut.json - describes the device under test
ct_tests.json - describe the tests to be run.

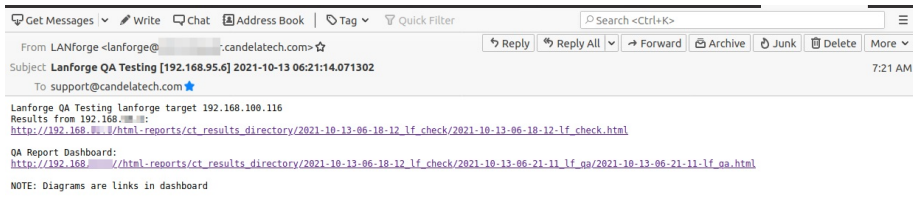
5. lf_check.py execution, simple command example

```

A. ./lf_check.py --json_rig ct_test_rig.json \
--json_dut ct_AX88U_dut.json \
--json_test ct_tests.json \
--suite "suite_wc" \
--path '/home/lanforge/html-reports/ct_results_directory'

```

6. Sample email sent on run



7. **lf_check.py**: sample **lf_check.py** Report

LF Check: CT-TEST-001 lf_check.py

2021-10-13-06-18-12

Objective
Run QA Tests

LANforge

LANforge	kernel version	server version	gui version	gui build date	gui git sha	scripts git sha
ct523c-3ab7b	5.13.0-rc5+	Version: 2.4.4 Compiled on: Mon 11 Oct 2021 05:51:28 PM PDT	5.4.4	Mon 11 Oct 2021 04:59:32 PM PDT	7e7402c3107bd9b137a240eac0ab7437871bcb319f	e9888d23d5cae42fde7b877b8661e408ec754019

LANforge Radios

Radio	WiFi-Radio Driver	Radio Capabilities	Firmware Version	max_sta	max_vap	max_vifs
1.1.wiphy0	ath10k(Q9984)	802.11bgn-AC	10.4b-c1-9984-xh-13-774502ee5	128	24	64
1.1.wiphy1	ath10k(Q9984)	802.11an-AC	10.4b-c1-9984-xh-13-774502ee5	128	24	64
1.1.wiphy2	ath9k()	802.11abgn	<ath9k radios lack firmware>	2048	32	2048
1.1.wiphy3	ath10k(Q9984)	802.11abgn-AC	10.1-ct-8x_xh-222-bcb24ff	127	24	64
1.1.wiphy4	hwifi(AX200)	802.11abgn-AX	release/core62-3ecbdada	1	1	1
1.1.wiphy5	hwifi(AX210)	802.11abgn-AX	release/core62-3ecbdada	1	1	1
1.1.wiphy6	hwifi(AX210)	802.11abgn-AX	release/core62-3ecbdada	1	1	1
1.1.wiphy7	mt7915e()	802.11abgn-AX	<no firmware data>	19	16	19

LF Check Test Results

Test	Command	Duration	Start	End	Result	STDOUT	STDERR
create_chamberview_gui_wc	./create_chamberview_gui.py	0d 2s 825293 ms	2021-10-13-06-18-18	2021-10-13-06-18-19	Success	STDOUT	
create_chamberview_wc	./create_chamberview.py	0d 5s 987380 ms	2021-10-13-06-18-19	2021-10-13-06-18-25	Success	STDOUT	
wifi_capacity	./rf_wifi_capacity_test.py	0d 14s 770807 ms	2021-10-13-06-18-25	2021-10-13-06-21-11	Success	STDOUT	
lf_qa	./looklf_qa.py	0d 2s 220803 ms	2021-10-13-06-21-11	2021-10-13-06-21-13	Success	STDOUT	

Generated by Candela Technologies LANforge network testing tool
www.candelatech.com



8. **lf_qa.py**

lf_qa.py: process kpi.csv, produces html/pdf results, produces plotly png and interactive graphs from test run kpi

sample command:

```
./lf_qa.py --path /home/lanforge/html-reports/ct_results_directory/(results dir of lf_check.py) \
--store \
--png \
--database ./tools/qa_aqlite3.db
```

9. **lf_qa.py**: sample **lf_qa.py** Report

Objective

QA Verification

Device Under Test

DUT	SW version	HW version	SN
ASUGST-AX8BU	DUT_SW_NA	DUT_HW_NA	NA

Test Rig: CT-TEST-001 Links

[PDF Report](#)
[Current Test Suite Results Directory](#)
[All Test Rig Test Suites Results Directory](#)

Test Suite

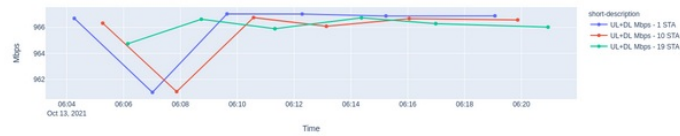
Test	Test_Tag	Links
WiFi Capacity	wpa2_wc	html / pdf

Suite Summary



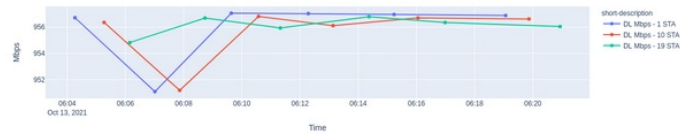
QA Test Results

WiFi Capacity : Per Stations Rate UL+DL : wpa2_wc : CT-TEST-001



[WiFi Capacity : Per Stations Rate UL+DL : wpa2_wc : CT-TEST-001 Report](#)

WiFi Capacity : Per Stations Rate DL : wpa2_wc : CT-TEST-001



[WiFi Capacity : Per Stations Rate DL : wpa2_wc : CT-TEST-001 Report](#)

10. Sample If_check.py Output example If_check Report

11. Test Control Inputs in Test Suite JSON

- A.
Allows for individual test enable and disable of the test.
- B.
Allows for loading a LANforge database prior to the test run.
- C.
Allows for test to have individual timeout other than default.
- D.
Allows for test to run multiple iterations.