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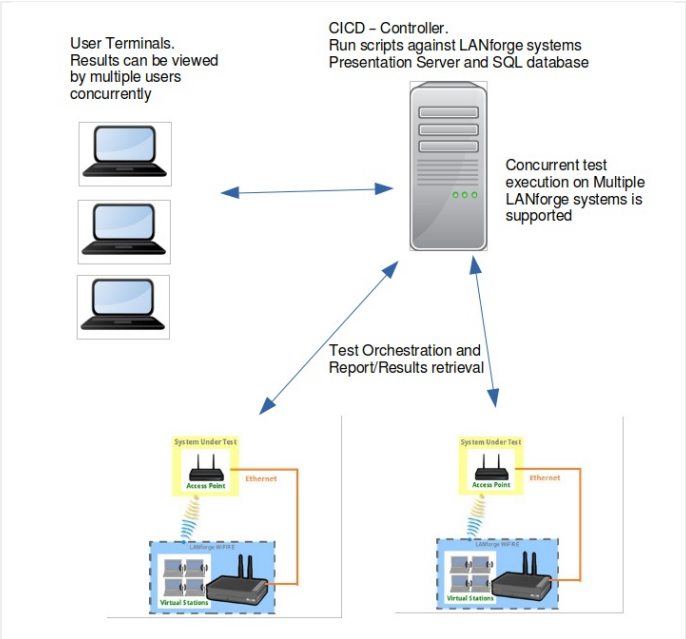
Basic CICD AP Testing with LANforge

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 kinstall.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_indx=1 the SSID_USED is set to asus11ax-5. For the test suite below the SSID_USED may be entered instead of asusu11ax-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 ASUSSRT-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 form the lanforge-scripts/py-scripts/tools directory

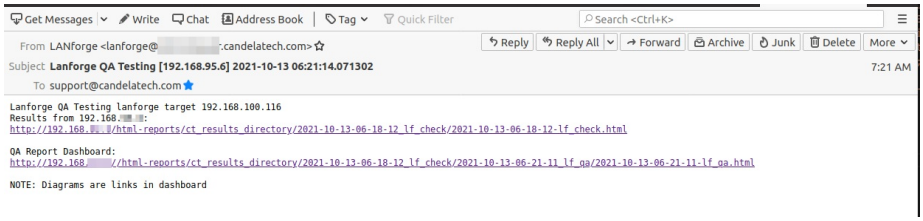
B. lf_check.py uses three JSON files as input:
For Example:
ct_test_rig.json - describes the LANforge test rig configuration
ct_AX88U_dut.json - describes the device under test
ct_tests.json -describe the tests to be run.

5. **lf_check.py execution, simple command example**

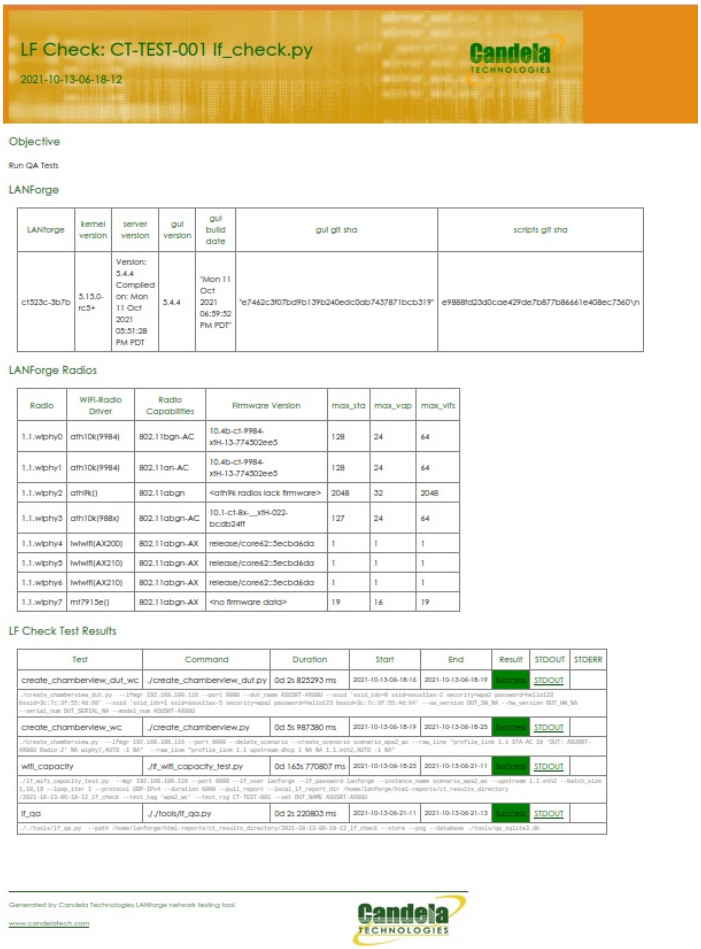
A.

```
./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



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

10. **Sample lf_heck.py Output** example lf_check Report

11. **Test Control Inputs in Test Suite JSON**

    A. `"enabled":"TRUE"`

    Allows for individual test enable and disable of the test.

    B. `"load_db":"CUSTOM_DATABASE"`

    Allows for loading a LANforge database prior to the test run.

    C. `"timeout":"300"`

    Allows for test to have individual timeout other then default.

    D. `"iterations":"2"`

    Allows for test to run multiple iterations.