

ABot in Renowned Server Vendor's 5G Interoperability Test Lab



ENSURING QUALITY ON SCHEDULE

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1 Objective

Execute different 3GPP specified scenarios to help test/certify 5G NFs for various deployment environment in renowned server vendor's lab. Certification is achieved by executing ABot provided 3GPP 5G test suites in an automated fashion against various network configurations - ABot emulated NFs, with Open5GS, and against Vendor System under Test (SuT)

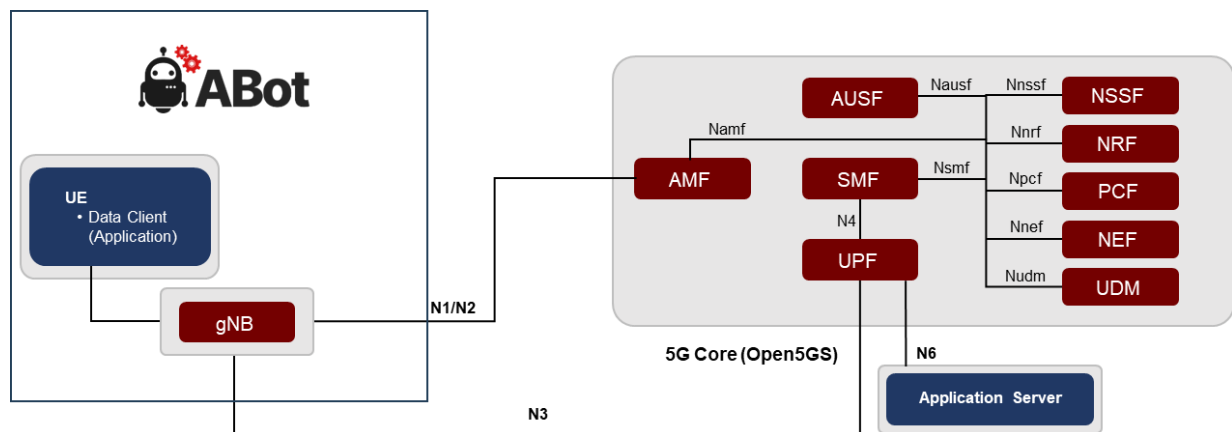
2 Engagement Details

2.1 Lab Setup

As a part of Lab setup Rebeca's engineering team was involved in the followings:

- Proper dimensioning of the VMs based on the scope of the tests e.g., total number of UEs, concurrency, throughput, etc.
- Configured the VMs and deployed ABot in those VMs.
- Validation of the test setup by executing Sanity Test suite

Below diagram shows a sample topology of renowned server vendor's test setup, with Open5GS 5G Core as SuT.



2.2 Test case execution

ABot has the flexibility of selecting any node as an emulated node or as a real node. This enabled renowned server vendor's to simulate the missing NFs as simulated ABot nodes to complete the 5G network topology in the lab environment.

- Rebeca engineers executed the functional testcase scenarios using the set of canned testcases in Emulated mode, with Open5GS as SuT and Vendor NFs as SuT.
- Executed the 3GPP compliant Conformance test suite related to NFs of a 5G Core.
- ABot's plug and play test cases triggered 5G use cases to validate different scenarios in the Lab.
- Generate RCA of the failed test cases

Below are few of the key screenshots of ABot test scenario execution against Open5GS as SUT.

Test Case Name: 5G_Initial_Registration_Load.feature

Test Scenario: Initial Registration with minimal load of 10 subscribers over the N1-N2 interface

Topology: gNodeB is ABot and core nodes are Open5gs

- a. Execution Window: Providing live insight of the test execution.

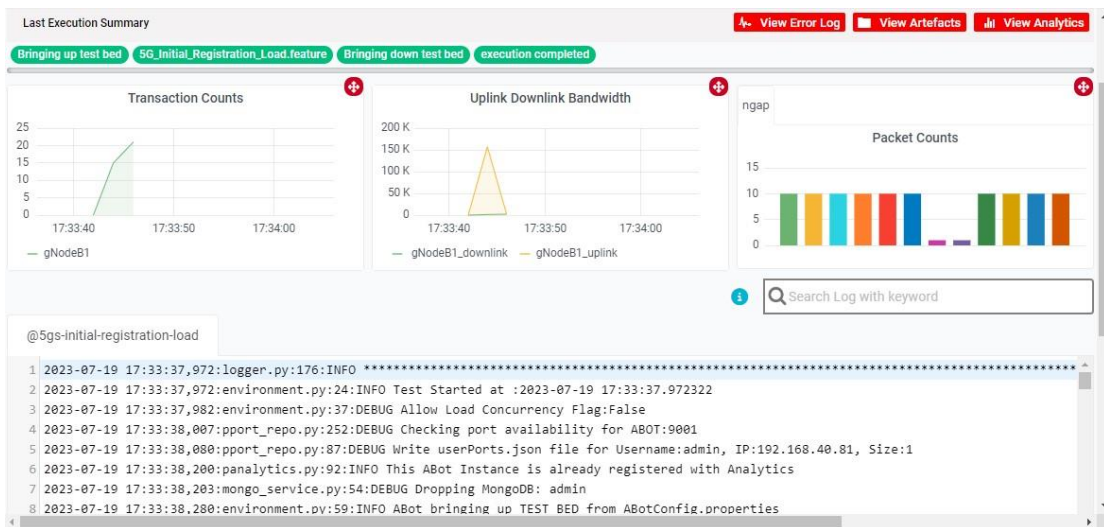


Figure 1: Execution Window

- b. Call-Ladder Diagram: A ladder diagram of the executed scenario is automatically generated by ABot with the messages exchanged between the associated nodes. In case of load scenario, ABot provides UE specific information as shown below.

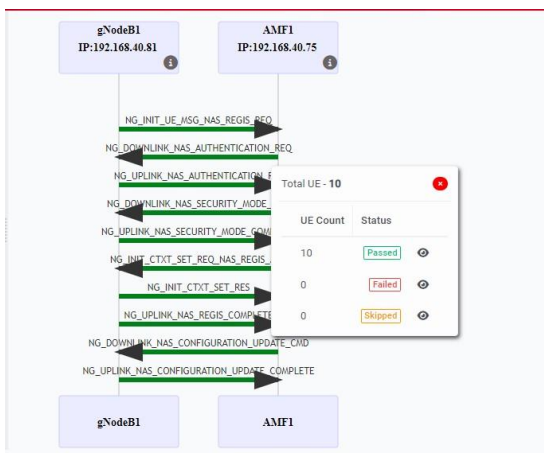


Figure 3: Call Ladder Diagram

IMSI	Action
001010000000003	See Call flow
001010000000004	See Call flow
001010000000002	See Call flow
001010000000007	See Call flow
001010000000001	See Call flow
001010000000006	See Call flow
001010000000005	See Call flow
001010000000008	See Call flow
001010000000010	See Call flow

Figure 2 - List of UE's executed

2.3 Testcase Authoring

ABot SmartEditor, is a 3GPP aware testcase authoring tool which requires no background on automation scripting and needs minimal domain knowledge. Rebeca engineering team guided the renowned server vendor's team to author and customize test cases using the SmartEditor.

2.4 Test Analysis

ABot has a powerful analytics capability which helped renowned server vendor's team to analyze the test execution results using artefacts, such as automation logs, node specific logs, packet captures etc. This facilitated identifying the root cause of the failed testcases. ABot Analytics also provided insight using various infrastructure and mobility KPIs.

Below are a few key ABot Analytics UI screenshots:

for better understanding of the execution outcome.

2.4.1 Analytics Dashboard

Provides details and insights on the test executed for the selected period of time.

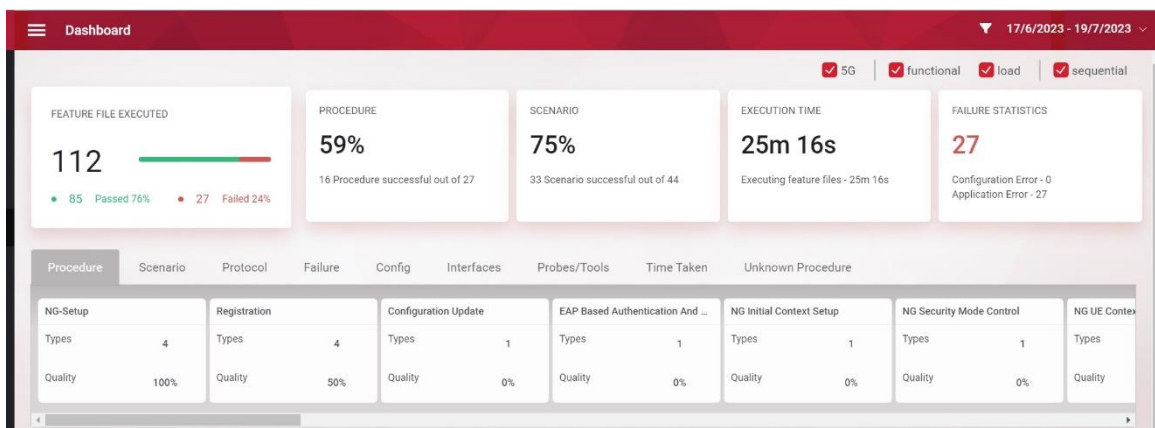


Figure 4: Analytics Dashboard

2.4.2 Infrastructure KPIs and Mobility KPIs

ABot Analytics has the provision of displaying Infrastructure KPIs and Mobility KPIs while a test is in progress. Infrastructure KPIs provides insight into the system resources utilized while executing the test scenario and mobility KPIs provide a deeper understanding of the mobility characteristics of the node under verification.



Figure 5: Infrastructure KPIs



Figure 6: Mobility KPIs

2.4.3 Storyboard

The Analytics Dashboard Storyboard summarizes the results from the analysis of the test cases processed within the selected filters on this dashboard; the information on the dashboard is depicted in easy-to-understand English sentences which gives a quick glance at the whole dashboard without the need to get into details.

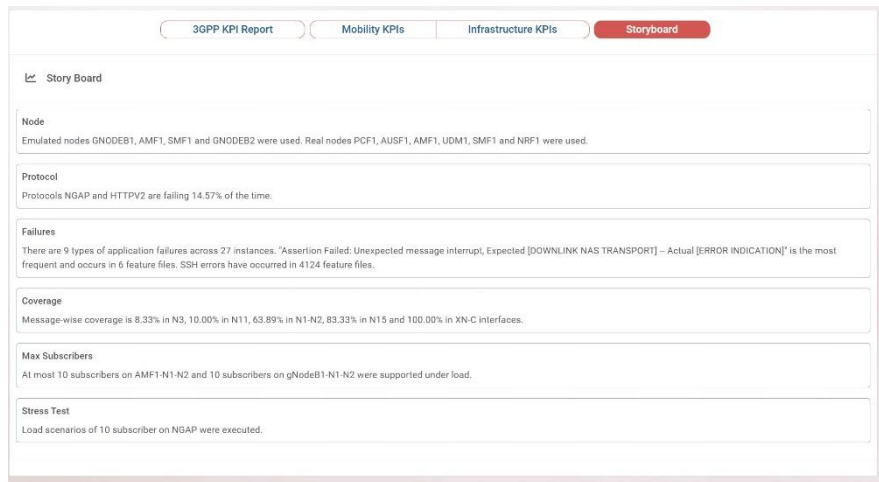


Figure 7: Storyboard

Besides the Analytics dashboard, an Analytics tab is generated for the test case executed. Various types of insights are provided in this tab. These can be easily customized using REST APIs. Below are a few sample screenshots of the Analytics tab.

2.5.1 Infrastructure KPI in Artefacts

Provides insight into the ABot system health status. The dashboard covers essentially four important KPI's namely CPU, Memory, Disk Read / Write, Network Usage



Figure 9: Infrastructure KPIs (CPU & Memory)



Figure 8: Infrastructure KPIs (Disk I/O, Throughput)

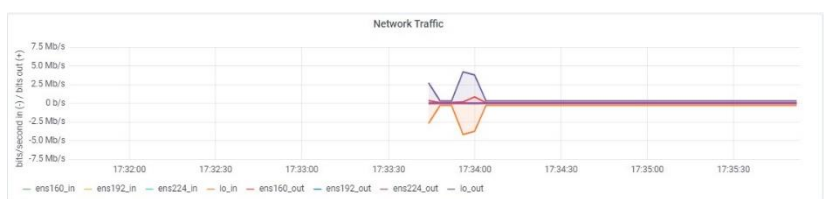


Figure 10: Infrastructure KPIs (Network Traffic)

2.5.2 5G Mobility KPI's in Artefacts

The mobility KPIs provides information about the executed call flow, e.g., how many UEs were involved, what was the control plane latency, and other details as shown below.



Figure 11: 5G Control Plane Latency

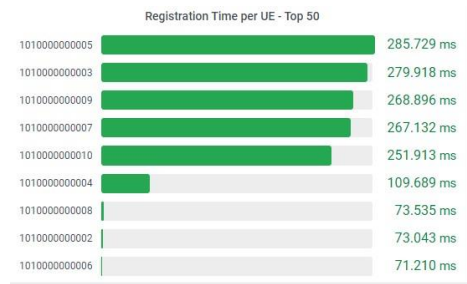


Figure 12: Registration time per UE

2.6 Test Report Generation

A set of Test Cases can be executed in batch mode using group tag. Test reports can be generated along with associated artefacts which can be exported and accessed through REST API. The artefact names are color coded in GREEN and RED to indicate PASS and FAIL respectively.

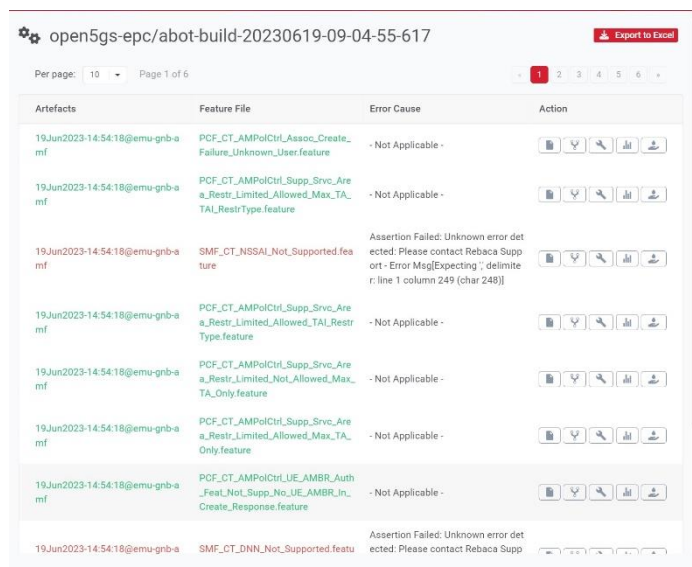


Figure 13: Test Report Generation

2.7 CI Integration

ABot has a rich set of REST API support for seamless integration with CI engine and for complete test automation. Rebaca engineers helped renowned server vendor's engineers in integrating ABot with renowned server vendor's CI engine.

3 Outcome

ABot integrated with the renowned server vendor's automation framework was able to provide Continuous Test solutions in their interoperability lab.