Nokia France Student Awards 2020

5G Embedded Test Framework Development

My name is Steevy Boubala, Gabonese student in embedded and real-time computer science engineering at ENSIM Le Mans. I am doing my end-of-study internship at Nokia Paris-Saclay in the LFS (Linux From Scratch) department, mentored by Romain Porte.

Context

The Linux From Scratch (LFS) team develops a base Linux system for other Baseband Platform entities. As quality is the priority in Nokia, developers need to ensure high compliance and non-regression of the components. To do so, they need to test their features and match the requirements with a testing platform based on the Behavior Driven Development (BDD) principle... Behavior what??

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Feature: Device trees are correctly loaded

Scenario Outline: The board has no device tree errors

Given we select the board

And the board is running

Then device tree has no errors
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Device_tree.feature : Behavior of the feature
Described using Cucumber

BDD is an agile methodology of testing that aims to describe what we want to test (behavior) and how (function calls). To support the BDD testing methodology, we use Cucumber framework which is a modern python testing tool.

From internship perspective, I work to improve the Cucumber framework introduced in LFS 2 years ago and already very actively used by other LFS teams across the globe: Poland, China, Germany...

Main Goal

My mission in this internship has been split in two main parts:

1) I work to improve user experience for developers using the framework to test their deliveries faster and simpler. So, my job is to gather non-user-friendly parts of the platform and patch them by enhancing the readability of log messages and adding some new features to improve the user experience of the developers involved with the framework.

2) In the coming months, I will start migrating some tests from the previous framework of test (TMF) to Cucumber to provide better visibility usage. This migration implies moving the compilation of the tests from TMF repository to the component's repository. In that way, the tests will be set along with the code.

Mission methodology

Knowing I am new in the use of this framework, the first step is logically to start learning the nuts and bolts of the Cucumber and figuring out its implementation in the LFS code. I could then improve existing tests, add new ones and add some new features.

After mastering Cucumber, I will start to learn TMF framework and take its relevant features to cucumber. Then I will compile HPD tests with Bitbake (currently done in TMF) using cucumber as part of the migration.

Mission impact

Amongst the impacts, we will increase the quality in the LFS releases for inciting people to write tests using the right tools for the right job. As a result, we will reduce the number of error reports and bugs found after LFS deliveries (commonly called PRONTOs).

This tool is a response for the need of change in the global testing mindset which has already started. Indeed, thanks to cucumber introduction we can fix any board supported by LFS team without breaking it anymore as it happened sometimes. It also helps upper management to see that the new 5G features implemented in LFS are now correctly tested. They can see the results in the COOP tool which cucumber reports test success and failures to.

Results

Considering the situation of the COVID-19 that makes human contact quite challenging, my internship has been entirely a remote work until now. Hopefully the coffee meetings help the way and allow me to discover what other people in LFS are working on.

For 2 months now, I have been learning the cucumber framework, its usage and implementation in the whole platform. Besides, I have been able to add some new features such as faster and concurrent ping tests to the remote boards, cleaned some log messages to name just that.

At the end of my internship we will have the cucumber framework fully set up with new features requested from LFS users. As a result, we will have a modern, robust and user-friendly tests platform used in the global LFS teams of Nokia to boost the ease of use of writing new tests and improve the overall feature test coverage.