

OAI 5G Core Network Testing Framework

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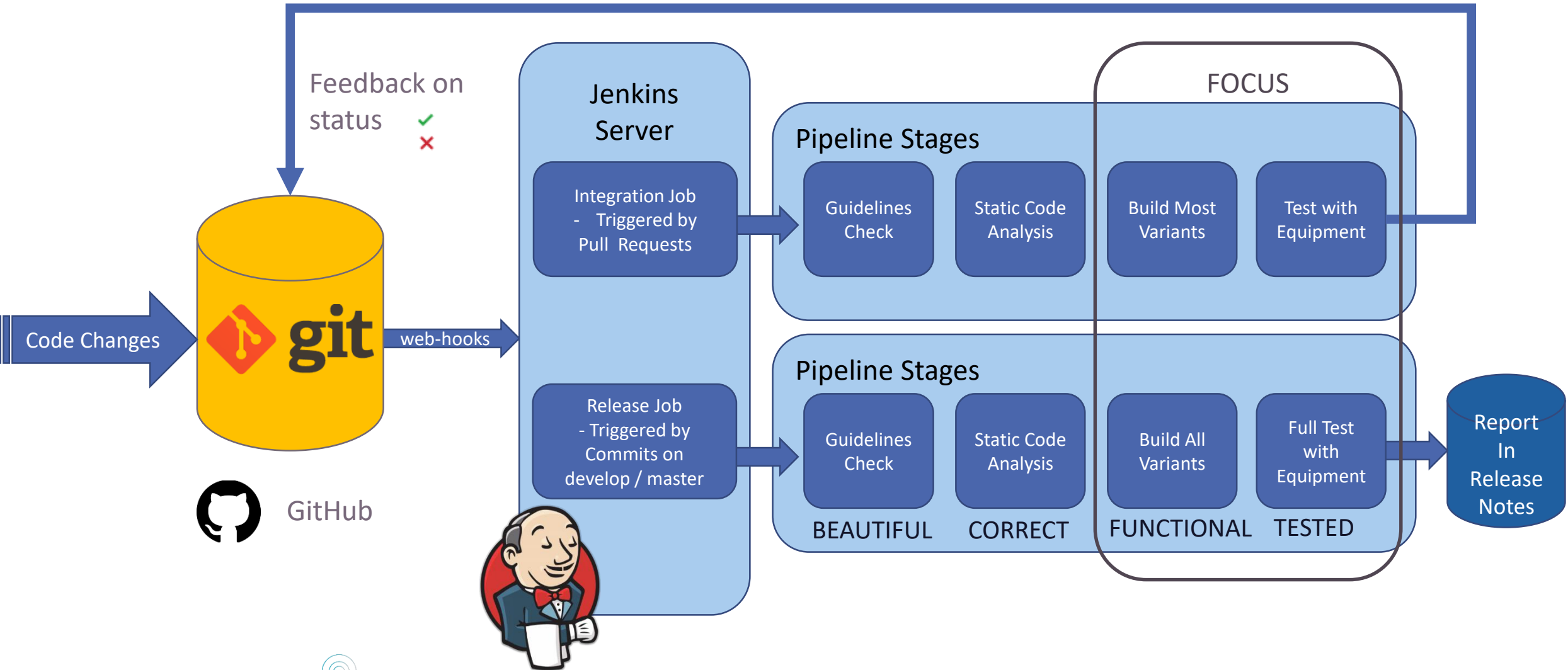


5G software alliance for democratising wireless innovation

Test: Fundamental Part of Continuous Integration

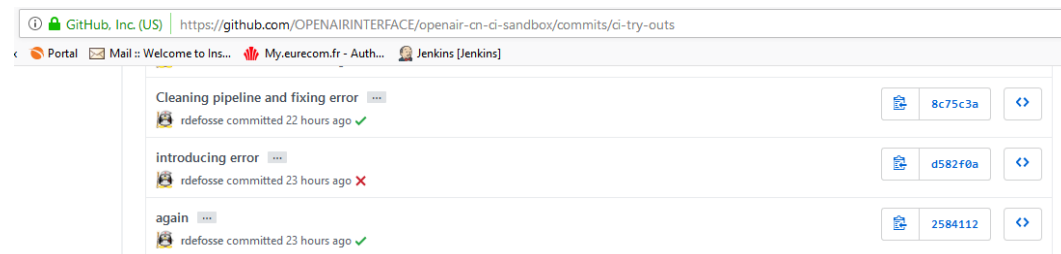
- Continuous Integration is just a tool
- The objectives are:
 - Ease of merge all contributors' effort
 - **Validate** correctness and functionality of new code
 - Keep old feature/code **validated**
 - Improve Code Quality
- Scripts on remote machine allow
 - Verifying rules and build
 - Running a test-suite or only a sub-set
 - Provide feedback in order to help decision

Generic OAI CI Work Flow



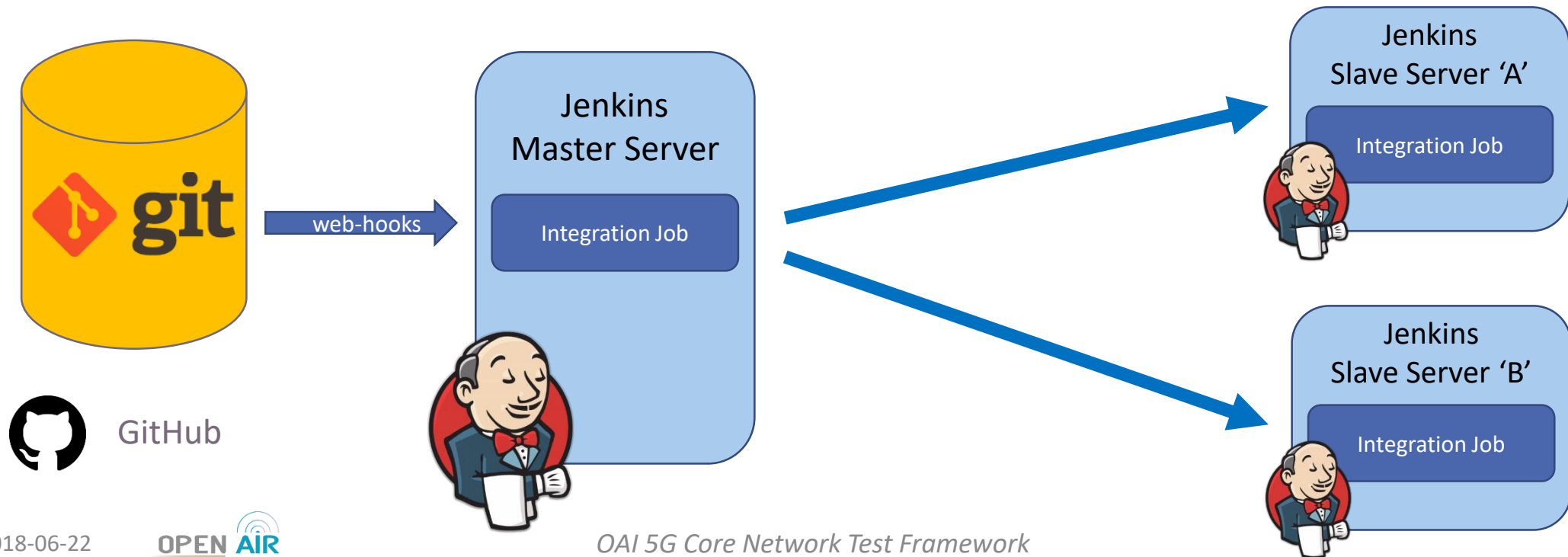
Why The Notifications in the Repository?

- It helps integrators to make a decision
 - The decision will remain human
 - Jenkins / GitHub plugin allows automated acceptance of Pull Requests
- It also provides traces / proof that a release has all quality indicators
 - That's for the Release Job



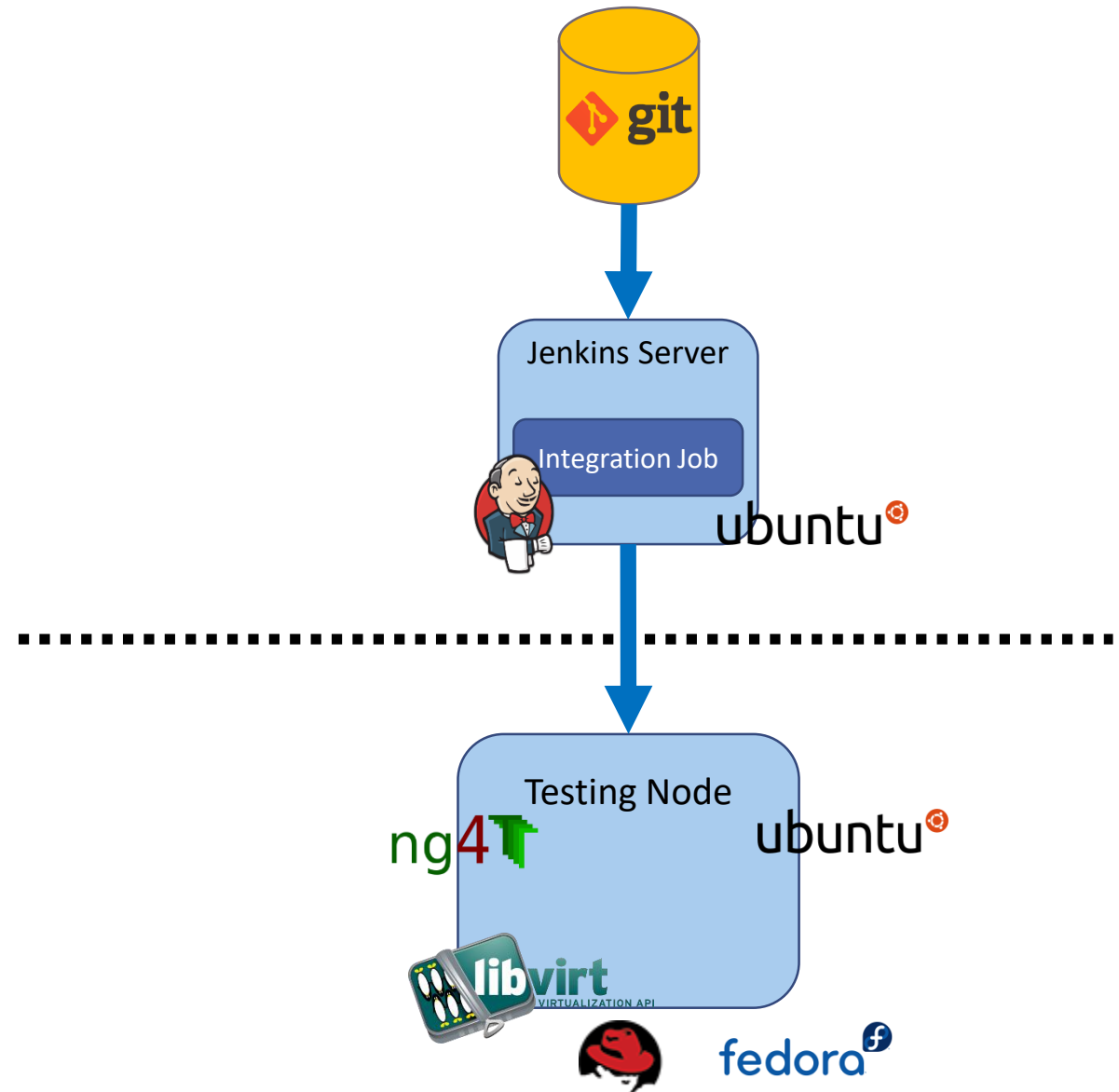
Decentralization is Possible

- OAI Alliance members/partner can duplicate the Core Network bench
- N CI test-beds with or without overlapping test coverages
 - Could speed up the CI process



Topology

- Git Server is
 - Hosted by GitHub
- Jenkins Server is
 - Hosted by Eurecom
 - Visible from WWW
 - Configured only by admins
- Testing node is
 - Hosted by Eurecom
 - In Private Network
 - Primary OS is Ubuntu



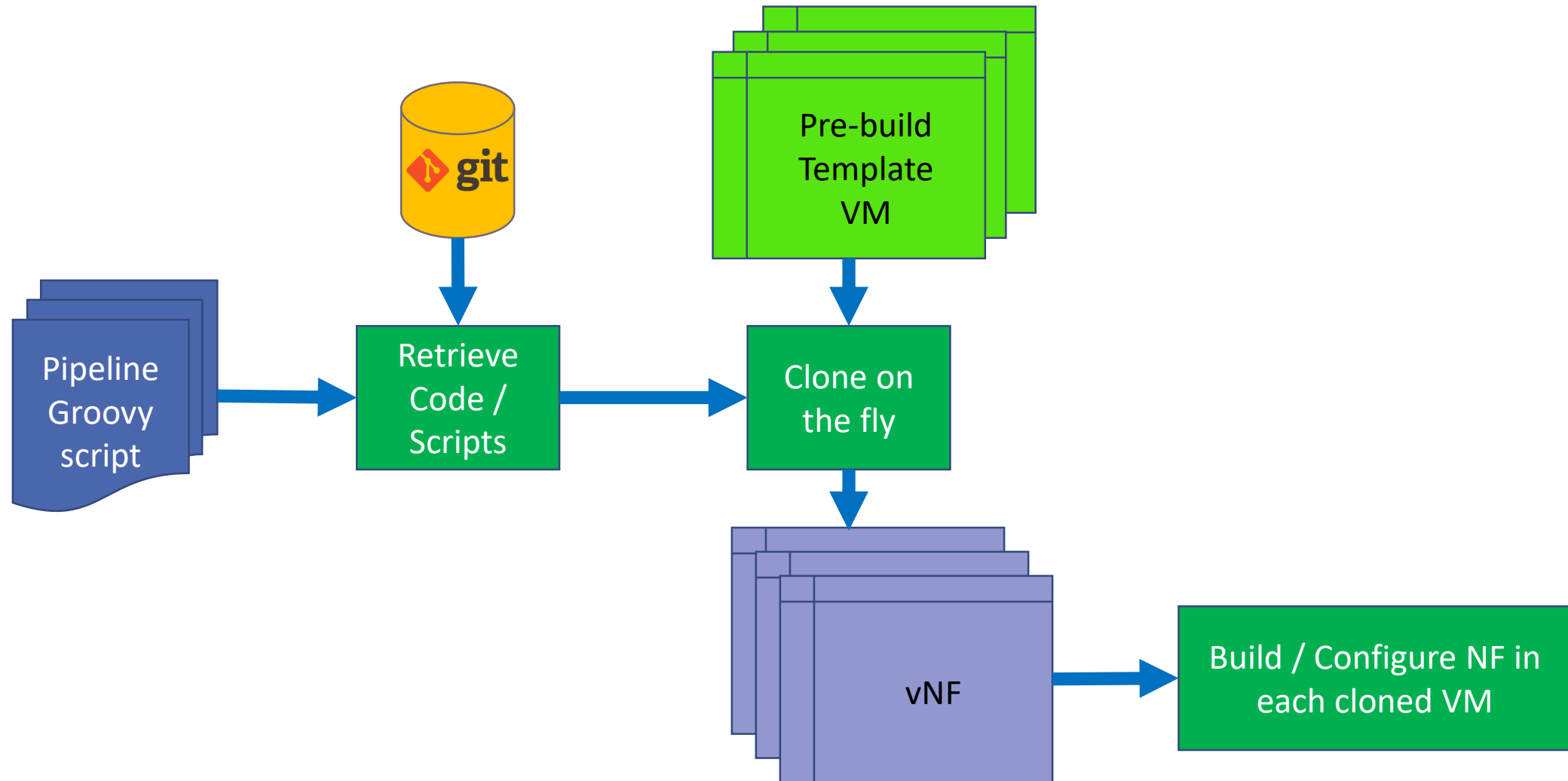
Virtualization

- Testing Node (orion):
 - 48 cores: Intel(R) Xeon(R) CPU E5-2658 v3 @ 2.20GHz
 - 64 Gbytes RAM
 - 900 Gbytes on “/” (mount size)
 - Ubuntu 16.04.4
- As a starting point we will use a VM for each Network Function (vNF)
 - VM could use any Linux-flavored OS (Fedora, Red Hat, ...)
 - Initial CI setup is still Ubuntu-based

Template Virtual Machines

- We are pre-building Virtual Machines that will be used as `Template`
 - Starting from distribution ISO Images
 - Starting from pre-build Cloud Images
- Template can be also dedicated to a single target vNF
- We perform a minimal installation and credentials link
 - So the 'Jenkins' user can logged onto VMs without any visible password
- To optimize the disk usage:
 - We are using QCOW2 format
 - Snapshots are introduced in the test process
 - All created VM for a given build will be deleted at the end of run

CI Job Workflow: Building the vNFs

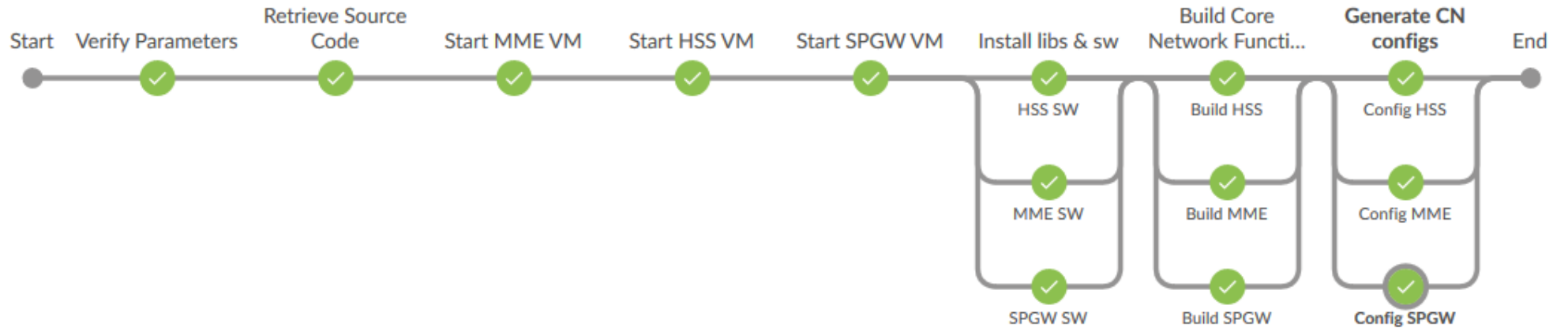


Jenkins View: Building the vNFs

✓ CN-CI-4G 42 Pipeline Changes Tests Artifacts ↻ ⚙️ 🔗

Branch: — 🕒 16m 10s Changes by Raphael Defosseux

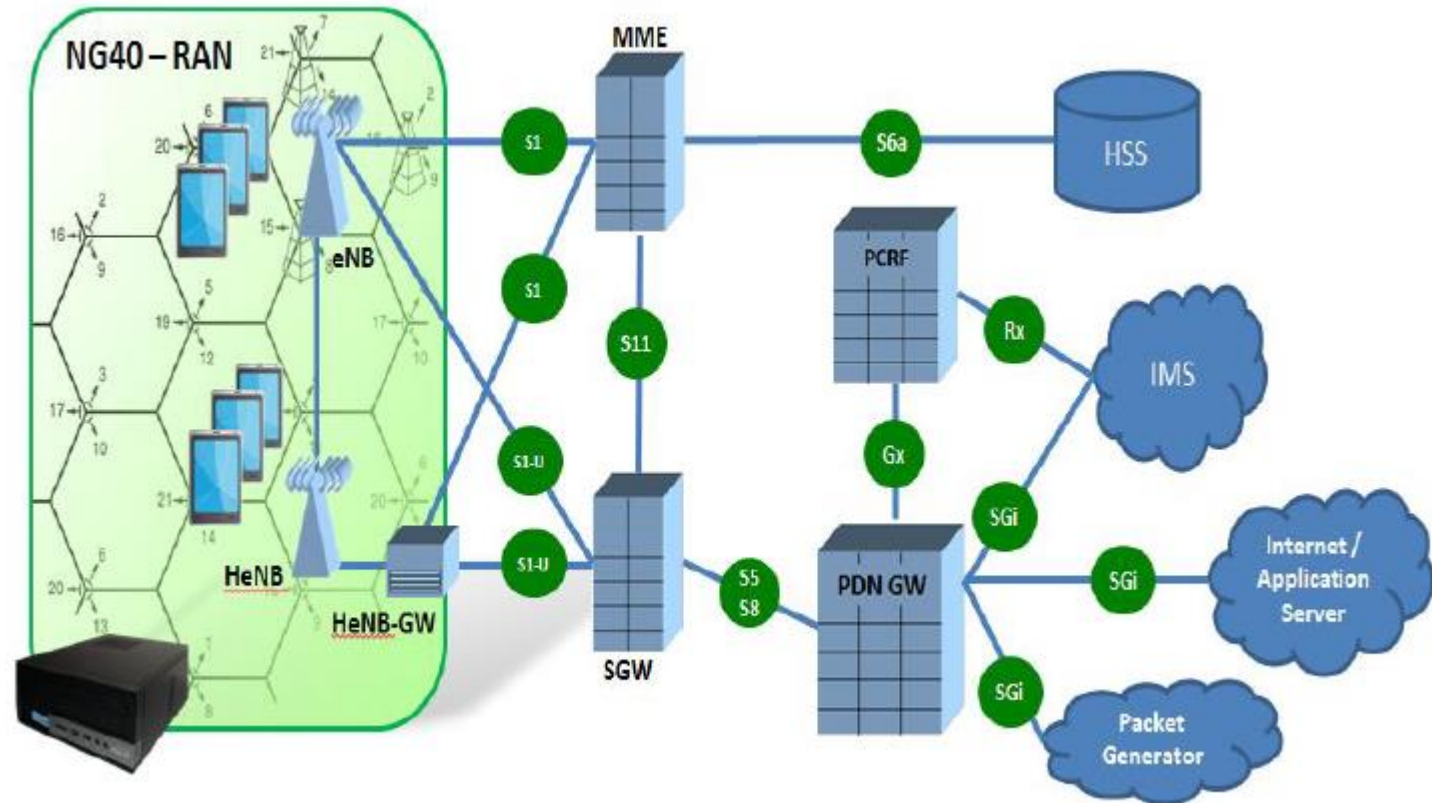
Commit: — 🕒 6 days ago Started by GitHub push by rdefosse



Optimization: apt-cacher

- During the build process, we are installing packages and compiling some libraries
- If your organization does not have mirrored archives server
 - Install apt-cacher on the test node
 - It speeds up the download of packages

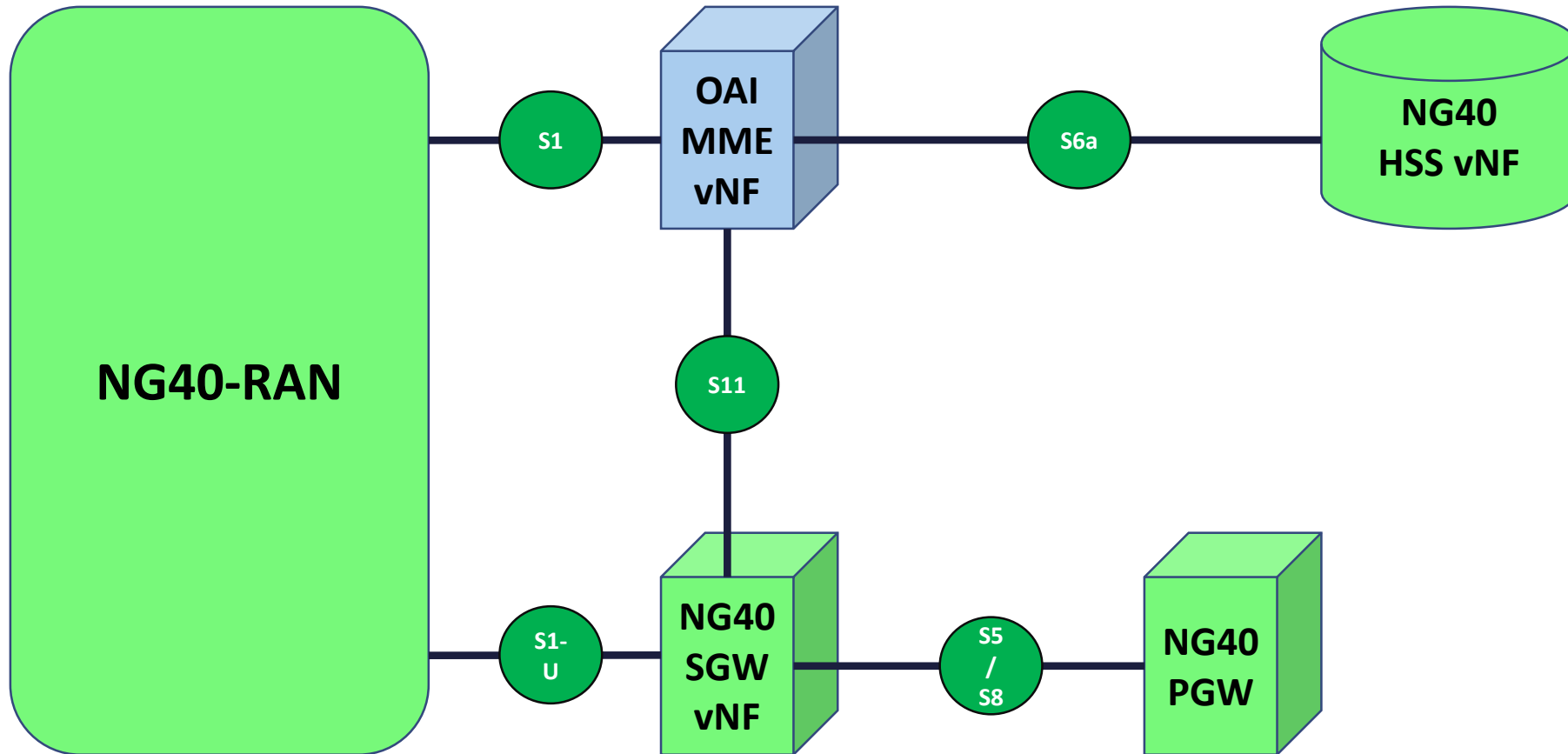
NG4T Tester: NG40-RAN-S1-X2-DT



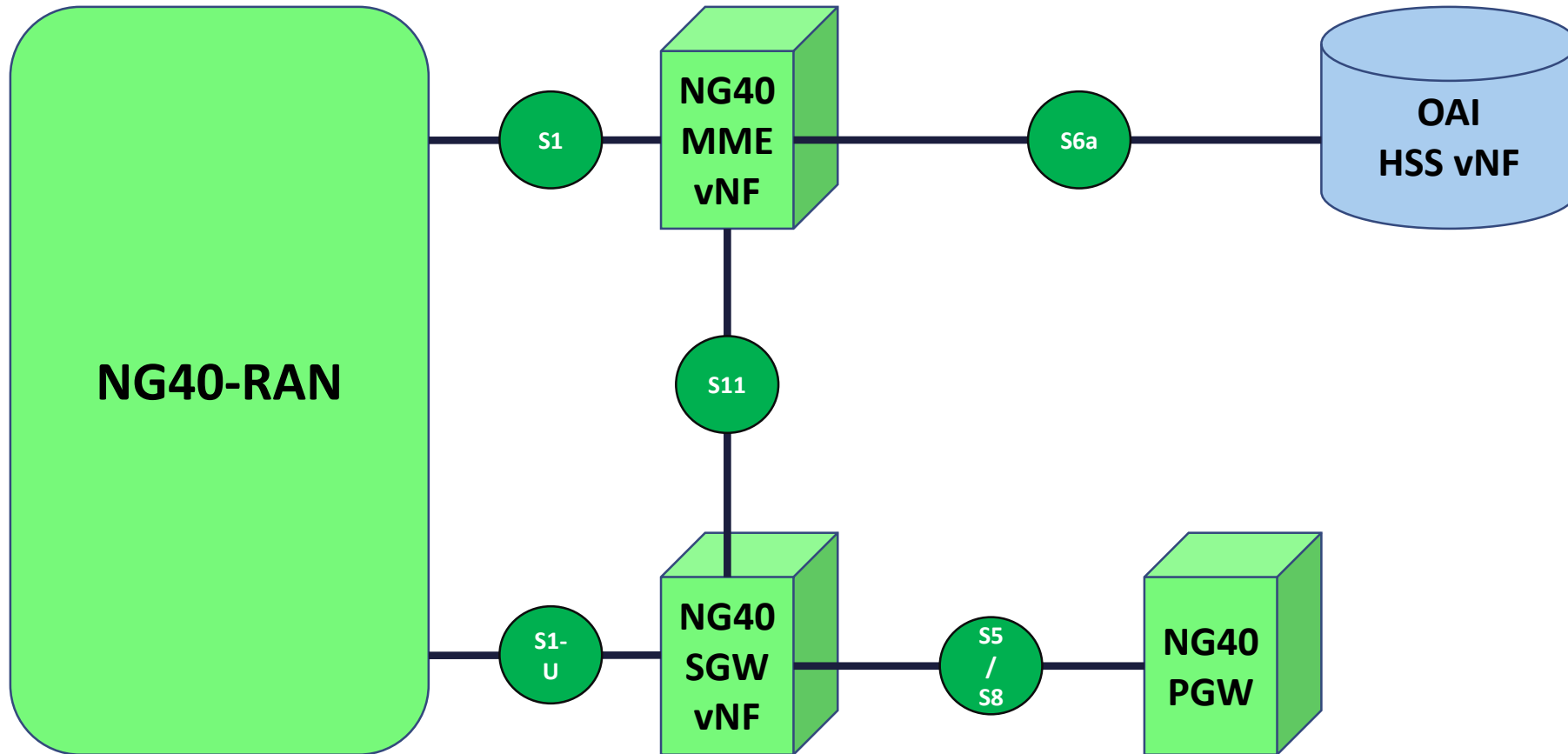
Testing step: vNF lifetime

- Stop NG40 corresponding vNF
- Modify NG40 framework configuration to incorporate OAI vNF to test
- Start OAI vNF
- Run test-suite
- Stop OAI vNF
- Put back original NG40 framework configuration
- Start again NG40 corresponding vNF

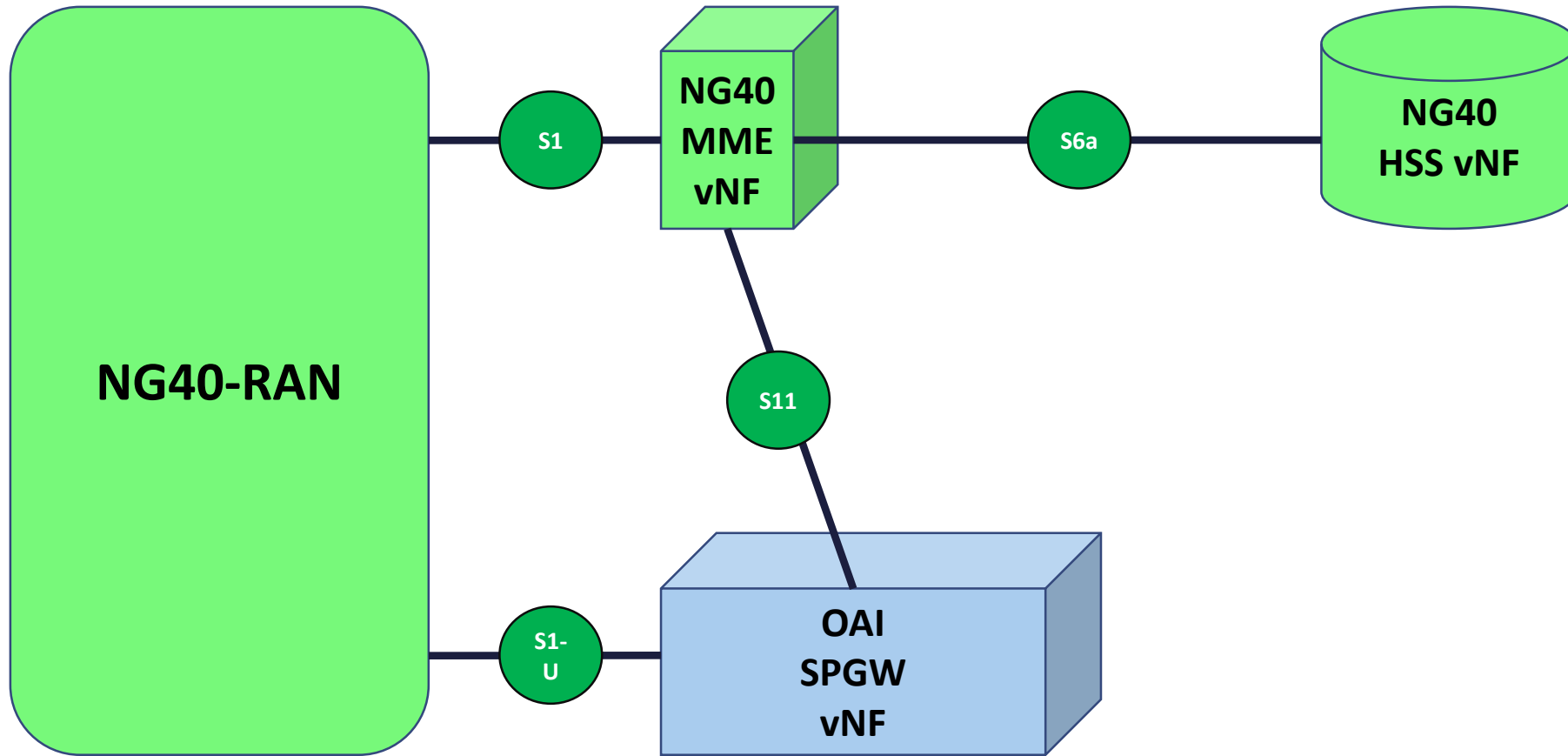
Testing OAI MME vNF



Testing OAI HSS vNF



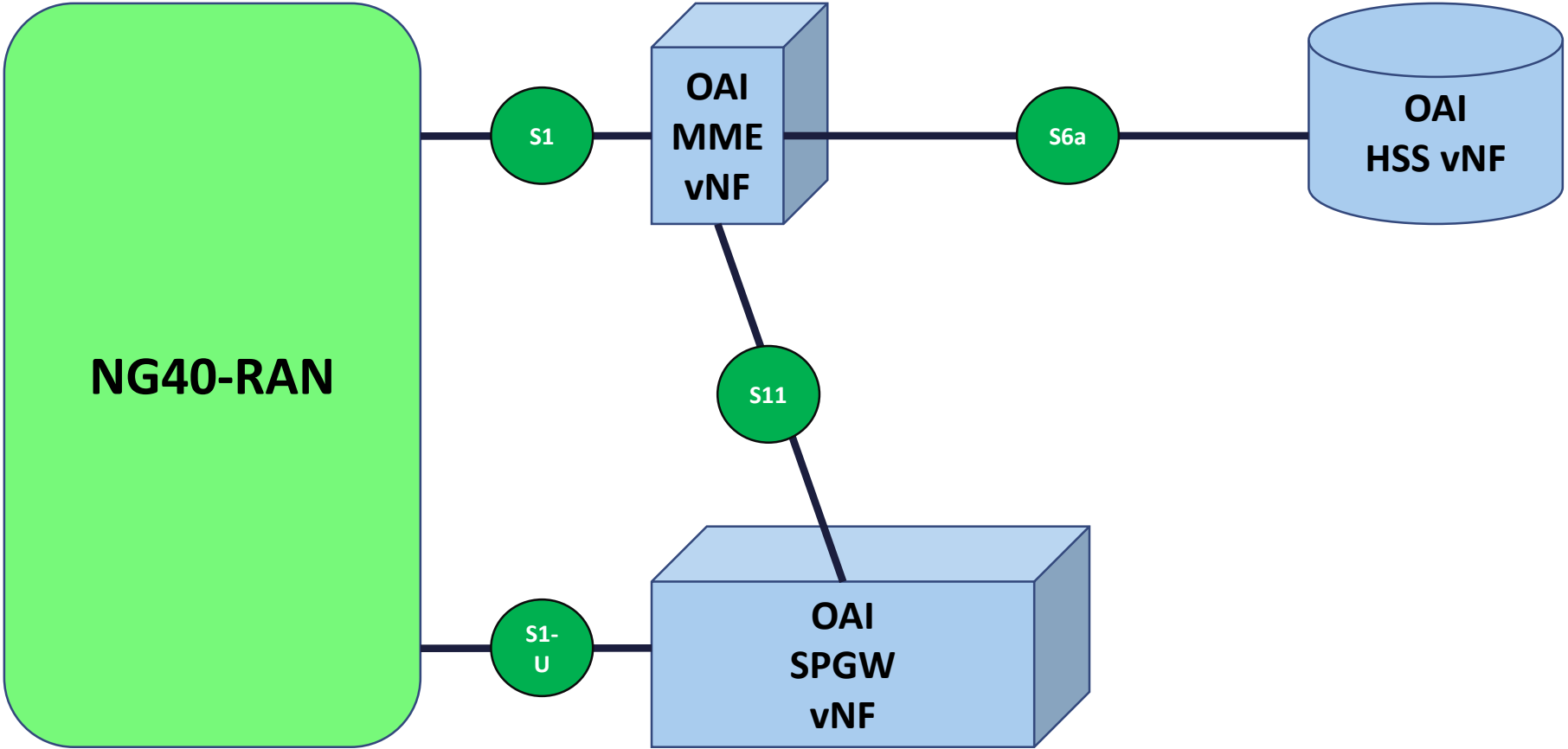
Testing OAI SPGW vNF



Testing the complete OAI Core Network

- Shutdown NG40 tester
- Configure NG40 framework with all OAI vNFs
- Start all OAI vNFs, NG40 Tester
- Run test suite
- Stop all vNFs
- Put back original NG40 framework configuration

Testing all OAI vNFs



End of CI Build Job

- Stop NG40 tester
- Stop all OAI vNF
- Archives testing results
- Destroy all images

Current Status

Implemented

Coming Soon

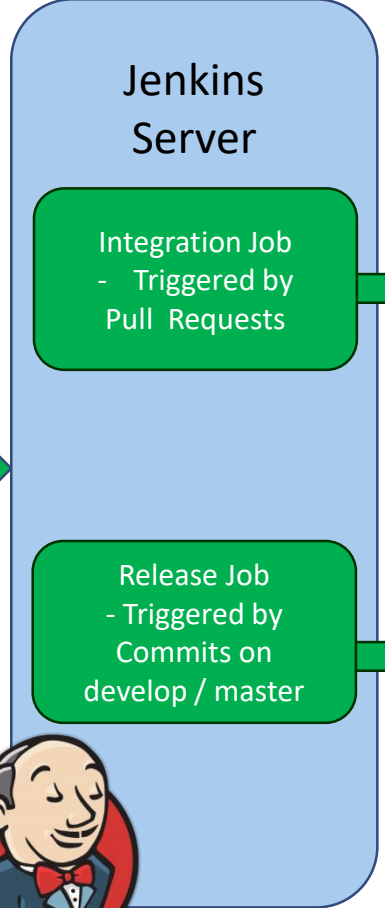
Code Changes

Feedback on status
✓
✗



GitHub

web-hooks



Jenkins Server

Integration Job
- Triggered by Pull Requests

Release Job
- Triggered by Commits on develop / master

Pipeline Stages

Guidelines Check

Static Code Analysis

Build Most Variants

Test with Equipment

Pipeline Stages

Guidelines Check

Static Code Analysis

Build All Variants

Full Test with Equipment

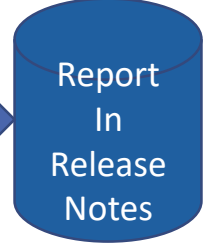
BEAUTIFUL

CORRECT

FUNCTIONAL

TESTED

FOCUS



Report In Release Notes

Thank you for listening