



GP4L

GN5-1 – Work Package 6/Task 2: Platform

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GNA-G community meeting, TNC23 @ TIRANA

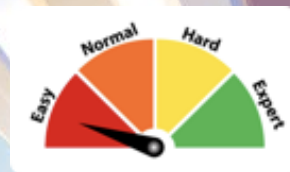
6th June 2023

Public (PU)

GN5-1

Agenda

- GP4L in GN5-1
 - Develop usage/demo
 - New developments (orchestration, automation)
- Global P4 lab: GP4L
- Network Management as a Service: **NMaaS**
- Discussions/Demo



GP4L & RARE/freeRtr in a nutshell

RARE is an open source routing platform, used to create a network operating system (NOS) on commodity hardware (a white box switch).



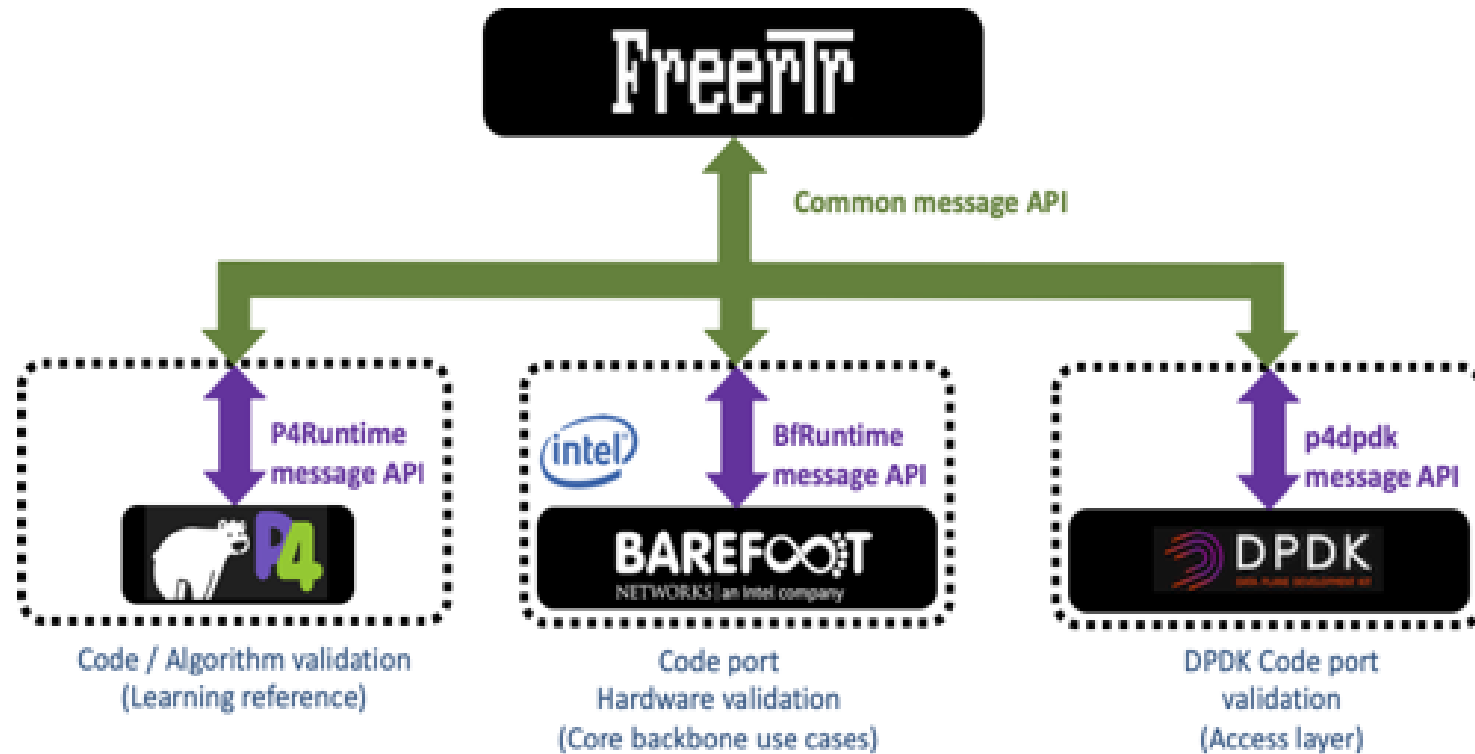
RARE uses FreeRtr as a control plane software and is thus often referred to as RARE/freeRtr



More information:
<https://wiki.geant.org/display/rare>

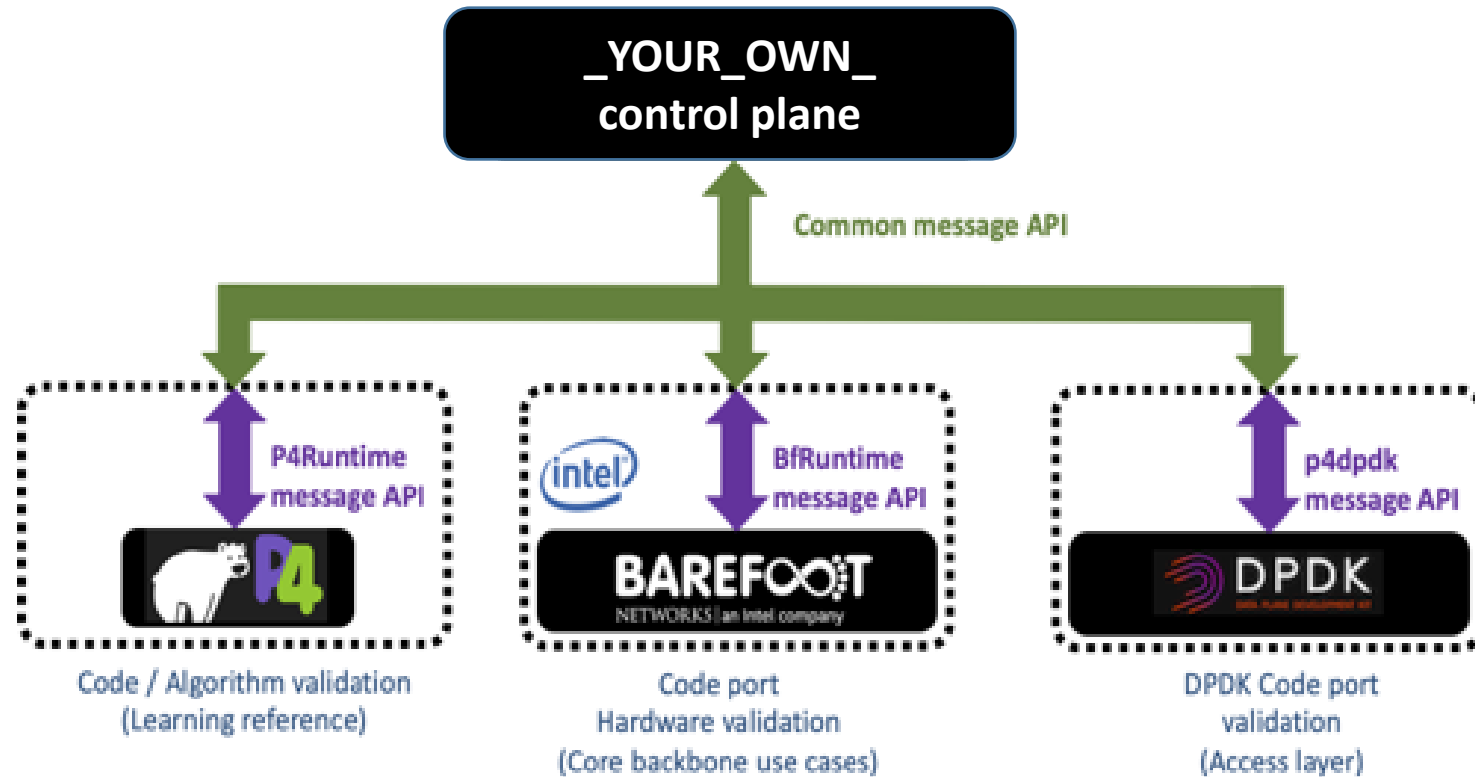
RARE/freeRtr in a nutshell

"One control plane to rule them all ..."



RARE/freeRtr in a nutshell

"... Or not !"



GP4L Project in GN5-1 (besides test RARE/freeRTr)

- **User community**

- Listen user community request
 - Demo wish-list
 - Problem solving approach
- GP4L as an experimentation facility
 - For representative demo
 - Used to develop new network management component

- **Developer community**

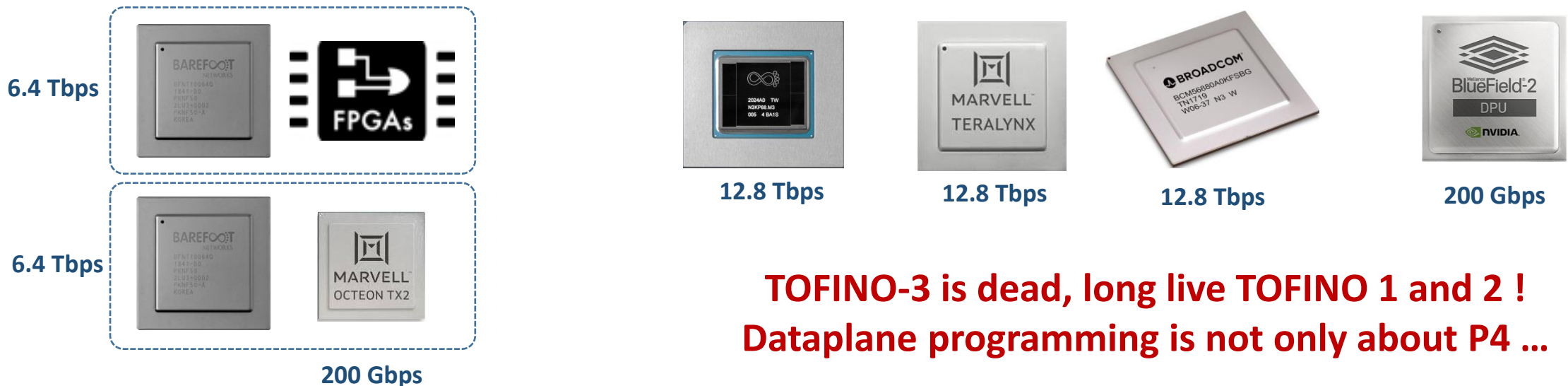
- Network orchestration (integration of NetBox, Camunda and Uptime Kuma)
- Network automation
- Network management components

Objective:

**INCREASE GP4L platform usage in both
Network usage prototyping and
facility for network development**

RARE/freeRtr feature development

- Feature development
 - Digital twin
 - Orchestration
 - Automation
 - ...
 - Please share your ideas !
- New targets (and thus new use cases)



TOFINO-3 is dead, long live TOFINO 1 and 2 !
Dataplane programming is not only about P4 ...

Liaison with GN5-1 WP6-T2 platform – Global P4 Lab



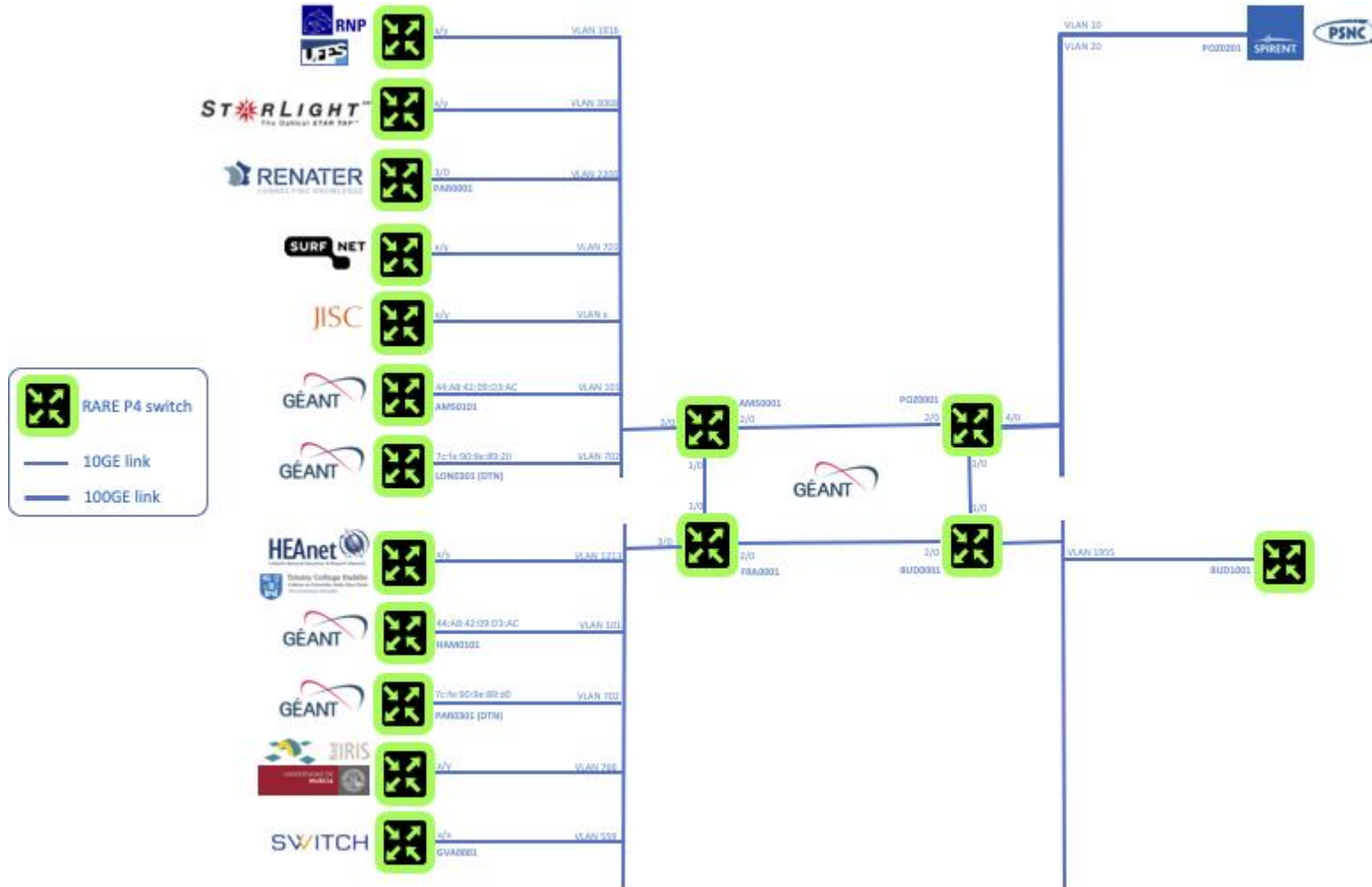
- December 2019



Liaison with GN5-1 WP6-T2 platform – Global P4 Lab



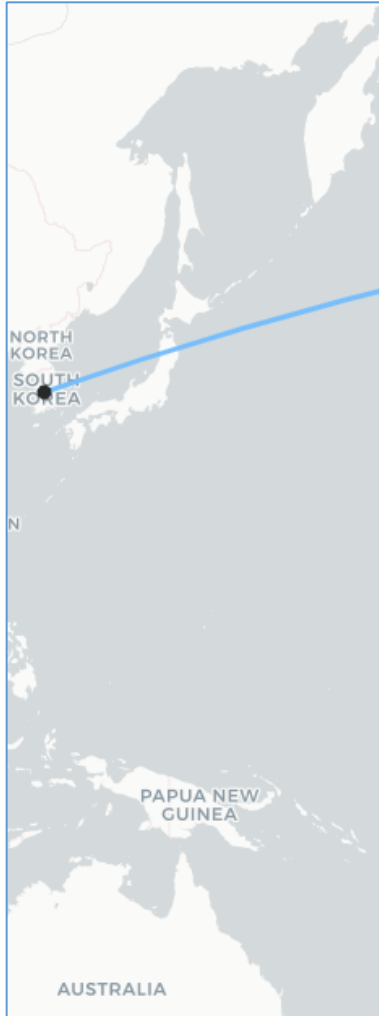
- December 2020



Liaison with GN5-1 WP6-T2 platform – Global P4 Lab

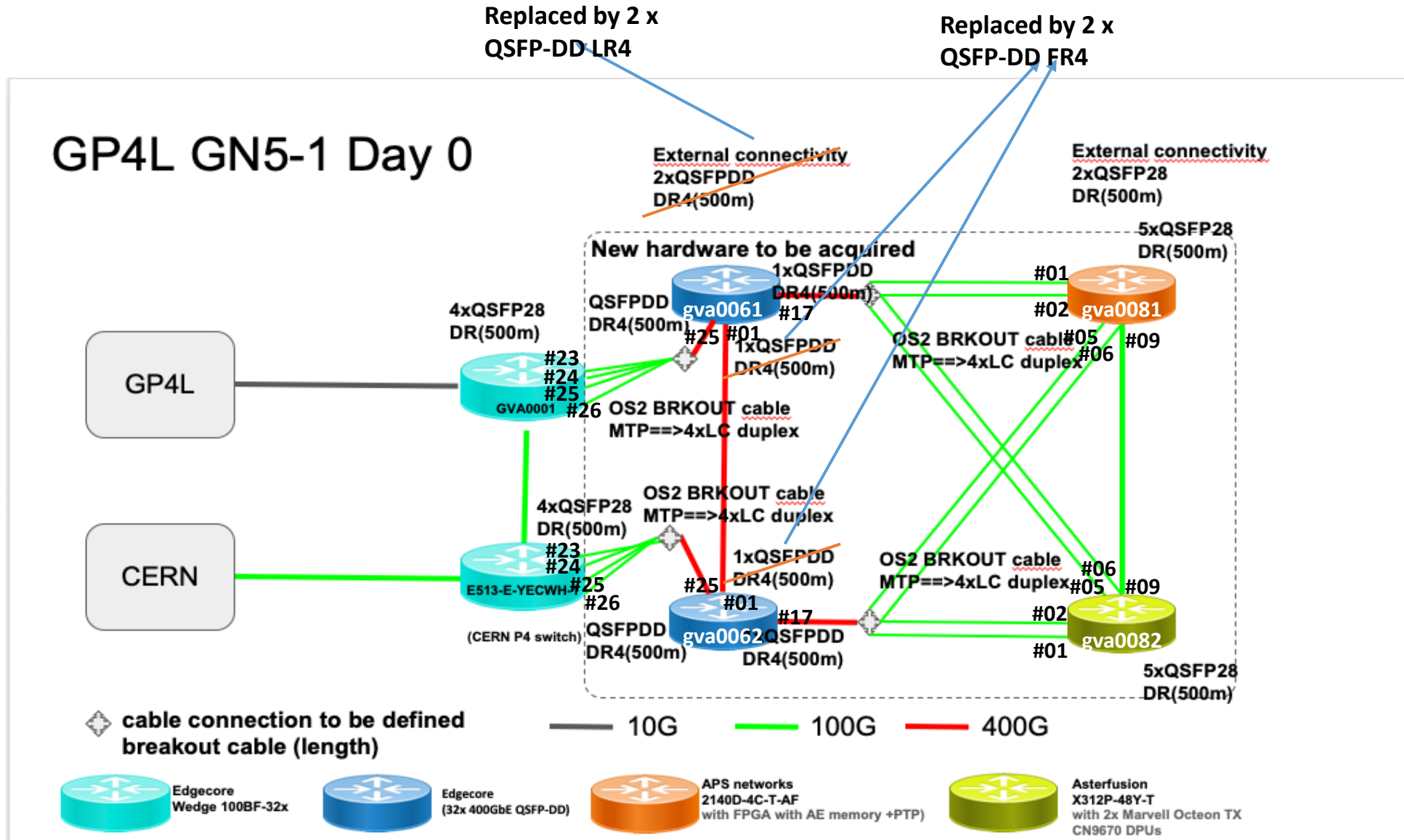


- December 2022 (presented to Supercomputing 2022 conference)



GP4L extension @ CERN in Geneva

GP4L GN5-1 Day 0



GP4L new nodes from partners

- Europe

University of “Pays Basque”

New nodes from University of Murcia

Existing nodes: AMS,FRA,POZ,BUD,GVA,DUB,UMU,PAR,PRA,

- Asia

KDDI. SINGAREN, KAUST

Existing node @ KISTI

Nepal (soon ?)

- US

New nodes in CALTECH

New nodes planned in BRIDGES WAS/NYC/PAR/AMS

Existing nodes: CHI,MIA,BNA,BWU

- Africa

Prospective in southern part of Africa with UbuntuAlliance

- Latin America

SAN

Existing SAO, RIO, VIT

RARE/freeRtr Network Management as a Service


What about
GP4L
monitoring?

NMaaS Network Management as a Service



Grafana
★★★★★5

Open source analytics & monitoring solution for every database




Prometheus
★★★★★5

Monitoring system & time series database




Icinga2
★★★★★0

Scalable and extensible monitoring system



SPA Inventory
★★★★★0

Resource and Service Inventory with TMF-compliant API




Routinator
★★★★★0

RPKI Validator




WebDAV Server
★★★★★5

WebDAV Server with Git versioning




Uptime Kuma
★★★★★5

Self-hosted monitoring tool like "Uptime Robot"



NetBox
★★★★★5

Infrastructure resource modeling application




WiFiMon
★★★★★0

Wireless Crowdsourced Performance Monitoring and...




Zabbix
★★★★★0

Enterprise-class monitoring solution for networks and applications



SPA
★★★★★0

SPA for the E-Line service



Healthchecks
★★★★★0

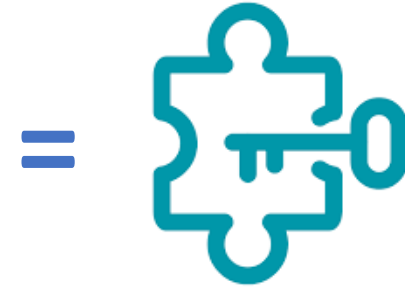
A cron monitoring tool



Key take-away



+ NMaas  + GP4L



CAPEX decrease dramatically

OPEX increase but:

This is not a bad thing RARE/freeRtr **empowers** local staff

Therefore it can reduce digital divide by providing an innovative networking solution at an affordable TCO

Power user or not, If you have DIY mindset (whether you are a Tier 1 NREN or not)

RARE/freeRtr is for you !

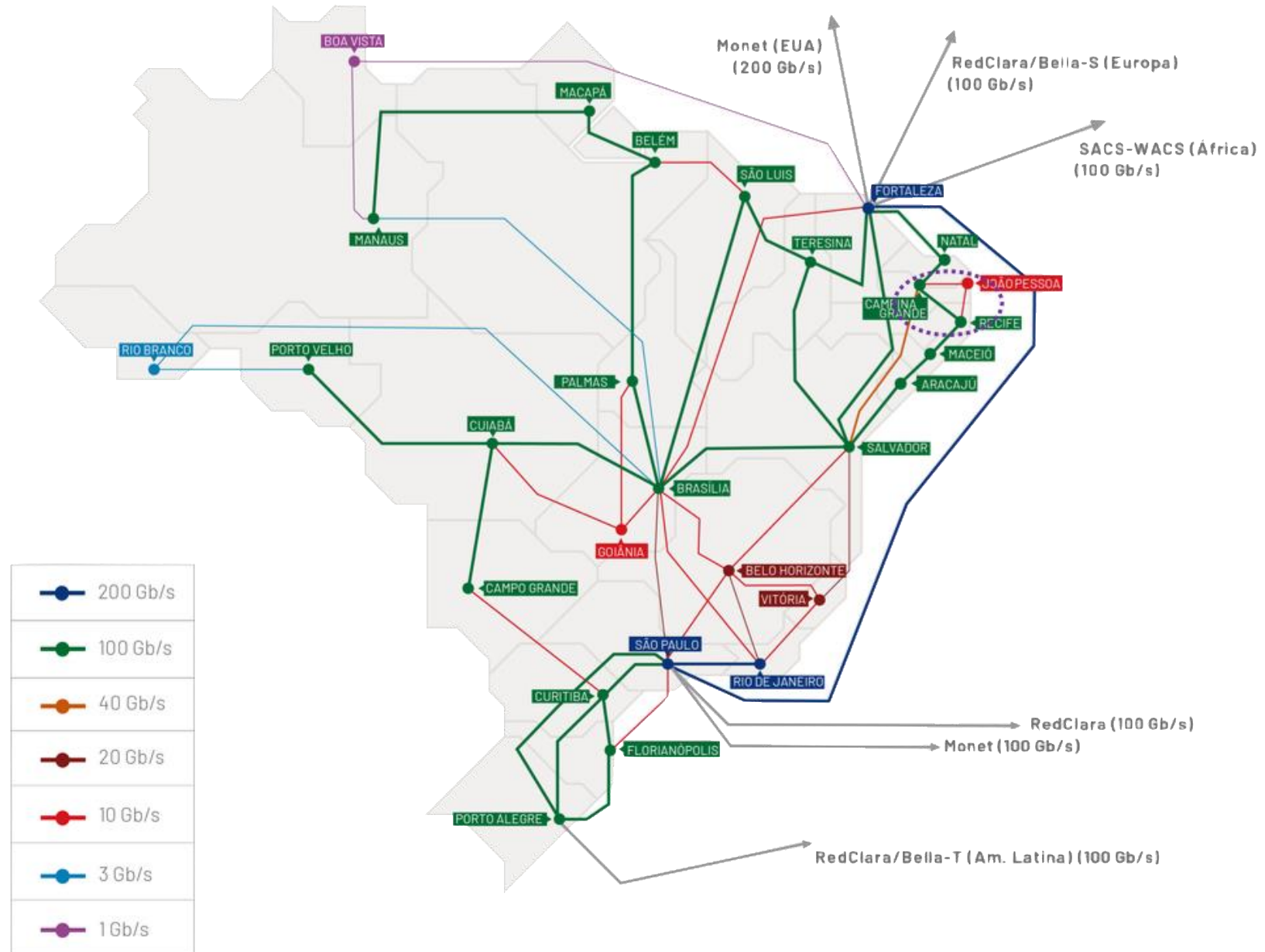


Please join GP4L & RARE/freeRtr
community !

**Digital twin
&
ORCHESTRATION**



Digital twin RNP practical example



GP4L in GN5-1: next major steps

- Keep RARE/freeRtr new features validation & feature requests in GP4L
- Workflow engine integration
 - Camunda
 - SURF WFO integration
- Digital twin extension:
 - Extend ContainerLab/nrx topology to new organisation
 - CMDB: "source of truth" → "cue model" → "cue target" template(cue-lang/kuesta)
 - Control Plane traffic injection:
 - rvers)
 - BMP replay
 - and BGP-LS
 - use case with Application-Layer Traffic Optimization servers ?
- NRE in SC23
- Additional cooperation request from the community ?



RARE/freeRtr in GN5-1

**Questions
Discussions
Ideas ?**

Quick demo !

RARE/freeRtr community support

- **Community channels**

- Mailing list
 - rare-users, rare-dev
 - gn5-1-wp6-t1-rare is internal to the GÉANT project
- RARE messaging
 - IRC #freertr@DN42
 -  RARE/freeRTr
 -  rare_freerouter

- **Dissemination**

- Liaison with international WG (GNA-G, APAN, LHC, UbuntuNet alliance etc.)
- Conferences
 - SC23/24, IETF hackathon, TNC, APAN, RIPE etc.
- Would you like to host a RARE/GP4L Workshop ?



Thank You

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