



GP4L

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

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GNA-G community meeting, TNC23 @ TIRANA

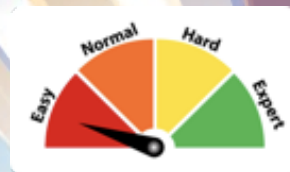
6th June 2023

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).



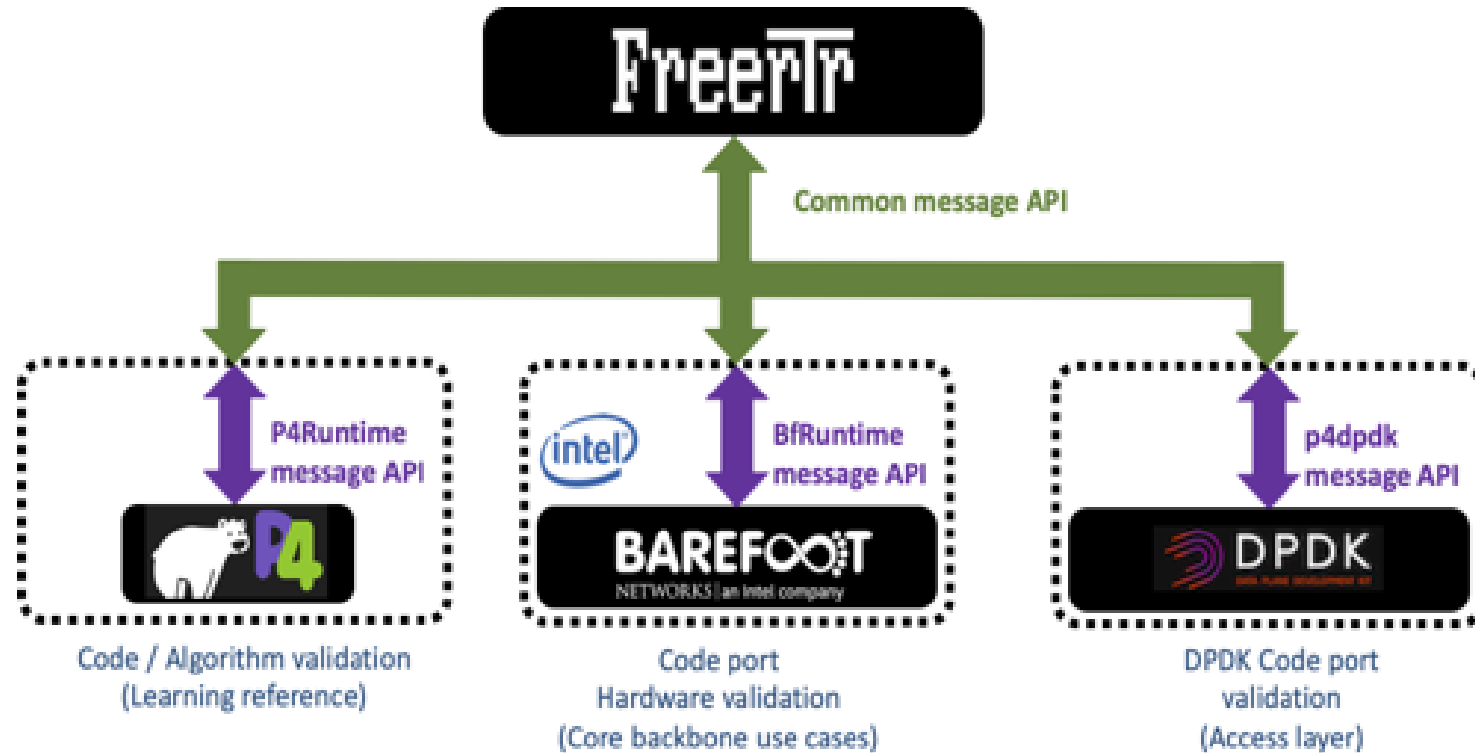
RARE uses FreeRtr as a control plane software and is thus often referred to as RARE/freeRtr



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

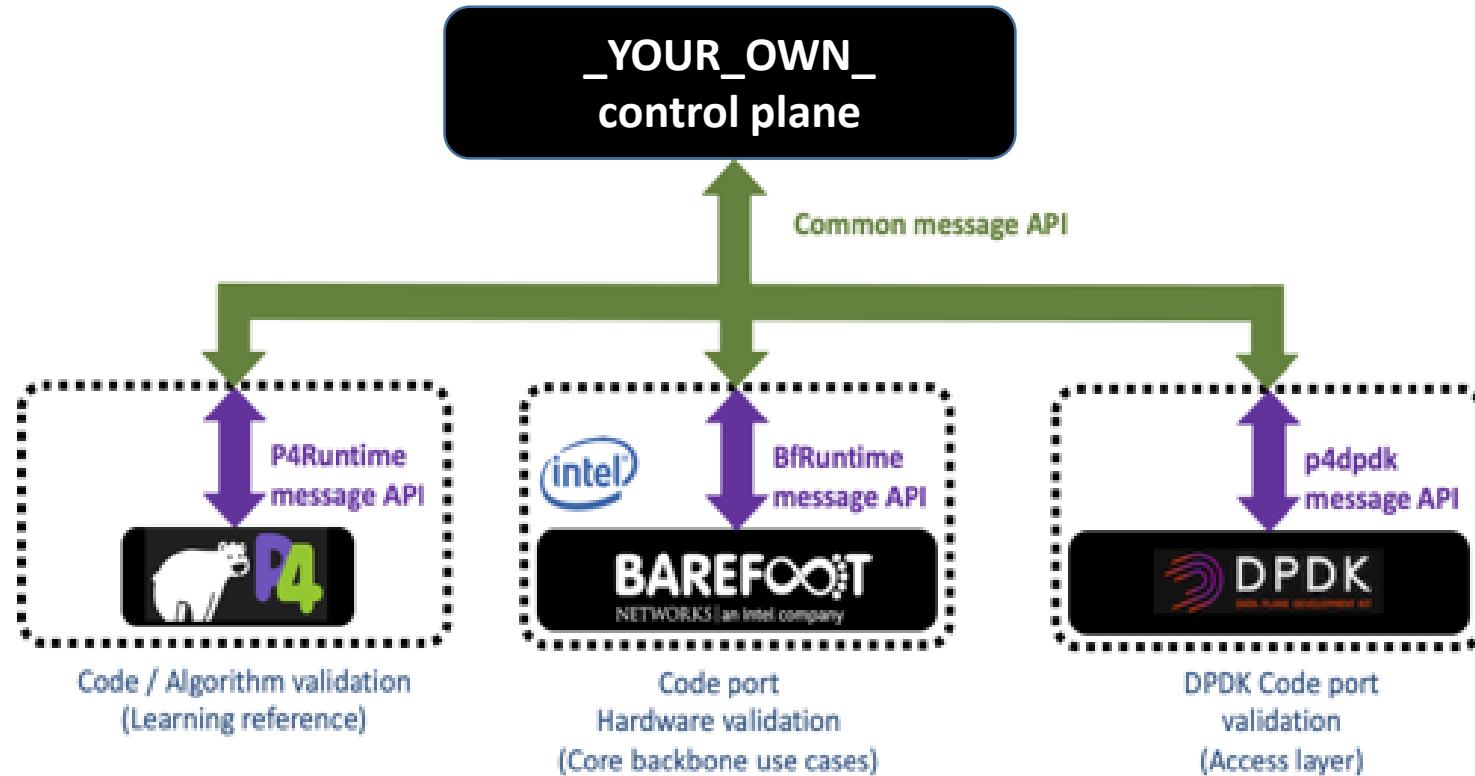
RARE/freeRtr in a nutshell

"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**

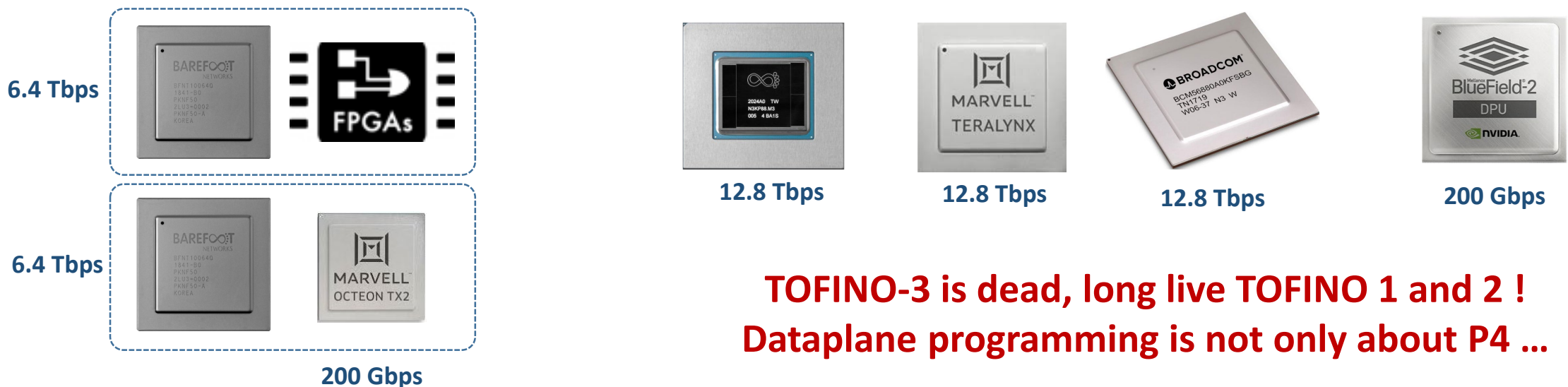
- Network orchestration (integration of NetBox, Camunda and Uptime Kuma)
- Network automation
- Network management components

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



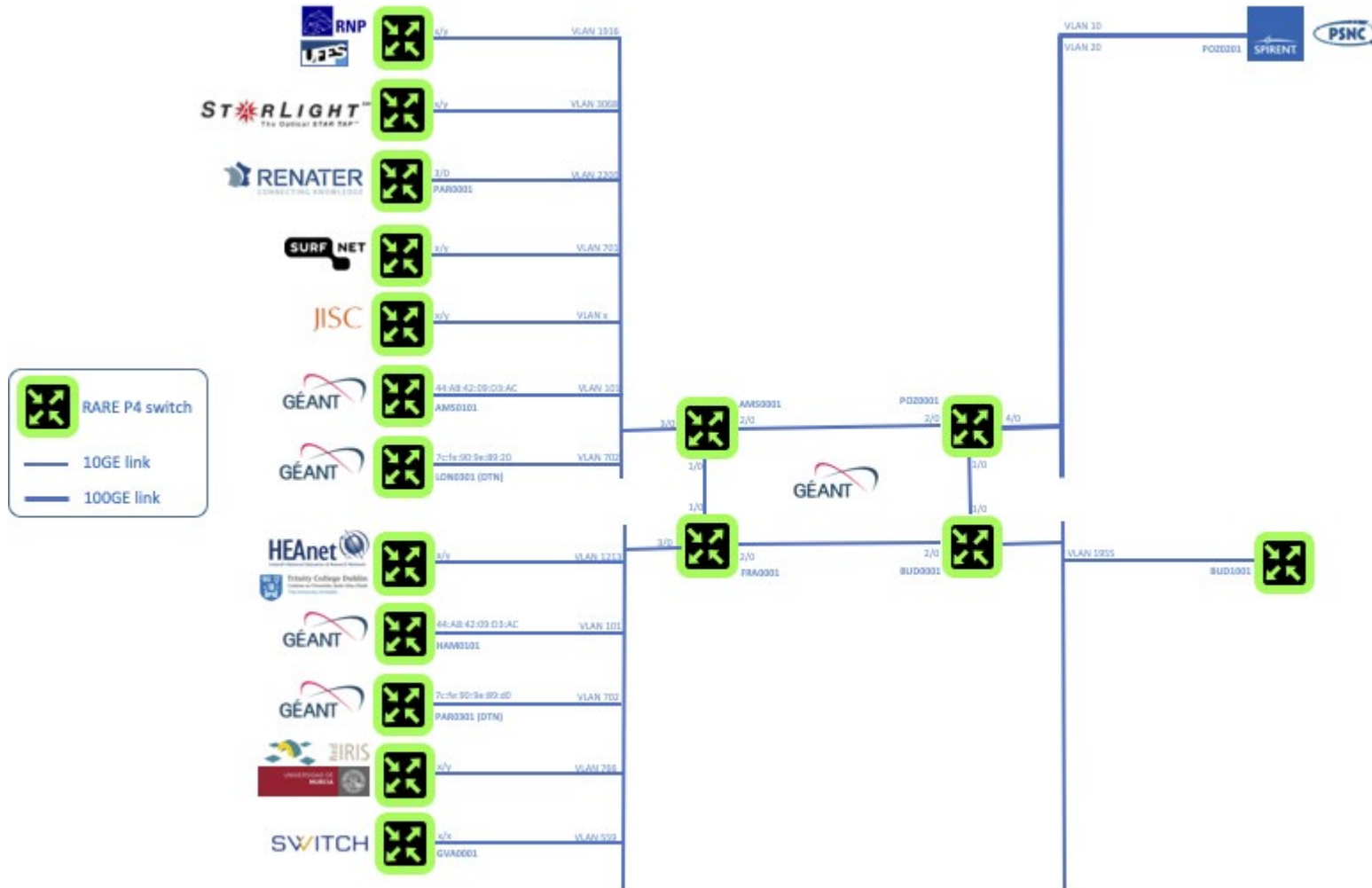
- December 2019



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



- December 2020



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

GP4L
GEANT P4 LAB

- December 2022 (presented to Supercomputing 2022 conference)



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

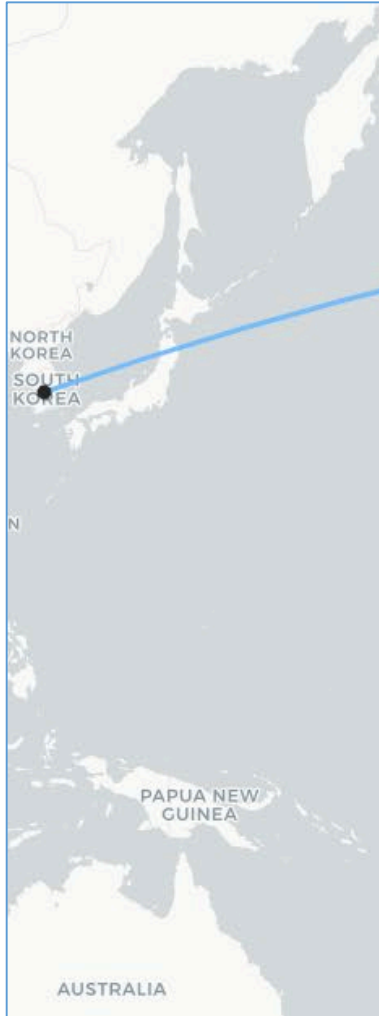
GP4L
GEANT P4 LAB

- December 2022 (presented to Supercomputing 2022 conference)

挑戦者が現れました

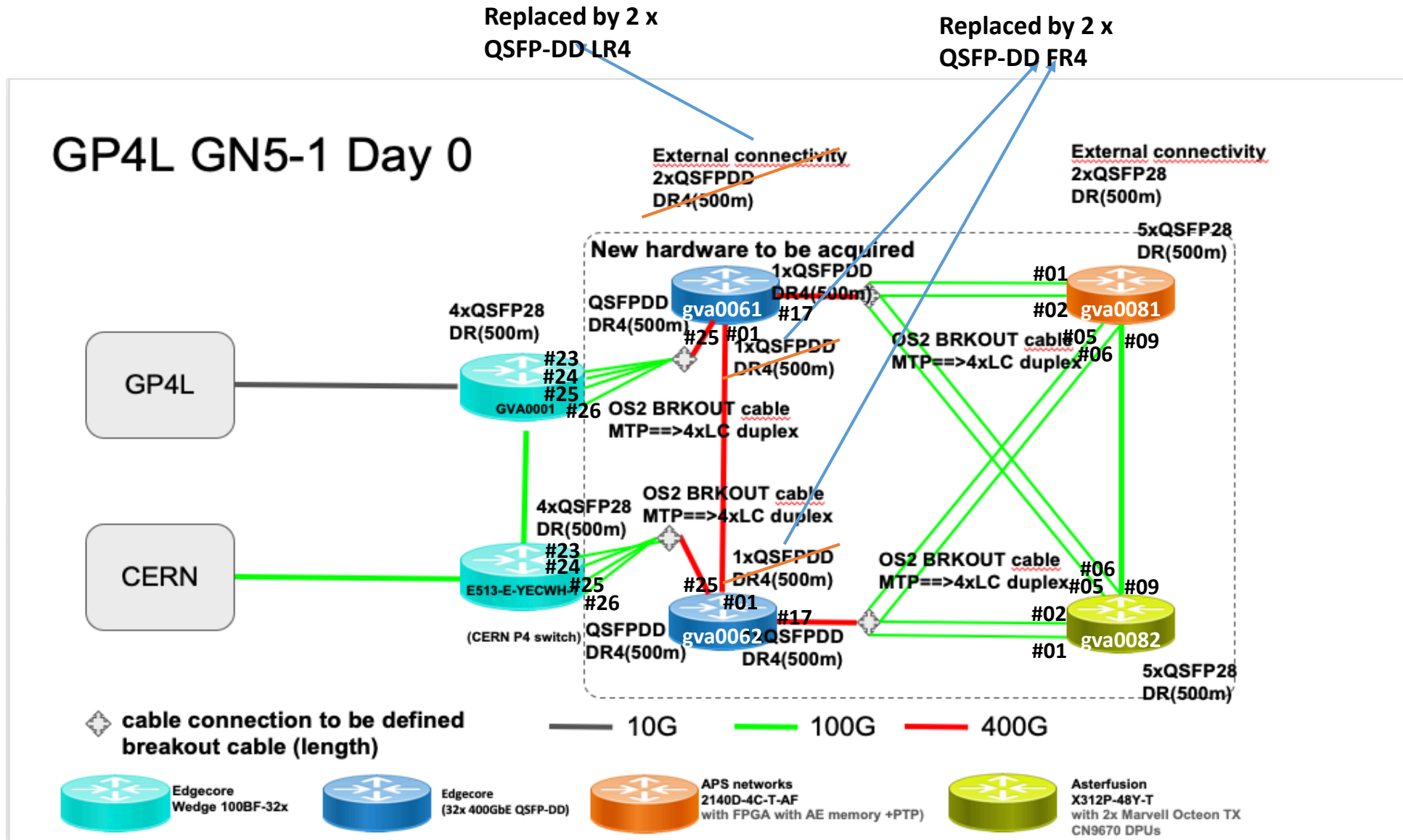
CHALLENGER APPROACHING

GP4L includes now an equipment in Tokyo !



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



$$+ \text{NMaaS} + \text{GP4L} = \text{Key}$$

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 !

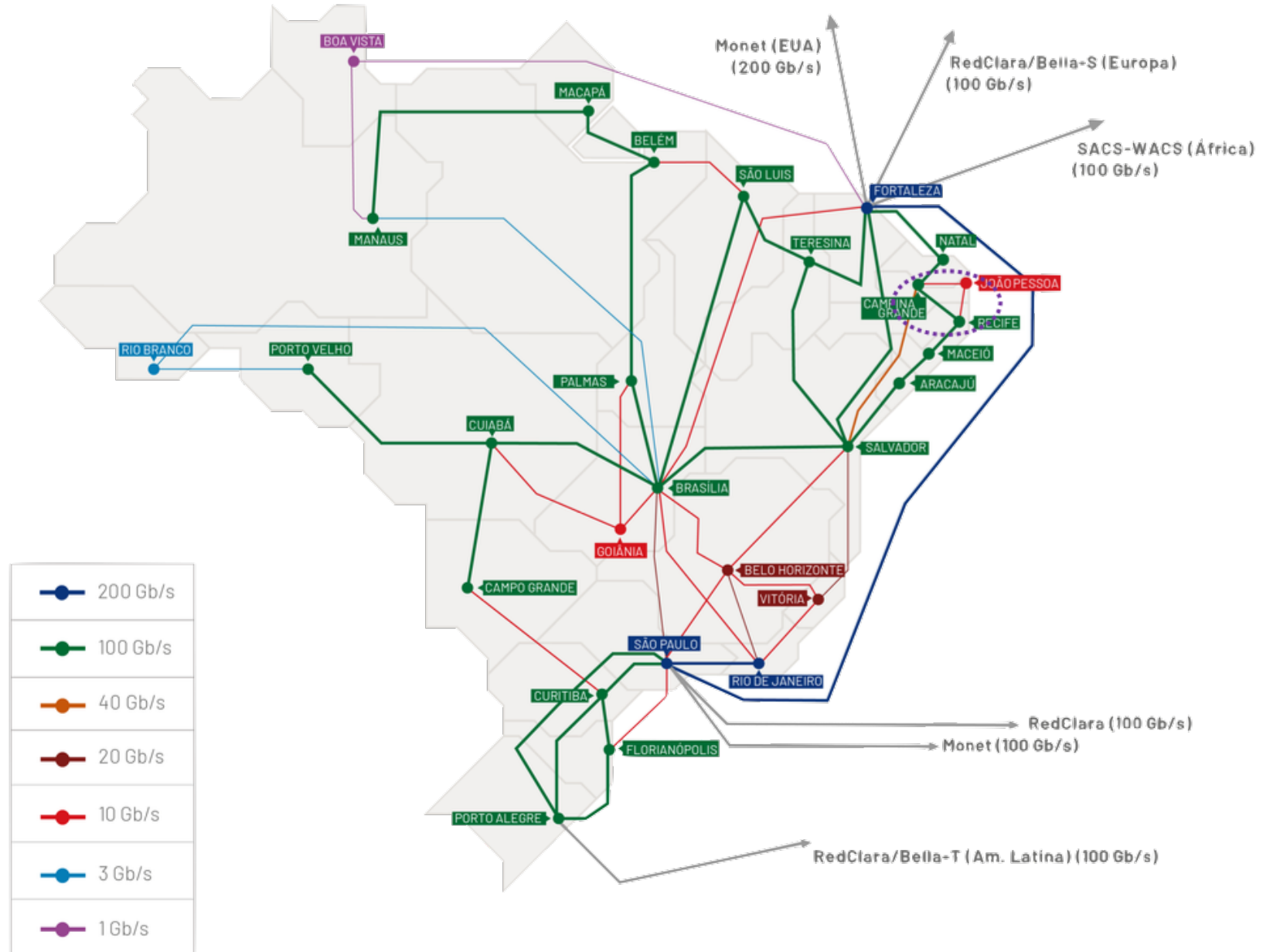


Please join GP4L & RARE/freeRtr community !

A world map with various countries labeled, overlaid with a network diagram. The network consists of several nodes (black dots) and connecting lines (colored arcs) in blue, purple, yellow, and red. The nodes are distributed across North America, Europe, and South America. The text 'Digital twin & ORCHESTRATION' is overlaid in large red font on the map.

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

www.geant.org



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