RARE/freeRtr

GN5-1 – Work Package 6/Task 1

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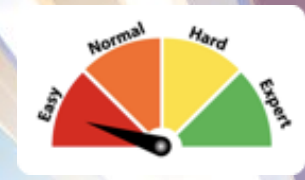
RARE/freeRTr Technical Leader

Agenda

- RARE**/freeRtr** in GN5-1
  - Focus on user/developer community
  - New developments (features, hw support)
- Release management
- RARE**/freeRtr validated design**
- Global P4 lab: GP4L
- Network Management as a Service: **NMaaS**
- Community support
- Discussions



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

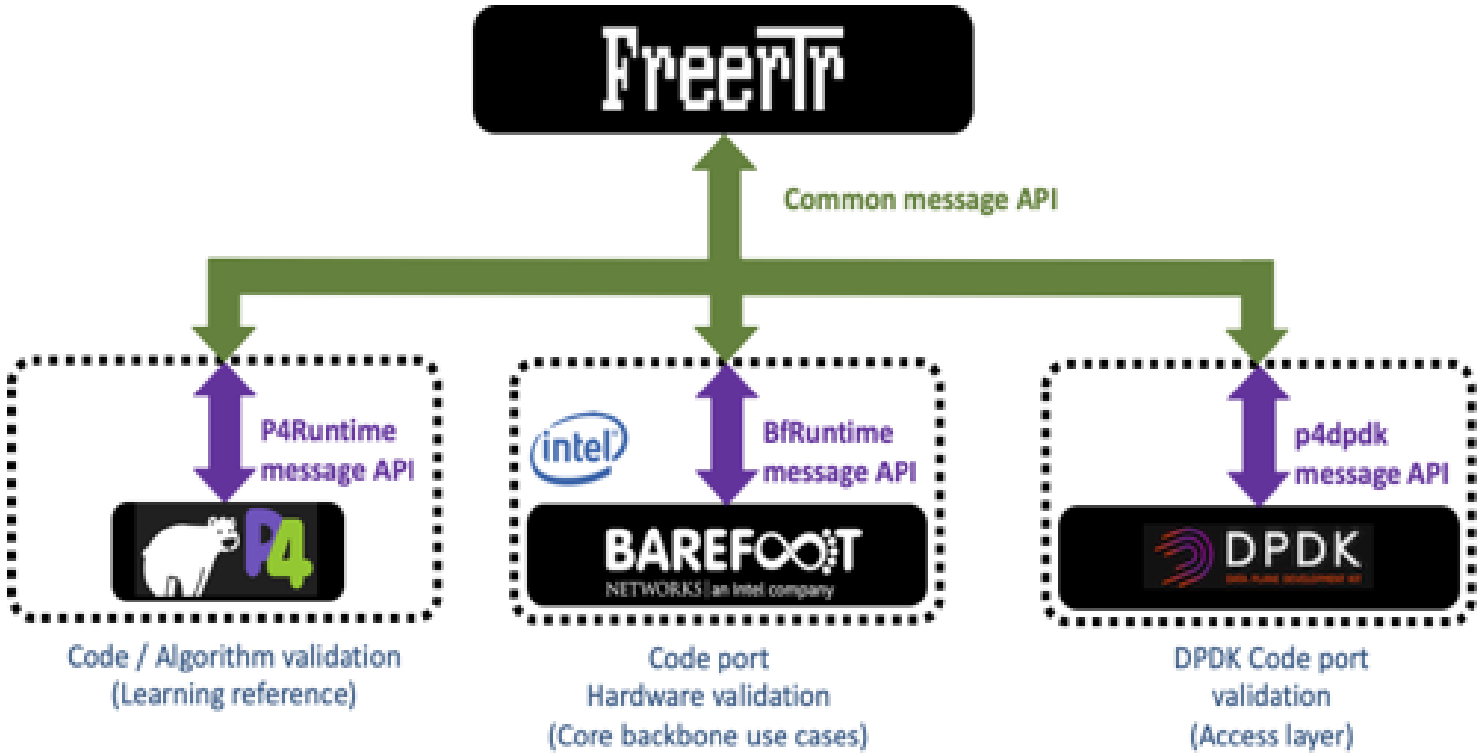
and is thus often referred to as

RARE/freeRtr

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

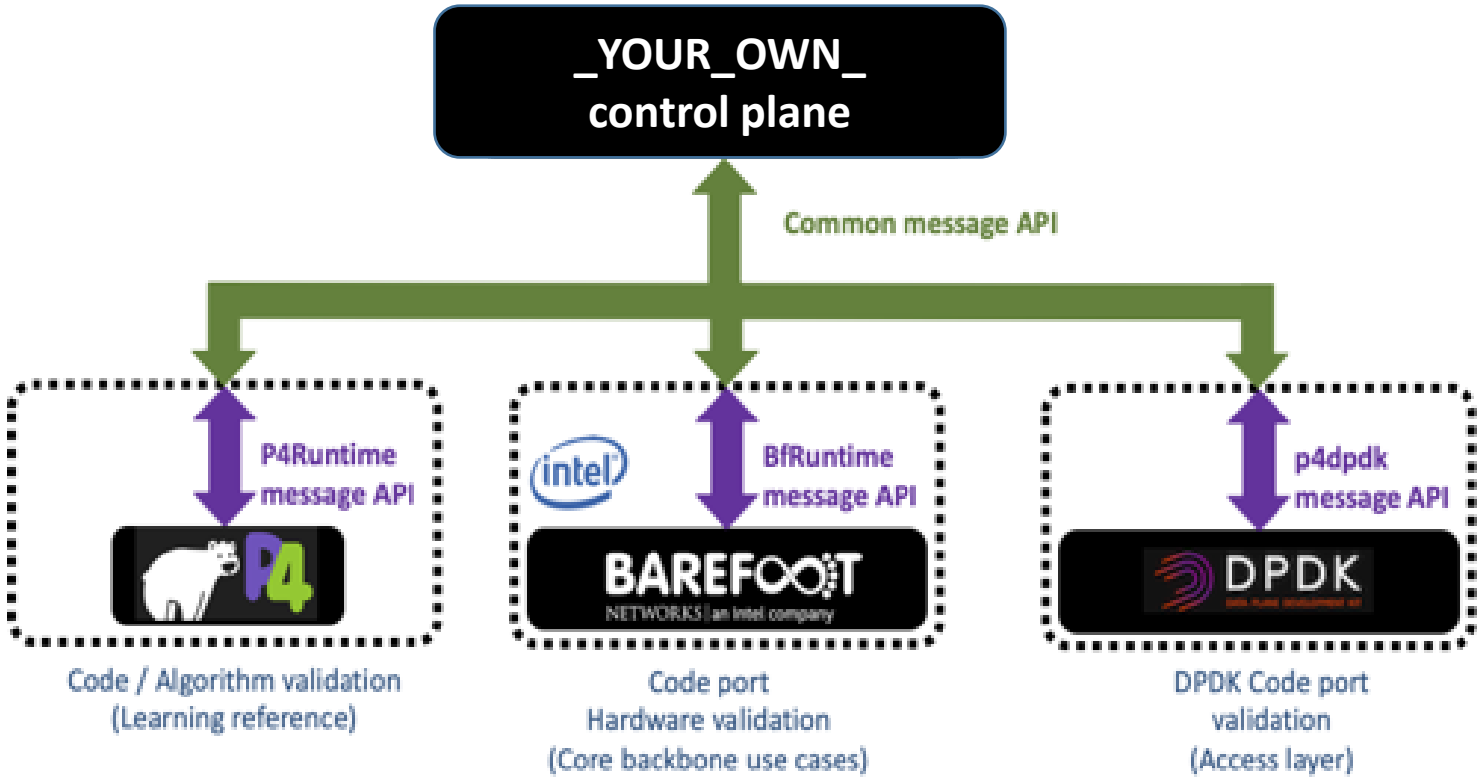
RARE/freeRtr in a nutshell

"One control plane to rule them all …"



RARE/freeRtr in a nutshell

"… Or not !"



RARE/freeRtr Project in GN5-1

- **User community**
  - Listen user community request
    - Feature wish-list
    - Problem solving approach
  - Attribute priority to production use case
    - Implementation
    - Documentation
    - Turn-key solution
  - docs.freertr.org
    - Reference documentation automation
    - RARE**/freeRTr** Validated Design
- **Developer community**
  - Developer's guide at both
    - Control plane
    - Data plane level
  - Developer section in **docs.freertr.org** ?
  - Enroll new developers

Objective:

INCREASE RARE/freeRTr software platform uptake and trust …

RARE/freeRtr feature development

- Feature development
  - RIFT (Routing In Fat Trees➔ https://datatracker.ietf.org/wg/rift/about/)
  - FIB compression
  - RARE/freeRTr virtualisation
  - New metric exposition (buffer counters)

  …
  - Please share your ideas !
- New targets (and thus new use cases)

6.4 Tbps

6.4 Tbps

200 Gbps

12.8 Tbps

12.8 Tbps

12.8 Tbps

200 Gbps

Dataplane programming is not only about P4 !

RARE/freeRtr Validated Design

What can you do with RARE/**freeRtr ?**

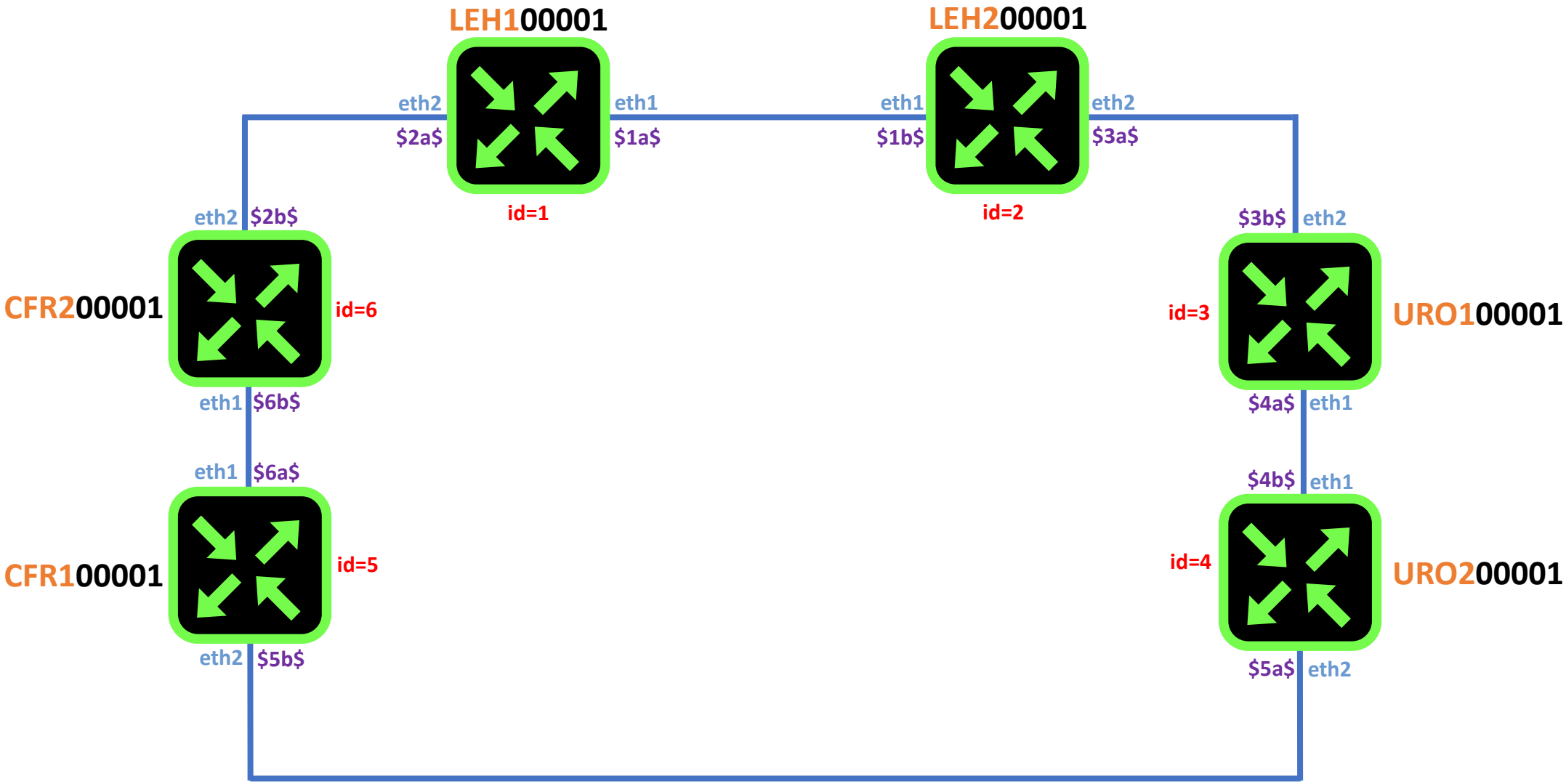
RARE/freeRtr Validated Design

https://github.com/rare-freertr/validated-design

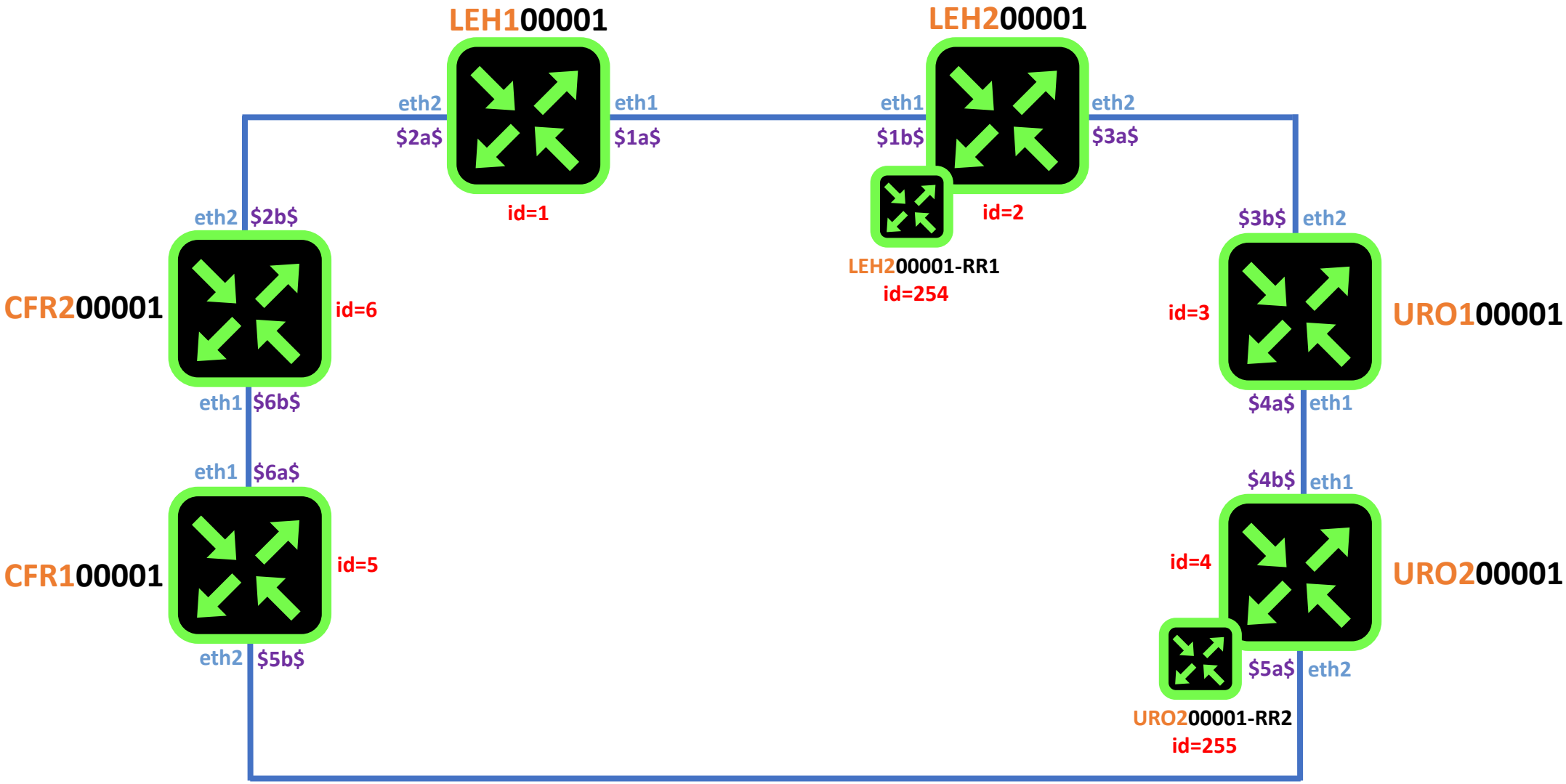
- Network Design description
  - Validated in production environment
  - Fully documented
  - Turn key solution platform
    - Virtual use case mockup
    - freeRtr socket forwarder
    - p4emu
    - p4dpdk
    - TOFINO [1/2] dataplane
    - Upgrade server with Nix
    - Network infrastructure as a Code - CI/CD
    - Testing capability [?] ➔ cross activity with GP4L

  - We should not forget **Network Management** !

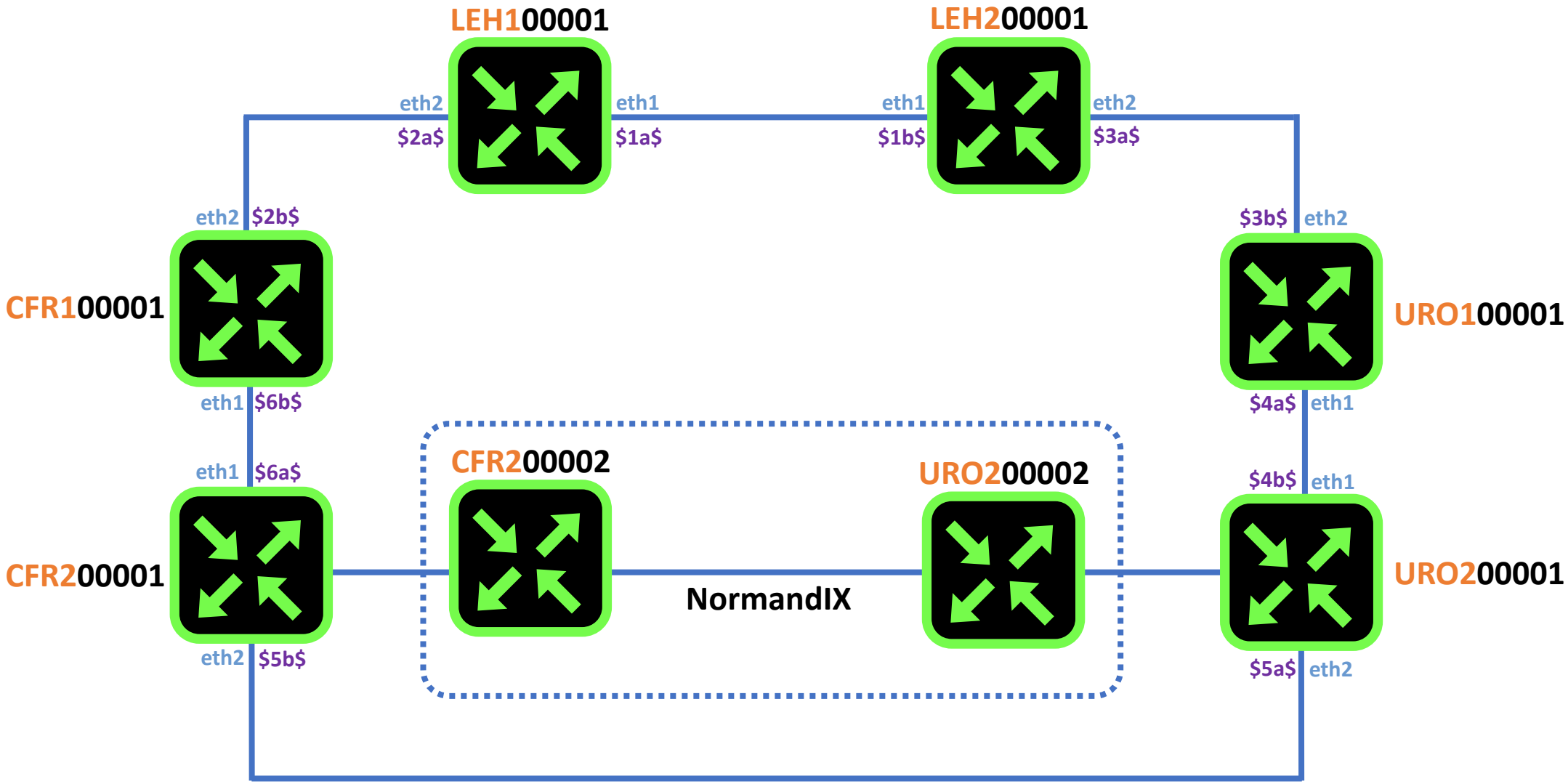
CRIANN / SYVIK-2: Regional network use case



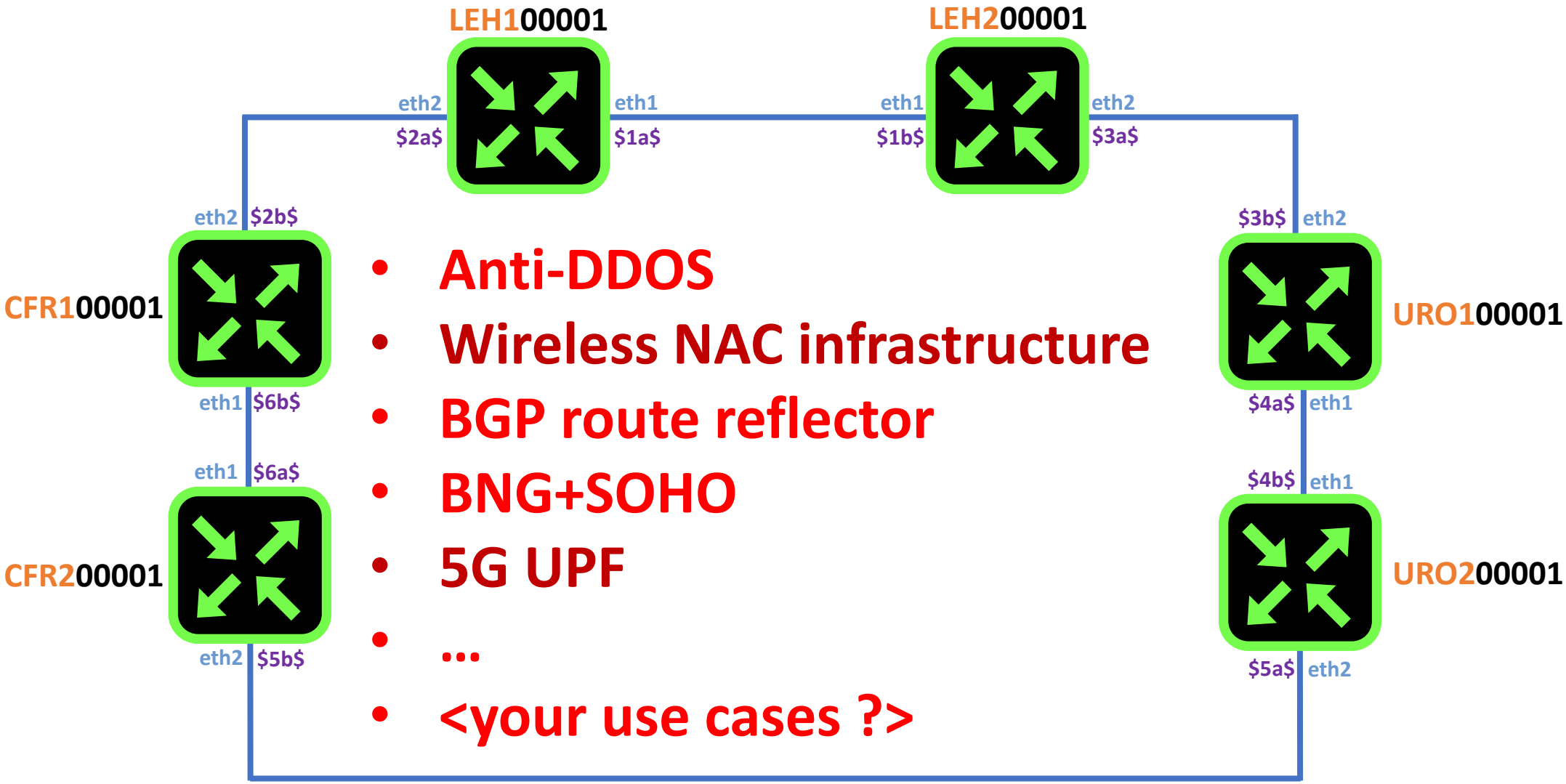
CRIANN / SYVIK-2: Regional network with iBGP route reflection



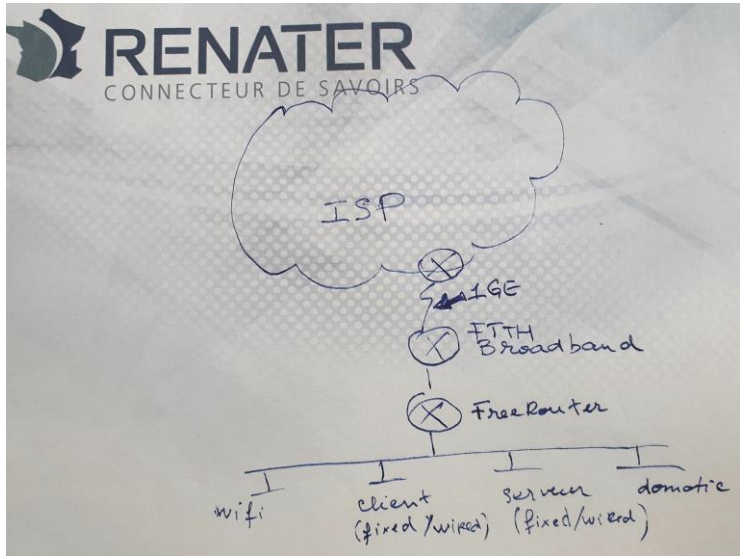
CRIANN / SYVIK-2: Regional network + NormandIX use case



CRIANN / SYVIK-2: Regional network + anti-DDOS use case



RARE/freeRtr Hardware example: **SOHO (small sites: schools, small labs)**



intel
DPDK
DATA PLANE DEVELOPMENT KIT

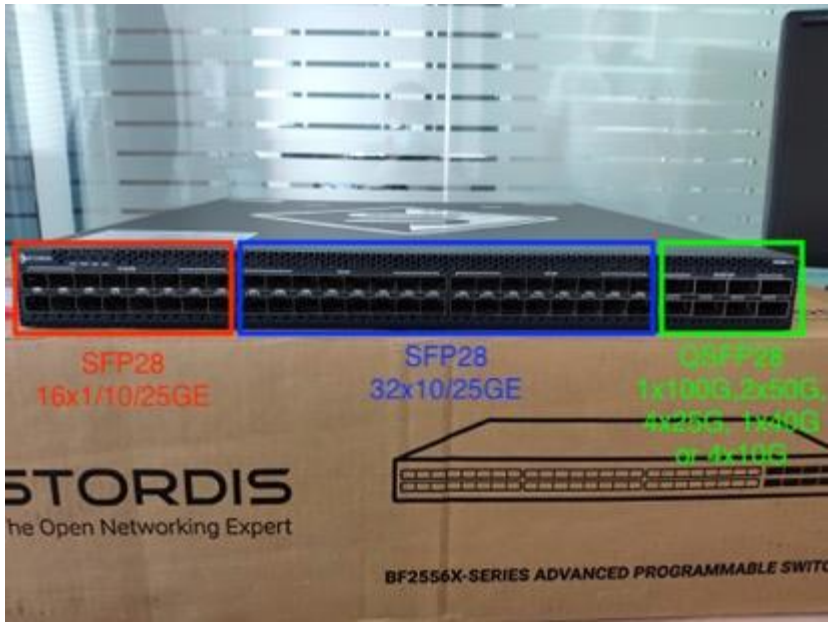
RARE/freeRtr Hardware example: [**MAN MPLS P/PE, IXP**]@ **100GE** !

EdgeCore - Wedge100BF32X

32x100GE - QSFP28

RARE/freeRtr Hardware example: **MAN MPLS P/PE, Spine/Leave/Tor, IXP**

Stordis – BF2556X-1

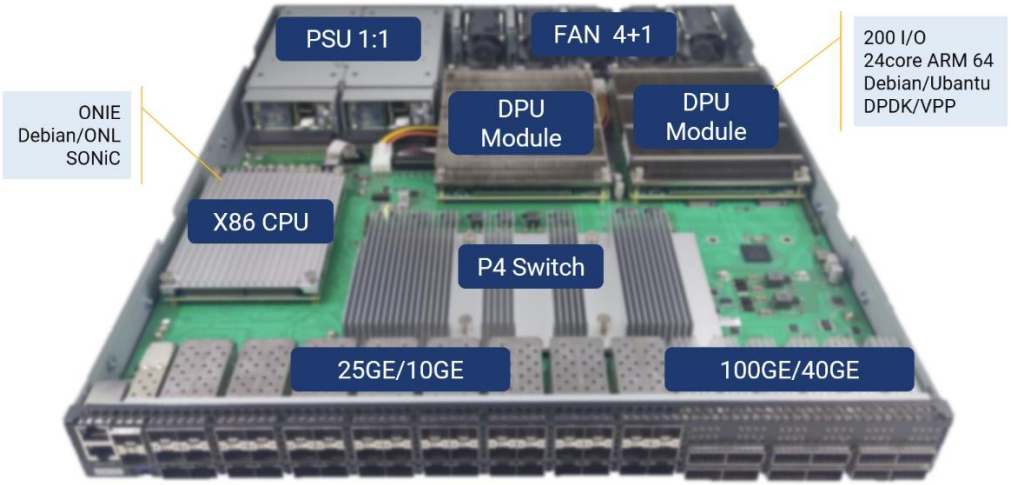


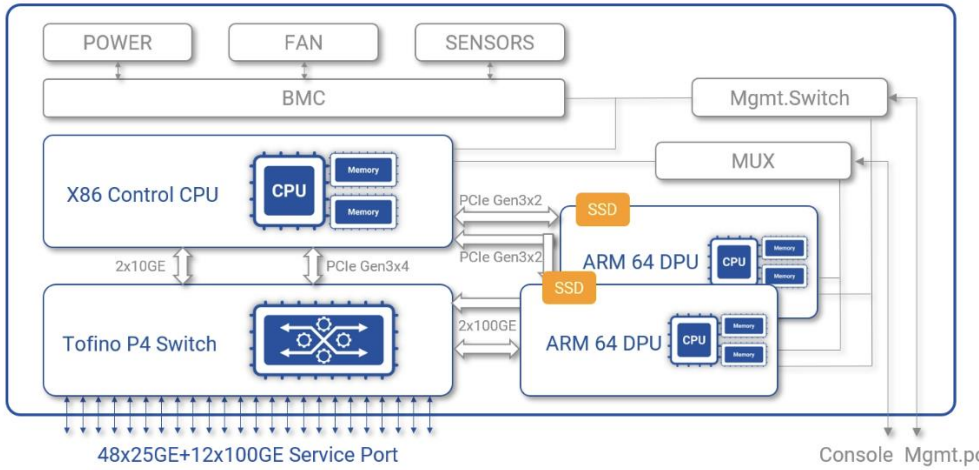
intel
BAREFOOT
TOFINO

8 x 100GE - QSFP28
32 x 10GE/25GE – SFP28
16 x 1GE SFP28

RARE/freeRtr Hardware example: **need more hardware processing power ?**

Hardware Architecture of X312P-48Y-T Barefoot Tofino Switch





What is RARE/**freeRtr** software life cycle management And how is it tested ?

RARE/freeRtr release management

- Release management
  - Based on **Nix package manager**
  - All RARE/freeRtr flavour (control plane and dataplane)

- Software life cycle management management
  - Testing
    - Automated CI/CD (~2300 tests run after each bulk commit)
    - Performance testing (maybe in GP4L ?)
  - You can test RARE/freeRtr with you preferred emulation environment !

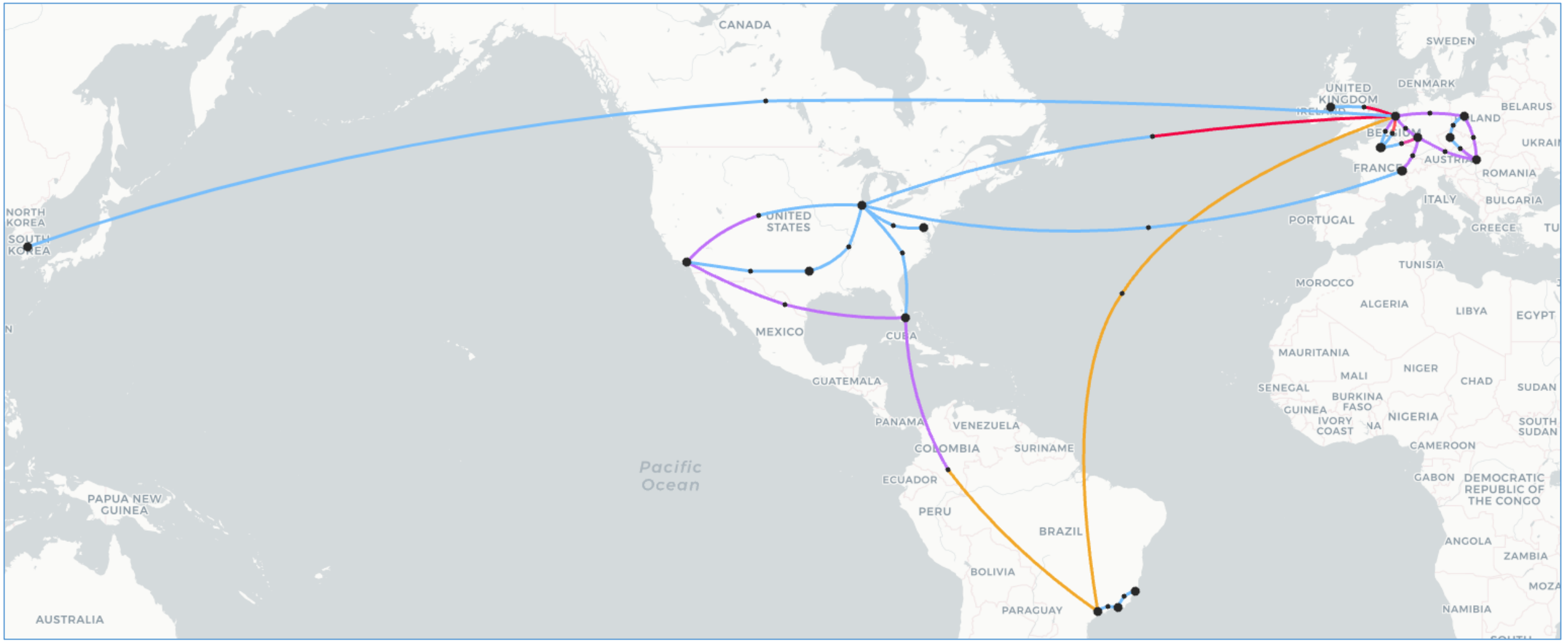
FreeRtr

CONTAINERlab

GNS3®

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

- December 2022 (presented to Supercomputing 2022 conference)



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

- December 2022 (presented to Supercomputing 2022 conference)

GP4L includes now an equipment in Tokyo !

RARE/freeRtr Network Management as a Service

What about RARE/**freeRtr** 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

kubernetes Inside

Key take-away

+NMaaS + GP4L =

CAPEX decrease dramatically

OPEX increase but:

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

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

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

RARE/freeRtr is for you !

Please join RARE/freeRtr community !

“Ever tried. Ever failed. No matter.

Try again. Fail again.

Fail again. Fail better”

Samuel Beckett

“Not knowing is a sign of knowledge …

Asking relevant questions is a sign of power …”

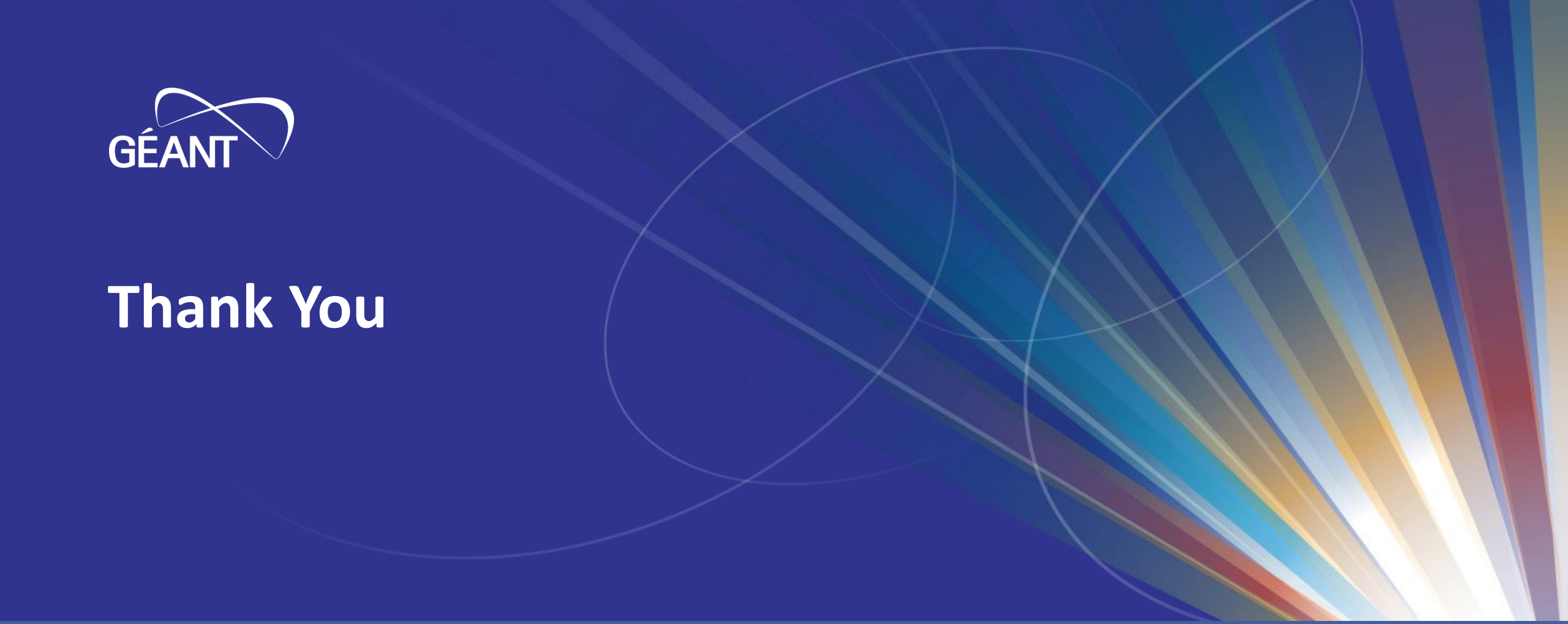
Frederic LOUI ;-)

RARE/freeRtr in GN5-1

Questions
Discussions
Ideas ?

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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Co-funded by
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