RARE/freeRtr
GN5-1 WP6 T1

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Public (PU)
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 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 Project in GN5-1

• User community
  ▪ Listen to requests from user community
    ▪ Feature wish-list
    ▪ Problem solving approach
  ▪ Attribute priority to production use cases
    ▪ 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?
  ▪ Onboard new developers

Objective:

to 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
  • Exposing new metrics (buffer counters)

... 

• 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 ...
What can you do with RARE/freeRtr?
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

- Anti-DDOS
- Wireless NAC infrastructure
- BGP route reflector
- BNG+SOHO
- 5G UPF
- ...
- <your use cases ?>
BGP Classful Transport Interoperability Demonstration

- BGP Classful Transport Planes (draft-ietf-idr-bgp-ct)
- Recent proposal to support network “slices” (e.g. for 5G) across AS boundaries
- Implemented by Juniper... and RARE/freeRtr
- Currently discussed in IETF Inter-Domain Routing (idr) Working Group
- Demonstrated at EANTC Interop Showcase 2023 (Berlin)
RARE/freeRtr Hardware example: SOHO (small sites: schools, small labs)
RARE/freeRtr Hardware example: [MAN MPLS P/PE, IXP]@ 100GE!

EdgeCore - Wedge100BF32X

32x100GE - QSFP28
RARE/freeRtr Hardware example: MAN MPLS P/PE, Spine/Leaf/ToR, IXP

Stordis – BF2556X-1

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 flavours (control plane and dataplane)

• Software life cycle management
  • Testing
    • Automated CI/CD (~2300 tests run after each bulk commit)
    • Performance testing (maybe in GP4L ?)
  • You can test RARE/freeRtr with your preferred emulation environment!
Liaison with GN5-1 WP6-T2 platform – Global P4 Lab

- December 2022 (presented to Supercomputing 2022 conference)
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GP4L now includes equipment in Tokyo!
What about RARE/freeRtr monitoring?
Network Management as a Service

- **Grafana**: Open source analytics & monitoring solution for every database
- **Prometheus**: Monitoring system & time series database
- **Icinga2**: Scalable and extensible monitoring system
- **SPA Inventory**: Resource and Service Inventory with TMF-compliant API
- **Routinator**: RPKI Validator
- **WebDAV Server**: WebDAV Server with Git versioning
- **Uptime Kuma**: Self-hosted monitoring tool like "Uptime Robot"
- **NetBox**: Infrastructure resource modeling application
- **WiFiMon**: Wireless Crowdsourced Performance Monitoring and...
- **Zabbix**: Enterprise-class monitoring solution for networks and applications
- **SPA**: SPA for the E-Line service
- **Healthchecks**: A cron monitoring tool
RARE/freeRtr in GN5-1

Questions

Discussions

Ideas?
RARE/freeRtr community support

• Community channels
  ▪ Mailing lists
    ▪ 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, EANTC Interop, IETF hackathon, TNC, APAN, RIPE etc.
  • Would you like to host a RARE/GP4L Workshop?
Thank You