freertr updates since ripe71

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RIPE#82 Virtual meeting
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www.geant.org

RARE project : Group focus

- GEANT project sub-task: RARE
  - Control plane software
  - Multiple data planes
  - Interface them and the result is …
- Fully functional router
  - Running at hardware line rate
  - DIY “hackable/extensible” router
  - Control plane independence

One familiar platform

⬇

Multiple solutions

⬇

Each solution addresses

⬇

R&E

use case

RARE latest news (M27/48)

- RARE p4 targets

  bmv2 software switch

  Intel/barefoot Tofino on WEDGE-BF100-32X, APS-BF2556X-T1, others

  under study

- RARE “p4” emulation targets

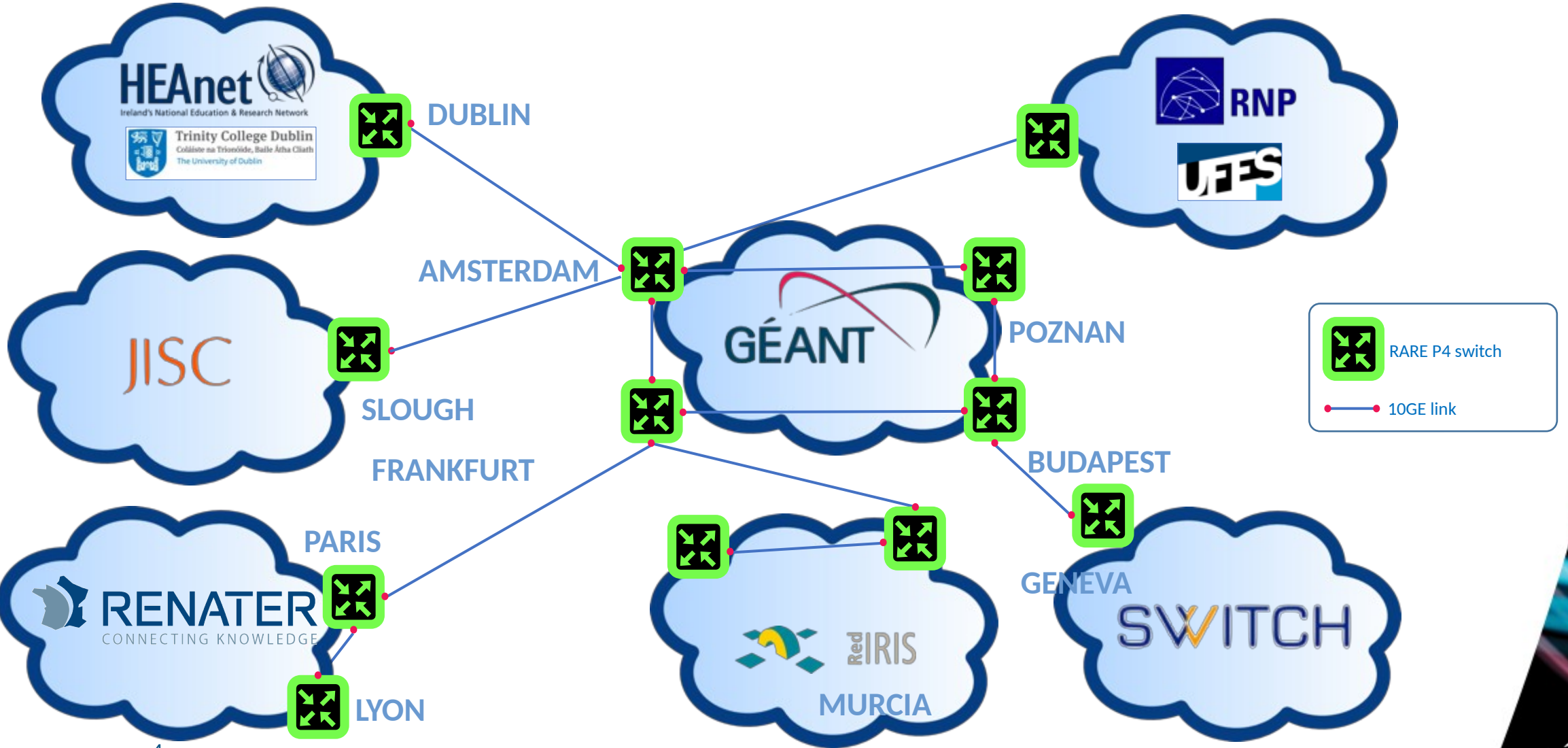
  TCPDUMP & LIBPCAP

  DPDK
  DATA PLANE DEVELOPMENT KIT

- RARE Network Programmable targets

  Broadcom **under study**

RARE P4 european testbed



Additional **CONFIG OPTIONS**

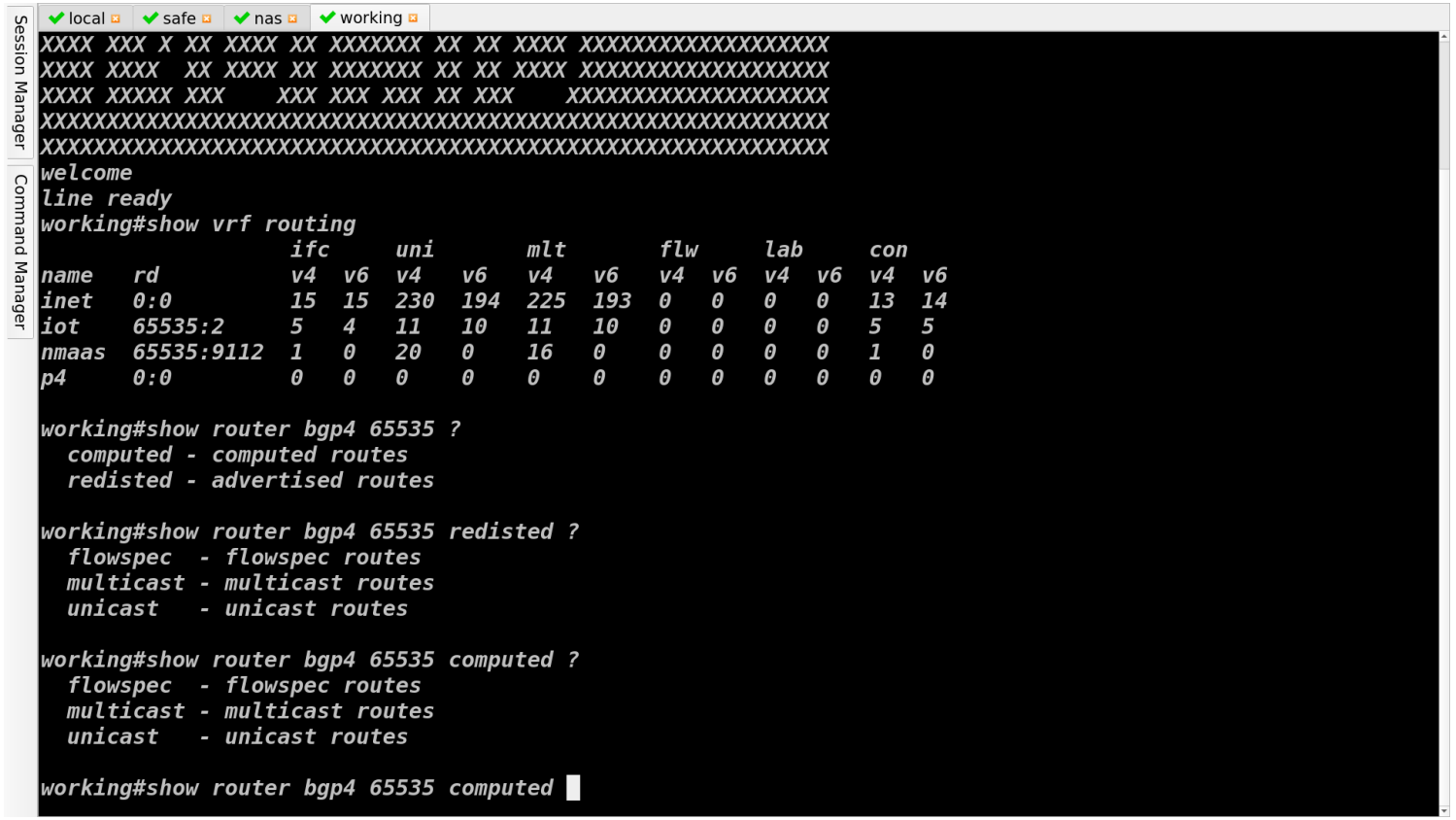
- **RPL** (Route Policy Language - example)
- **PBR** (Policy Based Routing - example)
- **EVC** (Ethernet Virtual Circuit - example)
- **AUTOROUTE** (example)
- **PWHE** (pseudowire headend - example)
- Control plane config syncing redundancy (example)

Additional **CLI OPTIONS**

- Terminal modes: colorized, spacetab, etc
- Filter modes: 2nd level filters, summary/average of the columns
- Show/watch/display/diff/etc

Additional AFI IN router processes

- **UNICAST**
- **MULTICAST**
- **FLOWSPEC**



Additional BGP AFI IN router processes

- **bgp afis: 21 BGP AFIs at the moment and increasing...**

Session Manager
Command Manager

local | safe | nas | working

```
incr time          1          ms
changes all        13751
changes now        1
static peers       2
dynamic peers      0
groups             1          8693..8693
rpki table         0
unicast table      187        0
multicast table    181        0
ouni table         0          0
omlt table         0          0
oflw table         0          0
osrt table         0          0
flowspec table     0          0
vpnuni table       565        0
vpnmlt table       80         0
vpnflw table       0          0
ovpnuni table      2          0
ovpnmlt table      2          0
ovpnflw table      0          0
vpls table         12         0
mspw table         0          0
evpn table         24         0
mdt table          0          0
srte table         0          0
linkstate table    0          0
mvpn table         23         0
omvpn table        1          0

working#
```

NEW! Since RIPE71 BUCHAREST ROMANIA 16-20 November 2015

Additional **imaginary router processes**

- **router aggr**
- **router deaggr**
- **router blackhole**
- **router downloader**
- **router flowspec(rewriter)**
- **router logger**
- **router mobile**
- **router uni2flow**
- **router uni2multi**

Additional/improved **Self-test framework**

- **Run every hour**
- **After code commit change, before releasing publicly**
- **2300 test number In total**
  - **300 interoperability test**
    (with top well known vendors)
  - **300 dataplane test**
    (P4, DPDK, BMv2 and Libpcap)

Additional **Code refactoring & Optimization**

- **Routing performance improvement**
  - **full feed in 13 secs**
- **ip aware spf**
- **ecmp/ucmp**
- **hierarchical table backend**
- **lot more!**

Additional Encapsulation & Tunnelling features

- **Encapsulation**
  - **Bit Index Explicit Replication: bier**
  - **Network Service Header: nsh**
  - **Segment Routing for IPv6: srv6**
- **Tunnelling modes**
  - **OpenVPN: ovpn**
  - **Wireguard: wg**
  - **some more !**

Additional **Security features**

- **Data plane rate-limiting (example)**
- **Control plane protection (example)**
- **RACL (Receive Access Control List - example)**
- **MPLS ACL (MultiPurpose-LabSubstitute Access Control List - example)**
- **HACL (Hybrid ACL - example)**
- **INFRA-ACL (Infrastructure Access Control List - example)**
- **IP/MPLS/Interface/Route/Flow direction aware inspection (example)**

Additional **Telephony features**

- **Dial-peer**
- **Translation-rule**
- **Scriptable “server sip”**
- **“server modem”**
- **Modem client**

Additional **Network Management features**

- **netconf**
- **rest api**
- **sensors/checks:**
  - **streaming telemetry**
  - **Prometheus agent**
  - **NRPE agent**

And more minor feature but still relevant features !

Please visit the auto-generated **changelog**

In order to know more !

New DATAPLANES and related features !

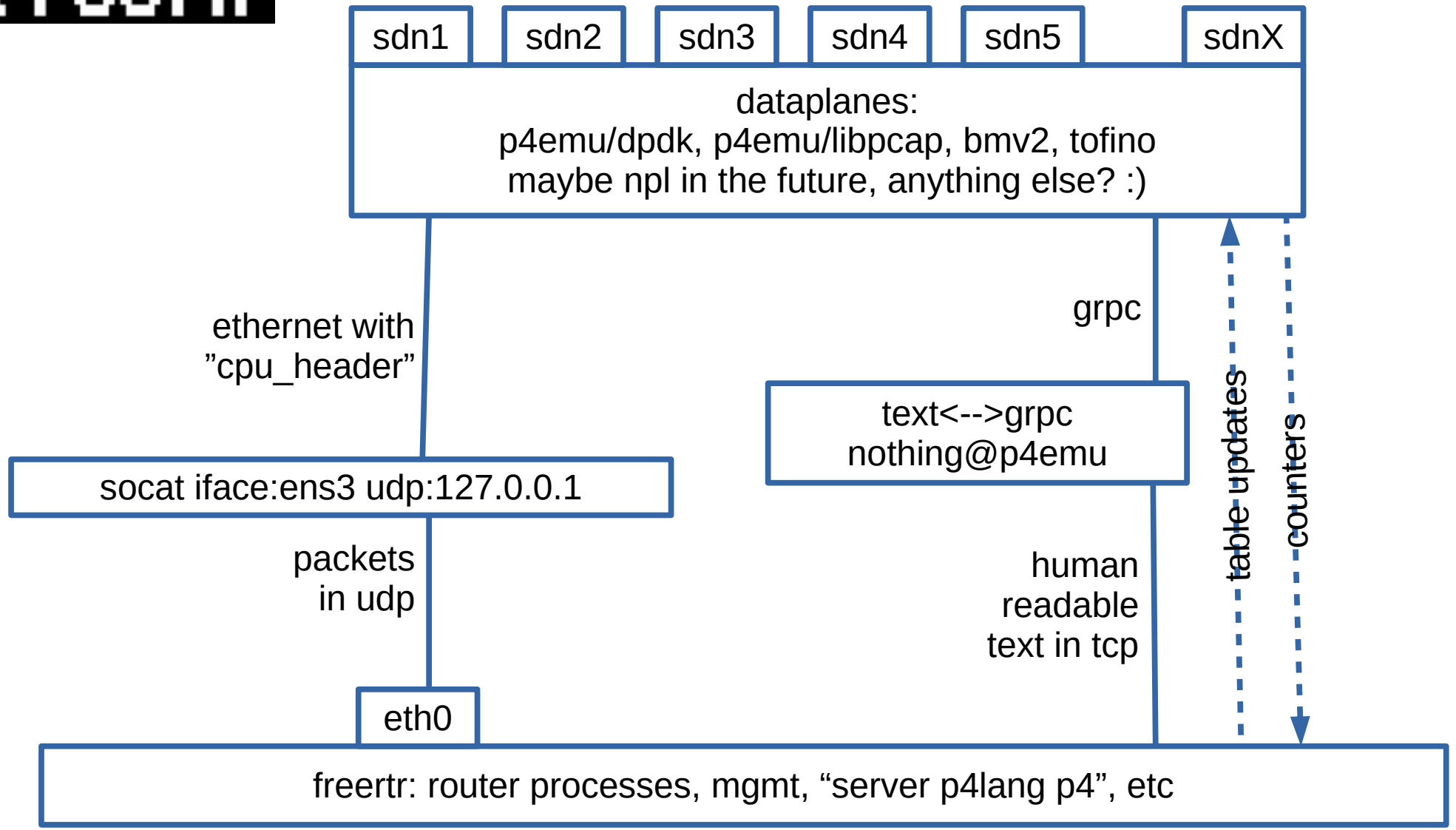
- **per dataplane capabilities: sources.nop.hu/cfg/p4lang*.ini**

- **CoPP, acl, flwspc**
- **nat vlan bridge**
- **bundle hairpin gre l2tp route**
- **mpls vpls evpn eompls**
- **pppoe gretap pppoetap l2tptap vxlan ipip macsec(*) ipsec(*) pckoudp**
- **openvpn(*) wireguard(*)**
- **srv6 pbr qos mroute duplab bier**

***: crypto only in p4emu/dpdk and p4emu/libpcap**

- alternatively openvswitch: **sources.nop.hu/cfg/opnflw*.ini**

rare.freertr.net architecture



Key take-away – We are ready to roll into production

- Automated testing: www.freertr.net/tests.html
- 3rd party testing via Spirent usage
  - (thanks PSNC@WB team)
- P4 profile calibration
- DPDK is in operation
- Production instances

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KIFÜ

- Someone else? **Please join us** :)

Useful links

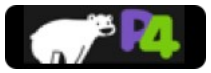
- Project
  - **freeRtr control plane's home:** freertr.net
  - **more information on dataplanes:** rare.freertr.net
  - **Project members' journey:** blog.freertr.net
  - **FreeRtr configuration guide:** docs.freertr.net
- Contact
  - **For freertr questions: https://groups.io/g/freertr**
  - **For daring RARE/freeRtr users:** rare-users@lists.geant.org
  - **For RARE/freeRtr JEDI developer wanabee:** rare-dev@lists.geant.org
  - **For RARE/freeRtr supporters !** https://twitter.com/rare_freerouter

Useful links

Source code !!!!

freeRtr core: sources.nop.hu/src/

TOFINO ASIC: sources.nop.hu/misc/p4bf/



P4Lang bmv2: sources.nop.hu/misc/p4lang/

p4emu: sources.nop.hu/misc/native/p4*

p4dpk: sources.nop.hu/misc/native/p4*

Special thanks …

And others …
Who make this possible !

Thank you

Any questions?

www.geant.org

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