
BSDRP

Uma opção de softrouter
com FRR



Agenda

- Motivação
- Historia do BSDRP
- Historia do FRR
- Conhecendo o BSDRP
- Conhecendo o FRR
- Exemplo de uso
- Cases de sucesso
- Agradecimentos



Motivação

- Aumento da demanda dos pequenos provedores.
- Melhores opções do que as existentes no mercado.
- Facilidade na operação / reposição.
- Baixo Investimento.
- Suporte a novas funcionalidades.
- Desenvolvimento constante.
- Falta de documentação.



Historia do BSDRP

- Soft-router baseado em FreeBSD
- Open source
- Teve seu inicio em 2009
- Versão 1.0 lançada em 10/2011
- No inicio usava Quagga/Bird
- Na versão 1.8 o Quagga foi trocado pelo FRR
- Atualmente está na versão 1.91
- <https://bsdrp.net>

Don't buy a router: download it !



Historia do FRRouting

1996 começa o desenvolvimento do Zebra



2002 inicia-se o Quagga, um fork do Zebra



2016 Inicia-se o FRR, um fork do Quagga



2017 lança-se a primeira release – FRR 2.0



Outubro de 2018 – Ultima release – FRR 6.0

<https://frrouting.org/>



Protocolos Suportados

- BGP
Large Communities, EVPN, VxLan, RPKI, VPN's baseadas em MPLS, VPN/VRF Route Leaking, RFC5549, FlowSpec
- OSPF
- ISISD
- PIM
- VRF
- RIP
- BABEL
- EIGRP
- NHRPD
- PBR
- LDPD

Lista completa em <https://github.com/FRRouting/frr/wiki>

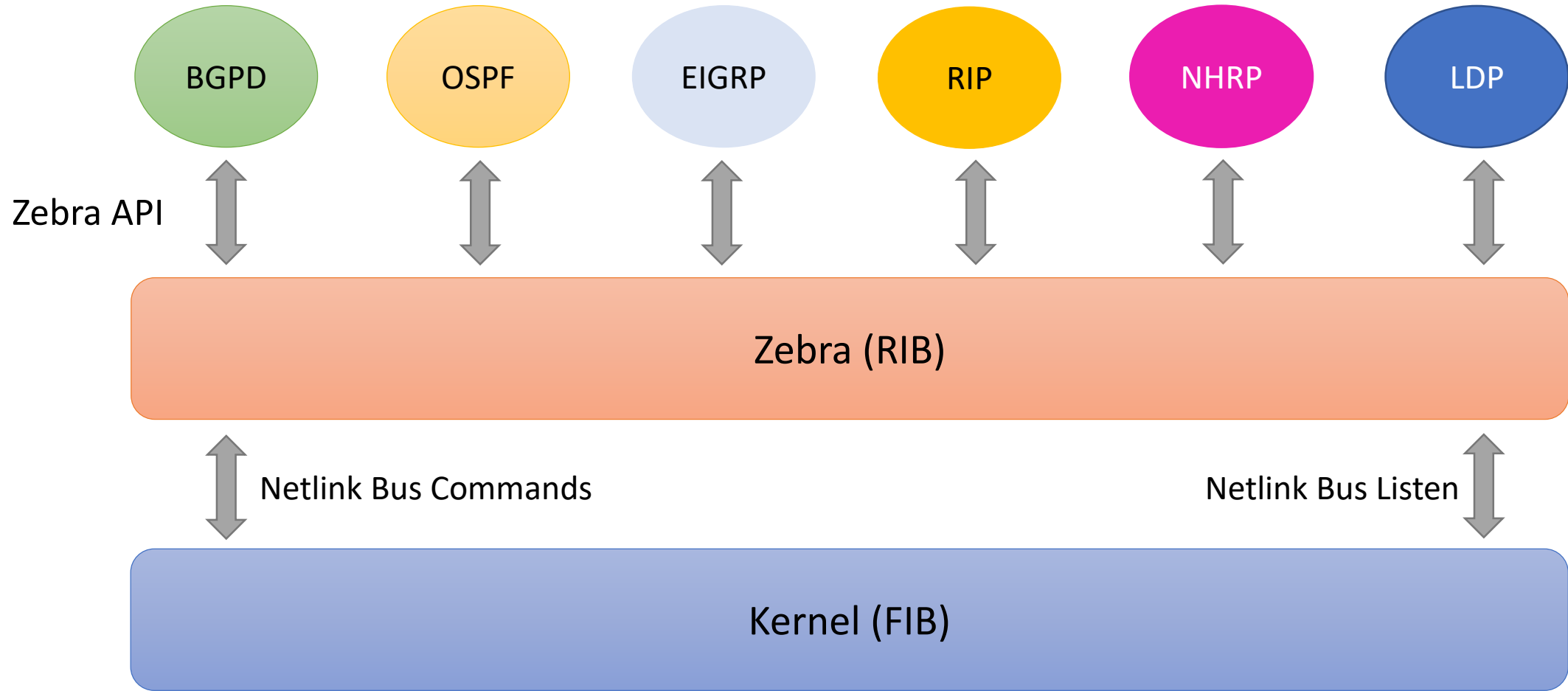


Protocolos suportados

- VRF
Depende de l3mdev e está funcional nas versões de kernel acima de 4.4
- BGP EVPN
Depende de NFT_EXT_LEARNED e Arp Suppression, kernel 4.14 e 4.17
- Homologado com FreeBSD, NetBSD, OpenBSD, Solaris, Debian, Ubuntu e RedHat
- VRF e BGP EVPN somente disponíveis para distribuições Linux



Arquitetura do Free Range Routing



Por que usar BSD Router Project?

- Baseado em FreeBSD
- Suporta os principais protocolos necessários para um ISP
- Desenvolvimento ativo e constante
- Otimizado para forward de pacotes
- Dispensa alto conhecimento em S.O.
- Fácil operação
- Vem com FRR embarcado
- Compatível com NETMAP



Comandos BSDRP

Alguns comandos para administração e troubleshooting

- **help**
- **config** – save, apply, factory, diff, rollback
- **show** – version, route, packages, process, traffic, ifstat
- **system** – halt, reboot
- **sysrc** – hostname, frr_enable, sshd_enable
- **service** – start | stop ffr, sshd
- **cli / vtysh**
- **passwd**

```
[root@router]~# help
Welcome to BSD Router Project (BSDRP) help

BSDRP is an embedded FreeBSD with some customized tools:
- config : Manage config files
- show   : Display some system information
- upgrade : upgrade BSDRP
- system : System actions
- cli    : Enter into frr router mode
          Need to start it first with
          sysrc frr_enable=yes
          service frr start
- graphpath: helper tool to graph path
- tuning   : Give some tuning advice
- help     : Display this help message

Command completion is available with TAB key
More information with: tools-name help
Display all rc variables configured with: sysrc -a
```



Iniciando a configuração

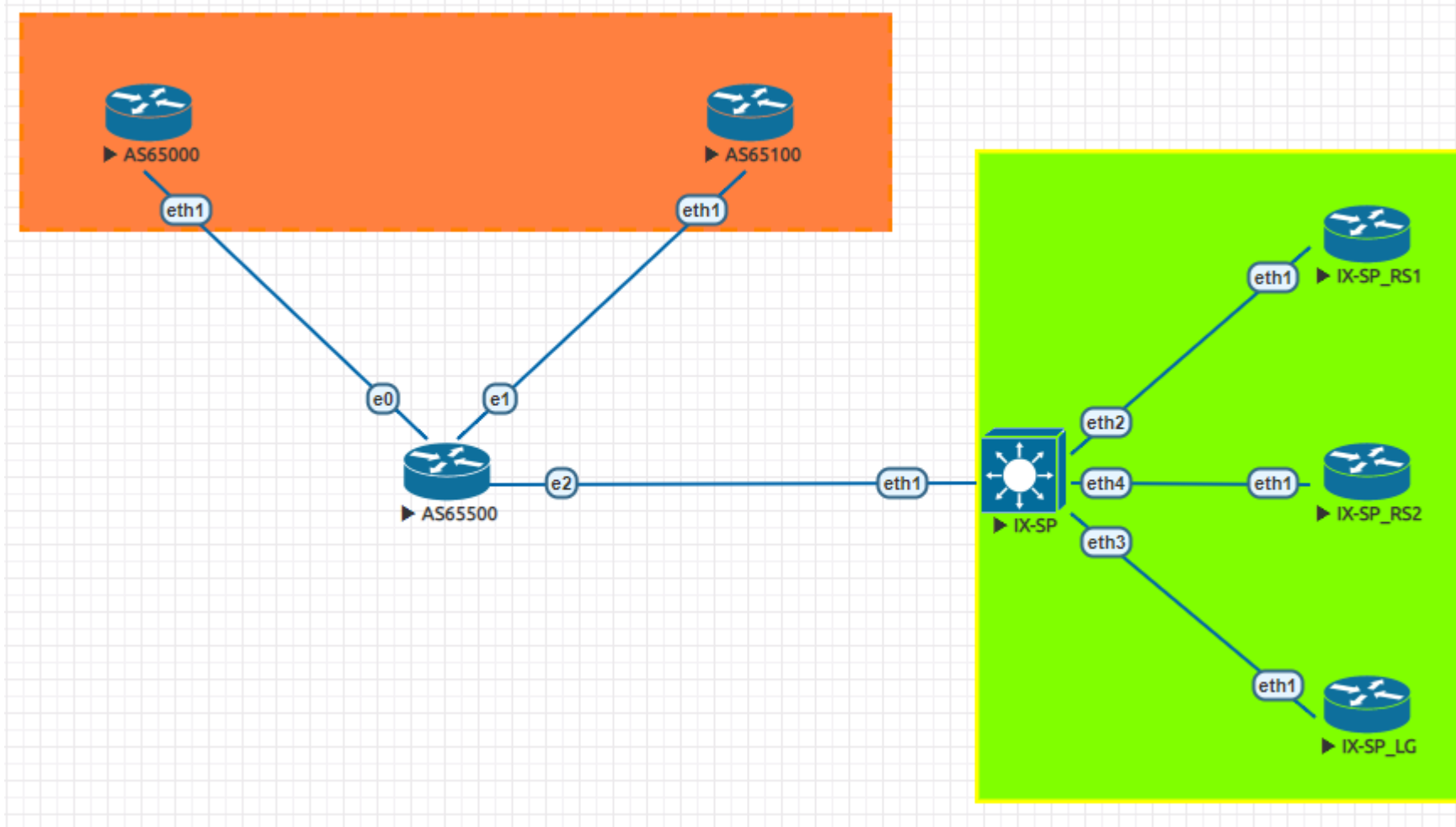
Existem duas maneiras de efetuar a configuração do equipamento.

A primeira é direto na interface do FRR com o comando **cli** ou **vttysh** e a segunda é editando manualmente o arquivo de configuração de cada protocolo de roteamento e do zebra

```
/usr/local/etc/frr/zebra.conf  
/usr/local/etc/frr/ripd.conf  
/usr/local/etc/frr/ripngd.conf  
/usr/local/etc/frr/ospfd.conf  
/usr/local/etc/frr/ospf6d.conf  
/usr/local/etc/frr/bgpd.conf  
/usr/local/etc/frr/isisd.conf  
/usr/local/etc/frr/eigrpd.conf  
/usr/local/etc/frr/babeld.conf
```



Exemplo de configuração



Exemplo de configuração

```
interface vtnet0
description AS65000
ip address 192.0.0.2/30
ipv6 address 2001:db8:beba:c0ca::2/126
!
interface vtnet1
description AS65100
ip address 203.0.113.6/30
ipv6 address 2001:db8:beba:cafe::6/126
!
interface vtnet2.1010
description IX_SP-V4
ip address 187.16.216.34/21
!
interface vtnet2.1020
description IX_SP-V6
ipv6 address 2001:12f8::216:34/64
!
```



Exemplo de configuração

```
router bgp 65500
  bgp router-id 198.18.0.0
  neighbor 187.16.216.252 remote-as 20121
  neighbor 187.16.216.252 description IX-SP_LookingGlassV4
  neighbor 187.16.216.252 update-source 187.16.216.34
  neighbor 187.16.216.253 remote-as 26162
  neighbor 187.16.216.253 description IX-SP_RS1-V4
  neighbor 187.16.216.254 remote-as 26162
  neighbor 187.16.216.254 description IX-SP_RS2-V4
  neighbor 187.16.216.254 update-source 187.16.216.34
  neighbor 192.0.0.1 remote-as 65000
  neighbor 192.0.0.1 description TRANSITO-AS65000-v4
  neighbor 192.0.0.1 update-source 192.0.0.2
  neighbor 203.0.113.5 remote-as 65100
  neighbor 203.0.113.5 description TRANSITO-AS65100-v4
  neighbor 203.0.113.5 update-source 203.0.113.6
  neighbor 2001:db8:beba:c0ca::1 remote-as 65000
  neighbor 2001:db8:beba:c0ca::1 description TRANSITO-AS65000-v6
  neighbor 2001:db8:beba:c0ca::1 update-source 2001:db8:beba:c0ca::2
  neighbor 2001:db8:beba:cafe::5 remote-as 65100
  neighbor 2001:db8:beba:cafe::5 description TRANSITO-AS65100-v6
  neighbor 2001:db8:beba:cafe::5 update-source 2001:db8:beba:cafe::6
  neighbor 2001:12f8::252 remote-as 20121
  neighbor 2001:12f8::252 description IX-SP_LookingGlassV6
  neighbor 2001:12f8::252 update-source 2001:12f8::216:34
  neighbor 2001:12f8::253 remote-as 26162
  neighbor 2001:12f8::253 description IX-SP_RS1-V6
  neighbor 2001:12f8::253 update-source 2001:12f8::216:34
  neighbor 2001:12f8::254 remote-as 26162
  neighbor 2001:12f8::254 description IX-SP_RS2-V6
  neighbor 2001:12f8::254 update-source 2001:12f8::216:34
  !
```



Exemplo de configuração

```
address-family ipv4 unicast
network 198.18.0.0/22
network 198.18.0.0/23
network 198.18.0.0/24
network 198.18.1.0/24
network 198.18.2.0/23
network 198.18.2.0/24
network 198.18.3.0/24
neighbor 187.16.216.253 route-map AS65500-V4-IN in
neighbor 187.16.216.253 route-map IX-SP-V4-OUT out
neighbor 187.16.216.254 route-map AS65500-V4-IN in
neighbor 187.16.216.254 route-map IX-SP-V4-OUT out
neighbor 192.0.0.1 route-map AS65500-V4-IN in
neighbor 192.0.0.1 route-map AS65000-V4-OUT out
neighbor 203.0.113.5 route-map AS65500-V4-IN in
neighbor 203.0.113.5 route-map AS65100-V4-OUT out
neighbor 2001:db8:beba:c0ca::1 route-map AS65500-V6-IN in
neighbor 2001:db8:beba:c0ca::1 route-map AS65000-V6-OUT out
neighbor 2001:db8:beba:cafe::5 route-map AS65500-V6-IN in
neighbor 2001:db8:beba:cafe::5 route-map AS65100-V6-OUT out
neighbor 2001:12f8::253 route-map AS65500-V6-IN in
neighbor 2001:12f8::253 route-map IX-SP-V6-OUT out
neighbor 2001:12f8::254 route-map AS65500-V6-IN in
neighbor 2001:12f8::254 route-map IX-SP-V6-OUT out
exit-address-family
!
```



Exemplo de configuração

```
address-family ipv6 unicast
network 2001:3::/32
neighbor 2001:db8:beba:c0ca::1 activate
neighbor 2001:db8:beba:cafe::5 activate
neighbor 2001:12f8::252 activate
neighbor 2001:12f8::253 activate
neighbor 2001:12f8::254 activate
exit-address-family
!
ip prefix-list AS65500-V4 seq 35 deny 198.18.0.0/22 le 32
ip prefix-list AS65500-V4 seq 36 deny 0.0.0.0/0
ip prefix-list AS65500-V4 seq 49 permit 0.0.0.0/0 le 24
ip prefix-list BLOCO-22-AS65500 seq 5 permit 198.18.0.0/22
ip prefix-list BLOCO0-23-AS65500 seq 5 permit 198.18.0.0/23
ip prefix-list BLOCO2-23-AS65500 seq 5 permit 198.18.2.0/23
ip prefix-list BLOCOS-24-AS65500 seq 5 permit 198.18.0.0/24
ip prefix-list BLOCOS-24-AS65500 seq 6 permit 198.18.1.0/24
ip prefix-list BLOCOS-24-AS65500 seq 7 permit 198.18.2.0/24
ip prefix-list BLOCOS-24-AS65500 seq 8 permit 198.18.3.0/24
!
ipv6 prefix-list AS65500-V6 seq 51 deny 2001:3::/32 le 128
ipv6 prefix-list AS65500-V6 seq 52 permit 2000::/3 le 48
ipv6 prefix-list BLOCO32-AS65500 seq 5 permit 2001:3::/32
!
```



Exemplo de configuração

```
route-map AS65500-V4-IN permit 5
  match ip address prefix-list AS65500-V4
!
route-map AS65000-V4-OUT permit 5
  match ip address prefix-list BLOCO-22-AS65500
!
route-map AS65000-V4-OUT permit 6
  match ip address prefix-list BLOCO0-23-AS65500
!
route-map AS65100-V4-OUT permit 5
  match ip address prefix-list BLOCO-22-AS65500
!
route-map AS65100-V4-OUT permit 6
  match ip address prefix-list BLOCO2-23-AS65500
!
route-map IX-SP-V4-OUT permit 5
  match ip address prefix-list BLOCOS-24-AS65500
!
route-map IX-SP-V4-OUT permit 6
  set community 65000:2906
!
route-map IX-SP-V4-OUT permit 7
  set extcommunity rt 65000:65536
!
route-map AS65000-V6-OUT permit 5
  match ip address prefix-list BLOCO32-AS65500
!
route-map AS65500-V6-IN permit 5
  match ip address prefix-list AS65500-V6
!
route-map IX-SP-V6-OUT permit 5
  match ip address prefix-list BLOCO32-AS65500
```



Exemplos básicos de troubleshooting

```
show running-config
```

```
show bgp ipv4 summary
```

```
show bgp ipv6 summary
```

```
show bgp ipv4 neighbors 187.16.216.253 advertised-routes
```

```
show bgp ipv6 neighbors 2001:12f8::253 advertised-routes
```

```
show bgp ipv4 neighbors 187.16.216.253 received-routes
```

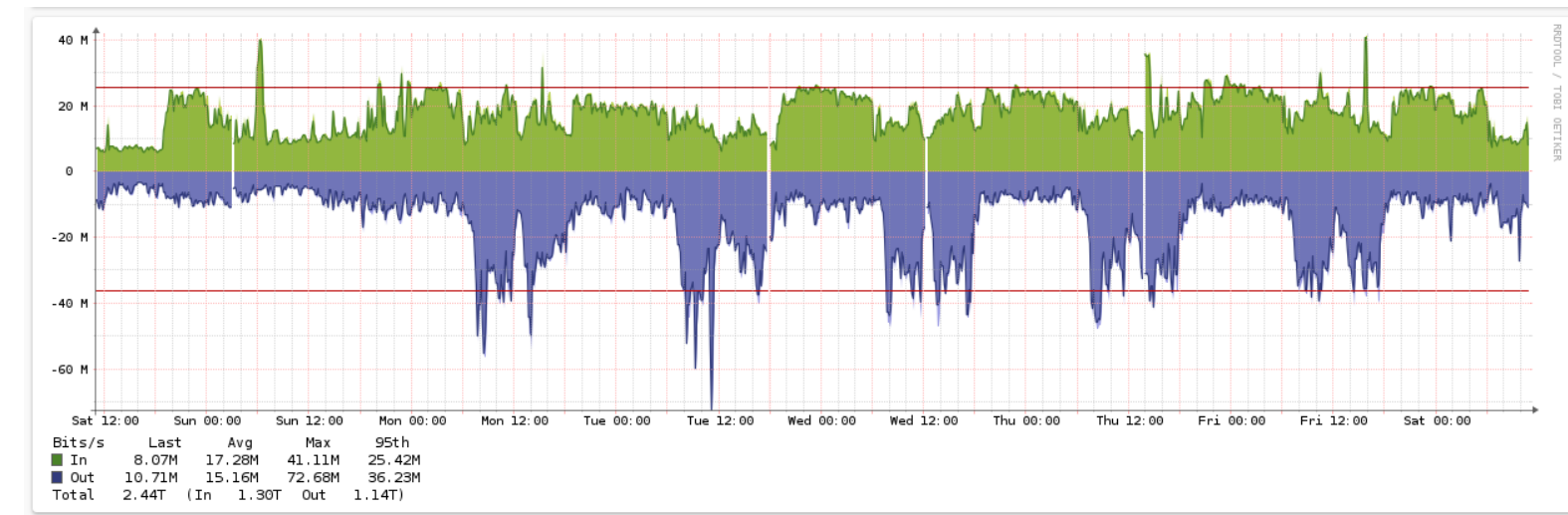
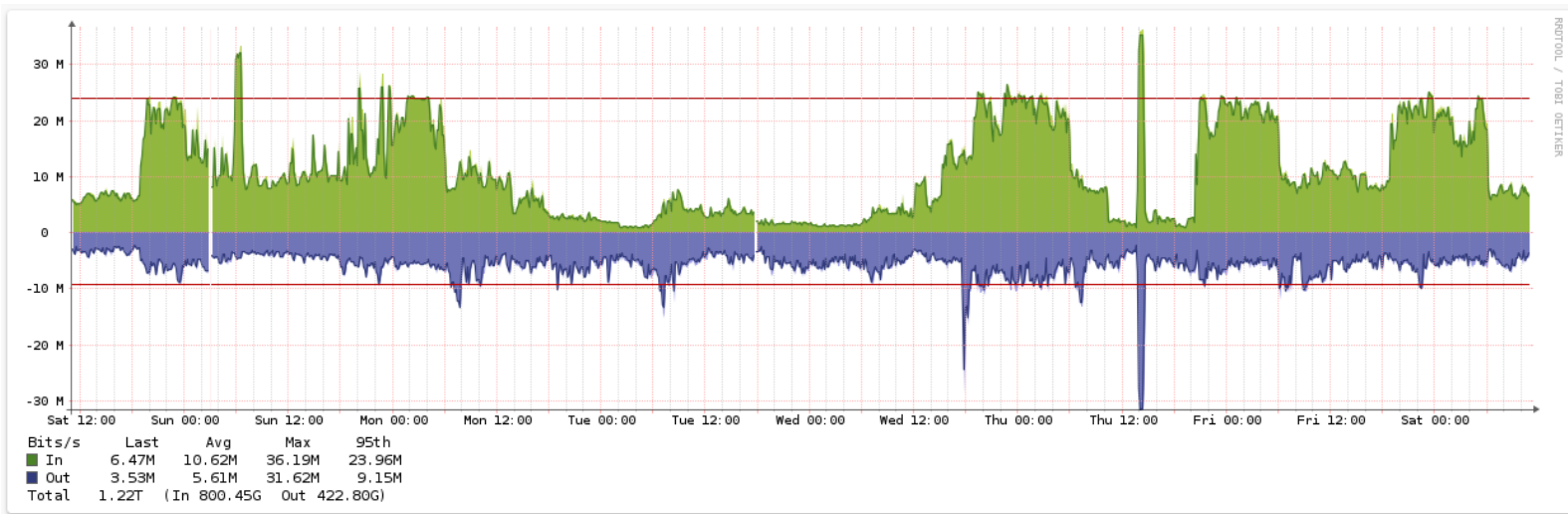
```
show bgp ipv6 neighbors 2001:12f8::253 received-routes
```

```
show bgp ipv4 8.8.8.0/24
```

```
show bgp ipv6 2001:4860::/32
```



Cases de Sucesso



Cenário:

2 appliances

eBGP com três upstreams no total (um deles com dupla abordagem)

Baixo tráfego com alta disponibilidade

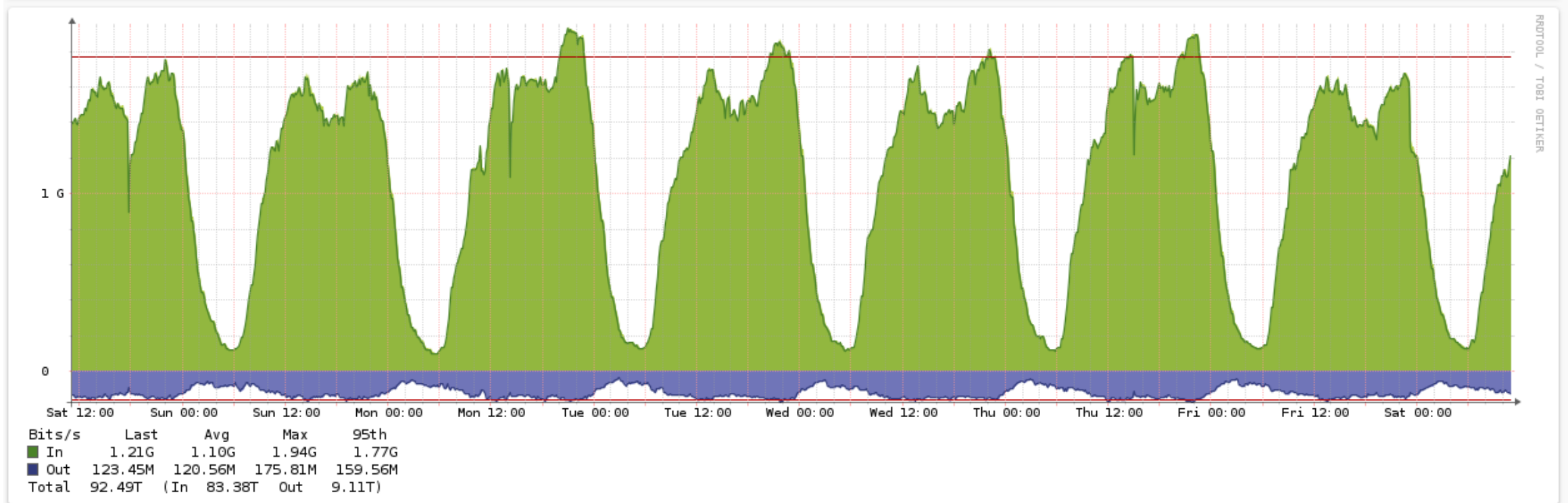


Cases de Sucesso

Cenário:

eBGP com dois upstreams

Dell r410 com uma Intel x520-da2 Dual port



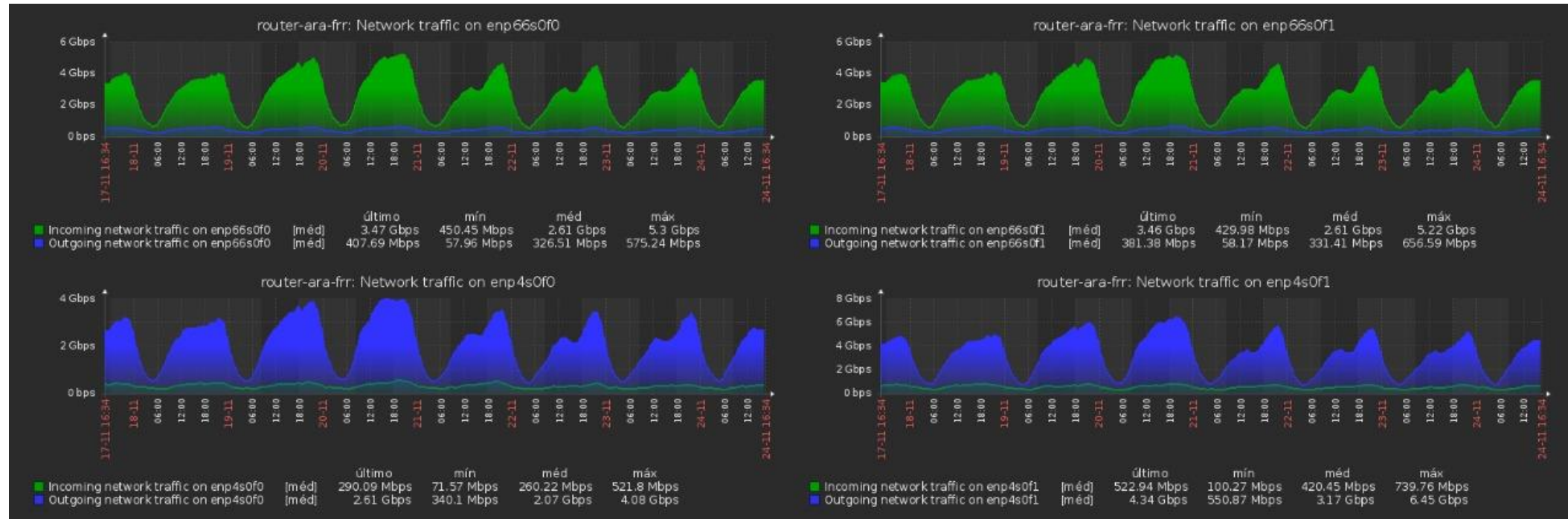
Cases de Sucesso

Cenário:

Debian 9.6 (kernel 4.18) + FRR

OSPF / OSPFv3 + Firewall

Dell r720 com duas Intel x520-sr2



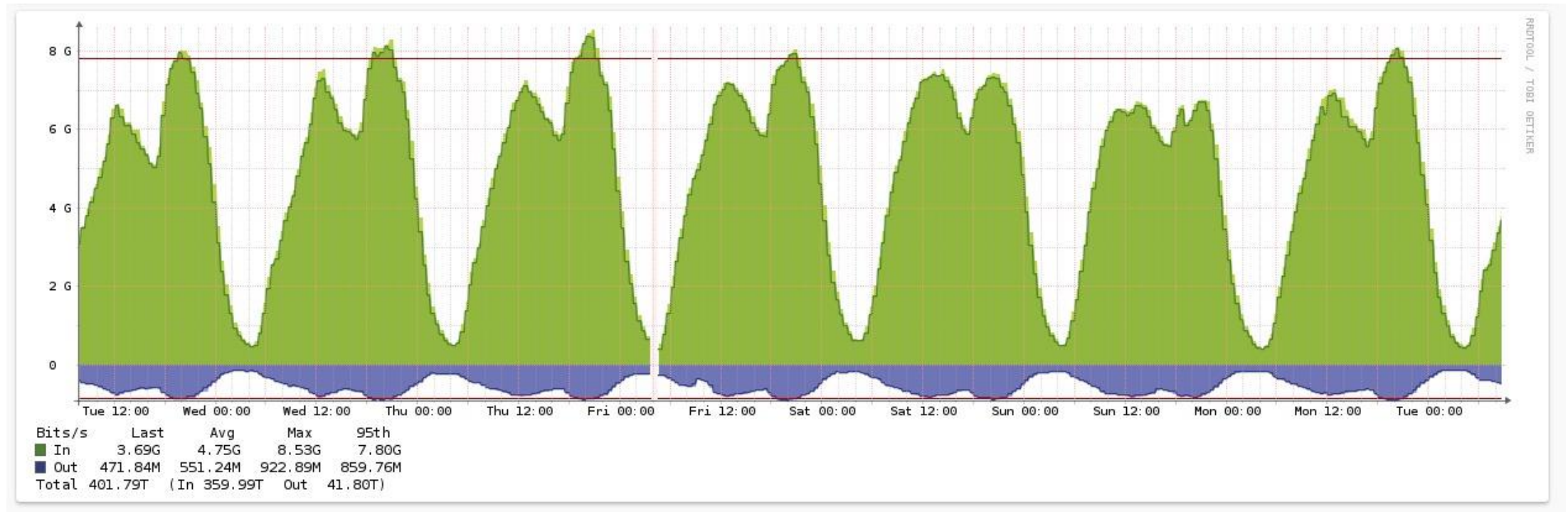
Cases de Sucesso

Cenário:

eBGP com dois upstreams e IX

eBGP com um cliente de trânsito

Dell r410 com uma Intel x520-da2



Referências e utilidades

Referências

- <https://youtu.be/NxP9lBvoawE>
- <https://frrouting.org/>
- <https://bsdrrp.net/>

Utilidades

- Imagem BSDRP para EVE
<https://goo.gl/EsEDf9>
- Template OVA para VMware
<https://goo.gl/AijDky>



Agradecimientos

- Uesley Correa – Telecom Consultoría, Entrenamiento y Servicios
- Marcelo Gondim – Intnet
- Coopercitrus – Cooperativa de Produtores Rurais
- Todos os clientes



Perguntas



Obrigado!

Contatos



corazza@incert.com.br



[linkedin.com/in/jrcorazza](https://www.linkedin.com/in/jrcorazza)



[facebook.com/corazzajr](https://www.facebook.com/corazzajr)



[\(17\) 9711-5311](tel:(17)9711-5311)

