BSDRP
Uma opção de softrouter com FRR

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Agenda

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

Quem Somos

- Consultoria em Routing, Switching e Virtualização para ISP's e ITP's.

- Nascemos em 2007 atendendo apenas empresas

- Em 2014 começamos a atender provedores

- Em 2019 com algumas parcerias, iniciamos a venda de transito IP para ISP's

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 1.92
- 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

Março de 2019 – Ultima release – FRR 7.0

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
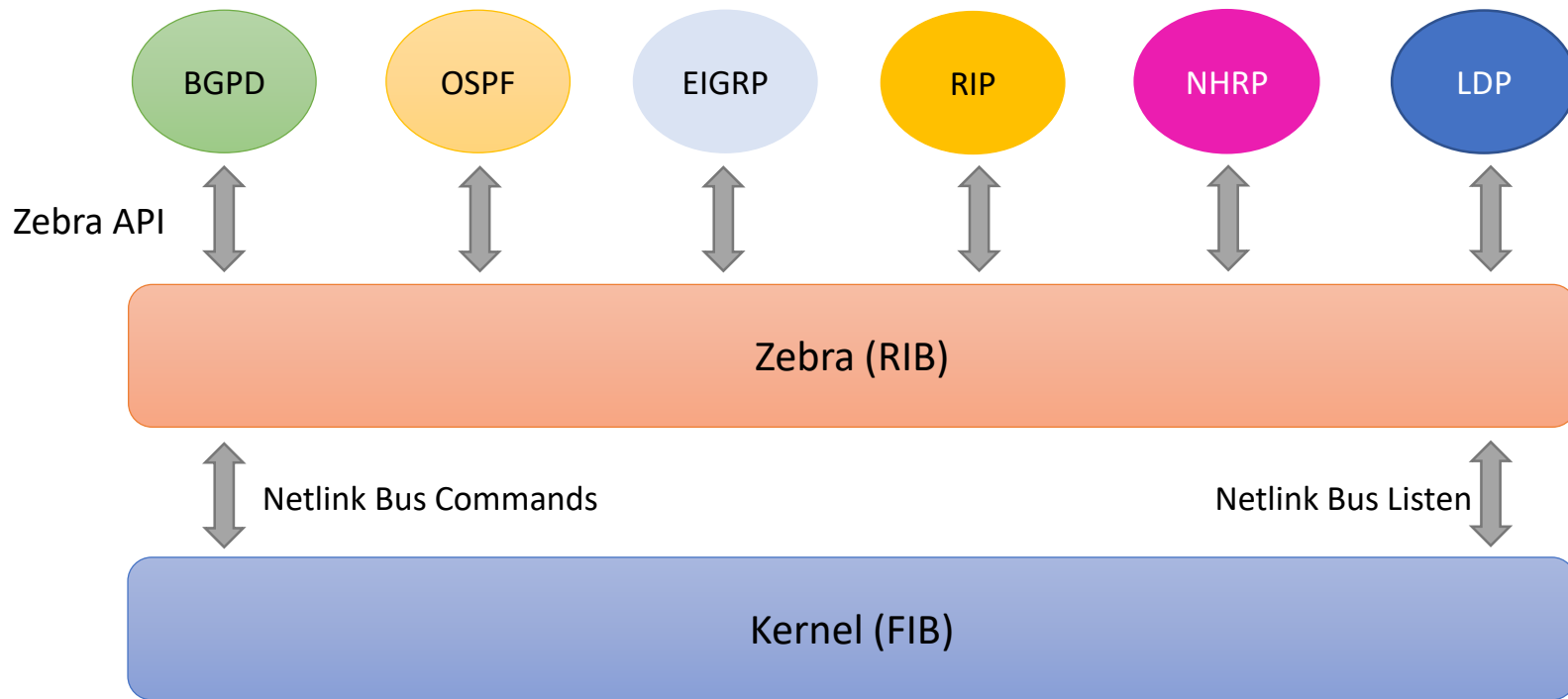
- BGP EVPN

  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

BGPD   OSPF   EIGRP   RIP   NHRP   LDP

Zebra API

Zebra (RIB)

Netlink Bus Commands   Netlink Bus Listen

Kernel (FIB)

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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 somes 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 *vtysh* 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
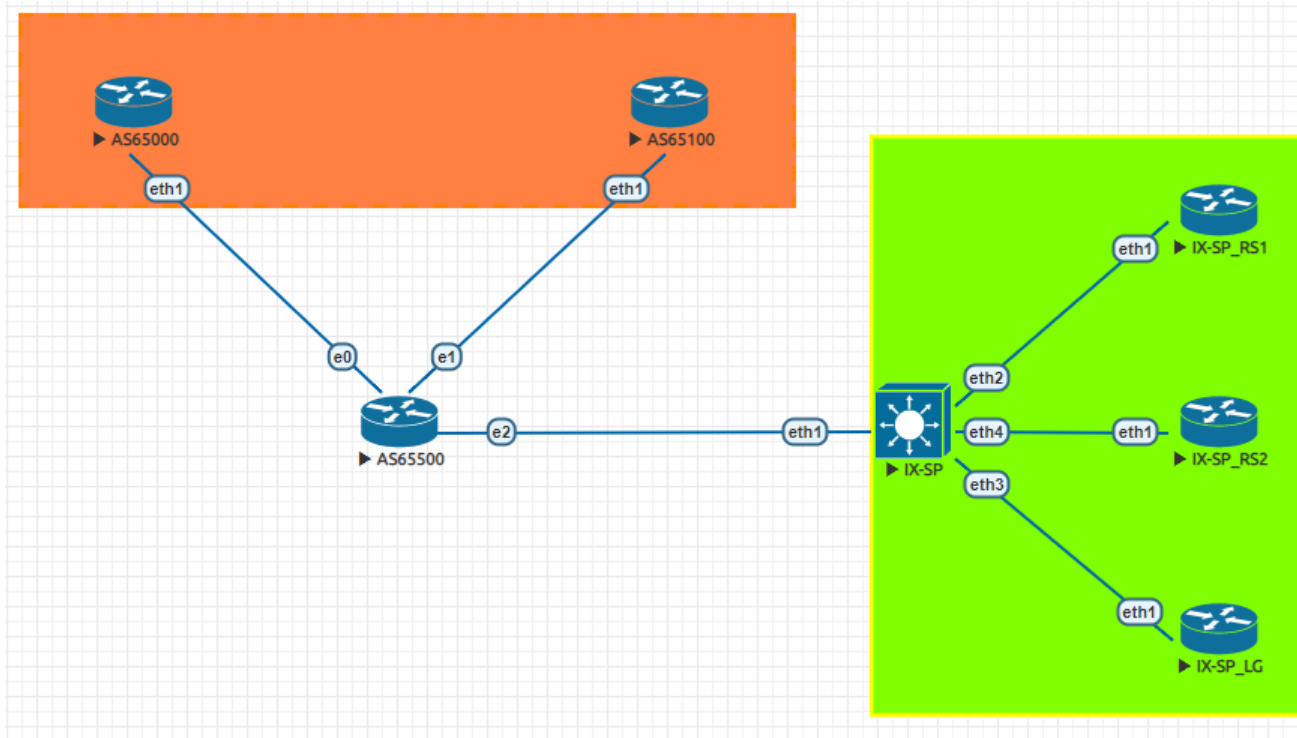
Exemplo de configuração

```
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

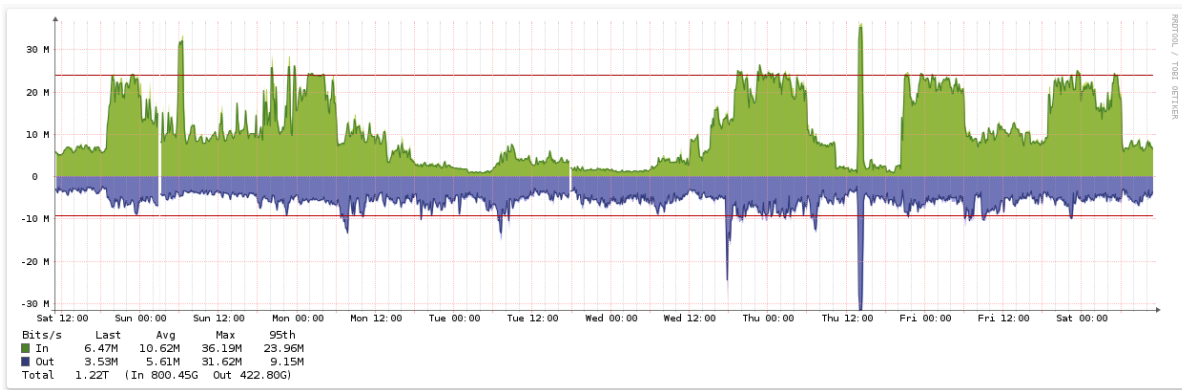show bgp ipv4 neighbors 187.16.216.253 received-routes

show bgp ipv6 neighbors 2001:12f8::253 received-routes
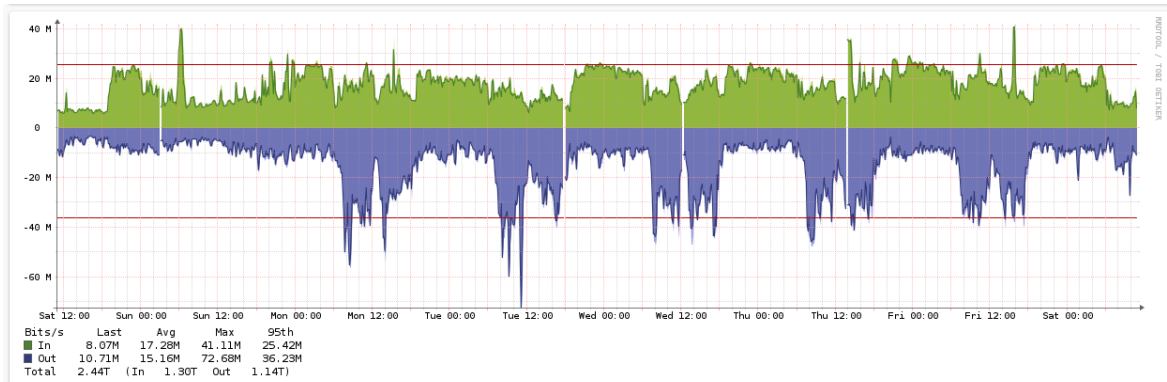
show bgp ipv4 8.8.8.0/24

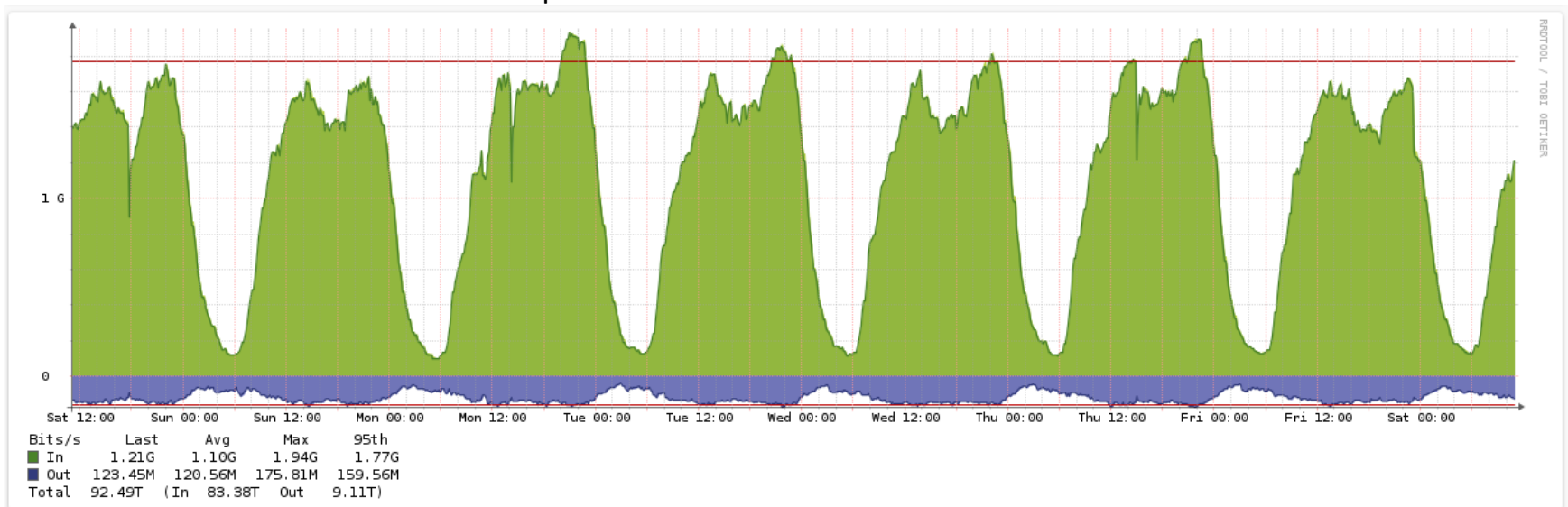show bgp ipv6 2001:4860::/32

Cases de Sucesso

Cenário:

2 appliances
eBGP com três upstreans no total (um deles com dupla abordagem)
Baixo trafego com alta disponibilidade

Cases de Sucesso

Cenário:

eBGP com dois upstreans

Dell r410 com uma Intel x520-da2 Dual port

Bits/s	Last	Avg	Max	95th
In	1.21G	1.10G	1.94G	1.77G
Out	123.45M	120.56M	175.81M	159.56M
Total	92.49T	(In 83.38T | Out 9.11T)		

Cases de Sucesso

Cenário:
Dell r420 com x520-da2
VMware ESXi 6.2 u2
BGP Full table
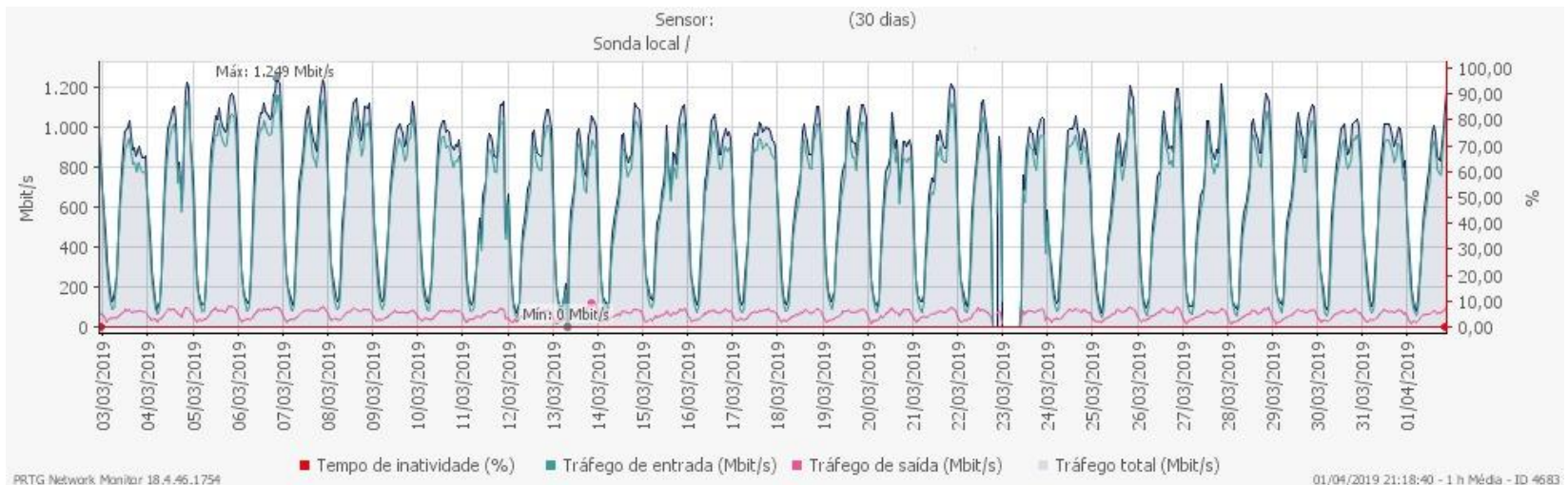
Cases de Sucesso

Cenário:

eBGP com dois upstreans e IX

eBGP com um cliente de trânsito

Dell r410 com uma Intel x520-da2
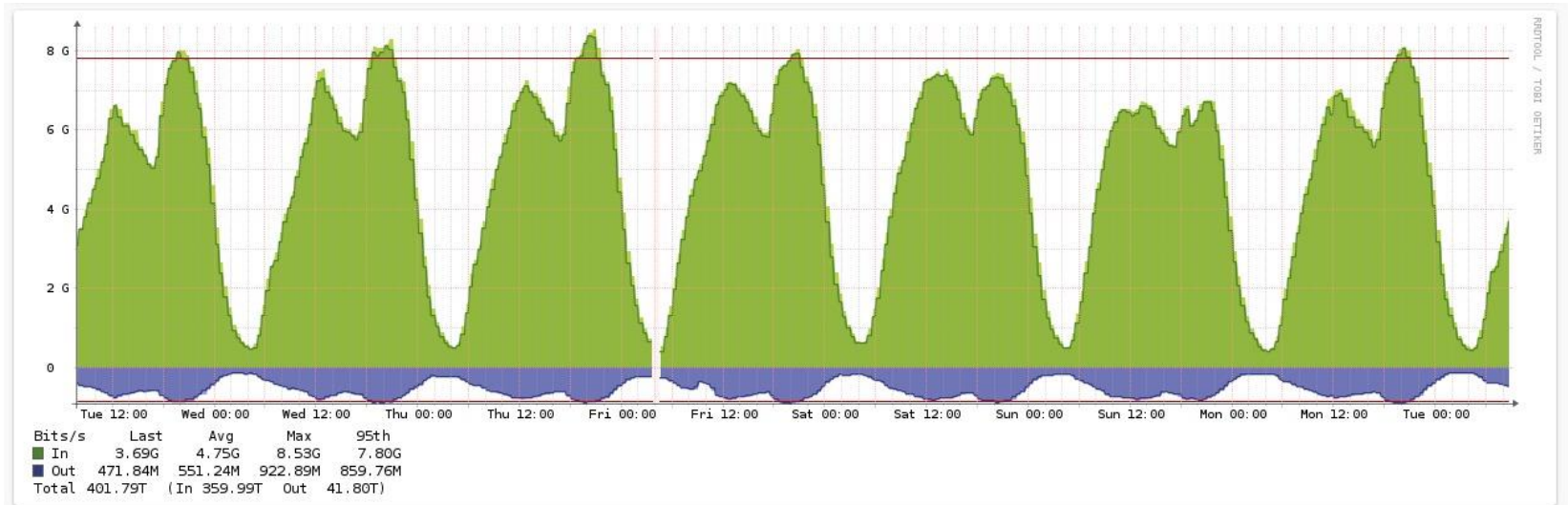
Cases de Sucesso

Cenário:

Debian 9.6 (kernel 4.19) + FRR

OSPF / OSPFv3 + Firewall

Dell r720 com Intel x520-sr2 (bond)
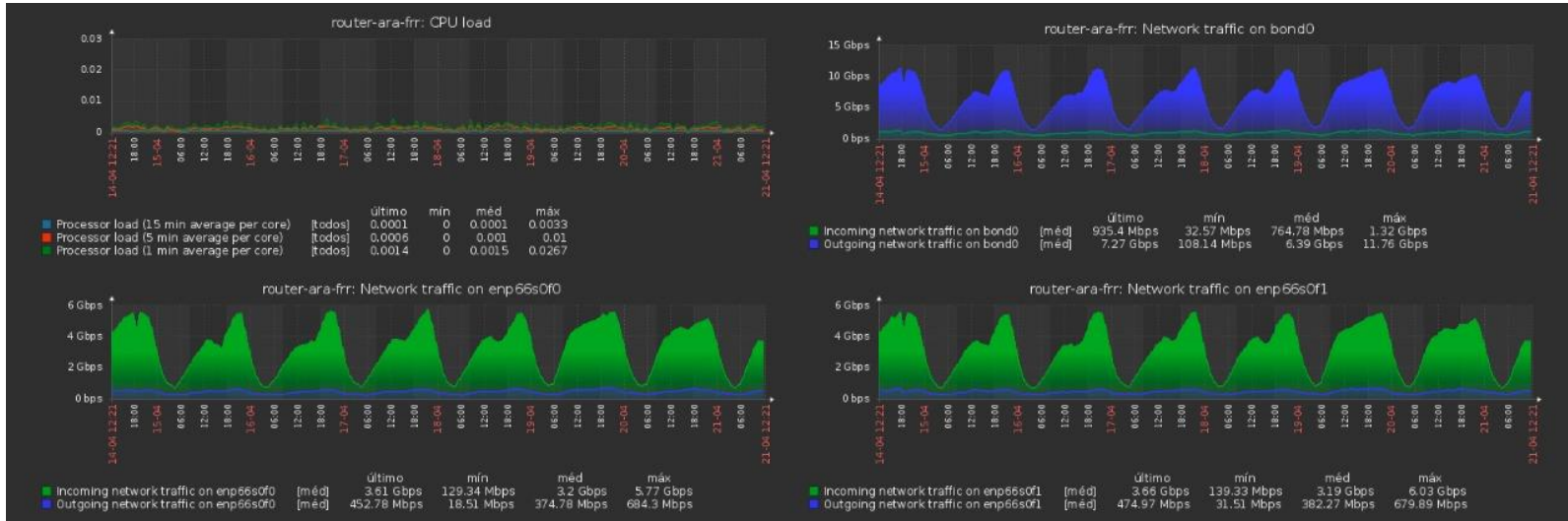
Referências e utilidades

Referências

- https://youtu.be/NxP9lBvoawE
- https://frrouting.org/
- https://bsdrp.net/

Utilidades

- Imagem BSDRP para EVE
  http://bit.do/eQb7P

- Template OVA para VMware
  http://bit.do/eQb6X

Agradecimentos

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Perguntas

Obrigado!

Contatos

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