



**TÉCNICAS E ATRIBUTOS PARA  
MANIPULAÇÃO DO TRAFEGO EM SEU AS**

**AOPF/AONOG-2020**



## Gustavo Sena



<https://br.linkedin.com/company/velonet>

@gsena89



### Redes

Graduação – Estácio;  
Pós Graduação –UTFPR;



### Experiência

ISP's / 12anos;



### Certificações

- CCNP-ENTERPRISE
- JNCIA
- HCIA-ROUTING&SWITCHING
- ...

## Disclaimer

As opiniões expressas nessa apresentação são exclusivamente minhas (Baseadas em experiências acumuladas ao longo dos anos no mercado) e não expressam a opinião ou pontos de vista do meu empregador

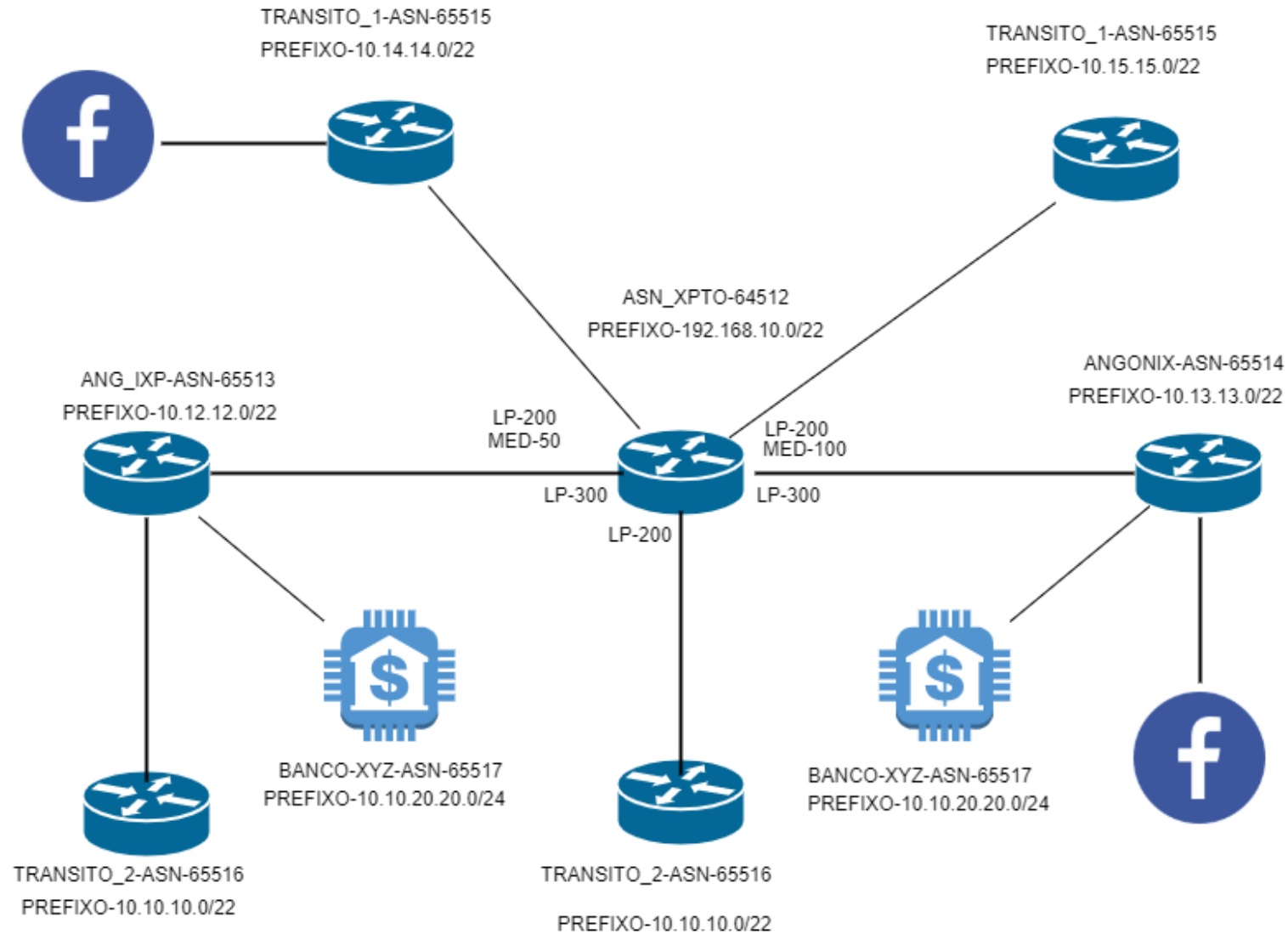
# Agenda

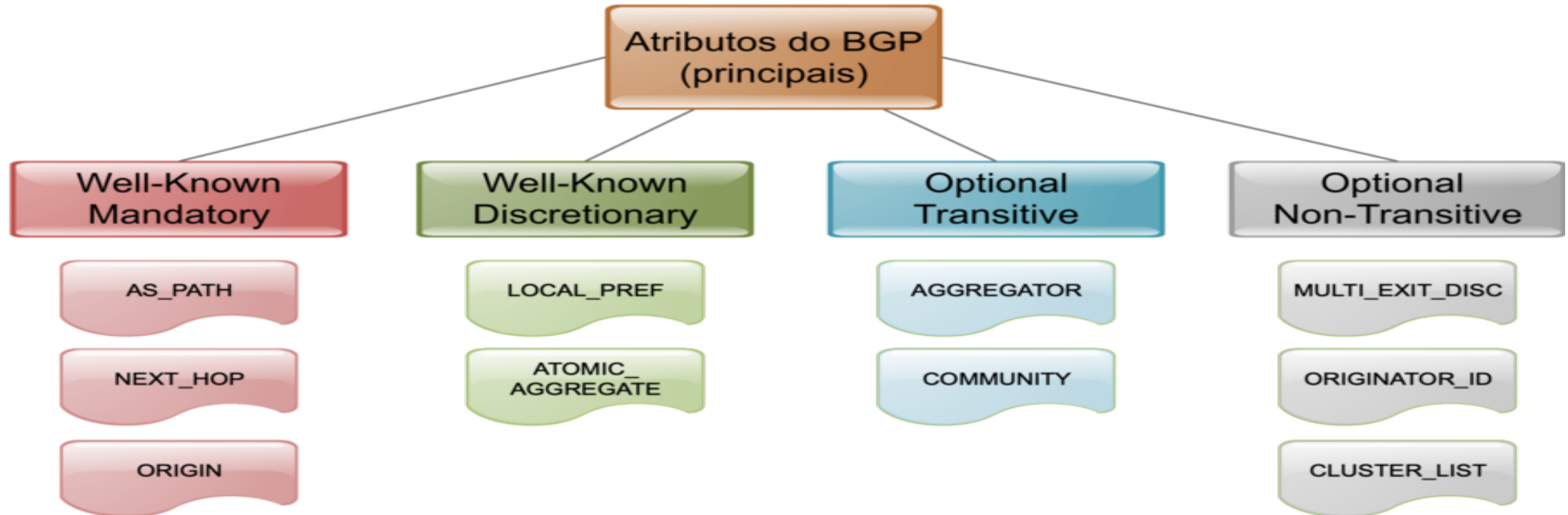
---



- Topologia;
- Atributos BGP;
- Manipulação Download;
- Manipulação Upload;
- Combinação de Atributos;
- Considerações Finais;
- Bibliografia

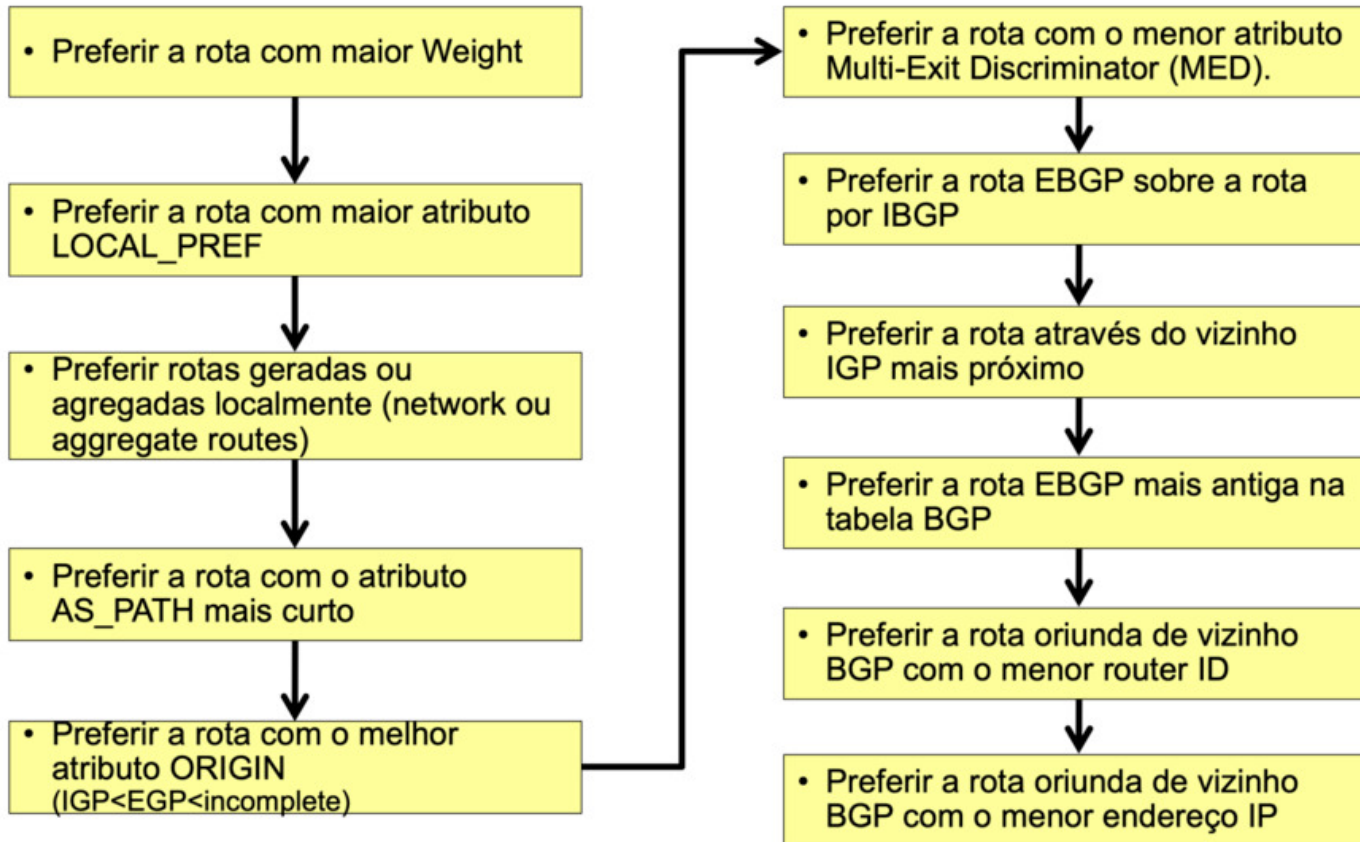
# Topologia





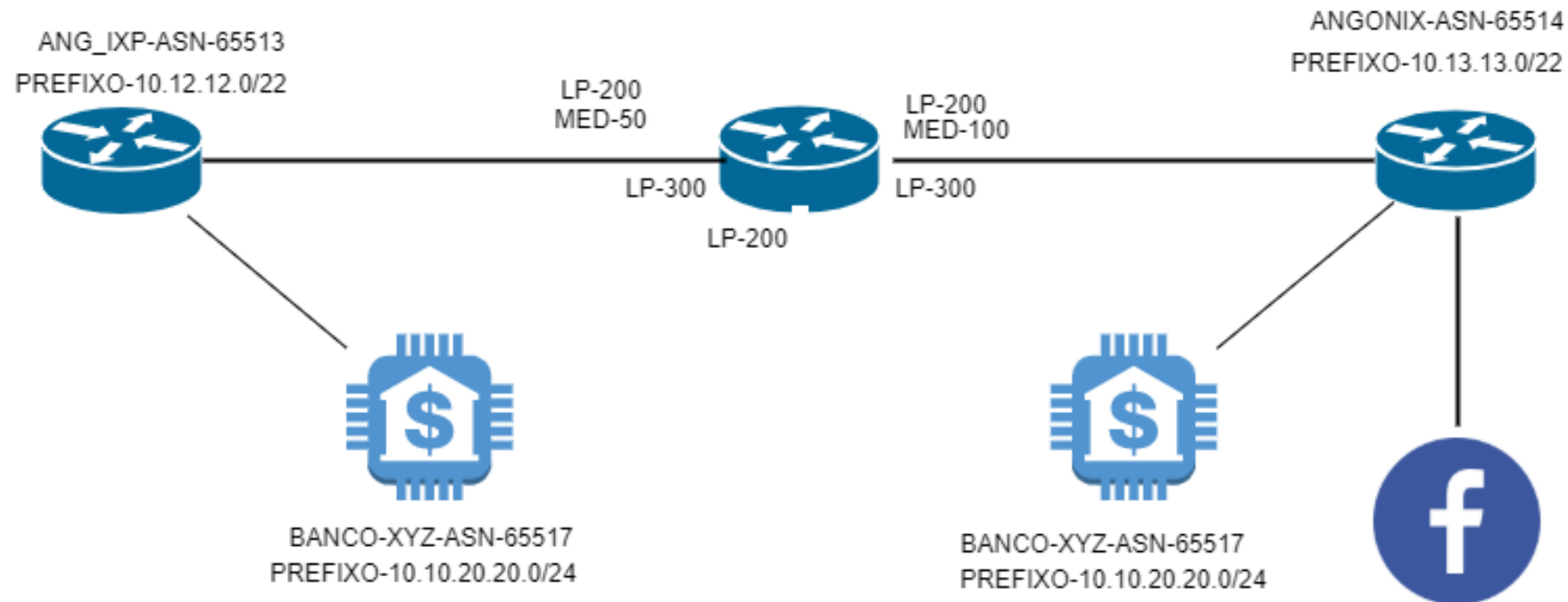


## Processo de Seleção de Rotas do BGP



# Manipulação Download

- Prefixos mais específicos x Menos específicos;
- As-Path Prepend;
- MED



# Manipulação Download



```
root@ASN-XPTO> show configuration policy-options prefix-list ANG_IXP
10.10.10.0/23;
10.10.12.0/23;

root@ASN-XPTO> ... policy-options policy-statement ANG_IXP | display set
set policy-options policy-statement ANG_IXP term MY-PREF from prefix-list ANG_IXP
set policy-options policy-statement ANG_IXP term MY-PREF then accept
set policy-options policy-statement ANG_IXP then reject
```

```
RP/0/0/CPU0:ASN-XPTO#sh running-config prefix-set ANG_IXP
Mon Nov  9 14:52:31.610 UTC
prefix-set ANG_IXP
 10.10.10.0/23,
 10.10.12.0/23
end-set
!

RP/0/0/CPU0:ASN-XPTO#sh running-config route-policy ANG_IXP
Mon Nov  9 14:52:43.259 UTC
route-policy ANG_IXP
  if (destination in ANG_IXP) then
  pass
  else
  drop
  endif
end-policy
!

RP/0/0/CPU0:ASN-XPTO#
```



## Utilizar essa técnica é ruim?

- Aumento da tabela de roteamento;
- Aumento da complexidade da engenharia;
- Alocações que não permitem este artifício



# Manipulação Download

Outra alternativa: AS-PATH PREPEND

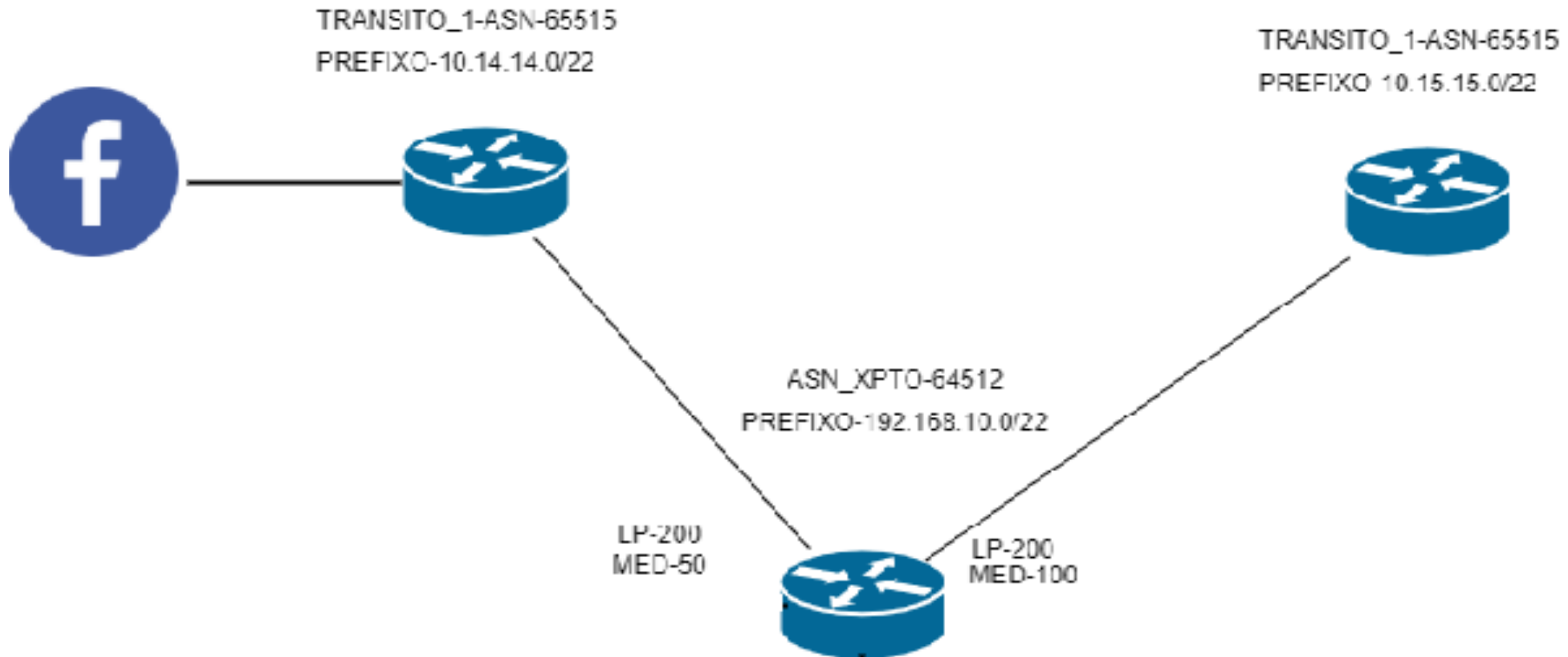
```
<ASN-XPTO>display current-configuration configuration route-policy ANG_IXP
#
route-policy ANG_IXP permit node 10
  if-match ip-prefix ANG_TYP
  apply as-path 64512 64512 additive
#
return
```



# Manipulação Download



## ATRIBUTO MED



# Manipulação Download



## ATRIBUTO MED

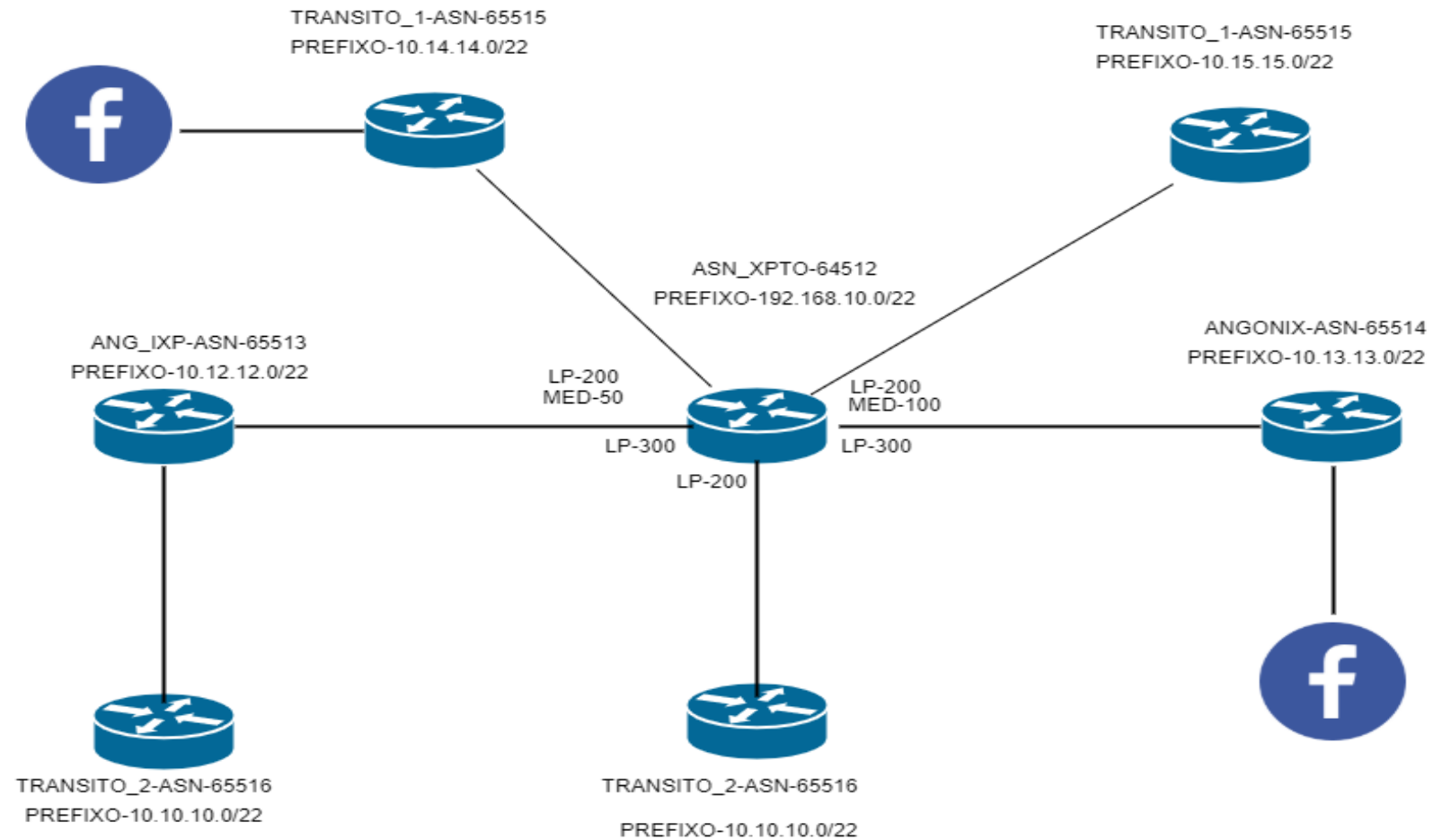
```
RP/0/0/CPU0:ASN-XPTO#show running-config route-policy ASN-65515-OUT-MAIN
Wed Nov 11 01:42:28.949 UTC
route-policy ASN-65515-OUT-MAIN
  if destination in ASN-65515-OUT-MAIN then
    set med 50
  pass
  else
    drop
  endif
end-policy
!
```

RP/0/0/CPU0:ASN-XPTO#

# Manipulação Upload



## Local Preference; AS-PATH Filter



# Manipulação Upload



Local Preference;  
AS-PATH Filter

```
xpl route-filter ANGONIX-IXP-IN-IPV4
if (ip route-destination in {0.0.0.0 0 le 24}) then
  call route-filter RGP-IPV4-SANITIZE
  apply local-preference 300
endif
end-filter
```

# Manipulação Upload

Local Preference;  
AS-PATH Filter

```
root@ASN-65516> show configuration policy-options as-path ASN-64512
".* 64512 .*";

root@ASN-65516> ...atement BGP-IPV4-ANG_IXP-IN | display set
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN term reject-customers from as-path ASN-64512
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN term reject-customers then reject
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN from route-filter 0.0.0.0/0 upto /24
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN then local-preference 300
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN then accept
```

Communities e AS-PATH;  
AS-PATH FILTER e LP

## Well-Known Communities

---

- Several well known communities
  - [www.iana.org/assignments/bgp-well-known-communities](http://www.iana.org/assignments/bgp-well-known-communities)
- no-export 65535:65281
  - do not advertise to any eBGP peers
- no-advertise 65535:65282
  - do not advertise to any BGP peer
- no-export-subconfed 65535:65283
  - do not advertise outside local AS (only used with confederations)
- no-peer 65535:65284
  - do not advertise to bi-lateral peers (RFC3765)



# Communities e AS-PATH

```
root@ASN-65516> ...atement BGP-IPV4-CUSTOMER-XPTO-IN | display set
set policy-options policy-statement BGP-IPV4-CUSTOMER-XPTO-IN from route-filter 0.0.0.0/0 upto /24
set policy-options policy-statement BGP-IPV4-CUSTOMER-XPTO-IN then local-preference 400
set policy-options policy-statement BGP-IPV4-CUSTOMER-XPTO-IN then community add CLIENTES
set policy-options policy-statement BGP-IPV4-CUSTOMER-XPTO-IN then accept
```

```
root@ASN-65516> ...s policy-statement BGP-IPV4-ANG_IXP-OUT | display set
set policy-options policy-statement BGP-IPV4-ANG_IXP-OUT term MY-PREF from prefix-list MY-PREFIX
set policy-options policy-statement BGP-IPV4-ANG_IXP-OUT term MY-PREF then as-path-prepend "65516 65516"
set policy-options policy-statement BGP-IPV4-ANG_IXP-OUT term MY-PREF then accept
set policy-options policy-statement BGP-IPV4-ANG_IXP-OUT term CLI from community CLIENTES
set policy-options policy-statement BGP-IPV4-ANG_IXP-OUT term CLI then as-path-prepend "65516 65516"
set policy-options policy-statement BGP-IPV4-ANG_IXP-OUT term CLI then accept
set policy-options policy-statement BGP-IPV4-ANG_IXP-OUT then reject
```

```
root@ASN-65516> ...atement BGP-IPV4-ANG_IXP-IN | display set
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN term reject-customers from as-path ASN-64512
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN term reject-customers then local-preference 50
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN term reject-customers then reject
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN from route-filter 0.0.0.0/0 upto /24
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN then local-preference 300
set policy-options policy-statement BGP-IPV4-ANG_IXP-IN then accept
```

# Considerações Finais

- Não possuímos o controle além do nosso próprio ASN;
- (MANRS);
- Assimetria, não necessariamente é um problema;



- <https://www.networkers-online.com/blog/wp-content/uploads/2016/05/BGP-Attributes.png>;
- [https://wiki.brasilpeeringforum.org/w/O\\_Minimo\\_que\\_Voce\\_precisa\\_saber\\_sobre\\_o\\_BGP](https://wiki.brasilpeeringforum.org/w/O_Minimo_que_Voce_precisa_saber_sobre_o_BGP)
- <https://www.networkfuntimes.com/junos-routing-policy-bgp-communities-and-mpls-vpns/>
- <https://medium.com/techrebels/engenharia-trafego-bgp-unicast-b3923646a826>