RouterOS v7 BGP

Este repositório tem o foco de explanar brevemente as principais mudanças que ocorreram no BGP do sistema RO's v6 P/ RO's v7.

Segue alguns exemplos de alterações referente ao BGP que aconteceram!

- **BGP-Networking**
  - **RO's v6:** *Na versão 6 você consegue informar os prefixos originados por seu ASN através do caminho* **Routing > BGP > Networks**
  - **RO's v7:** *Já na versão 7 para informar os prefixos que serão originados por seu ASN, é necessário criar uma address list, contendo a respectiva quebra do ASN, segue o caminho:* **IP > Firewall > Address Lists.**
- **Anuncio dos Prefixos**
  - **RO's v6:** *Na versão 6 é possível anunciar seu prefixo através da função* ***Synchronize****, sem que seja necessário adicionar de forma estática os prefixos que serão anunciados!*
  - **RO's v7:** *Já na versão 7, você precisa ter os prefixos que serão anunciados instalado em sua FIB de forma manual, pois não há mais a opção de Synchronize.*
- **Configuração de instancia**
  - **RO's v6:** *Na versão 6 é possível configurar uma nova instancia através do seguinte caminho:* **Routing > BGP > instances**
  - **RO's v7:** *Na versão 7 você pode configurar sua instancia diretamente em um peer, ou caso prefira, também é possível criar um template e associar o mesmo no peer desejado, através do seguinte caminho:* **Routing > BGP > Templates**
- **Configuração de Filtros**
  - **RO's v6:** *Na versão 6 possuimos uma GUI que nos permite manipular nossos anúncios*
  - **RO's v7:** *Na versão 7 os filtros devem ser configurados através de* ***CLI****, semelhante a um script*
- **Configuração de Peer BGP**
  - **RO's v6:** *Na versão 6 há o campo* ***Routing > BGP > Peers*** *onde possibilita estabelecer uma sessão*
  - **RO's v7:** *Já na versão 7 há o campo* ***Routing > BGP > Connection***

Exemplo sessão BGP RO's v7

Neste exemplo estaremos tratando sobre os seguintes temas:

1

- **Configurar Filtro BGP**
  - INPUT
    * Aplicar Local-Preference
  - OUTPUT
    * Aplicar community
    * Aplicar AS-path
- **Configurar Conexão BGP**
- Template
- Networks
- Peer BGP

Filtros BGP (Input)

```
/routing filter rule add chain=Link-Scorpion-IPv4-IN disabled=no rule="set bgp-local-pref 9(
```

```
/routing filter rule add chain=Link-Scorpion-IPv4-IN disabled=no rule="if(dst==0.0.0.0/0){ad
```

```
/routing filter rule add chain=Link-Scorpion-IPv4-IN disabled=no rule="if(dst in 172.20.20.(
```

```
/routing filter rule add chain=Link-Scorpion-IPv4-IN disabled=no rule="reject;"
```

Filtros BGP (Output)

Exemplos de anuncios BGP:

```
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="if(dst == 172.16.2
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="if(dst == 172.16.2
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="if(dst == 172.16.2
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="if(dst == 172.16.2
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="if(dst == 172.16.2
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="if(dst == 172.16.2
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="if(dst == 172.16.2
```

Através deste Exemplo obtemos o mesmo resultado:

```
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="if (dst in == 172.
```

Exemplo de filtro com community:

```
if(dst == 172.16.20.0/24) {set bgp-communities 777:666; accept;}
```

Exemplo aplicando prepend (AS-Path) com mikrotik:

```
if(dst == 172.16.21.0/24) {set bgp-path-prepend 3; accept;}
```

Configurando Peer BGP

```
root# run show route community .*

inet.0: 11 destinations, 11 routes (11 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

172.16.20.0/24     *[BGP/170] 00:21:32, localpref 100
                     AS path: 333 I, validation-state: unverified
                    > to 172.25.20.2 via ge-0/0/1.0

[edit]
root# run show route receive-protocol bgp 172.25.20.2 detail

inet.0: 11 destinations, 11 routes (11 active, 0 holddown, 0 hidden)
* 172.16.20.0/24 (1 entry, 1 announced)
     Accepted
     Nexthop: 172.25.20.2
     AS path: 333 I
     Communities: 777:666

* 172.16.21.0/24 (1 entry, 1 announced)
     Accepted
     Nexthop: 172.25.20.2
     AS path: 333 I
```
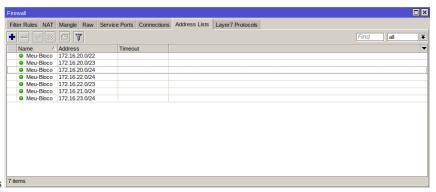
Figure 1: Configurar Community

```
root# run show route receive-protocol bgp 172.25.20.2 detail

inet.0: 11 destinations, 11 routes (11 active, 0 holddown, 0 hidden)
* 172.16.20.0/24 (1 entry, 1 announced)
     Accepted
     Nexthop: 172.25.20.2
     AS path: 333 I
     Communities: 777:666

* 172.16.21.0/24 (1 entry, 1 announced)
     Accepted
     Nexthop: 172.25.20.2
     AS path: 333 333 333 I
```
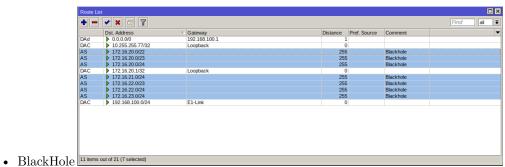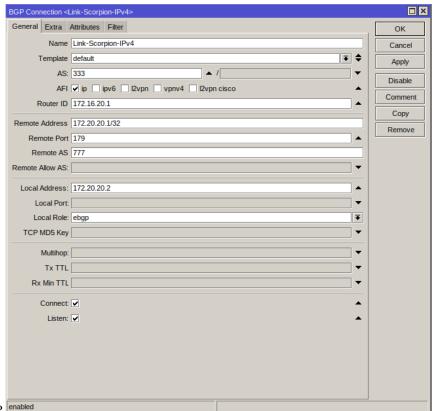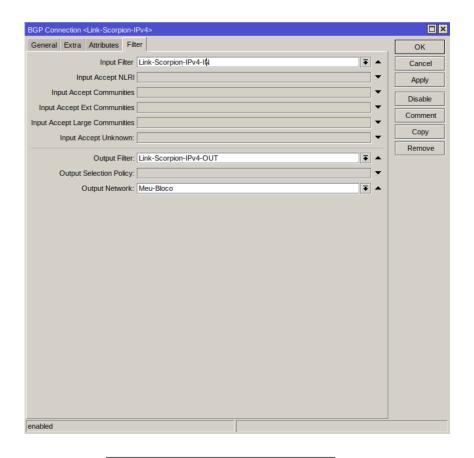
Figure 2: Configurar AS-Path

3

- networks

Firewall

Filter Rules | NAT | Mangle | Raw | Service Ports | Connections | **Address Lists** | Layer7 Protocols

Find | all

Name	Address	Timeout	
● Meu-Bloco	172.16.20.0/22		
● Meu-Bloco	172.16.20.0/23		
● Meu-Bloco	172.16.20.0/24		
● Meu-Bloco	172.16.22.0/24		
● Meu-Bloco	172.16.22.0/23		
● Meu-Bloco	172.16.21.0/24		
● Meu-Bloco	172.16.23.0/24		

7 items

- BlackHole

Route List

Find | all

	Dst. Address	Gateway	Distance	Pref. Source	Comment	
DAd	0.0.0.0/0	192.168.100.1	1			
DAC	10.255.255.77/32	Loopback	0			
AS	172.16.20.0/22		255		Blackhole	
AS	172.16.20.0/23		255		Blackhole	
AS	172.16.20.0/24		255		Blackhole	
DAC	172.16.20.1/32	Loopback	0			
AS	172.16.21.0/24		255		Blackhole	
AS	172.16.22.0/23		255		Blackhole	
AS	172.16.22.0/24		255		Blackhole	
AS	172.16.23.0/24		255		Blackhole	
DAC	192.168.100.0/24	E1-Link	0			

11 items out of 21 (7 selected)

4

- Peer BGP

Tabela de comandos úteis

Comando	Descrição
dst-len	Lorem ipsum
bgp-path-len	Quantidade atual de AS-Path
bgp-input-local-as	Lorem ipsum
bgp-input-remote-as	Lorem ipsum
bgp-output-local-as	Lorem ipsum
bgp-output-remote-as	Lorem ipsum
ospf-metric	Lorem ipsum
ospf-tag	Lorem ipsum
rip-metric	Lorem ipsum
rip-tag	Lorem ipsum

Operadores Lógico

Operador	Descrição
&&	-
||	-
not	-

Fatos interessantes RouterOS 7

```
No presente momento onde este artigo está sendo escrito, estamos
utilizando a versão 7.6 do RouterOS
```

- **BGP Received routes:**
    - *Na versão 7.6 do routerOS, mesmo quando é negado os prefixos que serão apreendidos via EBGP, os mesmos são listados na tabela de ro-*

  tas, segue exemplo:
- **BGP-Sessions:**
    - *Na versão 7.6, caso seja utilizado o serviço de "Refresh" para atualizar a tabela de rotas de rotas apreendidas via EBGP, o peer referênciado mudará o status para down e permanecera neste status, enquanto o equipamento não for rebootado!Sendo assim, é recomendado **não** utilizar este recurso da mikrotik.*

Export Operadora Scorpion

```
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Borda-Scorpion
!
```

```
boot-start-marker
boot-end-marker
!
!
!
no aaa new-model
clock timezone EET 2 0
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
!
!
!
!
!
!
!
!


!
!
!
!
no ip domain lookup
ip cef
no ipv6 cef
!
multilink bundle-name authenticated
!
!
!
!
!
!
!
!
!
redundancy
!
!
!
!
!
!
```

```
!
!
!
!
!
!
!
!
!
interface Loopback1
 ip address 172.20.21.1 255.255.255.255
!
interface Ethernet0/0
 ip address dhcp
!
interface Ethernet0/1
 no ip address
!
interface Ethernet0/1.366
 description Cliente-Sub-Zero
 encapsulation dot1Q 366
 ip address 172.20.20.1 255.255.255.252
!
interface Ethernet0/2
 no ip address
 shutdown
!
interface Ethernet0/3
 no ip address
 shutdown
!
router bgp 777
 bgp router-id 172.20.21.1
 bgp log-neighbor-changes
 neighbor 172.20.20.2 remote-as 333
 !
 address-family ipv4
  network 172.20.20.0 mask 255.255.252.0
  network 172.20.20.0 mask 255.255.254.0
  network 172.20.20.0 mask 255.255.255.0
  network 172.20.21.0 mask 255.255.255.0
  network 172.20.22.0 mask 255.255.254.0
  network 172.20.22.0 mask 255.255.255.0
  network 172.20.23.0 mask 255.255.255.0
  neighbor 172.20.20.2 activate
  neighbor 172.20.20.2 soft-reconfiguration inbound
```

```
  neighbor 172.20.20.2 route-map Cliente-Sub-Zero-IN in
  neighbor 172.20.20.2 route-map Cliente-Sub-Zero-OUT out
 exit-address-family
!
ip forward-protocol nd
!
!
no ip http server
no ip http secure-server
ip route 172.20.20.0 255.255.252.0 Null0
ip route 172.20.20.0 255.255.254.0 Null0
ip route 172.20.20.0 255.255.255.0 Null0
ip route 172.20.21.0 255.255.255.0 Null0
ip route 172.20.22.0 255.255.254.0 Null0
ip route 172.20.22.0 255.255.255.0 Null0
ip route 172.20.23.0 255.255.255.0 Null0
!
!
ip prefix-list Meu-Bloco seq 10 permit 172.20.20.0/22
ip prefix-list Meu-Bloco seq 20 permit 172.20.20.0/23
ip prefix-list Meu-Bloco seq 30 permit 172.20.22.0/23
ip prefix-list Meu-Bloco seq 40 permit 172.20.20.0/24
ip prefix-list Meu-Bloco seq 50 permit 172.20.21.0/24
ip prefix-list Meu-Bloco seq 60 permit 172.20.22.0/24
ip prefix-list Meu-Bloco seq 70 permit 172.20.23.0/24
!
route-map Cliente-Sub-Zero-IN permit 10
!
route-map Cliente-Sub-Zero-OUT permit 10
 match ip address prefix-list Meu-Bloco
!
!
!
control-plane
!
!
!
!
!
!
!
!
line con 0
 logging synchronous
line aux 0
line vty 0 4
```

```
 login
 transport input none
!
!
end
```

Export Operadora Raiden

```
## Last commit: 2023-01-09 19:18:41 UTC by root
version 14.1R4.8;
system {
    root-authentication {
        encrypted-password "$1$tyuCuQ4S$s/eOe/ZISPOvAuH2EACSw0"; ## SECRET-DATA
    }
    syslog {
        user * {
            any emergency;
        }
        file messages {
            any notice;
            authorization info;
        }
        file interactive-commands {
            interactive-commands any;
        }
    }
}
interfaces {
    ge-0/0/1 {
        description Cliente-Sub-Zero;
        unit 0 {
            family inet {
                address 172.25.20.1/30;
            }
        }
    }
}
routing-options {
    static {
        route 172.25.20.0/22 discard;
        route 172.25.20.0/23 discard;
        route 172.25.22.0/23 discard;
        route 172.25.20.0/24 discard;
        route 172.25.21.0/24 discard;
```

```
                route 172.25.22.0/24 discard;
                route 172.25.23.0/24 discard;
        }
        autonomous-system 999;
}
protocols {
        bgp {
                group Cliente-Sub-Zero {
                        type external;
                        description Cliente-Sub-Zero;
                        import Cliente-Sub-Zero-IN;
                        export Cliente-Sub-Zero-OUT;
                        peer-as 333;
                        neighbor 172.25.20.2;
                }
        }
}
policy-options {
        policy-statement Cliente-Sub-Zero-IN {
                term 10 {
                        then accept;
                }
        }
        policy-statement Cliente-Sub-Zero-OUT {
                term 10 {
                        from {
                                route-filter 172.25.20.0/22 exact;
                        }
                        then accept;
                }
                term 20 {
                        from {
                                route-filter 172.25.20.0/23 exact;
                        }
                        then accept;
                }
                term 30 {
                        from {
                                route-filter 172.25.22.0/23 exact;
                        }
                        then accept;
                }
                term 40 {
                        from {
                                route-filter 172.25.21.0/24 exact;
                        }
```

```
                then accept;
        }
        term 50 {
            from {
                route-filter 172.25.22.0/24 exact;
            }
            then accept;
        }
        term 60 {
            then reject;
        }
    }
}
```

Export Cliente-Sub-Zero

```
# jan/09/2023 21:05:12 by RouterOS 7.6
# software id =
#
/interface bridge add name=Loopback
/interface ethernet set [ find default-name=ether1 ] name=E1-Link-Scorpion
/interface ethernet set [ find default-name=ether2 ] name=E2-
/interface ethernet set [ find default-name=ether3 ] name=E3-Link-Raiden
/interface ethernet set [ find default-name=ether4 ] name=E4-
/interface vlan add interface=E1-Link-Scorpion name=vlan366-Link-Scorpion-IPv4 vlan-id=366
/interface wireless security-profiles set [ find default=yes ] supplicant-identity=MikroTik
/port set 0 name=serial0
/routing bgp template set default as=333 disabled=no router-id=172.16.20.1 routing-table=mai
/ip address add address=10.255.255.77 interface=Loopback network=10.255.255.77
/ip address add address=172.16.20.1 interface=Loopback network=172.16.20.1
/ip address add address=172.20.20.2/30 interface=vlan366-Link-Scorpion-IPv4 network=172.20.2
/ip address add address=172.25.20.2/30 interface=E3-Link-Raiden network=172.25.20.0
/ip dhcp-client add interface=E1-Link-Scorpion
/ip firewall address-list add address=172.16.20.0/22 list=Meu-Bloco
/ip firewall address-list add address=172.16.20.0/23 list=Meu-Bloco
/ip firewall address-list add address=172.16.20.0/24 list=Meu-Bloco
/ip firewall address-list add address=172.16.22.0/24 list=Meu-Bloco
/ip firewall address-list add address=172.16.22.0/23 list=Meu-Bloco
/ip firewall address-list add address=172.16.21.0/24 list=Meu-Bloco
/ip firewall address-list add address=172.16.23.0/24 list=Meu-Bloco
/ip proxy access add dst-address=172.18.18.1 dst-host=google.com/xxt
/ip route add blackhole comment=Blackhole disabled=no distance=255 dst-address=172.16.20.0/2
/ip route add blackhole comment=Blackhole disabled=no distance=255 dst-address=172.16.20.0/2
/ip route add blackhole comment=Blackhole disabled=no distance=255 dst-address=172.16.20.0/2
/ip route add blackhole comment=Blackhole disabled=no distance=255 dst-address=172.16.21.0/2
/ip route add blackhole comment=Blackhole disabled=no distance=255 dst-address=172.16.22.0/2
```

```
/ip route add blackhole comment=Blackhole disabled=no distance=255 dst-address=172.16.22.0/2
/ip route add blackhole comment=Blackhole disabled=no distance=255 dst-address=172.16.23.0/2
/routing bgp connection add address-families=ip as=333 cisco-vpls-nlri-len-fmt=auto-bits com
.filter-chain=Link-Scorpion-IPv4-OUT .network=Meu-Bloco .no-client-to-client-reflection=yes
/routing bgp connection add address-families=ip as=333 cisco-vpls-nlri-len-fmt=auto-bits com
hain=Link-Raiden-IPv4-OUT .network=Meu-Bloco .no-client-to-client-reflection=yes remote.addr
/routing filter rule add chain=Link-Scorpion-IPv4-IN disabled=no rule="if(dst==0.0.0.0/0){ac
/routing filter rule add chain=Link-Scorpion-IPv4-IN disabled=no rule="reject;"
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=yes rule="if(dst == 172.16.20
    \nif(dst == 172.16.20.0/23) {accept;}\r\
    \nif(dst == 172.16.22.0/23) {accept;}\r\
    \nif(dst == 172.16.20.0/24) {set bgp-communities 777:666,777:123; accept;}\r\
    \nif(dst == 172.16.21.0/24) {accept;}\r\
    \nif(dst == 172.16.22.0/24) {accept;}\r\
    \nreject;\r\
    \nif(dst == 172.16.23.0/24) {accept;}\r\
    \n"
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=yes rule="if(dst == 172.16.20
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=yes rule="if(dst == 172.16.20
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=yes rule="if(dst == 172.16.22
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="if(dst == 172.16.20.
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=yes rule="if(dst == 172.16.21
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=yes rule="if(dst == 172.16.22
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=yes rule="if(dst == 172.16.23
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=yes rule="if (dst in 172.16.2
/routing filter rule add chain=Link-Scorpion-IPv4-OUT disabled=no rule="reject;"
/routing filter rule add chain=Link-Raiden-IPv4-IN disabled=no rule="reject;"
/routing filter rule add chain=Link-Raiden-IPv4-OUT disabled=no rule="if(dst == 172.16.20.0/
    \n\r\
    \nif(dst == 172.16.21.0/24) {set bgp-path-prepend 3; accept;}"
```