

STANDARD OPERATION PROCEDURE (SOP)

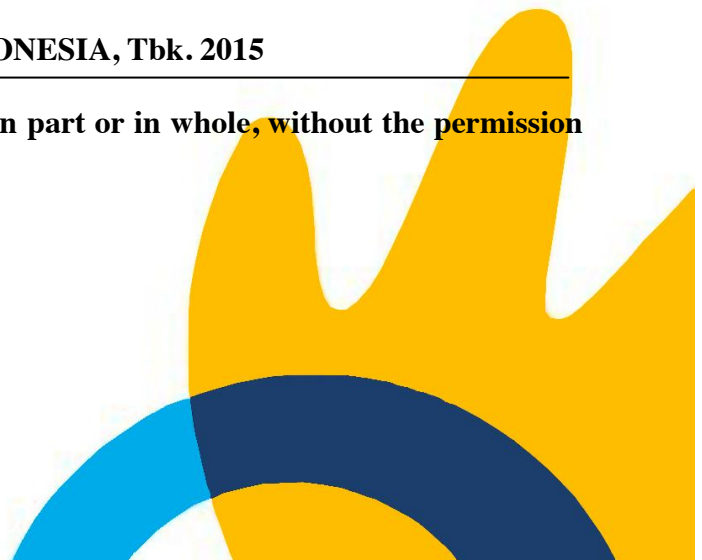
PE Transit

HUAWEI NE40E

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HOSTORIC REVERSION DOCUMENT

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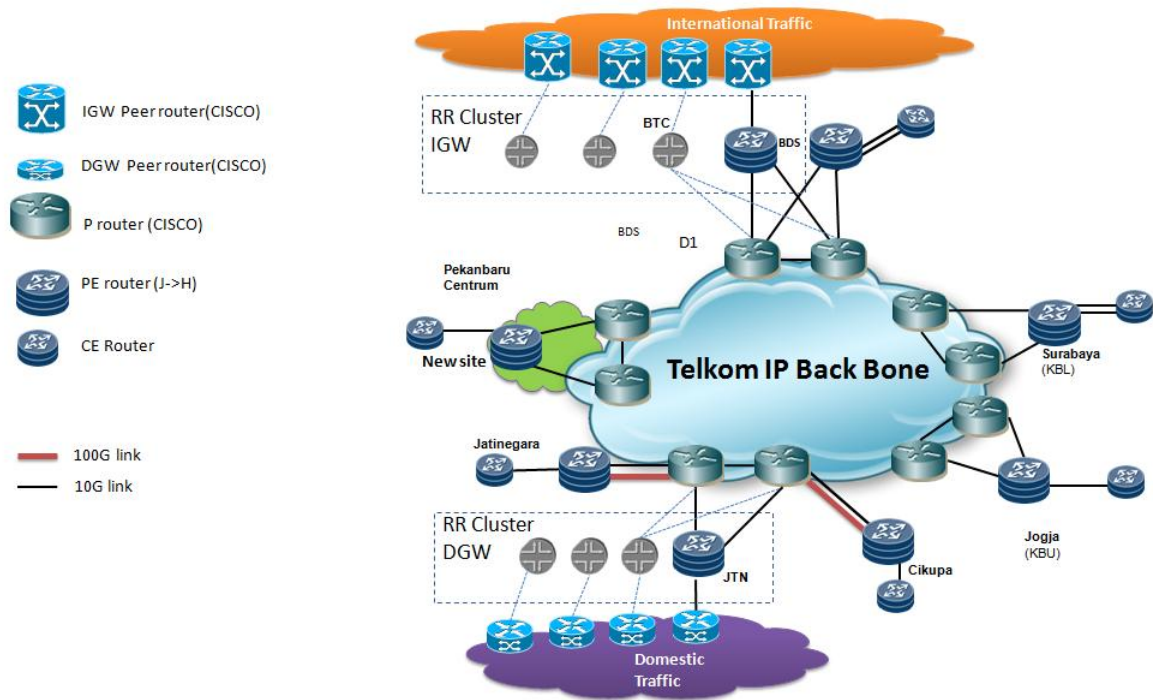
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1. Service PE Transit

1.1. Service

Figure 1.1-1 Network topology



In PE Transit, there are 3 types of service : International_Only, Dua-Bandwidth, MIX ;

1. International_Only service: One connection between PE and CE, the connection carry the International service. Just access international;
2. Dua-Bandwidth service: There are 2 connections (different bandwidth) between PE and CE, one connection for access international; the other connection for access Domestic.
3. MIX service: One connection (mixed bandwidth) between PE and CE, the connection carry the international service. Access international and Domestic;

International_Only Service:

No.	Service Source	Service Destination
1	Huawei PE International Only service	Huawei PE International Only service
2	Huawei PE International Only service	Huawei PE MIX service

3	Huawei PE International Only service	Huawei PE Dua-bandwidth
4	Huawei PE International Only service	Juniper PE International Only service
5	Huawei PE International Only service	Juniper PE MIX service
6	Huawei PE International Only service	Juniper PE Dua-bandwidth
7	Huawei PE International Only service	International

Dua-Bandwidth Service:

No.	Service Source	Service Destination	Remark
1	Huawei PE Dua-bandwidth	Huawei PE International Only service	Through the Private link in PE Dua-bandwidth
2	Huawei PE Dua-bandwidth	Huawei PE MIX service	Through the Private link in PE Dua-bandwidth
3	Huawei PE Dua-bandwidth	Huawei PE Dua-bandwidth	Through the Private link in PE Dua-bandwidth
4	Huawei PE Dua-bandwidth	Juniper PE International Only service	Through the Private link in PE Dua-bandwidth
5	Huawei PE Dua-bandwidth	Juniper PE MIX service	Through the Private link in PE Dua-bandwidth
6	Huawei PE Dua-bandwidth	Juniper PE Dua-bandwidth	Through the Private link in PE Dua-bandwidth
7	Huawei PE Dua-bandwidth	International	Through the Public link in PE Dua-bandwidth
8	Huawei PE Dua-bandwidth	Domestic	Through the Private link in PE Dua-bandwidth

MIX Service :

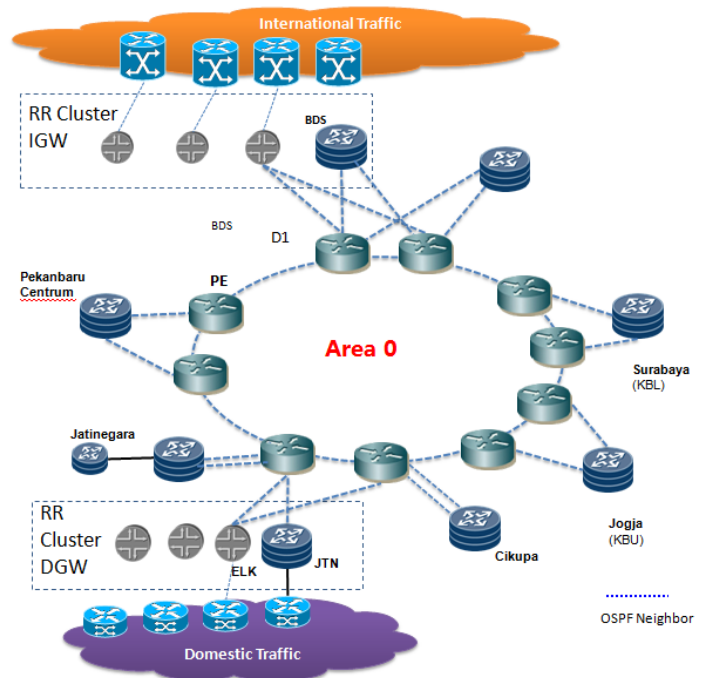
No.	Service Source	Service Destination
1	Huawei PE MIX service	Huawei PE International Only service
2	Huawei PE MIX service	Huawei PE MIX service
3	Huawei PE MIX service	Huawei PE Dua-bandwidth

4	Huawei PE MIX service	Juniper PE International Only service
5	Huawei PE MIX service	Juniper PE MIX service
6	Huawei PE MIX service	Juniper PE Dua-bandwidth
7	Huawei PE MIX service	International
8	Huawei PE MIX service	Domestic

1.2. IGP

The New device deploy OSPF area 0 Follow Network

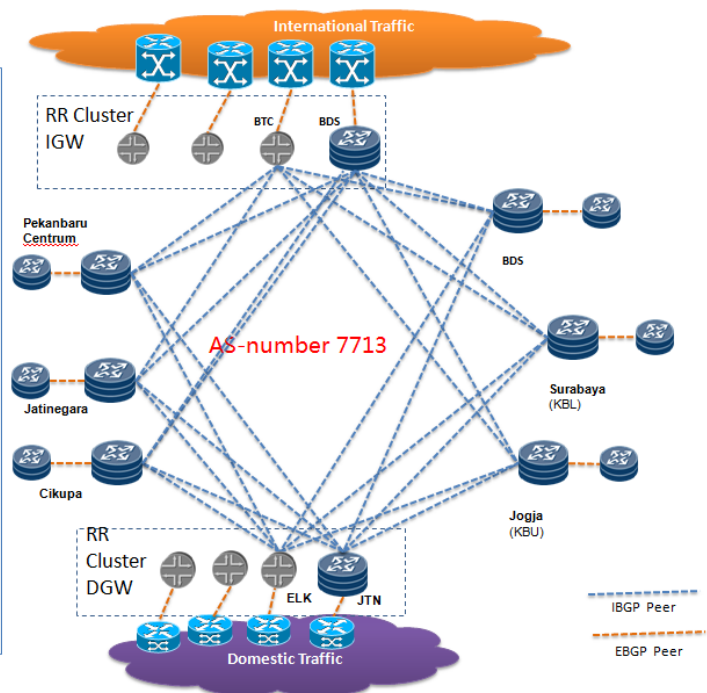
- **P2P OSPF**
Adjacency over Ethernet interfaces to decrease protocol cost and traffic;
- **BFD for OSPF**
To achieve fast convergence between each pair of OSPF neighbors;
- **OSPF fast convergence**
Deploying parameters on Acc & Acc & CEN core nodes to decrease convergence time when network failing;
- **OSPF GR & NSF**
To prevent long time service interrupted when control plane switching over between each pair of OSPF neighbors;
- **OSPF neighbor & area MD5 authentication**
To defense protocol attack;
- **OSPF routing protocol RSVP-TE extension**
To support RSVP-TE protocol;



1.3. BGP

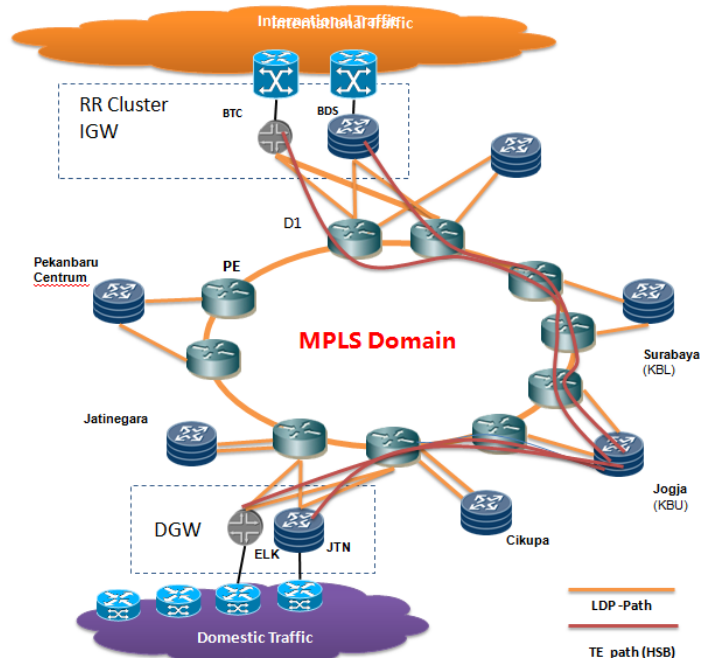
All device deploy one domain AS-number 7713
Follow Network

- **IBGP/IPv4/VPNv4 BGP Peer**
PE-transit <=> IGW&DGW
- **EBGP**
PE-transit <=> CE
- **BGP Peer Groups**
 - **PE transit 1 Group**
IBGP group on for IGW&DGW
 - **IGW&DGW 3 Group**
EBGP group, IPv6, PE-transit, PE-
iptransit
- **BGP GR**
- **BGP peer MD5 authentication**



1.4. MPLS

- **MPLS LDP**
Adjacency over Ethernet interfaces to decrease protocol cost and traffic;
- **IGP/LDP synchronization**
To achieve services stable during network failure and recovery.
- **MPLS TE**
TE deployed B/W PE-transit and IGW/DGW.
Hot-standby deployed for TE protection.



2. Data Of Services in PE Transit

2.1. List Of VPN

Depend on the services in Telkom PE Transit Network, for different type of the service will use different vpn-instance.

IPv4 and IPv6 vpn-instance use the same route-distinguisher and the same vpn-target.

The data for each service vpn-instance as below form:

Type Of Service	Name Of vpn-instance	route-distinguisher	vpn-target	
			import	export
Global	Transit_Global	17974:15007	17974:16256 17974:16257	17974:16256
Domestic	Transit_Domestik	17974:13182	17974:12762 17974:12763	17974:12762 17974:12763
Mix	Transit_Mix	17974:15009	17974:16256 17974:12762 17974:12763	17974:16256 17974:16257 17974:12762 17974:12763

In existing network the configuration of vpn-instance table :

PE2-D2-JT2-TRANSIT
<pre># ip vpn-instance Transit_Global ipv4-family route-distinguisher 17974:15007 vpn-target 17974:16256 export-extcommunity vpn-target 17974:16256 import-extcommunity vpn-target 17974:16257 import-extcommunity ipv6-family route-distinguisher 17974:15007 vpn-target 17974:16256 export-extcommunity vpn-target 17974:16256 import-extcommunity vpn-target 17974:16257 import-extcommunity #</pre>
<pre># ip vpn-instance Transit_Domestik ipv4-family route-distinguisher 17974:13182 vpn-target 17974:12762 export-extcommunity vpn-target 17974:12763 export-extcommunity vpn-target 17974:12762 import-extcommunity vpn-target 17974:12763 import-extcommunity ipv6-family route-distinguisher 17974:13182 vpn-target 17974:12762 export-extcommunity vpn-target 17974:12763 export-extcommunity</pre>


```

vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
#
#
ip vpn-instance Transit_Mix
ipv4-family
route-distinguisher 17974:15009
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16257 export-extcommunity
vpn-target 17974:12762 export-extcommunity
vpn-target 17974:12763 export-extcommunity
vpn-target 17974:16256 import-extcommunity
vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
ipv6-family
route-distinguisher 17974:15009
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16257 export-extcommunity
vpn-target 17974:12762 export-extcommunity
vpn-target 17974:12763 export-extcommunity
vpn-target 17974:16256 import-extcommunity
vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
#

```

2.2. List Of Route-Policy

Different service access different network, in PE Transit Network configure different route-policy for different service, then through the route-policy control the routing, after control the routing, service traffic can be control.

2.2.1 General IP-Prefix & Community

General IP-Prefix:

```

bogons ip-prefix
#
ip ip-prefix bogons index 5 permit 0.0.0.0 0 match-network
ip ip-prefix bogons index 10 permit 127.0.0.0 8 greater-equal 8 less-equal 32
ip ip-prefix bogons index 15 permit 10.0.0.0 8 greater-equal 8 less-equal 32
ip ip-prefix bogons index 20 permit 169.254.0.0 16 greater-equal 16 less-equal 32
ip ip-prefix bogons index 25 permit 172.16.0.0 12 greater-equal 12 less-equal 32
ip ip-prefix bogons index 30 permit 192.168.0.0 16 greater-equal 16 less-equal 32
ip ip-prefix bogons index 35 permit 224.0.0.0 3 greater-equal 3 less-equal 32
#

```

General Community List:

Community from Telin

```
#
```

```
ip community-filter basic tm permit 17974:301
ip community-filter basic btc permit 17974:302
#
ip community-filter basic stix permit 17974:300
ip community-filter basic bds permit 17974:307
#
```

Community from Domestic Network

```
#
ip community-filter basic iix permit 17974:400
ip community-filter basic telkom-prefix-btm permit 17974:501
ip community-filter basic telkom-prefix-sm2 permit 17974:500
#
```

Community Of Global Customer

```
#
ip community-filter basic cust-bds permit 17974:171
ip community-filter basic cust-btc permit 17974:103
ip community-filter basic cust-bp permit 17974:102
ip community-filter basic cust-global-only permit 17974:200
ip community-filter basic cust-ntt permit 17974:212
ip community-filter basic cust-stix permit 17974:100
ip community-filter basic cust-tm permit 17974:101
#
```

Community Of Domestic Customer

```
#
ip community-filter basic cust-iix permit 17974:130
#
```

Community Of Mix Customer

```
#
ip community-filter basic cust-btc-iix permit 17974:119
ip community-filter basic cust-bds-iix permit 17974:172
ip community-filter basic cust-bp-iix permit 17974:112
ip community-filter basic cust-bp-iix-telkomnet permit 17974:118
ip community-filter basic cust-bp-telkomnet permit 17974:115
ip community-filter basic cust-btc-iix-telkomnet permit 17974:121
ip community-filter basic cust-ntt-iix permit 17974:213
ip community-filter basic cust-stix-iix permit 17974:110
ip community-filter basic cust-stix-iix-telkomnet permit 17974:116
ip community-filter basic cust-stix-telkomnet permit 17974:113
ip community-filter basic cust-tm-iix permit 17974:111
ip community-filter basic cust-tm-iix-telkomnet permit 17974:117
ip community-filter basic cust-tm-telkomnet permit 17974:114
#
```

Community Of Telkomsell

```
#
ip community-filter basic tsel-cka permit 17974:23692
```

```
ip community-filter basic tsel-jt2 permit 17974:23691
ip community-filter basic tsel-kbl permit 17974:23693
ip community-filter basic tsel-pbr permit 17974:23694
ip community-filter basic tsel-ptr permit 17974:23695
#
```

Community Of ggc

```
#
ip community-filter basic ggc permit 17974:600
#
```

Community Of akamai

```
#
ip community-filter basic akamai permit 17974:700
#
```

Community Of Others

```
#
ip community-filter basic blackhole permit 17974:666
ip community-filter basic telkom-prefix-pe-d2-elk permit 17974:505
#
```

2.2.2 import-policy

Routing from User CE, import route-policy:

[User CE → PE]

Global User

```
#
route-policy set-comm-bds-cust deny node 10
description ** deny bogons **
if-match ip-prefix bogons
#
route-policy set-comm-bds-cust permit node 100
description ** set community cust-bds & cust-stix **
apply local-preference 230
apply community 17974:171 17974:100
#
#
route-policy set-comm-btc-cust deny node 10
description ** deny bogons **
if-match ip-prefix bogons
#
route-policy set-comm-btc-cust permit node 100
description ** set community cust-btc & cust-tm **
apply local-preference 230
apply community 17974:103 17974:101
#
```

Domestic User

```
#
route-policy set-comm-iix-cust deny node 10
```

```

description ** deny bogons **
if-match ip-prefix bogons
#
route-policy set-comm-iix-cust permit node 100
description ** set community cust-iix **
apply local-preference 230
apply community 17974:130
#

```

Mix User

```

#
route-policy set-comm-bds-iix-cust deny node 10
description ** deny bogons **
if-match ip-prefix bogons
#
route-policy set-comm-bds-iix-cust permit node 100
description ** set community cust-bds-iix & cust-stix-iix **
apply local-preference 230
apply community 17974:172 17974:110
#

```

```

#
route-policy set-comm-btc-iix-cust deny node 10
description ** deny bogons **
if-match ip-prefix bogons
#
route-policy set-comm-btc-iix-cust permit node 100
description ** set community cust-btc-iix & cust-tm-iix **
apply local-preference 230
apply community 17974:119 17974:111
#

```

2.2.3 export-policy

Routing advertise to user CE, export route-policy:

[PE → User CE]

Global User

```

#
route-policy export-non-iix deny node 10
description ** deny bogons ip prefix **
if-match ip-prefix bogons
#
route-policy export-non-iix permit node 500
description ** International Community **
if-match community-filter stix
if-match community-filter tm
if-match community-filter btc
if-match community-filter bds
apply community none
#
route-policy export-non-iix permit node 700

```

```

description ** Cust MIX Community**
if-match community-filter cust-btc-iix
if-match community-filter cust-bds-iix
if-match community-filter cust-stix-iix
if-match community-filter cust-btc-iix-telkomnet
if-match community-filter cust-tm-iix
if-match community-filter cust-bp-iix
if-match community-filter cust-bp-iix-telkomnet
if-match community-filter cust-bp-telkomnet
if-match community-filter cust-stix-iix-telkomnet
if-match community-filter cust-stix-telkomnet
if-match community-filter cust-tm-iix-telkomnet
if-match community-filter cust-tm-telkomnet
if-match community-filter cust-ntt-iix
apply community none
#
route-policy export-non-iix permit node 800
description ** Cust Global Community **
if-match community-filter cust-btc
if-match community-filter cust-bds
if-match community-filter cust-stix
if-match community-filter cust-tm
if-match community-filter cust-bp
if-match community-filter cust-ntt
if-match community-filter cust-global-only
apply community none
#
route-policy export-non-iix deny node 60000
#

```

Domestic User

```

#
route-policy export-iix deny node 10
description ** deny bogons ip prefix **
if-match ip-prefix bogons
#
route-policy export-iix permit node 600
description ** Domestic Community **
if-match community-filter iix
if-match community-filter telkom-prefix-btm
if-match community-filter telkom-prefix-sm2
apply community none
#
route-policy export-iix permit node 700
description ** Cust MIX Community**
if-match community-filter cust-btc-iix
if-match community-filter cust-bds-iix
if-match community-filter cust-stix-iix
if-match community-filter cust-btc-iix-telkomnet
if-match community-filter cust-tm-iix

```

```

if-match community-filter cust-bp-iix
if-match community-filter cust-bp-iix-telkomnet
if-match community-filter cust-bp-telkomnet
if-match community-filter cust-stix-iix-telkomnet
if-match community-filter cust-stix-telkomnet
if-match community-filter cust-tm-iix-telkomnet
if-match community-filter cust-tm-telkomnet
if-match community-filter cust-ntt-iix
apply community none
#
route-policy export-iix permit node 900
description ** Cust Domestic Community **
if-match community-filter cust-iix
apply community none
#
route-policy export-iix deny node 60000
#

```

Mix User

```

#
route-policy export-all deny node 10
description ** deny bogons ip prefix **
if-match ip-prefix bogons
#
route-policy export-all permit node 500
description ** International Community **
if-match community-filter stix
if-match community-filter tm
if-match community-filter btc
if-match community-filter bds
apply community none
#
route-policy export-all permit node 600
description ** Domestic Community **
if-match community-filter iix
if-match community-filter telkom-prefix-btm
if-match community-filter telkom-prefix-sm2
apply community none
#
route-policy export-all permit node 700
description ** Cust MIX Community**
if-match community-filter cust-btc-iix
if-match community-filter cust-bds-iix
if-match community-filter cust-stix-iix
if-match community-filter cust-btc-iix-telkomnet
if-match community-filter cust-tm-iix
if-match community-filter cust-bp-iix
if-match community-filter cust-bp-iix-telkomnet
if-match community-filter cust-bp-telkomnet
if-match community-filter cust-stix-iix-telkomnet

```

```

if-match community-filter cust-stix-telkomnet
if-match community-filter cust-tm-iix-telkomnet
if-match community-filter cust-tm-telkomnet
if-match community-filter cust-ntt-iix
apply community none
#
route-policy export-all permit node 800
description ** Cust Global Community **
if-match community-filter cust-btc
if-match community-filter cust-bds
if-match community-filter cust-stix
if-match community-filter cust-tm
if-match community-filter cust-bp
if-match community-filter cust-ntt
if-match community-filter cust-global-only
apply community none
#
route-policy export-all permit node 900
description ** Cust Domestic Community **
if-match community-filter cust-iix
apply community none
#
route-policy export-all deny node 60000
#

```

export-deny-all

```

#
route-policy export-deny-all deny node 60000
#

```

Mix user + ggc

```

#
route-policy export-all-ggc deny node 10
description ** deny bogons ip prefix **
if-match ip-prefix bogons
#
route-policy export-all-ggc permit node 100
description ** permit community ggc **
if-match community-filter ggc
apply community none
#
route-policy export-all-ggc permit node 500
description ** International Community **
if-match community-filter stix
if-match community-filter tm
if-match community-filter btc
if-match community-filter bds
apply community none
#
route-policy export-all-ggc permit node 600

```

```

description ** Domestic Community **
if-match community-filter iix
if-match community-filter telkom-prefix-btm
if-match community-filter telkom-prefix-sm2
apply community none
#
route-policy export-all-ggc permit node 700
description ** Cust MIX Community**
if-match community-filter cust-btc-iix
if-match community-filter cust-bds-iix
if-match community-filter cust-stix-iix
if-match community-filter cust-btc-iix-telkomnet
if-match community-filter cust-tm-iix
if-match community-filter cust-bp-iix
if-match community-filter cust-bp-iix-telkomnet
if-match community-filter cust-bp-telkomnet
if-match community-filter cust-stix-iix-telkomnet
if-match community-filter cust-stix-telkomnet
if-match community-filter cust-tm-iix-telkomnet
if-match community-filter cust-tm-telkomnet
if-match community-filter cust-ntt-iix
apply community none
#
route-policy export-all-ggc permit node 800
description ** Cust Global Community **
if-match community-filter cust-btc
if-match community-filter cust-bds
if-match community-filter cust-stix
if-match community-filter cust-tm
if-match community-filter cust-bp
if-match community-filter cust-ntt
if-match community-filter cust-global-only
apply community none
#
route-policy export-all-ggc permit node 900
description ** Cust Domestic Community **
if-match community-filter cust-iix
apply community none
#
route-policy export-all-ggc deny node 60000
#

```

Domestic user + akamai

```

#
route-policy export-iix-akamai deny node 10
description ** deny bogons ip prefix **
if-match ip-prefix bogons
#
route-policy export-iix-akamai permit node 100
description ** Akamai Community **

```



```
if-match community-filter akamai
apply community none
#
route-policy export-iix-akamai permit node 600
description ** Domestic Community **
if-match community-filter iix
if-match community-filter telkom-prefix-btm
if-match community-filter telkom-prefix-sm2
apply community none
#
route-policy export-iix-akamai permit node 700
description ** Cust MIX Community**
if-match community-filter cust-btc-iix
if-match community-filter cust-bds-iix
if-match community-filter cust-stix-iix
if-match community-filter cust-btc-iix-telkomnet
if-match community-filter cust-tm-iix
if-match community-filter cust-bp-iix
if-match community-filter cust-bp-iix-telkomnet
if-match community-filter cust-bp-telkomnet
if-match community-filter cust-stix-iix-telkomnet
if-match community-filter cust-stix-telkomnet
if-match community-filter cust-tm-iix-telkomnet
if-match community-filter cust-tm-telkomnet
if-match community-filter cust-ntt-iix
apply community none
#
route-policy export-iix-akamai permit node 900
description ** Cust Domestic Community **
if-match community-filter cust-iix
apply community none
#
route-policy export-iix-akamai deny node 60000
#
```

3. Configuration Of Services in PE Transit

3.1. Global Service

For global service, in PE :

import policy set cust-bds or cust-btc

export policy use export-non-iix

example :

Data Plan :

Service Name	Telkom-Global-Test
PE Site	Jatinegara
Service Type	Global
AS Number	100
Vlan id	1234
Interface	Eth-trunk 30.1234
Local IP Address	118.98.88.61/30
Peer IP Address	118.98.88.62/30
Input Rate Limit	150M
Output Rate Limit	150M
Prefix-limit	150
Idle-Timeout(min)	10
Import	set-comm-bds-cust
Export	export-non-iix

Configuration :

Step 1 : create the submit interface

```
#
interface eth-trunk30.1234
description Telkom-Global-Test
vlan-type dot1q 1234
ip binding vpn-instance Transit_Global
ip address 118.98.88.61 30
qos car cir 150000 inbound
qos car cir 150000 outbound
statistic enable
#
```

Step 2 : create the BGP to Global service CE

```
#
bgp 7713
ipv4-family vpn-instance Transit_Global
group customer-global external
peer 118.98.88.61 as-number 100
peer 118.98.88.61 group customer-global
```

```
peer 118.98.88.61 connect-interface eth-trunk30.1234
peer 118.98.88.61 description Telkom-Global-Test
peer 118.98.88.61 route-policy set-comm-bds-cust import
peer 118.98.88.61 route-policy export-non-iix export
peer 118.98.88.61 route-limit 150 idle-timeout 10
peer customer-global advertise-community
#
```

Step 3 : check the Global Service

1. Ping CE
`<PE2-D2-JT2-TRANSIT>ping -vpn-instance Transit_Global -a 118.98.88.61 118.98.88.62`
2. Check BGP peer to CE status
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all peer`
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global peer 118.98.88.62 verbose`
3. Check routing prefix advertise to CE
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global routing-table peer 118.98.88.62 advertised-routes statistics`
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global routing-table peer 118.98.88.62 advertised-routes`
4. Check routing prefix from CE
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global routing-table peer 118.98.88.62 received-routes statistics`
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global routing-table peer 118.98.88.62 received-routes`
5. Check routing in each vpn-instance routing table
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all routing-table 118.98.88.0 24`
`<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Global 118.98.88.0 24`
`<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Mix 118.98.88.0 24`
6. Check CE routing prefix in IGW
`<GW-BDS-Transit>display bgp vpnv4 all routing-table 118.98.88.0 24`
7. Check CE routing prefix in router-server and traceroute CE routing in router-server
`<router-server-att>show route 118.98.88.0/24 extensive | no-more`
`<router-server-att>traceroute 118.98.88.0/24`

3.2. Domestic Service

For domestic service, in PE :

import policy set cust-iix
 export policy use export-iix

example :

Data Plan :

Service Name	Telkom-Domestic-Test
PE Site	Jatinegara
Service Type	Domestic
AS Number	100
Vlan id	1234
Interface	Eth-trunk 30.1234
Local IP Address	118.98.88.61/30
Peer IP Address	118.98.88.62/30
Input Rate Limit	200M
Output Rate Limit	200M
Prefix-limit	50
Idle-Timeout(min)	10
Import	set-comm-iix-cust
Export	export-iix

Configuration :**Step 1 : create the submit interface**

```
#
interface eth-trunk30.1234
description Telkom-Domestic-Test
vlan-type dot1q 1234
ip binding vpn-instance Transit_Domestik
ip address 118.98.88.61 30
qos car cir 200000 inbound
qos car cir 200000 outbound
statistic enable
#
```

Step 2 : create the BGP to Domestic service CE

```
#
bgp 7713
ipv4-family vpn-instance Transit_Domestik
group customer-domestik external
peer 118.98.88.61 as-number 100
peer 118.98.88.61 group customer-domestik
peer 118.98.88.61 connect-interface eth-trunk30.1234
peer 118.98.88.61 description Telkom-Domestic-Test
peer 118.98.88.61 route-policy set-comm-iix-cust import
peer 118.98.88.61 route-policy export-iix export
peer 118.98.88.61 route-limit 50 idle-timeout 10
peer customer-domestik advertise-community
#
```

Step 3 : check the Domestic Service

```
1. Ping CE
<PE2-D2-JT2-TRANSIT>ping -vpn-instance Transit_Domestik -a 118.98.88.61 118.98.88.62
```

2. Check BGP peer to CE status

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all peer
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik peer 118.98.88.62 verbose
```

3. Check routing prefix advertise to CE

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik routing-table peer 118.98.88.62 advertised-routes statistics
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik routing-table peer 118.98.88.62 advertised-routes
```

4. Check routing prefix from CE

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik routing-table peer 118.98.88.62 received-routes statistics
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik routing-table peer 118.98.88.62 received-routes
```

5. Check routing in each vpn-instance routing table

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all routing-table 118.98.88.0 24
```

```
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Domestik 118.98.88.0 24
```

```
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Mix 118.98.88.0 24
```

6. Check CE routing prefix in IGW

```
<GW-BDS-Transit>display bgp vpnv4 all routing-table 118.98.88.0 24
```

7. Check CE routing prefix in router-server and tracert CE routing in router-server Domestik Network

```
<router-server-Domestic-Network>show route 118.98.88.0/24 extensive | no-more
```

```
<router-server-Domestic-Network>tracert 118.98.88.0/24
```

3.3. Mix Service

For mix service, in PE :

import policy set cust-bds-iix or cust-btc-iix

export policy use export-all

example :

Data Plan IPv4:

Service Name	Telkom-Mix-Test
PE Site	Jatinegara
Service Type	Mix
AS Number	100
Vlan id	1234
Interface	Eth-trunk 30.1234
Local IP Address	118.98.88.61/30
Peer IP Address	118.98.88.62/30
Input Rate Limit	1600M
Output Rate Limit	1600M
Prefix-limit	150

Idle-Timeout(min)	10
Import	set-comm-btc-iix-cust
Export	export-all

Data Plan IPv6 :

Service Name	Telkom-Mix-Test
PE Site	Jatinegara
Service Type	Mix
AS Number	100
Vlan id	1234
Interface	Eth-trunk 30.1234
Local IP Address	2001:4488:1::b1/126
Peer IP Address	2001:4488:1::b2/126
Input Rate Limit	1600M
Output Rate Limit	1600M
Prefix-limit	150
Idle-Timeout(min)	10

Configuration :**Step 1 : create the submit interface**

```
#
interface eth-trunk30.1234
description Telkom-Mix-Test
vlan-type dot1q 1234
ip binding vpn-instance Transit_Mix
ip address 118.98.88.61 30
ipv6 enable
ipv6 address 2001:4488:1::b1 126
qos car cir 1600000 inbound
qos car cir 1600000 outbound
statistic enable
#
```

Step 2 : create the BGP to Mix service CE

```
#
bgp 7713
ipv4-family vpn-instance Transit_Mix
group customer-mix external
peer 118.98.88.61 as-number 100
peer 118.98.88.61 group customer-mix
peer 118.98.88.61 connect-interface eth-trunk30.1234
peer 118.98.88.61 description Telkom-Mix-Test
peer 118.98.88.61 route-policy set-comm-btc-iix-cust import
peer 118.98.88.61 route-policy export-all export
```

```

peer 118.98.88.61 route-limit 150 idle-timeout 10
peer customer-mix advertise-community
ipv6-family vpn-instance Transit_Mix
group customer-mix-v6 external
peer 2001:4488:1::b2 as-number 100
peer 2001:4488:1::b2 as-number customer-mix-v6
peer 2001:4488:1::b2 connect-interface eth-trunk30.1234
peer 2001:4488:1::b2 description Telkom-Mix-Test-v6
peer 2001:4488:1::b2 route-limit 150 idle-timeout 10
peer customer-mix-v6 advertise-community
#

```

Step 3 : check the Global Service(IPv4)

1. Ping CE

```
<PE2-D2-JT2-TRANSIT>ping -vpn-instance Transit_Mix -a 118.98.88.61 118.98.88.62
```

2. Check BGP peer to CE status

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all peer
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix peer 118.98.88.62 verbose
```

3. Check routing prefix advertise to CE

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix routing-table peer 118.98.88.62 advertised-routes statistics
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix routing-table peer 118.98.88.62 advertised-routes
```

4. Check routing prefix from CE

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix routing-table peer 118.98.88.62 received-routes statistics
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix routing-table peer 118.98.88.62 received-routes
```

5. Check routing in each vpn-instance routing table

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all routing-table 118.98.88.0 24
```

```
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Global 118.98.88.0 24
```

```
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Domestik 118.98.88.0 24
```

```
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Mix 118.98.88.0 24
```

6. Check CE routing prefix in IGW

```
<GW-BDS-Transit>display bgp vpnv4 all routing-table 118.98.88.0 24
```

7. Check CE routing prefix in router-server and tracer CE routing in router-server

```
<router-server-att>show route 118.98.88.0/24 extensive | no-more
```

```
<router-server-att>traceroute 118.98.88.0/24
```

```
<router-server-Domestic-Network>show route 118.98.88.0/24 extensive | no-more
```

```
<router-server-Domestic-Network>traceroute 118.98.88.0/24
```

Step 4 : check the Global Service(IPv6)

1. Ping CE

```
<PE2-D2-JT2-TRANSIT>ping ipv6 vpn-instance Transit_Mix -a 2001:4488:1::b1 2001:4488:1::b2
```

2. Check BGP peer to CE status

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv6 all peer
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv6 vpn-instance Transit_Mix peer 2001:4488:1::b2 verbose
```

3. Check routing prefix advertise to CE

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv6 vpn-instance Transit_Mix routing-table peer 2001:4488:1::b2 advertised-routes statistics
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv6 vpn-instance Transit_Mix routing-table peer 2001:4488:1::b2 advertised-routes
```

4. Check routing prefix from CE

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv6 vpn-instance Transit_Mix routing-table peer 2001:4488:1::b2 received-routes statistics
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv6 vpn-instance Transit_Mix routing-table peer 2001:4488:1::b2 received-routes
```

5. Check routing in each vpn-instance routing table

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv6 all routing-table 2001:4488:1::b0 64
```

```
<PE2-D2-JT2-TRANSIT>display ipv6 routing-table vpn-instance Transit_Global 2001:4488:1::b0 64
```

```
<PE2-D2-JT2-TRANSIT>display ipv6 routing-table vpn-instance Transit_Domestik 2001:4488:1::b0 64
```

```
<PE2-D2-JT2-TRANSIT>display ipv6 routing-table vpn-instance Transit_Mix 2001:4488:1::b0 64
```

6. Check CE routing prefix in IGW

```
<GW-BDS-Transit>display bgp vpnv6 all routing-table 2001:4488:1::b0 64
```

3.4. Mix Service + GGC

For [mix + ggc] service, in PE :

import policy set cust-bds-iix or cust-btc-iix

export policy use export-all-ggc

example :

Data Plan :

Service Name	Telkom-Mix-ggc-Test
PE Site	Jatinegara
Service Type	Mix
AS Number	100
Vlan id	1234
Interface	Eth-trunk 30.1234
Local IP Address	118.98.88.61/30
Peer IP Address	118.98.88.62/30
Input Rate Limit	100M
Output Rate Limit	100M
Prefix-limit	150
Idle-Timeout(min)	10
Import	set-comm-bds-iix-cust
Export	export-all-ggc

Configuration :**Step 1 : create the submit interface**

```
#
interface eth-trunk30.1234
description Telkom-Mix-ggc-Test
vlan-type dot1q 1234
ip binding vpn-instance Transit_Mix
ip address 118.98.88.61 30
qos car cir 100000 inbound
qos car cir 100000 outbound
statistic enable
#
```

Step 2 : create the BGP to Mix service CE

```
#
bgp 7713
ipv4-family vpn-instance Transit_Mix
group customer-mix external
peer 118.98.88.61 as-number 100
peer 118.98.88.61 group customer-Mix
peer 118.98.88.61 connect-interface eth-trunk30.1234
peer 118.98.88.61 description Telkom-Mix-ggc-Test
peer 118.98.88.61 route-policy set-comm-bds-iix-cust import
peer 118.98.88.61 route-policy export-all-ggc export
peer 118.98.88.61 route-limit 150 idle-timeout 10
peer customer-mix advertise-community
#
```

Step 3 : check the Global Service

1. Ping CE
`<PE2-D2-JT2-TRANSIT>ping -vpn-instance Transit_Mix -a 118.98.88.61 118.98.88.62`
2. Check BGP peer to CE status
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all peer`
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix peer 118.98.88.62 verbose`
3. Check routing prefix advertise to CE
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix routing-table peer 118.98.88.62 advertised-routes statistics`
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix routing-table peer 118.98.88.62 advertised-routes`
4. Check routing prefix from CE
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix routing-table peer 118.98.88.62 received-routes statistics`
`<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Mix routing-table peer 118.98.88.62 received-routes`
5. Check routing in each vpn-instance routing table

```

<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all routing-table 118.98.88.0 24
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Global 118.98.88.0 24
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Domestik 118.98.88.0 24
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Mix 118.98.88.0 24

```

6. Check CE routing prefix in IGW

```

<GW-BDS-Transit>display bgp vpnv4 all routing-table 118.98.88.0 24

```

7. Check CE routing prefix in router-server and tracer CE routing in router-server

```

<router-server-att>show route 118.98.88.0/24 extensive | no-more
<router-server-att>traceroute 118.98.88.0/24
<router-server-Domestic-Network>show route 118.98.88.0/24 extensive | no-more
<router-server-Domestic-Network>traceroute 118.98.88.0/24

```

3.5. Domestic + Akamai

For domestic service, in PE :

import policy set cust-iix

export policy use export-iix-akamai

example :

Data Plan :

Service Name	Telkom-Domestic-akamai-Test
PE Site	Jatinegara
Service Type	Domestic
AS Number	100
Vlan id	1234
Interface	Eth-trunk 30.1234
Local IP Address	118.98.88.61/30
Peer IP Address	118.98.88.62/30
Input Rate Limit	200M
Output Rate Limit	200M
Prefix-limit	50
Idle-Timeout(min)	10
Import	set-comm-iix-cust
Export	export-iix-akamai

Configuration :

Step 1 : create the submit interface

```

#
interface eth-trunk30.1234
description Telkom-Domestic-akamai-Test
vlan-type dot1q 1234
ip binding vpn-instance Transit_Domestik
ip address 118.98.88.61 30
qos car cir 200000 inbound
qos car cir 200000 outbound

```

```
statistic enable
```

```
#
```

Step 2 : create the BGP to Domestic service CE

```
#
```

```
bgp 7713
ipv4-family vpn-instance Transit_Domestik
group customer-domestik external
peer 118.98.88.61 as-number 100
peer 118.98.88.61 group customer-domestik
peer 118.98.88.61 connect-interface eth-trunk30.1234
peer 118.98.88.61 description Telkom-Domestic-akamai-Test
peer 118.98.88.61 route-policy set-comm-iix-cust import
peer 118.98.88.61 route-policy export-iix-akamai export
peer 118.98.88.61 route-limit 50 idle-timeout 10
peer customer-domestik advertise-community
```

```
#
```

Step 3 : check the Domestic Service

1. Ping CE

```
<PE2-D2-JT2-TRANSIT>ping -vpn-instance Transit_Domestik -a 118.98.88.61 118.98.88.62
```

2. Check BGP peer to CE status

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all peer
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik peer 118.98.88.62 verbose
```

3. Check routing prefix advertise to CE

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik routing-table peer 118.98.88.62 advertised-routes statistics
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik routing-table peer 118.98.88.62 advertised-routes
```

4. Check routing prefix from CE

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik routing-table peer 118.98.88.62 received-routes statistics
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Domestik routing-table peer 118.98.88.62 received-routes
```

5. Check routing in each vpn-instance routing table

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all routing-table 118.98.88.0 24
```

```
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Domestik 118.98.88.0 24
```

```
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Mix 118.98.88.0 24
```

6. Check CE routing prefix in IGW

```
<GW-BDS-Transit>display bgp vpnv4 all routing-table 118.98.88.0 24
```

7. Check CE routing prefix in router-server and tracert CE routing in router-server Domestik Network

```
<router-server-Domestic-Network>show route 118.98.88.0/24 extensive | no-more
```

```
<router-server-Domestic-Network>tracert 118.98.88.0/24
```

3.6. Only need default route user

For Global/Domestic/Mix service which only want receive the default route, in PE :
import policy set cust-bds or cust-btc / cust-iix / cust-bds-iix or cust-btc-iix
export policy use export-deny-all
in bgp peer use command to advertise the default route
Example for Global default route advertise:

Data Plan :

Service Name	Telkom-Global-Default-Test
PE Site	Jatinegara
Service Type	Global
AS Number	100
Vlan id	1234
Interface	Eth-trunk 30.1234
Local IP Address	118.98.88.61/30
Peer IP Address	118.98.88.62/30
Input Rate Limit	150M
Output Rate Limit	150M
Prefix-limit	150
Idle-Timeout(min)	10
Import	set-comm-bds-cust
Export	export-deny-all

Configuration :

Step 1 : create the submit interface

```
#
interface eth-trunk30.1234
description Telkom-Global-Default-Test
vlan-type dot1q 1234
ip binding vpn-instance Transit_Global
ip address 118.98.88.61 30
qos car cir 150000 inbound
qos car cir 150000 outbound
statistic enable
#
```

Step 2 : create the BGP to Global service CE

```
#
bgp 7713
ipv4-family vpn-instance Transit_Global
group customer-global external
peer 118.98.88.61 as-number 100
peer 118.98.88.61 group customer-global
peer 118.98.88.61 connect-interface eth-trunk30.1234
peer 118.98.88.61 description Telkom-Global-Default-Test
```

```
peer 118.98.88.61 route-policy set-comm-bds-cust import
peer 118.98.88.61 route-policy export-deny-all export
peer 118.98.88.61 default-route-advertise
peer 118.98.88.61 route-limit 150 idle-timeout 10
peer customer-global advertise-community
#
```

Step 3 : check the Global Service

1. Ping CE

```
<PE2-D2-JT2-TRANSIT>ping -vpn-instance Transit_Global -a 118.98.88.61 118.98.88.62
```

2. Check BGP peer to CE status

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all peer
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global peer 118.98.88.62 verbose
```

3. Check routing prefix advertise to CE

Only the default route advertise to CE :

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global routing-table peer 118.98.88.62 advertised-routes statistics
```

Default originated : 1

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global routing-table peer 118.98.88.62 advertised-routes
```

A default route is advertised originally

4. Check routing prefix from CE

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global routing-table peer 118.98.88.62 received-routes statistics
```

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 vpn-instance Transit_Global routing-table peer 118.98.88.62 received-routes
```

5. Check routing in each vpn-instance routing table

```
<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all routing-table 118.98.88.0 24
```

```
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Global 118.98.88.0 24
```

```
<PE2-D2-JT2-TRANSIT>display ip routing-table vpn-instance Transit_Mix 118.98.88.0 24
```

6. Check CE routing prefix in IGW

```
<GW-BDS-Transit>display bgp vpnv4 all routing-table 118.98.88.0 24
```

7. Check CE routing prefix in router-server and traceroute CE routing in router-server

```
<router-server-att>show route 118.98.88.0/24 extensive | no-more
```

```
<router-server-att>tracert 118.98.88.0/24
```

3.7. Netstream

NetStream is configured to collect statistics about the source IP address, destination IP address, port, and protocol information of network packets.

IPv4 Example Configuration :

Step 1 : Configure the distributed NetStream service processing mode

```
#
slot 1
ip netstream sampler to slot self
#
```

Step 2 : Enable NetStream sampling and configure the fixed packet sampling mode, sample rate 10 :1

```
#
ip netstream sampler fix-packets 10 inbound
ip netstream sampler fix-packets 10 outbound
#
```

Step 3 : Configure NetStream to collect statistics about incoming and outgoing flows on interface

```
#
interface Eth-trunk 30.1234
ip netstream inbound
ip netstream outbound
#
```

Step 4 : Verify the configuration

<PE2-D2-JT2-TRANSIT> display ip netstream cache origin slot 1
Information of IP and MPLS cache on slot 1

<i>DstIf</i>	<i>DstP</i>	<i>Msk</i>	<i>Pro</i>	<i>Tos</i>	<i>Flags</i>	<i>Packets</i>
<i>SrcIf</i>	<i>SrcP</i>	<i>Msk</i>				
<i>NextHop</i>			<i>Direction</i>			
<i>DstIP</i>			<i>DstAs</i>			
<i>SrcIP</i>			<i>SrcAs</i>			
<i>BGP: BGP NextHop</i>			<i>TopLabelType</i>			
<i>Label1</i>	<i>Exp1</i>	<i>Bottom1</i>				
<i>Label2</i>	<i>Exp2</i>	<i>Bottom2</i>				
<i>Label3</i>	<i>Exp3</i>	<i>Bottom3</i>				
<i>TopLabelIpAddress</i>			<i>VlanId</i>			

<i>Unknown</i>	200	32	6	16	0	1
<i>Eth-trunk30.1234</i>			100	24		
<i>0.0.0.0</i>					<i>in</i>	
<i>10.10.1.1</i>					0	
<i>10.10.1.2</i>					0	
<i>0.0.0.0</i>					0	
<i>0</i>	0	0				
<i>0</i>	0	0				
<i>0</i>	0	0				
<i>1.1.1.1</i>	0					

IPv6 Example Configuration :**Step 1 : Configure the distributed NetStream service processing mode**

```
#
slot 1
  ipv6 netstream sampler to slot self
#
```

Step 2 : Enable NetStream sampling and configure the fixed packet sampling mode, sample rate 10 :1

```
#
ipv6 netstream sampler fix-packets 10 inbound
ipv6 netstream sampler fix-packets 10 outbound
#
```

Step 3 : Configure NetStream to collect statistics about incoming and outgoing flows on interface

```
#
interface Eth-trunk 30.1234
  ipv6 netstream inbound
  ipv6 netstream outbound
#
```

Step 4 : Verify the configuration

```
<PE2-D2-JT2-TRANSIT> display ipv6 netstream cache origin slot 1
Show information of IP and MPLS cache of slot 1 is starting.
get show cache user data success.
DstIf      DstIP      SrcIP      Pro Tos Flags Packets
SrcIf      DstP Msk    SrcP Msk    NextHop
          DstAs      SrcAs
BGP: BGP NextHop      TopLabelType  Direction
Label1      Exp1      Bottom1
Label2      Exp2      Bottom2
Label3      Exp3      Bottom3
TopLabelIpAddress
-----
Null        1:1::1:1    2:2::2:2    1 1 0    2746
GI3/0/0     0 32       0 24       3:3::3:3
          0        0
0:0::0:0    0        0        in
0          0        0
0          0        0
0          0        0
0:0::0:0
```

3.8. ACL To deny the ICMP packets in interface

In Huawei NE40E, use traffic policy configuration in the interface, and control the protocol or depend on the source/destination IP to deny the packet.

IPv4 Example to deny the ICMP protocol packets :**Step 1 : Configuration the ACL for deny ICMP protocol packets**

```
#
acl 3000
description ** deny ICMP **
rule deny icmp
#
```

Step 2 : Configure traffic classifier

```
#
traffic classifier deny-icmp
if-match acl 3000
#
```

Step 3 : Configure traffic behavior

```
#
traffic behavior deny-icmp
deny
#
```

Step 4 : Configure traffic policy

```
#
traffic policy deny-icmp
statistics enable
classifier deny-icmp behavior deny-icmp
#
```

Step 5 : Configure traffic policy in interface

```
#
interface eth-trunk30.1234
traffic-policy deny-icmp inbound
traffic-policy deny-icmp outbound
#
```

Step 6 : Verify the configuration

```
<PE2-D2-JT2-TRANSIT> display acl 3000
Basic ACL 3000, 1 rules, match-order is auto
ACL's step is 5
rule 5 deny icmp (10 times matched)

<PE2-D2-JT2-TRANSIT> display traffic behavior user-defined deny-icmp
<PE2-D2-JT2-TRANSIT> display traffic classifier user-defined deny-icmp
<PE2-D2-JT2-TRANSIT> display traffic policy user-defined deny-icmp
<PE2-D2-JT2-TRANSIT> display traffic policy statistics interface eth-trunk30.1234 inbound
<PE2-D2-JT2-TRANSIT> display traffic policy statistics interface eth-trunk30.1234 outbound
```

IPv6 Example to deny the ICMPv6 protocol packets :**Step 1 : Configuration the ACL for deny ICMP protocol packets**

```
#
```



```

acl 3000
description ** deny ICMPv6 **
rule deny icmpv6
#

```

Step 2 : Configure traffic classifier

```

#
traffic classifier deny-icmp-v6
if-match ipv6 acl 3000
#

```

Step 3 : Configure traffic behavior

```

#
traffic behavior deny-icmp-v6
deny
#

```

Step 4 : Configure traffic policy

```

#
traffic policy deny-icmp
statistics enable
classifier deny-icmp-v6 behavior deny-icmp-v6
#

```

Step 5 : Configure traffic policy in interface

```

#
interface eth-trunk30.1234
traffic-policy deny-icmp inbound
traffic-policy deny-icmp outbound
#

```

Step 6 : Verify the configuration

```

<PE2-D2-JT2-TRANSIT> display acl 3000
Basic ACL 3000, 1 rules, match-order is auto
ACL's step is 5
rule 5 deny icmp (10 times matched)

<PE2-D2-JT2-TRANSIT> display traffic behavior user-defined deny-icmp-v6
<PE2-D2-JT2-TRANSIT> display traffic classifier user-defined deny-icmp-v6
<PE2-D2-JT2-TRANSIT> display traffic policy user-defined deny-icmp
<PE2-D2-JT2-TRANSIT> display traffic policy statistics interface eth-trunk30.1234 inbound
<PE2-D2-JT2-TRANSIT> display traffic policy statistics interface eth-trunk30.1234 outbound

```

3.9. IGP

OSPF Checking

```

<PE2-D2-JT2-TRANSIT> display ospf peer brief

```

OSPF Process 1 with Router ID 111.112.113.115
Peer Statistic Information

Area Id	Interface	Neighbor id	State
0.0.0.0	Eth3/0/1	111.112.113.116	Full
0.0.0.0	Eth3/0/2	111.112.113.116	Full

<PE2-D2-JT2-TRANSIT>display ospf interface

OSPF Process 1 with Router ID 111.112.113.115
Interfaces

Area: 0.0.0.0 (MPLS TE not enabled)

Interface	IP Address	Type	State	Cost	Pri
Eth3/0/1	192.161.1.2	Broadcast	BDR	1	1
Eth3/0/2	192.162.1.2	Broadcast	BDR	1	1
Loop0	111.112.113.115	P2P	P-2-P	0	1

<PE2-D2-JT2-TRANSIT>display ospf peer

OSPF Process 1 with Router ID 111.112.113.115
Neighbors

Area 0.0.0.0 interface 192.161.1.2 (Eth3/0/1)'s neighbors
 Router ID: 111.112.113.116 Address: 192.161.1.1
 State: Full Mode:Nbr is Master Priority: 1
 DR: 192.161.1.1 BDR: 192.161.1.2 MTU: 0
 Dead timer due in 39 sec
 Retrans timer interval: 5
 Neighbor is up for 121:20:01
 Authentication Sequence: [0]

Area 0.0.0.0 interface 192.162.1.2 (Eth3/0/2)'s neighbors
 Router ID: 111.112.113.116 Address: 192.162.1.1
 State: Full Mode:Nbr is Master Priority: 1
 DR: 192.162.1.1 BDR: 192.162.1.2 MTU: 0
 Dead timer due in 35 sec
 Retrans timer interval: 5
 Neighbor is up for 121:20:01
 Authentication Sequence: [0]

<PE2-D2-JT2-TRANSIT>display ospf routing

OSPF Process 1 with Router ID 111.112.113.115
Routing Tables

Routing for Network

Destination	Cost	Type	NextHop	AdvRouter	Area
2.2.2.118/32	1	Stub	192.162.1.1	111.112.113.116	0.0.0.0
2.2.2.118/32	1	Stub	192.161.1.1	111.112.113.116	0.0.0.0
111.112.113.115/32	0	Direct	111.112.113.115	111.112.113.115	0.0.0.0
111.112.113.116/32	1	Stub	192.162.1.1	111.112.113.116	0.0.0.0
111.112.113.116/32	1	Stub	192.161.1.1	111.112.113.116	0.0.0.0
192.161.1.0/24	1	Direct	192.161.1.2	111.112.113.115	0.0.0.0
192.162.1.0/24	1	Direct	192.162.1.2	111.112.113.115	0.0.0.0

Total Nets: 5

Intra Area: 5 Inter Area: 0 ASE: 0 NSSA: 0

<PE2-D2-JT2-TRANSIT>disp ospf lsd

OSPF Process 1 with Router ID 111.112.113.115
Link State Database

Area: 0.0.0.0

Type	LinkState ID	AdvRouter	Age	Len	Sequence	Metric
Router	111.112.113.115	111.112.113.115	1099	60	80000276	1
Router	111.112.113.116	111.112.113.116	1102	72	80000275	1
Network	192.161.1.1	111.112.113.116	1102	32	80000240	0
Network	192.162.1.1	111.112.113.116	1102	32	80000240	0

LDP Checking

<PE2-D2-JT2-TRANSIT>display mpls ldp session

LDP Session(s) in Public Network

Codes: LAM(Label Advertisement Mode), SsnAge Unit(DDDD:HH:MM)

A '*' before a session means the session is being deleted.

PeerID	Status	LAM	SsnRole	SsnAge	KASent/Rcv
111.112.113.116:0	Operational	DU	Passive	0005:01:18	29115/29115

TOTAL: 1 Session(s) Found.

<PE2-D2-JT2-TRANSIT>display mpls lsp st

Lsp Type	Total	Ingress	Transit	Egress
STATIC LSP	0	0	0	0
STATIC CRLSP	0	0	0	0
LDP LSP	8	2	2	4
LDP IPV6 LSP	0	0	0	0
RSVP CRLSP	0	0	0	0
BGP LSP	1	0	0	1
ASBR LSP	0	0	0	0
BGP IPV6 LSP	3	0	0	3
L3VPN IPV6 LSP	0	0	0	0

LSP	12	2	2	8
CRLSP	0	0	0	0

Lsp Type	IngressLspBypassState		TransitLspBypassState	
	Exist	NotUsed	Exist	NotUsed
RSVP CRLSP	0	0	0	0

<PE2-D2-JT2-TRANSIT>display mpls ldp interface

LDP Interface Information in Public Network

Codes: LAM(Label Advertisement Mode), IFName(Interface name)

A '*' before an interface means the entity is being deleted.

IFName	Status	LAM	TransportAddress	HelloSent/Rcv
--------	--------	-----	------------------	---------------

Eth3/0/1 Active DU 111.112.113.115 215651/215640

<PE2-D2-JT2-TRANSIT> display mpls ldp lsp

LDP LSP Information

DestAddress/Mask	In/OutLabel	UpstreamPeer	NextHop	OutInterface
1.1.1.1/32	23/NULL	111.112.113.116	0.0.0.0	NULL0
2.2.2.118/32	NULL/3	-	192.161.1.1	Eth3/0/1
2.2.2.118/32	25/3	111.112.113.116	192.161.1.1	Eth3/0/1
111.112.113.115/32	3/NULL	111.112.113.116	127.0.0.1	Loop0
*111.112.113.115/32	Liberal/23		DS/111.112.113.116	
111.112.113.116/32	NULL/3	-	192.161.1.1	Eth3/0/1
111.112.113.116/32	24/3	111.112.113.116	192.161.1.1	Eth3/0/1
192.161.1.0/24	3/NULL	111.112.113.116	192.161.1.2	Eth3/0/1
*192.161.1.0/24	Liberal/3		DS/111.112.113.116	
192.162.1.0/24	3/NULL	111.112.113.116	192.162.1.2	Eth3/0/2
*192.162.1.0/24	Liberal/3		DS/111.112.113.116	

TOTAL: 8 Normal LSP(s) Found.

TOTAL: 3 Liberal LSP(s) Found.

TOTAL: 0 Frr LSP(s) Found.

A '*' before an LSP means the LSP is not established

A '*' before a Label means the USCB or DSCB is stale

A '*' before a UpstreamPeer means the session is in GR state

A '*' before a DS means the session is in GR state

A '*' before a NextHop means the LSP is FRR LSP

RSVP Checking

<PE2-D2-JT2-TRANSIT> display mpls rsvp-te

LSR ID: 1.1.1.1

Resv Confirmation Request: DISABLE

RSVP Hello Extension: DISABLE

Hello interval: 3 sec Max Hello misses: 4

Path and Resv message refresh interval: 30 sec

Path and Resv message refresh retries count: 3

Blockade Multiplier: 4

Graceful-Restart Capability: None

<PE2-D2-JT2-TRANSIT> display mpls rsvp-te established

Interface GigabitEthernet1/0/0

Token Bucket Rate: 0 Peak Data Rate: 0

Tunnel Addr: 3.3.3.3 Ingress LSR ID: 1.1.1.1

Local LSP ID: 0 Session Tunnel ID: 100

Next Hop Addr: 10.1.1.2

Upstream Label: NULL Downstream Label: 3

Interface: Outgoing-Interface at the Egress

Token Bucket Rate: 0 Peak Data Rate: 0.00

Tunnel Addr: 3.3.3.3 Ingress LSR ID: 1.1.1.1

Local LSP ID: 1 Session Tunnel ID: 101

Next Hop Addr: ----

Upstream Label: NULL Downstream Label: NULL

<PE2-D2-JT2-TRANSIT> display mpls rsvp-te peer

Interface GigabitEthernet3/0/1

Neighbor Addr: 172.16.12.2

SrcInstance: 0x42C8BBCD NbrSrcInstance: 0x0

```

PSB Count: 0          RSB Count: 1
Hello Type Sent: NONE Neighbor Hello Extension: DISABLE
SRefresh Enable: NO
Authentication: ENABLE
WindowsSize: 32
Last Valid Seq # rcvd: 1626603521 3451

```

```

Remote Node id Neighbor
Neighbor Addr: 2.2.2.2
SrcInstance: 0x42C8BBCD NbrSrcInstance: 0x0
PSB Count: 0          RSB Count: 0
Hello Type Sent: NONE Neighbor Hello Extension: DISABLE
SRefresh Enable: NO
Authentication: DISABLE
Last Valid Seq # rcvd: NULL

```

3.10. BGP

Checking Routing Received from peer

<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all peer

```

BGP local router ID : 2.3.4.5
Local AS number : 100
Total number of peers : 1          Peers in established state : 1

```

Peer	V	AS	MsgRcvd	MsgSent	OutQ	Up/Down	State	PrefRcv
111.112.113.116	4	100	20137	20130	0	0121h32m	Established	0

<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all routing-table peer 111.112.113.115 received-routes

```

BGP Local router ID is 1.2.3.4
Status codes: * - valid, > - best, d - damped,
              h - history, i - internal, s - suppressed, S - Stale
Origin : i - IGP, e - EGP, ? - incomplete

```

```

Total Number of Routes: 1
Route Distinguisher: 100:1

```

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
*>i 2.2.2.2/32	111.112.113.115	0	100	0	?

Checking Routing Advertised from peer

<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all peer

```

BGP local router ID : 2.3.4.5
Local AS number : 100
Total number of peers : 1          Peers in established state : 1

```

Peer	V	AS	MsgRcvd	MsgSent	OutQ	Up/Down	State	PrefRcv
111.112.113.116	4	100	20137	20130	0	0121h32m	Established	0

<PE2-D2-JT2-TRANSIT>display bgp vpnv4 all routing-table peer 111.112.113.116 advertised-routes

BGP Local router ID is 2.3.4.5

*Status codes: * - valid, > - best, d - damped,
h - history, i - internal, s - suppressed, S - Stale
Origin : i - IGP, e - EGP, ? - incomplete*

Total Number of Routes: 1

Route Distinguisher: 100:1

<i>Network</i>	<i>NextHop</i>	<i>MED</i>	<i>LocPrf</i>	<i>PrefVal</i>	<i>Path/Ogn</i>
*> 2.2.2.2/32	0.0.0.0	0	0	?	

Import direct protocol routing inside VRF(IPv4 & IPv6)

```
#
ip ip-prefix direct-Global permit 118.98.88.1 30
ip ip-prefix direct-Domestic permit 118.98.88.11 30
ip ip-prefix direct-Mix permit 118.98.88.21 30
#
ip ipv6-prefix direct-Global-v6 permit 2001::1 126
ip ipv6-prefix direct-Domestic-v6 permit 2001::11 126
ip ipv6-prefix direct-Mix-v6 permit 2001::21 126
#
route-policy import-Global-direct permit node 10
  description ** ipv4 Global direct routing **
  if-match ip-prefix direct-Global
route-policy import-Global-direct deny node 60000
#
route-policy import-Domestic-direct permit node 10
  description ** ipv4 Domestic direct routing **
  if-match ip-prefix direct-Domestic
route-policy import-Domestic-direct deny node 60000
#
route-policy import-Mix-direct permit node 10
  description ** ipv4 Mix direct routing **
  if-match ip-prefix direct-Mix
route-policy import-Mix-direct deny node 60000
#
route-policy import-Global-direct-v6 permit node 10
  description ** ipv6 Global direct routing **
  if-match ip-prefix direct-Global-v6
route-policy import-Global-direct-v6 deny node 60000
#
route-policy import-Domestic-direct-v6 permit node 10
  description ** ipv6 Domestic direct routing **
  if-match ip-prefix direct-Domestic-v6
route-policy import-Domestic-direct-v6 deny node 60000
#
route-policy import-Mix-direct-v6 permit node 10
```

```

description ** ipv6 Mix direct routing **
if-match ip-prefix direct-Mix-v6
route-policy import-Mix-direct-v6 deny node 60000
#
bgp 7713
ipv4-family vpn-instance Transit_Domestik
import-route direct route-policy import-Global-direct
ipv4-family vpn-instance Transit_Global
import-route direct route-policy import-Domestic-direct
ipv4-family vpn-instance Transit_Mix
import-route direct route-policy import-Mix-direct
ipv6-family vpn-instance Transit_Domestik
import-route direct route-policy import-Global-direct-v6
ipv6-family vpn-instance Transit_Global
import-route direct route-policy import-Domestic-direct-v6
ipv6-family vpn-instance Transit_Mix
import-route direct route-policy import-Mix-direct-v6
#

```

3.11. MPLS TE Tunnel

TE tunnel configuration(use Affinity):

Step 1: Enable TE function in global

```

#
mpls lsr-id 118.98.9.106
#
mpls
mpls te
mpls rsvp-te
mpls te cspf
#

```

Step 2: Enable TE function in IGP

```

#
ospf 1 router-id 118.98.9.106
opaque-capability enable
area 0.0.0.0
mpls-te enable
#

```

Step 3: Enable TE function in Interface

```

#
interface Eth-Trunk1
mpls
mpls te
mpls rsvp-te

```

#

Step 4: Configure affinity-mapping

```
#
path-constraint affinity-mapping
attribute TRANSIT:01 bit-sequence 8
attribute TRANSIT:02 bit-sequence 9
attribute S-CORE:NONBROADBAND bit-sequence 5
attribute S-CORE:BROADBAND bit-sequence 6
attribute S-CORE:EXP bit-sequence 7
attribute SS bit-sequence 2
#
```

Step 5: Configure administrative group in interface

```
#
interface Eth-Trunk1
 mpls te link administrative group name TRANSIT:01
#
interface Eth-Trunk2
 mpls te link administrative group name TRANSIT:01
#
```

Step 6: Configure TE Tunnel

```
#
interface Tunnel1/2/12201
description **TO GW-BDS-TRANSIT**
ip address unnumbered interface LoopBack0
tunnel-protocol mpls te
destination 118.98.9.113
mpls te record-route
mpls te backup hot-standby
mpls te backup hot-standby overlap-path
mpls te affinity primary include-any TRANSIT:01 S-CORE:NONBROADBAND
mpls te affinity primary exclude SS
mpls te affinity secondary include-any TRANSIT:01 S-CORE:BROADBAND
mpls te affinity secondary exclude SS
mpls te tunnel-id 12201
#
```

Step 7: Use the tunnel in vpn-instance

```
#
tunnel-policy Tunnel-Selector
 tunnel select-seq cr-lsp lsp load-balance-number 1
#
ip vpn-instance Transit_Domestik
 ipv4-family
 route-distinguisher 17974:13182
 tnl-policy Tunnel-Selector
 vpn-target 17974:12762 export-extcommunity
 vpn-target 17974:12763 export-extcommunity
```



```

vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
ipv6-family
route-distinguisher 17974:13182
tnl-policy Tunnel-Selector
vpn-target 17974:12762 export-extcommunity
vpn-target 17974:12763 export-extcommunity
vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
#
ip vpn-instance Transit_Global
ipv4-family
route-distinguisher 17974:15007
tnl-policy Tunnel-Selector
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16256 import-extcommunity
vpn-target 17974:16257 import-extcommunity
ipv6-family
route-distinguisher 17974:15007
tnl-policy Tunnel-Selector
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16256 import-extcommunity
vpn-target 17974:16257 import-extcommunity
#
ip vpn-instance Transit_Mix
ipv4-family
route-distinguisher 17974:15009
tnl-policy Tunnel-Selector
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16257 export-extcommunity
vpn-target 17974:12762 export-extcommunity
vpn-target 17974:12763 export-extcommunity
vpn-target 17974:16256 import-extcommunity
vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
ipv6-family
route-distinguisher 17974:15009
tnl-policy Tunnel-Selector
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16257 export-extcommunity
vpn-target 17974:12762 export-extcommunity
vpn-target 17974:12763 export-extcommunity
vpn-target 17974:16256 import-extcommunity
vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
#

```

Step 8: Verify the configuration

```
<PE2-D2-JT2-TRANSIT> display mpls te cspf destination 2.2.2.9
```

Path for the given constraints is:

192.168.23.2 Include

192.168.23.3 Include

192.168.36.3 Include

192.168.36.6 Include

The total metrics of the calculated path is : 11

<PE2-D2-JT2-TRANSIT> display mpls te tunnel-interface

Tunnel Name : Tunnel1

 Signalled Tunnel Name: -

 Tunnel State Desc : CR-LSP is Up

 Tunnel Attributes :

 Active LSP : Primary LSP

 Traffic Switch : -

 Session ID : 1

 Ingress LSR ID : 1.1.1.9 Egress LSR ID: 4.4.4.9

 Admin State : UP Oper State : UP

 Signaling Protocol : RSVP

 FTid : 1

 Tie-Breaking Policy : None Metric Type : None

 Bfd Cap : None

 Reopt : Disabled Reopt Freq : -

 Auto BW : Disabled Threshold : 0 percent

 Current Collected BW: 0 kbps Auto BW Freq : 0

 Min BW : 0 kbps Max BW : 0 kbps

 Tunnel Group : -

 Interfaces Protected: -

 Excluded IP Address : -

 Referred LSP Count : 0

 Primary Tunnel : - Pri Tunn Sum : -

 Backup Tunnel : -

 Group Status : - Oam Status : -

 IPTN InLabel : -

 BackUp LSP Type : None BestEffort : Disabled

 Secondary HopLimit : -

 BestEffort HopLimit : -

 Secondary Explicit Path Name: -

 Secondary Affinity Prop/Mask: 0x0/0x0

 BestEffort Affinity Prop/Mask: 0x0/0x0

 IsConfigLspConstraint: -

 Hot-Standby Revertive Mode: Revertive

 Hot-Standby Overlap-path: Disabled

 Hot-Standby Switch State: CLEAR

 Bit Error Detection: Disabled

 Bit Error Detection Switch Threshold: -

 Bit Error Detection Resume Threshold: -

 Primary LSP ID : 1.1.1.9:19

 LSP State : UP LSP Type : Primary

 Setup Priority : 7 Hold Priority: 7

 IncludeAll : 0x0

 IncludeAny : 0x0

 ExcludeAny : 0x0

 Affinity Prop/Mask : 0x0/0x0 Resv Style : SE

 Configured Bandwidth Information:

 CT0 Bandwidth(Kbit/sec): 20000 CT1 Bandwidth(Kbit/sec): 0

 CT2 Bandwidth(Kbit/sec): 0 CT3 Bandwidth(Kbit/sec): 0

 CT4 Bandwidth(Kbit/sec): 0 CT5 Bandwidth(Kbit/sec): 0

 CT6 Bandwidth(Kbit/sec): 0 CT7 Bandwidth(Kbit/sec): 0

 Actual Bandwidth Information:

<i>CT0 Bandwidth(Kbit/sec): 20000</i>	<i>CT1 Bandwidth(Kbit/sec): 0</i>
<i>CT2 Bandwidth(Kbit/sec): 0</i>	<i>CT3 Bandwidth(Kbit/sec): 0</i>
<i>CT4 Bandwidth(Kbit/sec): 0</i>	<i>CT5 Bandwidth(Kbit/sec): 0</i>
<i>CT6 Bandwidth(Kbit/sec): 0</i>	<i>CT7 Bandwidth(Kbit/sec): 0</i>
<i>Explicit Path Name : -</i>	<i>Hop Limit: -</i>
<i>Record Route : Disabled</i>	<i>Record Label : Disabled</i>
<i>Route Pinning : Disabled</i>	
<i>FRR Flag : Disabled</i>	
<i>IdleTime Remain : -</i>	
<i>BFD Status : -</i>	
<i>Soft Preemption : Enabled</i>	

TE tunnel configuration(use strict path):

Step 1: Enable TE function in global

```
#
mpls lsr-id 118.98.9.106
#
mpls
mpls te
mpls rsvp-te
mpls te cspf
#
```

Step 2: Enable TE function in IGP

```
#
ospf 1 router-id 118.98.9.106
opaque-capability enable
area 0.0.0.0
mpls-te enable
#
```

Step 3: Enable TE function in Interface

```
#
interface Eth-Trunk1
mpls
mpls te
mpls rsvp-te
#
```

Step 4: Configure master explicit-path (strict)

```
#
explicit-path main-path
next hop 10.4.1.2 include strict
next hop 10.2.1.2 include strict
next hop 3.3.3.3 include strict
#
```

Step 5: Configure backup explicit-path (loose)

```
#
explicit-path backup-path
```

```

next hop 10.5.1.2 include loose
next hop 10.6.1.2 include loose
next hop 3.3.3.3 include loose
#

```

Step 6: Configure TE Tunnel

```

#
interface Tunnel1/0/111112
description ** To-IGW-BDS **
ip address unnumbered interface LoopBack0
tunnel-protocol mpls te
destination 10.40.0.16
mpls te tunnel-id 307
mpls te record-route label
mpls te path explicit-path main-path
mpls te path explicit-path backup-path secondary
mpls te backup hot-standby
mpls te backup ordinary best-effort
mpls te reserved-for-binding
mpls te commit
statistic enable
#

```

Step 7: Use the tunnel in vpn-instance

```

#
tunnel-policy Tunnel-Selector
tunnel select-seq cr-lsp lsp load-balance-number 1
#
ip vpn-instance Transit_Domestik
ipv4-family
route-distinguisher 17974:13182
tnl-policy Tunnel-Selector
vpn-target 17974:12762 export-extcommunity
vpn-target 17974:12763 export-extcommunity
vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
ipv6-family
route-distinguisher 17974:13182
tnl-policy Tunnel-Selector
vpn-target 17974:12762 export-extcommunity
vpn-target 17974:12763 export-extcommunity
vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
#
ip vpn-instance Transit_Global
ipv4-family
route-distinguisher 17974:15007
tnl-policy Tunnel-Selector
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16256 import-extcommunity

```

```

vpn-target 17974:16257 import-extcommunity
ipv6-family
route-distinguisher 17974:15007
tnl-policy Tunnel-Selector
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16256 import-extcommunity
vpn-target 17974:16257 import-extcommunity
#
ip vpn-instance Transit_Mix
ipv4-family
route-distinguisher 17974:15009
tnl-policy Tunnel-Selector
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16257 export-extcommunity
vpn-target 17974:12762 export-extcommunity
vpn-target 17974:12763 export-extcommunity
vpn-target 17974:16256 import-extcommunity
vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
ipv6-family
route-distinguisher 17974:15009
tnl-policy Tunnel-Selector
vpn-target 17974:16256 export-extcommunity
vpn-target 17974:16257 export-extcommunity
vpn-target 17974:12762 export-extcommunity
vpn-target 17974:12763 export-extcommunity
vpn-target 17974:16256 import-extcommunity
vpn-target 17974:12762 import-extcommunity
vpn-target 17974:12763 import-extcommunity
#

```

Step 8: Verify the configuration

<PE2-D2-JT2-TRANSIT> display mpls te cspf destination 2.2.2.9

Path for the given constraints is:

192.168.23.2 Include

192.168.23.3 Include

192.168.36.3 Include

192.168.36.6 Include

The total metrics of the calculated path is : 11

<PE2-D2-JT2-TRANSIT> display mpls te tunnel-interface

Tunnel Name : Tunnell

Signalled Tunnel Name: -

Tunnel State Desc : CR-LSP is Up

Tunnel Attributes :

Active LSP : Primary LSP

Traffic Switch : -

Session ID : 1

Ingress LSR ID : 1.1.1.9 Egress LSR ID: 4.4.4.9

Admin State : UP Oper State : UP

Signaling Protocol : RSVP

FTid : 1

Tie-Breaking Policy : None Metric Type : None

Bfd Cap : None

```

Reopt      : Disabled      Reopt Freq : -
Auto BW    : Disabled      Threshold  : 0 percent
Current Collected BW: 0 kbps      Auto BW Freq : 0
Min BW     : 0 kbps        Max BW      : 0 kbps
Tunnel Group : -
Interfaces Protected: -
Excluded IP Address : -
Referred LSP Count : 0
Primary Tunnel : -          Pri Tunn Sum : -
Backup Tunnel : -
Group Status  : -          Oam Status  : -
IPTN InLabel  : -
BackUp LSP Type : None      BestEffort : Disabled
Secondary HopLimit : -
BestEffort HopLimit : -
Secondary Explicit Path Name: -
Secondary Affinity Prop/Mask: 0x0/0x0
BestEffort Affinity Prop/Mask: 0x0/0x0
IsConfigLspConstraint: -
Hot-Standby Revertive Mode: Revertive
Hot-Standby Overlap-path: Disabled
Hot-Standby Switch State: CLEAR
Bit Error Detection: Disabled
Bit Error Detection Switch Threshold: -
Bit Error Detection Resume Threshold: -

Primary LSP ID : 1.1.1.9:19
LSP State      : UP          LSP Type   : Primary
Setup Priority  : 7           Hold Priority: 7
IncludeAll     : 0x0
IncludeAny     : 0x0
ExcludeAny     : 0x0
Affinity Prop/Mask : 0x0/0x0  Resv Style  : SE
Configured Bandwidth Information:
CT0 Bandwidth(Kbit/sec): 20000      CT1 Bandwidth(Kbit/sec): 0
CT2 Bandwidth(Kbit/sec): 0          CT3 Bandwidth(Kbit/sec): 0
CT4 Bandwidth(Kbit/sec): 0          CT5 Bandwidth(Kbit/sec): 0
CT6 Bandwidth(Kbit/sec): 0          CT7 Bandwidth(Kbit/sec): 0
Actual Bandwidth Information:
CT0 Bandwidth(Kbit/sec): 20000      CT1 Bandwidth(Kbit/sec): 0
CT2 Bandwidth(Kbit/sec): 0          CT3 Bandwidth(Kbit/sec): 0
CT4 Bandwidth(Kbit/sec): 0          CT5 Bandwidth(Kbit/sec): 0
CT6 Bandwidth(Kbit/sec): 0          CT7 Bandwidth(Kbit/sec): 0
Explicit Path Name : -              Hop Limit: -
Record Route       : Disabled      Record Label : Disabled
Route Pinning      : Disabled
FRR Flag           : Disabled
IdleTime Remain    : -
BFD Status         : -
Soft Preemption    : Enabled

```