



Ontario's Gateway to Research and Discovery

ORION BGP communities

Ontario Research and Innovation Optical Network

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1. INTRODUCTION

The purpose of this document is to discuss and provide overview of ORION BGP communities. This document will also present a case study that shows how to use BGP communities with ORION network.

2. BGP communities

BGP communities are used to simplify routing policies by identifying routes based on a logical property rather than an IP prefix or an AS number.

A BGP speaker can use this attribute in conjunction with other attributes to control which routes to accept, prefer, and pass on to other BGP neighbors.

BGP communities can be defined in three different formats: decimal, hexadecimal, and AA:NN. By default, Cisco IOS uses the decimal format. To configure and display in AA:NN, use the following global command:

`ip bgp-community new-format`

2.1 ORION BGP community

Communities are applied to all routes within the ORION network and are used for identifying Member type, route filtering and route type. Route maps are used to set the BGP community attributes.

2.2 Inbound BGP communities

BGP peers can send the communities listed in Table 2-1. This will advise ORION to set Local preference, route advertisement and create black hole routes.

BGP community	Local Preference	Description
26677:120	120	Default (Primary path)
26677:110	110	Backup (secondary path)
26677:4	120	Don't advertise to Private peer
26677:4 26677:120	120	Don't advertise to Private peer
26677:4 26677:110	110	Don't advertise to Private peer
26677:30	30	Fall Back
26677:999	20	Black hole route

Table 2-1: BGP community values receive by BGP peers

BGP peers can use the above mentioned community values to control their inbound traffic. If ORION does not receive any community attributes from Members then

the Local Preference value of 120 will be used by default and the routes will get advertised to all peering members (RNE and Private/Public peers)

Community value 26677:4 is reserved to control route advertisement to Private/Public peering members. This community could be used in conjunction with 26677:120 or 26677:110 (to set the local preference value inside the ORION backbone also). So if a prefix is attached with the community value 26677:4 then the route will not get advertised to Private/Public peering members, but will be propagated to all ORION Members and CA*NET4 (RNE network)

In the same way, BGP community 26677:999 is used to create black hole route for Members inside the ORION backbone. Members can send their prefixes with this community to the ORION AS and ORION will create a NULL0 route for that prefix. Members can utilize this feature in case of DOS or other attacks to protect their network.

2.3 Outbound BGP communities

ORION advertises prefixes to its BGP peering Members with pre-defined community values. Members can use the community values listed in Table 2-2 to control their outbound traffic.

BGP community	Description
26677:90	Transit routes
26677:80	Private/Public Peering routes
26677:30	CANARIE routes
26677:20	ORION aggregate blocks
26677:10	ORION Members routes

Table 2-2: BGP community values advertising to Members.

3. Case study: Route exchanged with Private/Public peers

- ORION advertises all Private/Public peering routes to Members along with RNE routes.
- By default, Member routes are advertised to all Private/Public peers.

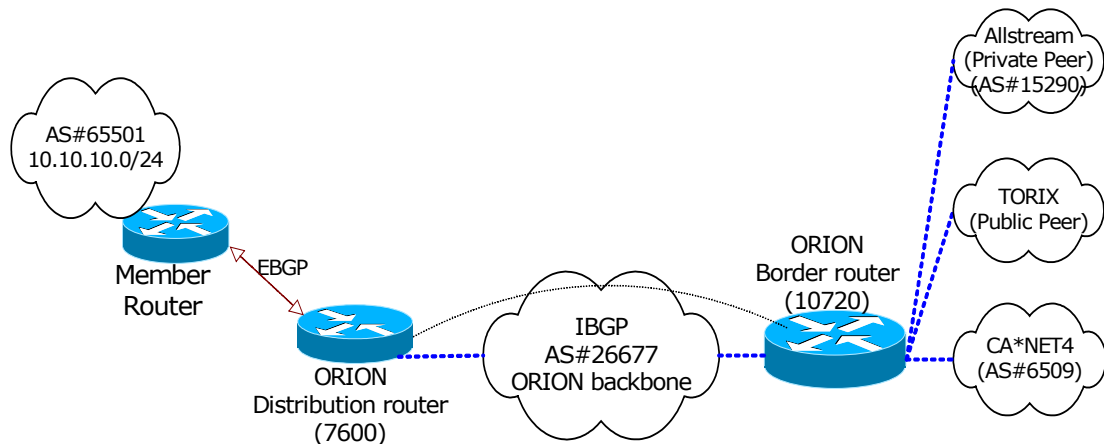


Figure 3-1: Example of a Member connectivity with the ORION backbone

As mentioned above Members can use BGP communities to control their inbound and outbound traffic. There are several scenarios to use BGP communities with ORION network. As an example, this case study will show a Member configuration for who **DOES NOT want to exchange routes with Private/Public peers.**

The following few sections illustrate one of the possible configuration on the Member's Border router to achieve the above results:

3.1 Router BGP configuration

```
router bgp 65501
 neighbor <neighbor-ip> remote-as 26677
 neighbor <neighbor-ip> description ORION RNE BGP session
 neighbor <neighbor-ip> send-community
 neighbor <neighbor-ip> route-map NOT-RECEIEVE-PRP-PUB-PEER in
 neighbor <neighbor-ip> route-map NOT-ADVERTISE-TO-PRP-PUB-PEER out
!
```

3.2 Inbound route map to deny Private/Public peering routes

```
ip bgp-community new-format
!
! Private/Public Peering routes are tagged with 26677:80
ip community-list 10 permit 26677:80
!
! Deny Private/Public peering routes
route-map NOT-RECEIEVE-PRP-PUB-PEER deny 10
 match community 10
!
! Accept all other routes
route-map NOT-RECEIEVE-PRP-PUB-PEER permit 20
!
```

3.3 Outbound route map to advertise Prefix with BGP community 26677:4

As mentioned in the above section, if Members advertise prefixes to ORION with the community value 26677:4 then the route will NOT be propagated to Private/Public peers.

```
route-map NOT-ADVERTISE-TO-PRP-PUB-PEER permit 10
  match ip address prefix-list ORION-PREFIX
  set community 26677:4
!
ip prefix-list ORION-PREFIX permit 10.10.10.0/24
```

NOTE

Mostly Private and Public peering members accept only /24 or smaller prefixes, in that case ORION will not be able to advertise /25 or larger prefixes to those peers.