Using BGP Communities

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BGP Communities

- RFC 1997
  - To facilitate and simplify the control of routing information this document suggests a grouping of destinations so that the routing decision can also be based on the identity of a group.
  - A community is a group of destinations which share some common property.

Other RFCs

- RFC 4360
  - BGP Extended Communities Attribute
- RFC 4384
  - BGP Communities for Data Collection
- Few others describing usage
  - Extension for 4byte ASN soon

Communities

- 32 bit field

- New format is two 16 bit fields separated by a colon

  - <asn>: < string>

  - 45170:64001; 42:1 etc

Nepal Research and Education Network

- Nepal Research and Education Network (NREN) has been established as a facilitator to support for advanced research and education network through the means of Information and Communication Technology.

- Extending national networking and connecting soon to Internet2/GEANT.

- Facilitation of different research activities

NREN Customers

- Members with 'commodity' Transit

- Members without 'commodity' Transit

- Members with and without NPIX

- Special RFC1918 networks

- Internal Routes/networks

NREN Upstreams/ Peers

- International R&E Network (TEIN/APAN/ GEANT)

- Bilateral R&E Networks (ERNET, CERNET)

- Local IXP Connection

- Internet Transit Providers (two)

1st Design

- Based on Route types tagging centrally
  - Tag routes and then setup as per peer
  - Didn't scale so well

Second Design

Session and Route Type	Peer Group	Inbound Actions		Outbound Actions		
		Community Tag	Route-map	Community match		Route-map
				List	String	
Internal Networks						
NREN Prefixes / iBGP sessions	iBGP-PEER	45170:10000	NREN-ROUTES	100	45170:…..	None
Subscriber Networks						
Members with Transit	TRANSIT-MEMBERS	45170:10000 45170:20xxx	MEMBER-TRANSIT-ROUTES-IN	101	45170:.0…	MEMBER-TRANSIT-ROUTES-OUT
Members without Transit	NOTRANSIT-MEMBERS	45170:20000	MEMBER-NON-TRANSIT-ROUTES-IN	102	45170:.00.. 45170:20…	MEMBER-NON-TRANSIT-ROUTES-OUT
NWP / SPECIAL-RFC1918	SPECIAL1918-PEERS	45170:11000	RFC1918-SPECIAL-ROUTES-IN	110	45170:..000	RFC1918-SPECIAL-ROUTES-OUT
Upstream Networks						
R&E Networks/ TEIN etc	EDU-PEERS	45170:10001	EDU-ROUTES-IN	104	45170:.000.	EDU-ROUTES-OUT
NPIX	NPIX-PEERS	45170:10010	NPIX-ROUTES-IN	105	45170:.0000	NPIX-ROUTES-OUT
Transit	TRANSIT	45170:10100	TRANSIT-IN	106	45170:10000	NREN-ROUTES
Default	TRANSIT	45170:10111	TRANSIT-IN	107	45170:10111	none

```
ip bgp-community new-format
ip community-list 100 permit _45170:....._
ip community-list 101 permit _45170:.0..._
ip community-list 102 permit _45170:.00.._
ip community-list 102 permit _45170:20..._
ip community-list 104 permit _45170:.000._
ip community-list 105 permit _45170:.0000_
ip community-list 106 permit _45170:10000_
ip community-list 107 permit _45170:10111_
ip community-list 110 permit _45170:..000_
```

Benefits

- Much easier to mange new members

- Standardized configuration on all core/edge and customer end routers

- Routes tagged on the ingress as well as centrally

- Can recognize routes based on tags

- Can co-relate v4 and v6 routes easily.

Plan

- Outbound communities for tagged routes accepted by the upstreams

  - DDoS mitigation and routing policy implementation

  - Signal routing policy changes and adapt to outages.

Lessons

- Plan carefully..

- Regular expression match makes things simply but also complex to design

- Keep good documentation

  - Deploy same setting on all router (use template)

Questions

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