

Pipe Networks Pty Limited

AS24130

BGP Routing Policy

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Brisbane

Level 17
127 Creek Street
Brisbane QLD
4000

Sydney

Level 14
201 Kent Street
Sydney NSW
2000

Melbourne

Q2 Level 9
2 Queen Street
Melbourne VIC
3000

Adelaide

Level 2
132 Franklin Street
Adelaide SA
5000

Hobart

Level 2
29 Elizabeth Street
Hobart TAS
7000

PIPE Networks Pty Limited

ABN 21 099 104 122
Phone +61 7 3233 9800
Fax +61 7 3233 9880
Web www.pipenetworks.com

Table of Contents

1	Summary	3
2	PIPE Internet Exchanges	3
3	Looking Glass	3
4	IPv6 and 4-byte ASN.....	3
5	Customer Routing Advertisements	4
5.1	Import Policy	4
5.2	Multi-homing	4
5.3	Export Policy.....	4
6	Informational Communities	5
7	Traffic Engineering Communities	5
7.1	Well-Known Communities	5
7.2	Default Local Preference.....	5
7.3	Local Preference BGP Communities	6
7.4	Remote Triggered Black-Hole (RTBH).....	6
7.5	Advertisements to Peers and Transit Providers.....	7
8	Contact	7
9	Additional Information	7

1 Summary

This document outlines the BGP routing policy of Pipe Networks, AS24130. It is intended primarily for BGP routed customers, and to a lesser extent third party network operators who wish to understand routing decision within the network.

Pipe Networks will set 'informational communities' to provide additional detail to customers and peers regarding any route advertised by our network. Additionally, 'traffic engineering communities' may be set by customers to influence routing policy within our network. Pipe Networks also offers a remote triggered black-hole service that can be implemented using BGP communities.

2 PIPE Internet Exchanges

In addition to IP transit, Pipe Networks also operates a number of Internet Exchange Points around Australia. Although the IP transit network - AS24130 - peers at most of these exchange points, this document does not relate to PIPE Internet Exchanges in any way.

3 Looking Glass

Pipe Networks operates a public looking glass for customers and third party network operators to investigate routing policy and potential faults. The looking glass can be accessed on the web at:

<http://lg.pipenetworks.com/>

Note: The looking glass supports multiple autonomous systems. This information in this document is applicable only to AS24130.

4 IPv6 and 4-byte ASN

Our service is IPv6 compatible. Dual-stack or "native" IPv6 is provisioned as standard on all services. Pipe also operates a 6to4 gateway for use by our customers, though we recommend dual-stack over 6to4 where possible.

Unless mentioned otherwise, all of the information discussed in this document applies to both IPv4 and IPv6.

Pipe Networks makes no distinction between 2-byte and 4-byte autonomous system numbers. Both are supported. Our systems use the AS-PLAIN format to represent 4-byte autonomous system numbers.

5 Customer Routing Advertisements

5.1 Import Policy

- Customers must register routes and AS paths they intend to advertise to Pipe by email to support@pipenetworks.com.
- Pipe Networks will accept registered prefixes and included prefixes not longer than;
 - IPv4: /24 (equivalent to "le 24").
 - IPv6: /48, up to a maximum of 100 prefixes per customer.
- Pipe will apply a maximum prefix limit to BGP sessions to protect against large routing leaks and excessive de-aggregation.
- Customers may use multi-exit discriminator (MED) to indicate preference where multiple paths exist.
- A number of BGP communities are available to customers to influence how routes are distributed within our network and how they are exported to other autonomous systems (*section 6*).

5.2 Multi-homing

Customers that are to be multi-homed to other networks must provide a public ASN that has been assigned by a Regional Internet Registry. Customers that are multi-homed only to Pipe Networks may request to be assigned a private ASN.

Private AS numbers will be stripped from BGP advertisements to other autonomous systems.

BGP MED is the preferred mechanism for multi-homed customers and peers to indicate routing preference, however other mechanisms are supported:

- More specific prefixes will be accepted, provided they meet the rules above.
- Modification of local preference using BGP communities.
- AS path prepending.

5.3 Export Policy

Customers may chose one of the following four sets of routes to receive from PIPE Networks.

Name	Routes Advertised
DEFAULT	A locally originated default route.
CUSTOMERS	Routes from PIPE Networks customers.
CUSTOMERS-PEERING	Routes from PIPE Networks customers and peers.
FULL-TABLE	A full Internet routing table, including customers and peers.

- BGP communities are advertised to all neighbors. Certain internal use communities will be stripped from outbound advertisements.
- Internal BGP MED values are not exported to customers unless requested.

6 Informational Communities

The following communities are set by PIPE Networks and exported to customers for informational purposes. Unlisted communities may be used and exported for internal uses.

Community	Learned from Location
24130:2201	Sydney, Australia
24130:2301	Melbourne, Australia
24130:2401	Brisbane, Australia
24130:2501	Adelaide, Australia
24130:2601	Perth, Australia
24130:3101	Auckland, New Zealand
24130:4101	Hong Kong
24130:5101	Tokyo, Japan
24130:9101	San Jose, USA
24130:9102	Los Angeles, USA

Community	Learned from Type
24130:1000	Internal Prefix (not exported)
24130:1001	Originated
24130:1002	Customer
24130:1003	Transit
24130:1004	Peer

7 Traffic Engineering Communities

PIPE Networks will accept BGP communities from customers for the purpose of influencing routing policy within our network. Traffic engineering communities are not accepted from peers or transit providers.

To make use of these communities, please ensure that community propagation is enabled. The Cisco IOS command is:

```
router bgp 65123
 neighbor 192.0.2.99 send-community
```

7.1 Well-Known Communities

PIPE Networks will accept and honour the following well-known communities:

```
NO_EXPORT
NO_ADVERTISE
```

7.2 Default Local Preference

These are the local preference values applied as standard to all prefixes.

Type	Default Local Preference
Internal & Originated Routes	200
Customer Route	200
Peer Route	150-170
Transit Route	110-130

7.3 Local Preference BGP Communities

These communities may be used to set local preference within the Pipe network. A local preference of 100 will cause PIPE Networks to prefer all other routes. This may be useful for customers who wish to receive traffic through other providers and use PIPE Networks as a backup route only.

Community	Result
24130:180	Set Local Preference to 180
24130:140	Set Local Preference to 140
24130:100	Set Local Preference to 100

7.4 Remote Triggered Black-Hole (RTBH)

Black-hole routing is useful in situations where a large volume of traffic is directed at a single or small number of IP hosts or subnets. In a malicious situation, this is known as a denial-of-service attack. Often the goal of such an attack is to overwhelm the target host or upstream network links with useless packets.

Pipe Networks offers a remote triggered black-hole service to customers to aid in denial-of-service attack mitigation. Packets destined for black-holed routes will be dropped upon ingress to our network. Black-hole routes will not be exported to other autonomous systems.

This functionality must be requested at the time of provisioning or anytime following provisioning by contacting support@pipenetworks.com. Once configured we will accept host routes (/32) from any prefix registered by the customer.

Community	Result
24130:666	Packets dropped at ingress to Pipe

Setup

Triggering a black-hole route

The following is a simple, common configuration to trigger black-hole routing for the address 192.0.2.99.

```
route-map BLACKHOLE permit 10
  set community 24130:666

ip route 192.0.2.99/32 null0

router bgp 65123
  network 192.0.2.99 mask 255.255.255.255 route-map BLACKHOLE
```

Non-BGP customers can contact the Network Operations Centre to request a black-hole route manually.

7.5 Advertisements to Peers and Transit Providers

Customers may set communities to influence how their routes are propagated to peers and transit providers. The following communities cannot be used for altering announcements to other customers.

General communities.

Community	Result
24130:10	Do not export to peers or transit
24130:20	Do not export to transit
24130:30	Do not export to global transit
24130:40	Do not export to domestic transit

AS specific communities. These communities will be removed from advertisements to EBGP neighbours.

Community	Result
65000:xxxx	Do not export to ASxxxx
65001:xxxx	Prepend once to ASxxxx
65002:xxxx	Prepend twice to ASxxxx
65003:xxxx	Prepend three times to ASxxxx

8 Contact

If you have any questions or requests, please contact Pipe Networks. Our Network Operations Centre is available 24 hours, every day. Provisioning and engineering staff are available during business hours (UTC+10) or at any time in the event of an emergency.

Pipe Networks

Level 17, 127 Creek Street
Brisbane
QLD 4000
AUSTRALIA

Network Operations Centre (24x7)

Phone (Australia): 1800 201 100
Phone (International): +61 7 3233 9895
Fax: +61 7 3233 9885
Email: support@pipenetworks.com

9 Additional Information

Please see the following documents for further information.

RFC1997 - BGP Communities Attribute
RFC1998 - An Application of the BGP Community Attribute
RFC3056 - Connection of IPv6 Domains via IPv4 Clouds
RFC3882 - Configuring BGP to Block Denial-of-Service Attacks
RFC4893 - BGP Support for Four-octet AS Number Space
RFC5668 - 4-Octet AS Specific BGP Extended Community
<http://www.iana.org/assignments/bgp-well-known-communities/>