

ANGOLA CABLES GLOBAL IP NETWORK ROUTING POLICY AND BGP COMMUNITY REFERENCE

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BACKGROUND AND INTRODUCTION

Angola Cables is a multinational telecom company operating in the wholesale market, engaged in the exploration and marketing of international data circuit capacity and voice, in our subsea cables WACS, MONET, and SACS, as well as in other partnered networks around the globe. More details of our service offerings are available on our website (<https://www.angolacables.co.ao>).

This page provides an overview of Angola Cables Routing Policy, as well as general information about the BGP communities in use at Angola Cables global IP network.

ANGOLA CABLES GLOBAL IP NETWORK - GENERAL INFORMATION

- Angola Cables operates a unique global IP Network under **ASN #37468** and supports both IPv4 and IPv6.
- Angola Cables **does not accept any RFCs 1918/5735/6598 prefixes** or any other reserved address space (IPv4 or IPv6) advertisements. The same applies to reserved/private ASN space.
- Angola Cables reserves the right to disable a BGP peer that is adversely affecting other Angola Cables customers or Angola Cables network stability and/or performance, until the problem is contained. Angola Cables will support a reasonable effort to contact the customer/partner prior to turning down the peer; however, the integrity of the Angola Cables network remains the top priority.
- Angola Cables strongly encourage the utilization of MD5 authentication on the BGP sessions.
- Angola Cables makes no guarantees, explicit or implicit, about the routing policies of other providers and the routes that they accept into their routing tables.

ANGOLA CABLES PEERING POLICY - REQUIREMENTS

- Angola Cables current peering policy is **Selective**.
- Angola Cables **suggests** a minimum of 3 out of 5 locations abroad to peer, in order to have redundancy.
- Angola Cables expects to see a reasonable interest traffic ratio for peering request evaluation. Any evidences of this ratio are welcome by peer Peering Team.
- All peering sessions with Angola Cables **MUST** be done in IPv4 and IPv6.
- Angola Cables keeps an updated PeeringDB record (<https://as37468.peeringdb.com>) containing POP locations and private facilities where can provide IP services.
- The candidate peer **MUST** have an updated PeeringDB record, as well as have a 24x7 NOC reachable to be eligible to peer with Angola Cables.
- Peering requests **MUST** use [peering\[at\]angolacables\[dot\]co\[dot\]ao](mailto:peering[at]angolacables[dot]co[dot]ao) email address. We kindly ask you to consider reviewing the interconnection and technical requirements prior applying for peering.

ANGOLA CABLES IP TRANSIT SERVICE - CUSTOMER ROUTING POLICY SPECIFICS

- Angola Cables filters BGP advertisements from customers based on network address space, and every customer IPv4/IPv6 prefix **MUST** be registered in an IRR available on the Internet.
- New customer IPv4/IPv6 prefixes **MUST** be inserted into a specific customer prefix-list. To request the insertion, customers can choose one of the following options:
 - i. Request by ticket/email to our NOC ([noc\[at\]angolacables\[dot\]co\[dot\]ao](mailto:noc[at]angolacables[dot]co[dot]ao)) providing the information of new IPv4/IPv6 prefix, the origin ASN and the IRR route/route6 object record.
 - ii. Provide customer's **AS-SET** registered in any IRR.
- In the case where customer prefix is not present in any IRR, Angola Cables reserves to the right of

proxy register the route/route6 object prior adding the prefix to the customer's allowed filter list. However, customer may ask Angola Cables to remove the proxy-registered record if he/she wants to keep the **route/route6** registry under his own responsibility.

- Angola Cables uses **AFRINIC** AND **RADB** IRR to manage both Angola Cables and customers IPv4/IPv6 prefixes. The following objects are used:
 - i. **MNT-BY**: ANGOLA-CABLE-MNT (AFRINIC) and MNT-AS37468 (RADB)
 - ii. **AS-SET**: AS-ANGOLACABLES, AS-ANGOLACABLES-EU, AS-ANGOLACABLES-BR
- Announcements are allowed on the following basis:
 - i. Customer IPv4/IPv6 prefix assigned by Angola Cables;
 - ii. AFRINIC/RIPE/LACNIC/Registro.br or other RIR assigns the IP prefix to the customer; or
 - iii. IPv4/IPv6 assigned by other carrier/ISP. In this case, Angola Cables will verify the announcements by one of the following:
 - The information is in RWHOIS or other RIR database.
 - The IP prefix already being announced globally from the customer.
- Every new IPv4/v6 prefix usually takes up to 48 hours to be completely functional on the Internet;
- At any moment, IP Transit customers **MAY** decide receive one of the following set of routes:
 - i. **Full Routing**: all prefixes received from all BGP sessions;
 - ii. **Partial Routing**: only prefixes from Angola Cable's customers and peers (Global | Africa | Europe | Americas);
 - iii. **Default Route**: only default route;
 - iv. **Full Routing** + Default Route: all prefixes plus the default route;
- BGP Communities on Appendix A **MAY** be used by customers for more specific selection of routes.
- Angola Cables **does not accept** announcements that are more specific than /24 for IPv4 or /48 for IPv6;
- Angola Cables uses **300 as the default BGP Local Preference** for customers. More information about the Local Preference values are available in Appendices A and B.
- Angola Cables provides a set of community strings to help customers to manage their traffic. These communities are listed on Appendices A and B;
- Angola Cables strips all community strings that are not on the lists on Appendix's A and B of this document;
- AS Prepending: Customers with public AS numbers may prepend their AS path to control the desirability of their connections. Customers with an assigned private AS number from Angola Cables may not pad their AS path. Angola Cables will ignore any padding of private AS numbers from customers;
- BGP Multi-Exit Discriminator (MED): customers with more than one BGP session may control their incoming traffic based on MED or BGP Communities to change the BGP Local Preference;
- Angola Cables reserves the right to perform inbound and outbound traffic engineering with own upstream, peers, and IXPs using AS-Path prepending, MED, or BGP Communities;
- Angola Cables has BGP FlowSpec enabled on the entire Backbone, being the service available to our Customers on demand;

APPENDIX A - INFORMATIONAL BGP COMMUNITIES

Angola Cables community strings splits in two groups for a better understanding: informational and the Traffic Engineering (TE) *BGP communities*.

Relationship information

Angola Cables adopts the following code structure, to organize the BGP communities accordingly to the relationship of the peer announcing the route.

37468: R00Y, where **R** is the relationship code and **Y** is a sequential number

Relationship	Code	Community	Description
Transit	1	37468:1000	Routes learned from upstream providers
Public Peering (IXP)	2	37468:2000	Routes learned from public peering points/IXPs
AC Customer	3	37468:3000	Routes learned from customer
Private Peering (PNI/CDN)	4	37468:4000	Routes learned from PNI/CDN partner
AC Prefixes	9	37468:9000	Routes originated at AS37468

Relationship	Code	Community	Description
Transit	1	37468:1001	Routes learned from upstream COGENT (AS174)
	2	37468:1002	Routes learned from upstream TELIA (AS1299)
	3	37468:1003	Routes learned from upstream LEVEL3 (AS3356 / AS3549)
	4	37468:1004	Routes learned from upstream TATA (AS6461)
	5	37468:1005	Routes learned from upstream GTT (AS3257)
	7	37468:1007	Routes learned from upstream VIVO (AS10429)
	8	37468:1008	Routes learned from upstream CHINATELECOM (AS4809)

Relationship	Code	Community	Description
Partner (PNI/CDN)	1	37468:4001	Routes learned from partner GOOGLE (AS15169)
	2	37468:4002	Routes learned from partner FACEBOOK (AS32934 63293)
	3	37468:4003	Routes learned from partner AKAMAI (AS5577)
	4	37468:4004	Routes learned from partner CLOUDFLARE (AS13335)
	5	37468:4005	Routes learned from partner NETFLIX (AS40027)
	6	37468:4006	Routes learned from partner AMAZON (AS15169)
	7	37468:4007	Routes learned from partner G8 (28329)

	8	37468:4008	Routes learned from partner EQUINIX (16397)
Relationship	Code	Community	Description
AC Prefixes	1	37468:9100	Routes originated from AFRICA
	2	37468:9200	Routes originated from EUROPE
	3	37468:9300	Routes originated from SOUTHAMERICA
	4	37468:9400	Routes originated from NORTHAMERICA

GEOGRAPHICAL ORIGIN INFORMATION – LOCATION CODE

Angola Cables adopts the following code structure to organize the BGP communities accordingly to the geographical origin of the learned route:

37468:1CXYY, where **C**=CONTINENT | **X**=COUNTRY | **YY**=POP, where the route was learned.

Continent	Country	POP	Community	Description
Africa (1)	-	-	37468:11000	Represents all routes learned in Africa
	Angola (1)	-	37468:11100	Represents all routes learned in Angola (AO)
		Luanda (01)	37468:11101	Represents all routes learned in Luanda (AO)
		Sanganano (02)	37468:11102	Represents all routes learned in Sanganano (AO)
	South Africa (2)	-	37468:11200	Represents all routes learned in South Africa (ZA)
		Johannesburg (01)	37468:11201	Represents all routes learned in Johannesburg (ZA)
		Cape Town (02)	37468:11202	Represents all routes learned in Cape Town (ZA)
		Yzerfontein (03)	37468:11203	Represents all routes learned in Yzerfontein (ZA)
	Nigeria (3)	-	37468:11300	Represents all routes learned in Nigeria (NG)
		Lagos (01)	37468:11301	Represents all routes learned in Lagos (NG)
Ghana (4)	-	37468:11400	Represents all routes learned in Ghana (GN)	
	Accra (01)	37468:11401	Represents all routes learned in Accra (GN)	
Europe (2)	-	-	37468:12000	Represents all routes learned in Europe
	Portugal (1)	-	37468:12100	Represents all routes learned in Portugal (PT)
		Lisbon (01)	37468:12101	Represents all routes learned in Lisbon (PT)
	Spain (2)	-	37468:12200	Represents all routes learned in Spain (SP)
		Madrid (01)	37468:12201	Represents all routes learned in Madrid (SP)
	France (3)	-	37468:12300	Represents all routes learned in France (FR)
Marseille (01)		37468:12301	Represents all routes learned in Marseille (FR)	

	Germany (4)	-	37468:12400	Represents all routes learned in Germany (DE)
		Frankfurt (01)	37468:12401	Represents all routes learned in Frankfurt (DE)
	Netherlands (5)	-	37468:12500	Represents all routes learned in The Netherlands (NL)
		Amsterdam (01)	37468:12501	Represents all routes learned in Amsterdam (NL)
	United Kingdom (6)	-	37468:12600	Represents all routes learned in United Kingdom (UK)
		London (01)	37468:12601	Represents all routes learned in London (UK)
South America (3)	-	-	37468:13000	Represents all routes learned in South America
	Brazil (1)	-	37468:13100	Represents all routes learned in Brazil (BR)
		Fortaleza (01)	37468:13101	Represents all routes learned in Fortaleza (BR)
		Sao Paulo (02)	37468:13102	Represents all routes learned in São Paulo (BR)
North America (4)	-	-	37468:14000	Represents all routes learned in North America
	USA (1)	-	37468:14100	Represents all routes learned in the USA (US)
		Boca Raton (01)	37468:14101	Represents all routes learned in Boca Raton (US)

UPSTREAM INFORMATION

Angola Cables adopts the following code structure to tag the prefixes learned from public UPSTREAMS:

37468:1CXY, where **C=CONTINENT** | **X=COUNTRY**, **Y=IXP_CODE** where the route was learned.

Continent	Country	Community	Description
-	-	37468:1000	Represents all routes learned through Upstreams
Africa (1)	-	37468:1100	Represents all routes learned at Upstreams in Africa
	Angola (1)	37468:1110	Represents all routes learned at Upstreams in Angola (AO)
	South Africa (2)	37468:1120	Represents all routes learned at Upstreams in South Africa (ZA)
		37468:1121	Represents all routes learned at China Telecom in Johannesburg (ZA)
	Nigeria (3)	37468:1130	Represents all routes learned at Upstream in Nigeria (NG)
	Ghana (4)	37468:1140	Represents all routes learned at Upstream in Ghana (GN)
Europe (2)	-	37468:1200	Represents all routes learned at Upstreams in Europe
	Portugal (1)	37468:1210	Represents all routes learned at Upstreams in Portugal (PT)
		37468:1211	Represents all routes learned at Cogent in Lisbon (PT)
		37468:1214	Represents all routes learned at Tata in Lisbon (PT)
	Spain (2)	37468:1220	Represents all routes learned at Upstreams in Spain (SP)

		37468:1222	Represents all routes learned at Telia in Madrid (SP)
		37468:1223	Represents all routes learned at Level3 in Madrid (SP)
	France (3)	37468:1230	Represents all routes learned at Upstreams in France (FR)
	Germany (4)	37468:1240	Represents all routes learned at Upstreams in Germany (DE)
	Netherlands (5)	37468:1250	Represents all routes learned at Upstreams in the Netherlands (NL)
	United Kingdom (6)	37468:1260	Represents all routes learned at Upstreams in United Kingdom (UK)
		37468:1262	Represents all routes learned at Telia in London (UK)
		37468:1265	Represents all routes learned at GTT in London (UK)
	South America (3)	-	37468:1300
Brazil		37468:1310	Represents all routes learned at Upstreams in Brazil (BR)
		37468:1313	Represents all routes learned at Level3 in Fortaleza (BR)
		37468:1323	Represents all routes learned at Level3 in São Paulo (BR)
		37468:1327	Represents all routes learned at Vivo in São Paulo (BR)
North America (4)	-	37468:1400	Represents all routes learned at Upstreams in North America
	USA	37468:1410	Represents all routes learned at Upstreams in USA (US)
		37468:1411	Represents all routes learned at Cogent in Boca Raton (US)
		37468:1412	Represents all routes learned at Telia in Boca Raton (US)

IXP/PEERING INFORMATION

Angola Cables adopts the following code structure to tag the prefixes learned from public IXPs:

37468:2CXY, where **C=CONTINENT** | **X=COUNTRY**, **Y=IXP_CODE** where the route was learned.

Continent	Country	Community	Description
-	-	37468:2000	Represents all routes learned through IXPs/public peering
Africa (1)	-	37468:2100	Represents all routes learned at IXPs in Africa
	Angola (1)	37468:2110	Represents all routes learned at IXPs in Angola (AO)
		37468:2111	Represents all routes learned at ANGONIX in Luanda (AO)
	South Africa (2)	37468:2120	Represents all routes learned at IXPs in South Africa (ZA)
		37468:2121	Represents all routes learned at NAP Africa in Johannesburg (ZA)
		37468:2122	Represents all routes learned at NAP Africa in Cape Town (ZA)
	Nigeria (3)	37468:2130	Represents all routes learned at IXPs in Nigeria (NG)

		37468:2131	Represents all routes learned at IXPN in Lagos(NG)
	Ghana (4)	37468:2140	Represents all routes learned at IXPs in Ghana (GN)
		37468:2141	Represents all routes learned at GIX in Accra(GN)
Europe (2)	-	37468:2200	Represents all routes learned at IXPs in Europe
	Portugal (1)	37468:2210	Represents all routes learned at IXPs in Portugal (PT)
		37468:2211	Represents all routes learned at GigaPix in Lisbon (PT)
	Spain (2)	37468:2220	Represents all routes learned at IXPs in Spain (ES)
		37468:2221	Represents all routes learned at ESPANIX in Madrid (ES)
	France (3)	37468:2230	Represents all routes learned at IXPs in France (FR)
		37468:2231	Represents all routes learned at France-IX in Marseille (FR)
	Germany (4)	37468:2240	Represents all routes learned at IXPs in Germany (DE)
		37468:2241	Represents all routes learned at DE-CIX in Frankfurt (DE)
	Netherlands (5)	37468:2250	Represents all routes learned at IXPs in the Netherlands (NL)
		37468:2251	Represents all routes learned at AMS-IX in Amsterdam (NL)
	United Kingdom (6)	37468:2260	Represents all routes learned at IXPs in the United Kingdom (UK)
37468:2261		Represents all routes learned at LINX in London (UK)	
South America (3)	-	37468:2300	Represents all routes learned at IXPs in South America
	Brazil	37468:2310	Represents all routes learned at IXPs in Brazil (BR)
		37468:2311	Represents all routes learned at PTT-CE in Fortaleza (BR)
		37468:2312	Represents all routes learned at PTT-SP in São Paulo (BR)
		37468:2313	Represents all routes learned at EQUINIXSP in São Paulo (BR)
North America (4)	-	37468:2400	Represents all routes learned at IXPs in North America
	USA	37468:2410	Represents all routes learned at IXPs in the USA (US)
		37468:2411	Represents all routes learned at Equinix Ashburn DC2 (US)
		37468:2412	Represents all routes learned at Equinix NOTA in Boca Raton (US)
		37468:2413	Represents all routes learned at NYIIX NY in Boca Raton (US)
		37468:2414	Represents all routes learned at DE-CIX NY in Boca Raton (US)

PNI/CDN PARTNER INFORMATION

Angola Cables adopts the following code structure to tag the prefixes learned from public PNI/CDN PARTNERS:

37468:4CXY, where **C=CONTINENT** | **X=COUNTRY**, **Y=IXP_CODE** where the route was learned.

Continent	Country	Community	Description	
-	-	37468:4000	Represents all routes learned through Partners	
Africa (1)	-	37468:4100	Represents all routes learned at Partners in Africa	
	Angola (1)	37468:4110	Represents all routes learned at Partners in Angola (AO)	
		37468:4111	Represents all routes learned at Partners in Luanda (AO)	
		37468:41111	Represents all routes learned at Partners Google in Luanda (AO)	
		37468:41112	Represents all routes learned at Partners Facebook in Luanda (AO)	
		37468:41113	Represents all routes learned at Partners Akamai in Luanda (AO)	
		37468:41114	Represents all routes learned at Partners in Cloudflare Luanda (AO)	
		37468:41115	Represents all routes learned at Partners Netflix in Luanda (AO)	
		37468:4112	Represents all routes learned at Partners in Sangano (AO)	
	South Africa (2)	37468:4120	Represents all routes learned at Partners in South Africa (ZA)	
		37468:4121	Represents all routes learned at Partners in Johannesburg (ZA)	
		37468:41211	Represents all routes learned at Google in Johannesburg (ZA)	
		37468:41212	Represents all routes learned at Facebook in Johannesburg (ZA)	
		37468:41213	Represents all routes learned at Workonline in Johannesburg (ZA)	
		37468:41214	Represents all routes learned at Limelight in Johannesburg (ZA)	
		37468:41216	Represents all routes learned at Amazon in Johannesburg (ZA)	
		37468:4122	Represents all routes learned at Partners in Cape Town (ZA)	
		37468:41226	Represents all routes learned at Amazon in Cape Town(ZA)	
		37468:4123	Represents all routes learned at Partners in Yzerfontain (ZA)	
	Nigeria (3)	37468:4130	Represents all routes learned at Partners in Nigeria (NG)	
	Ghana (4)	37468:4140	Represents all routes learned at Partners in Ghana (GN)	
	Europe (2)	-	37468:4200	Represents all routes learned at Partners in Europe
		Portugal (1)	37468:4210	Represents all routes learned at Partners in Portugal (PT)
			37468:4211	Represents all routes learned at Partners in Lisbon (PT)
37468:42111			Represents all routes learned at Google in Lisbon (PT)	
37468:42112			Represents all routes learned at Meo in Lisbon (PT)	
Spain (2)		37468:4220	Represents all routes learned at Partners in Spain (ES)	

	France (3)	37468:4230	Represents all routes learned at Partners in France (FR)
	Germany (4)	37468:4240	Represents all routes learned at Partners in Germany (DE)
	Netherlands (5)	37468:4250	Represents all routes learned at Partners in the Netherlands (NL)
	United Kingdom (6)	37468:4260	Represents all routes learned at Partners in the United Kingdom (UK)
South America (3)	-	37468:4300	Represents all routes learned at Partners in South America
	Brazil	37468:4310	Represents all routes learned at Partners in Brazil (BR)
		37468:4311	Represents all routes learned at Partners in Fortaleza (BR)
		37468:4312	Represents all routes learned at Partners in São Paulo (BR)
		37468:43121	Represents all routes learned at Google in São Paulo (BR)
		37468:43122	Represents all routes learned at Facebook in São Paulo (BR)
		37468:43213	Represents all routes learned at G8 in São Paulo (BR)
		37468:43214	Represents all routes learned at EQUINIX in São Paulo (BR)
37468:43216	Represents all routes learned at Amazon in São Paulo (BR)		
North America (4)	-	37468:4240	Represents all routes learned at Partners in North America

APPENDIX B – BGP COMMUNITIES FOR TRAFFIC ENGINEERING (TE)

Angola Cables IP Transit customers may want to change the default behavior of their routes with the following BGP Communities.

CUSTOMER LOCAL-PREFERENCE MODIFICATION

Community	Action
37468:50090	Set route local-pref to 90 (lowest value possible)
37468:50100	Set route local-pref to 100 (equal to upstream routes)
37468:50190	Set route local-pref to 190 (peer backup)
37468:50200	Set route local-pref to 200 (peer)
37468:50210	Set route local-pref to 210 (customer backup route)

CUSTOMER AS_PATH MODIFICATION

11:xxxx	Add one prepend to the prefix when advertising outbound
12:xxxx	Add two prepends to the prefix when advertising outbound
13:xxxx	Add three prepends to the prefix when advertising outbound

xxxx represents the community of the peer upstream/ixp/partner

Examples (not exhaustive list):

11:1400	Add one prepend to the prefixes advertised outbound at Upstream providers in North America
12:1400	Add two prepends to the prefixes advertised outbound at Upstream providers in North America
13:1400	Add three prepends to the prefixes advertised outbound at Upstream providers in North America

11:1262	Add one prepend to the prefixes advertised outbound at Telia in London
12:1262	Add two prepends to the prefixes advertised outbound at Telia in London
13:1262	Add three prepends to the prefixes advertised outbound at Telia in London

CUSTOMER ROUTE EXPORT CONTROL

Customers may want to modify the default behavior of their routes propagation when advertising via Angola Cables with the community structure

0:xxxx	Don't send the prefix when advertising outbound
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xxxx represents the community of the peer upstream/ixp/partner

“0:RELATIONSHIP_CODE”

Where RELATIONSHIP_CODE is one of the codes specified in the Appendix A, Section 4.1.

Examples (not exhaustive list):

Community	Action
0:1000	Don't send to any upstream
0:1001	Don't send to Cogent (AS174)

Community	Action
0:4000	Don't send to any partner
0:4001	Don't send to Google (AS15169)

“0:LOCATION_CODE”

Where LOCATION_CODE is one of the codes specified in the Appendix A, Section 4.2.

Examples (not exhaustive list):

Community	Action
0:11000	Don't send to Africa
0:11100	Don't send to Angola (AO)
0:11101	Don't send to Luanda (AO)
0:11102	Don't send to Sangano (AO)

“0:UPSTREAM_CODE”

Where UPSTREAM_CODE is one of the codes specified in the Appendix A, Section 4.3.

Examples (not exhaustive list):

Community	Action
0:1200	Don't send to any upstream in Europe
0:1210	Don't send to any upstream in Portugal (PT)
0:1211	Don't send to upstream Cogent in Lisbon (PT)

0:1214	Don't send to upstream Tata in Lisbon (PT)
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“0:IXP_CODE”

Where IXP_CODE is one of the codes specified in the Appendix A, Section 4.4.

Examples (not exhaustive list):

Community	Action
0:2300	Don't send to any ixp in South America
0:2310	Don't send to any ixp in Brazil
0:2311	Don't send to ixp PTT Fortaleza
0:2312	Don't send to ixp PTT in São Paulo

“0:PNI/CDN PARTNER_CODE”

Where PNI/CDN PARTNER_CODE is one of the codes specified in the Appendix A, Section 4.5.

Examples (not exhaustive list):

Community	Action
0:4312	Don't send to any partner in São Paulo (BR)
0:43121	Don't send to partner Google (BR) in São Paulo
0:43122	Don't send to partner Facebook (BR) in São Paulo
0:43213	Don't send to partner G8 (BR) in São Paulo

CUSTOMER ROUTE REMOTE TRIGGERED BLACK HOLING (RTBH)

Customers may want to use Remote Triggered Black Holing for specific hosts in their network experiencing a Denial of Service Attack with the following BGP communities:

Community	Action
37468:666	Black hole the host (/32 or /128) route to all peers
37468:6661	Black hole the host (/32 or /128) route to all peers in Africa
37468:6662	Black hole the host (/32 or /128) route to all peers in Europe
37468:6663	Black hole the host (/32 or /128) route to all peers in South America
37468:6664	Black hole the host (/32 or /128) route to all peers in North America

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