Peering @ DBX & Peer Manager

Presented By:

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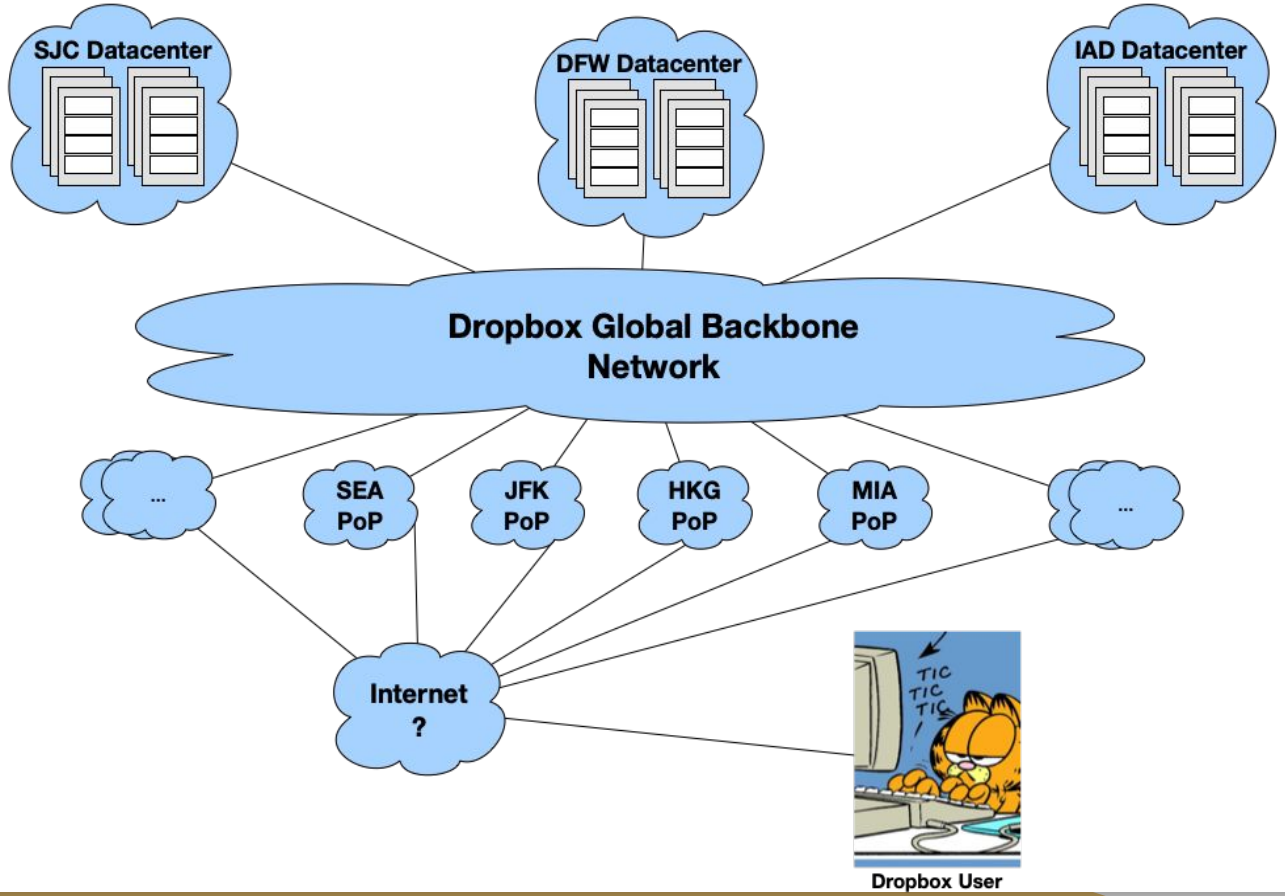
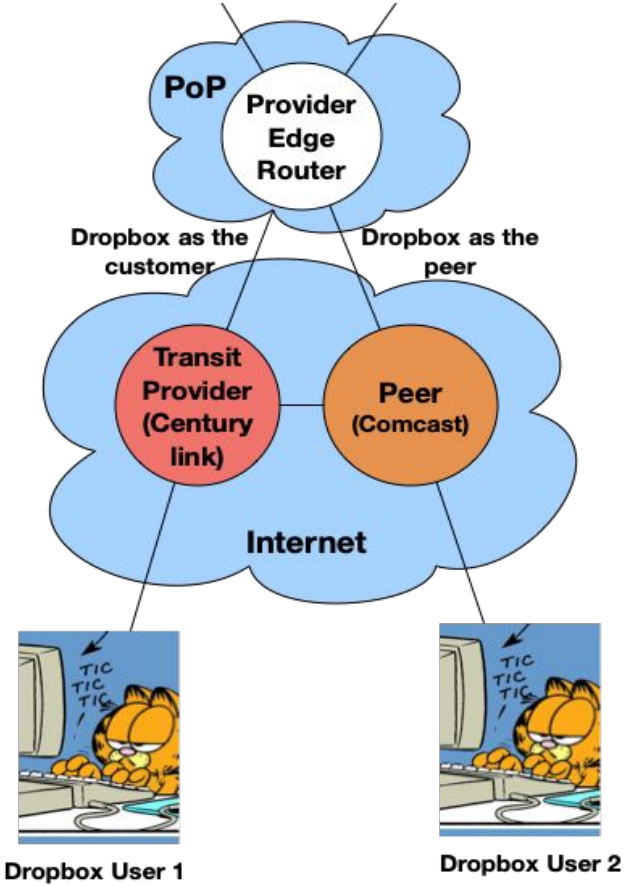
Dropbox Production Network



What is Peering?



Benefits of Peering

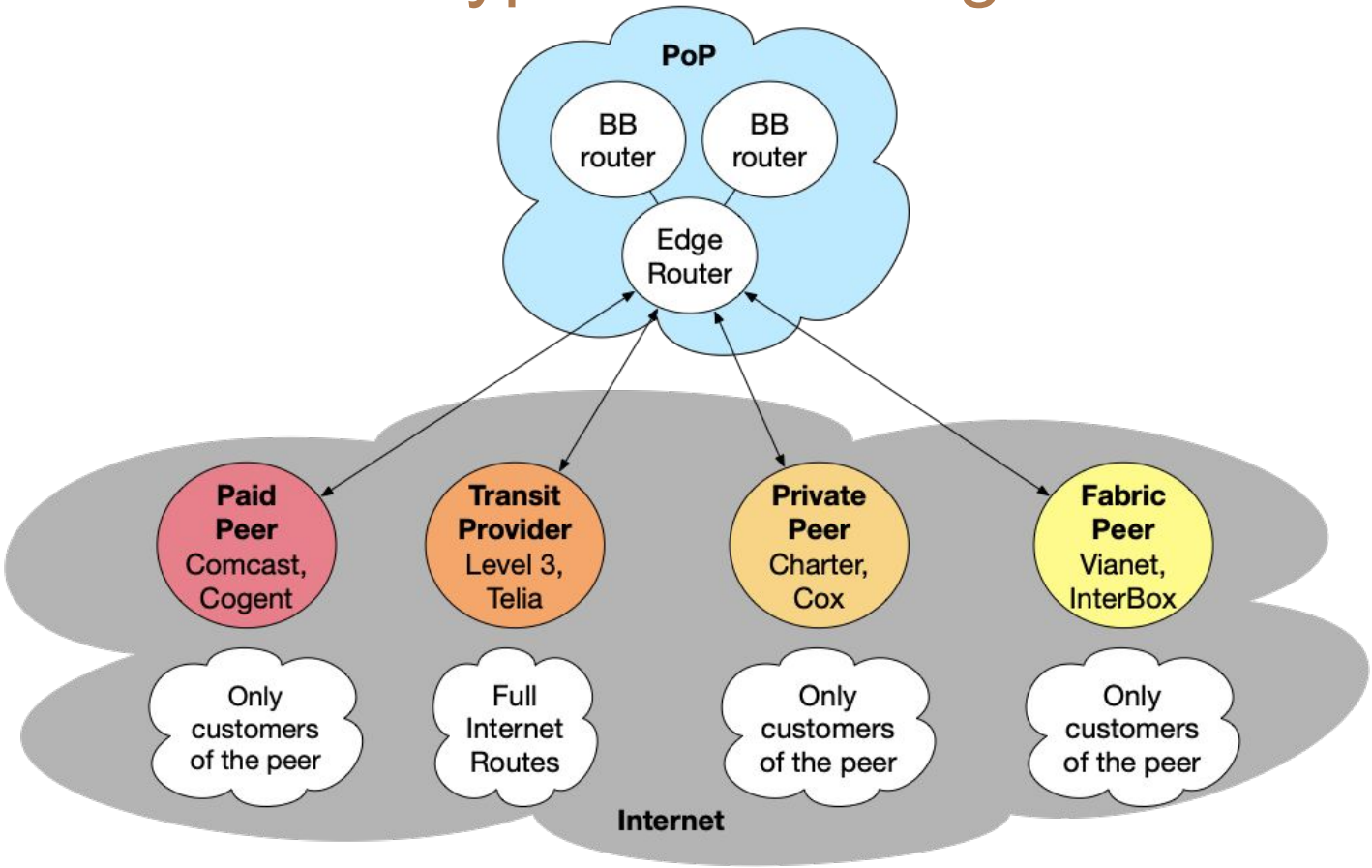
Reduced Operating Costs

Improved Routing

Getting DBX Customers Onto The Network Faster

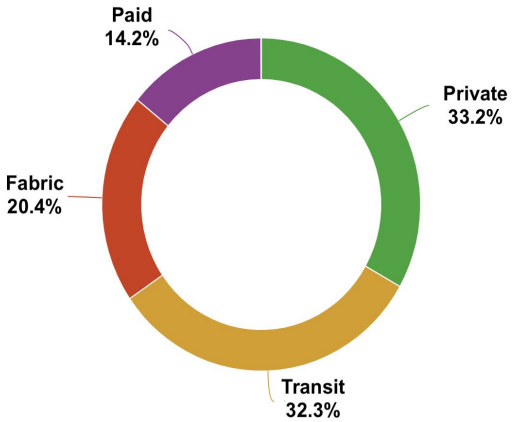
Increased redundancy

Types of Peering



Non-SFI Peering ($$$)		SFI Peering (FREE!)	
Paid Peer	**Transit Provider**	**Private Peer**	**Fabric Peer**
Peer's customer routes	Full internet routes	Peer's customer routes	Peer's customer routes
$$$	$$	$	-
Cross connect Traffic Commitment Cost per Mbps	Cross connect Traffic Commitment Cost per Mbps	Cross connect	Cross connect
Dedicated bandwidth	Dedicated bandwidth	Dedicated bandwidth	Shared bandwidth

Traffic % Per Peering Type



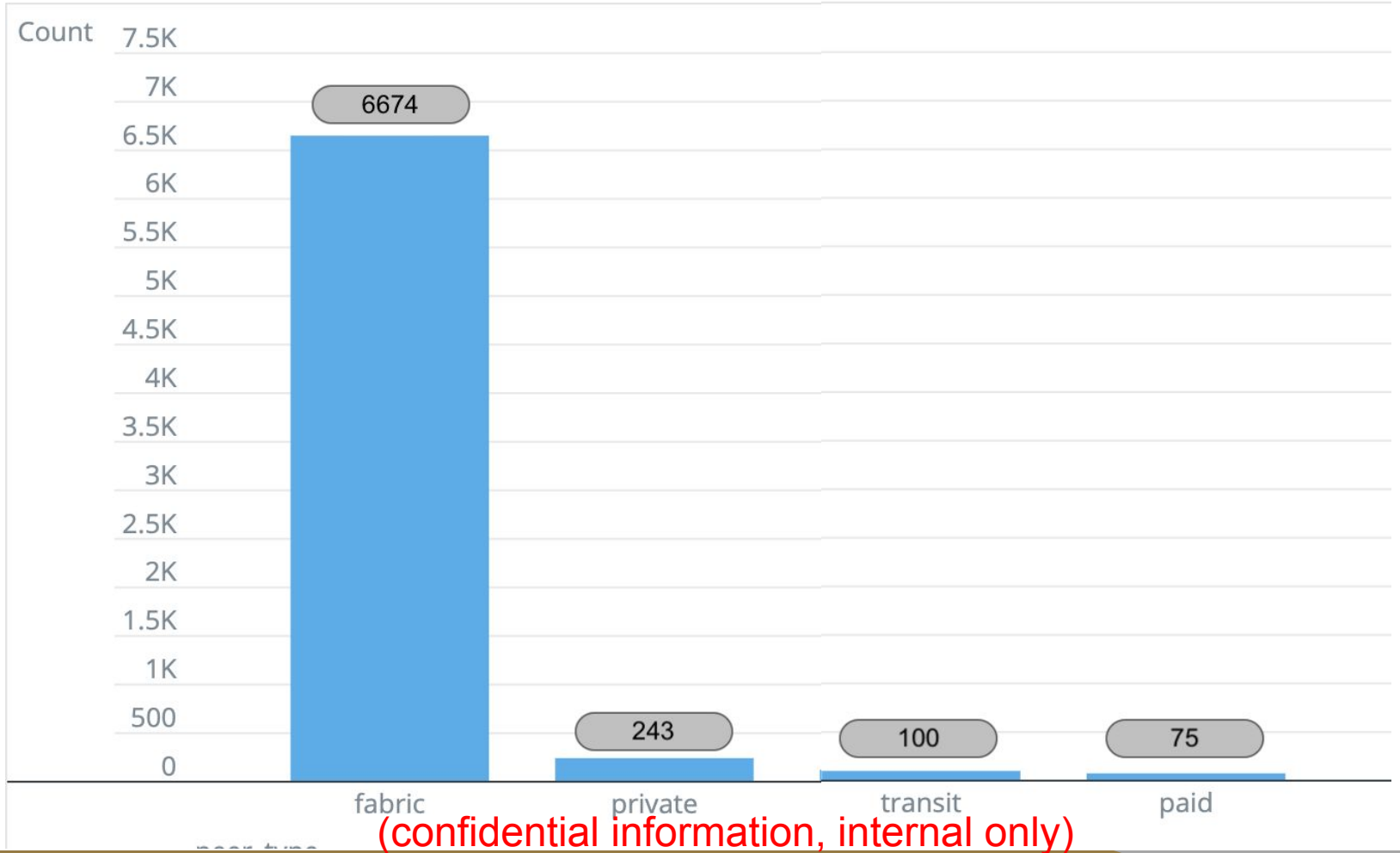
Peering Types	Average Gbits/s	95th Percentile Gbits/s	Max Gbits/s	Last Datapoint Gbits/s
Historical Total: 7 days back	628.10	641.86	647.94	608.31
Total Overlay	455.31	473.20	476.05	447.35
PRIVATE	151.01 (33.17%)	156.76	160.08	145.43 (32.51%)
TRANSIT	146.91 (32.27%)	153.08	154.24	145.46 (32.52%)
FABRIC	92.70 (20.36%)	97.06	98.58	94.23 (21.06%)
PAID	64.55 (14.18%)	67.31	68.09	62.15 (13.89%)
---	<0.01 (0.00%)	<0.01	<0.01	<0.01 (0.00%)
Total of Top 5	**455.16**	**474.22**	**481.00**	**447.27**

(confidential information, internal only)

So How Much Traffic Does Dropbox Send Over SFI?

44.8%

How Many Peering Sessions Does DBX Have?



(confidential information, internal only)

How Many $$$ Is DBX Paying The Non-SFI Peers??

Dec 2018, 86Gbps Centurylink traffic, billed at $0.48/Mbps ~= $41k/month!

Dec 2017, 78Gbps Centurylink traffic, billed at $0.90/Mbps ~= $70k/month!

Recently, Annual Commitment of 960Gbps => 80Gbps/month

2 months in, we've exhausted 197Gbps => 20% ahead of commitment!

(confidential information, internal only)

Non-SFI Peer Billing

- Billed at 95th Percentile Traffic Usage
- Monthly Bill = Max (in @ 95th, out @95th) * Transit Unit Price
- Monthly Bill with commit value:

Monthly Bill = Max(Max (in @ 95th, out @95th) * Transit Unit Price , Commit Volume * Transit Unit Price)

How Has Peering Been Done Historically At DBX??

Step 1: Parsing Peer Emails

Step 2: Grab Relevant Info From PeeringDB About Peer

Step 3: Check NSoT To Grab DBX Edge Router Info

Step 4: Prepare Configs For Each Peering Session

Step 5: Login To Edge Routers & Configure Peering Sessions

Step 6: Verify That Sessions Were Configured Correctly

Step 7: Notify Peer About Completion Of Peering Turnup

TOTAL TIME: ~10-15 mins/Peer!

How Many Peers Do Neteng/Netops Turn Up Per Week??

~10-15 per week -> ~40-60 per month!

How Do We Reduce The Toil For Neteng/Netops??

Peer Manager

Push Button Service w/ PeeringDB Integration

Ability to Turnup, Drain, Undrain Peers

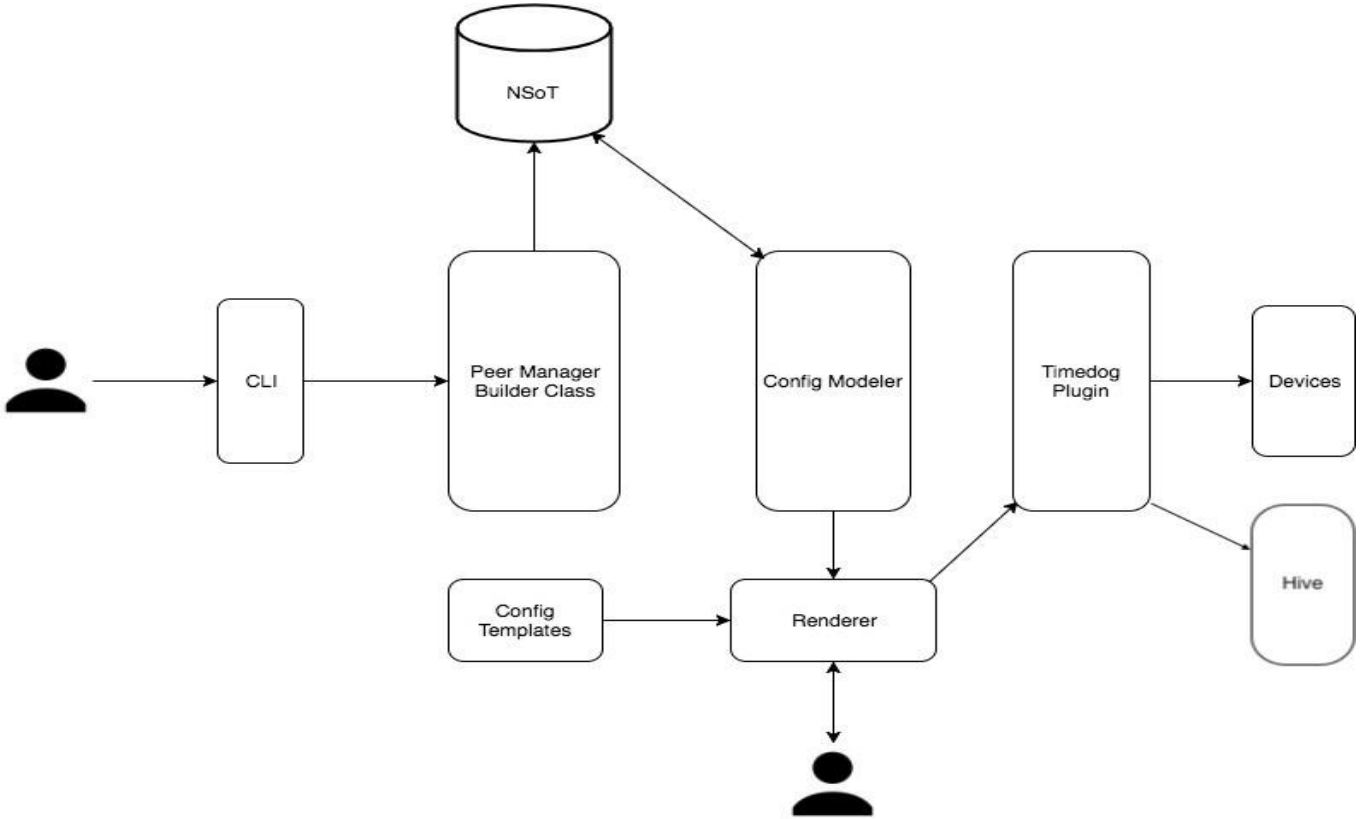
Ability to Configure Policies On Peering Sessions

Time Reductions

Source Of Truth Data About Peering Sessions in NSoT

Analytics Using Hive

Peer Manager Design



```
nseshan@sjc8b-rf19-18a:~$ nsot protocols list -D lhr1-pr01 -a remote_asn=58500
+-------+-----------+------+-------------------+---------+-----------------------------------+
| ID    | Device    | Type | Interface         | Circuit | Attributes                        |
+-------+-----------+------+-------------------+---------+-----------------------------------+
| 21833 | lhr1-pr01 | bgp  | lhr1-pr01:ae10.0  | None    | drain=False                       |
|       |           |      |                   |         | ix=linx-juniper-lan               |
|       |           |      |                   |         | local_asn=19679                   |
|       |           |      |                   |         | noc_email=peering@citra.net.id    |
|       |           |      |                   |         | peer_ips=                         |
|       |           |      |                   |         |  195.66.225.109                   |
|       |           |      |                   |         | peer_name=citra_internet_exchange |
|       |           |      |                   |         | peer_type=fabric                  |
|       |           |      |                   |         | peering_email=riza@citra.net.id   |
|       |           |      |                   |         | prefix_limit=5000                 |
|       |           |      |                   |         | remote_asn=58500                  |
|       |           |      |                   |         | remove=False                      |
| 21834 | lhr1-pr01 | bgp  | lhr1-pr01:ae10.0  | None    | drain=False                       |
|       |           |      |                   |         | ix=linx-juniper-lan               |
|       |           |      |                   |         | local_asn=19679                   |
|       |           |      |                   |         | noc_email=peering@citra.net.id    |
|       |           |      |                   |         | peer_ips=                         |
|       |           |      |                   |         |  2001:7f8:4::e484:1               |
|       |           |      |                   |         | peer_name=citra_internet_exchange |
|       |           |      |                   |         | peer_type=fabric                  |
|       |           |      |                   |         | peering_email=riza@citra.net.id   |
|       |           |      |                   |         | prefix_limit=5000                 |
|       |           |      |                   |         | remote_asn=58500                  |
|       |           |      |                   |         | remove=False                      |
+-------+-----------+------+-------------------+---------+-----------------------------------+
nseshan@sjc8b-rf19-18a:~$
```

```
nseshan@sjc12a-re6-6a:~$ ./peer_manager turnup -c test.yaml
sfo1-pr01
=========

10.207.0.10
-----------

set protocols bgp group PRIVATE-PEER neighbor 10.207.0.10 description CHARTER
set protocols bgp group PRIVATE-PEER neighbor 10.207.0.10 authentication-key "xyzdefqiu"
set protocols bgp group PRIVATE-PEER neighbor 10.207.0.10 family inet any prefix-limit maximum 500
set protocols bgp group PRIVATE-PEER neighbor 10.207.0.10 family inet any prefix-limit teardown 90 idle-timeout 120
set protocols bgp group PRIVATE-PEER neighbor 10.207.0.10 peer-as 12345
set protocols bgp group PRIVATE-PEER neighbor 10.207.0.10 import [ DENY-ALL ]

set protocols bgp group PRIVATE-PEER neighbor 10.207.0.10 export [ DENY-ALL ]


10.207.6.12
-----------

set protocols bgp group FABRIC-PEER neighbor 10.207.6.12 description AMAZON
set protocols bgp group FABRIC-PEER neighbor 10.207.6.12 authentication-key "abcdefgh"
set protocols bgp group FABRIC-PEER neighbor 10.207.6.12 family inet any prefix-limit maximum 100
set protocols bgp group FABRIC-PEER neighbor 10.207.6.12 family inet any prefix-limit teardown 90 idle-timeout 120
set protocols bgp group FABRIC-PEER neighbor 10.207.6.12 peer-as 98765

10.207.6.10
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set protocols bgp group FABRIC-PEER neighbor 10.207.6.10 description AMAZON
set protocols bgp group FABRIC-PEER neighbor 10.207.6.10 authentication-key "abcdefgh"
set protocols bgp group FABRIC-PEER neighbor 10.207.6.10 family inet any prefix-limit maximum 100
set protocols bgp group FABRIC-PEER neighbor 10.207.6.10 family inet any prefix-limit teardown 90 idle-timeout 120
set protocols bgp group FABRIC-PEER neighbor 10.207.6.10 peer-as 98765



Is the above rendered config correct? [y/N]: y
Pushing above turnup configuration to sfo1-pr01 ....
```

Potential Future Work...

Automated Traffic Engineering at edge based on actual traffic

Pro-active peering based on actual traffic

Integrate Peer Maintenance Notifications with Peer Manager

References

www.dropbox.com/peering

Edge Peering Turnup Process

www.peeringdb.com

Peer Manager Design Doc

Peer Manager Usage Guide

drl/peer-turnup-summary

drl/peers-per-metro

drl/peers-per-ix

Q & A?

Thank You!!

(For any additional questions, hop into #neteng or hit us up @rugveda or @nseshan)