

# Integrating Multiple Data Sources

For the efficient  
peering coordinator

Jac Kloots  
Senior Solutions Engineer



**What are the most common tools  
for the peering coordinator?**





### A1 Telekom Austria AG

Organization	A1 Telekom Austria AG
Also Known As	AON/Highway 194
Long Name	
Company Website	<a href="http://www.a1.net/">http://www.a1.net/</a>
ASN	8447
IRR as-set/route-set	RIPE::AS-PTA RIPE::AS-TA6
Route Server URL	
Looking Glass URL	<a href="http://ppp.a1.net/tools/looking">http://ppp.a1.net/tools/looking</a>
Network Types	Cable/DSL/ISP
IPv4 Prefixes	3000
IPv6 Prefixes	350
Traffic Levels	50-100Gbps
Traffic Ratios	Balanced

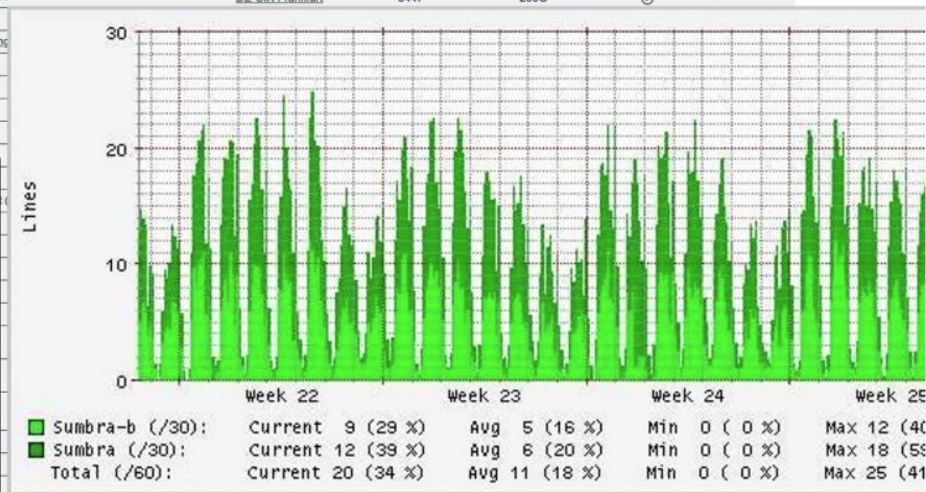
### Public Peering Exchange Points

Exchange AS	ASN	Speed	RS Peer
IPv4	IPv6		
AMS-IX	8447	200G	
80.249.209.207	2001:7f8:1::a500:8447:1		
DE-CIX Frankfurt	8447	200G	

```

+ ~ traceroute www.a1.at
traceroute to www.a1.at (80.75.46.164), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 5.579 ms 5.512 ms 8.758 ms
 2 100.120.0.1 (100.120.0.1) 26.835 ms 6.560 ms 6.949 ms
 3 be230.aarh-dist01.link.stofa.net (45.80.92.116) 6.961 ms 11.962 ms 41.739 ms
 4 * * *
 5 be229.aarh-dist02.link.stofa.net (89.184.134.46) 18.533 ms 18.573 ms 18.306 ms
 6 be-190.aarh-cor03.ip.norlys.io (139.45.29.226) 17.875 ms 17.605 ms 17.337 ms
 7 be-182.koldb-cor03.ip.norlys.io (139.45.18.43) 18.154 ms 17.262 ms 17.603 ms
 8 be-200.frnrx-br01.ip.norlys.io (139.45.29.174) 17.791 ms
 9 be-201.frnrx-br01.ip.norlys.io (139.45.29.176) 18.931 ms 19.106 ms
 9 ipv4.de-cix.fra.de.as8447.a1.net (80.81.192.69) 104.883 ms 20.344 ms 17.862 ms
10 lg4-9080.as8447.a1.net (195.3.64.5) 32.450 ms 28.117 ms 28.182 ms
11 lg2-9082.as8447.a1.net (195.3.68.34) 29.289 ms 28.570 ms 28.689 ms
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *

```



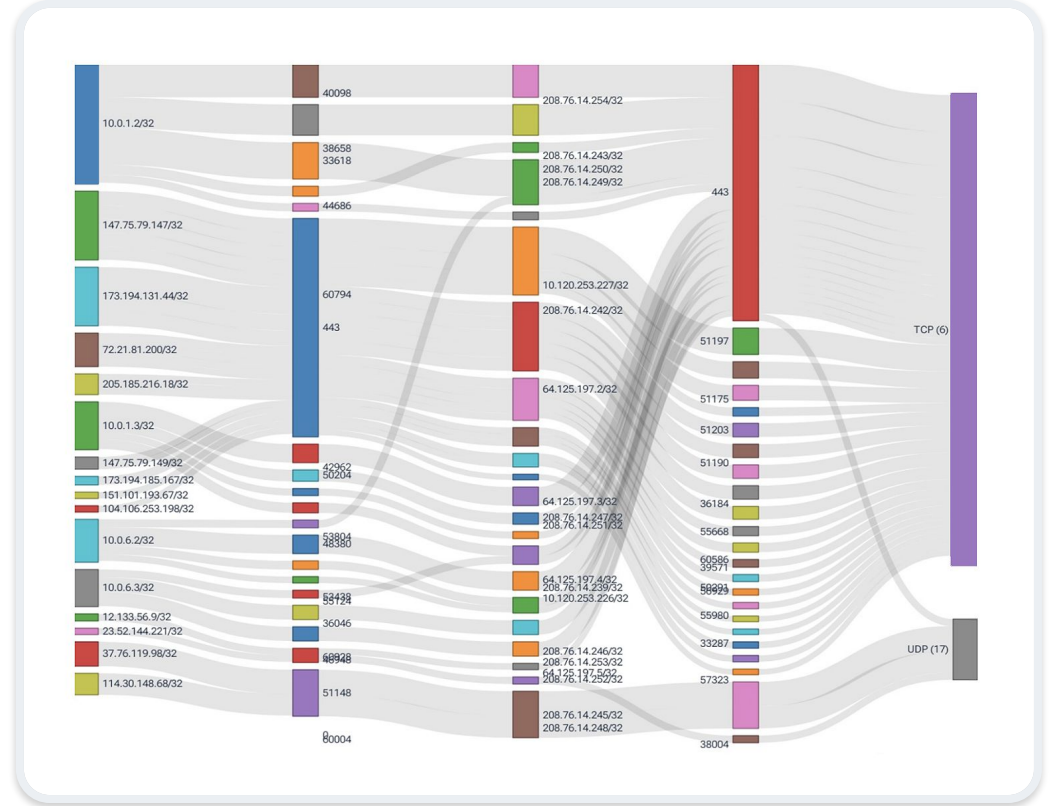
# Adding NetFlow is a good step

Source	Destination	Non-Directional / Other
<b>- Network &amp; Traffic Topology</b>		
<input type="checkbox"/> Interface <input type="checkbox"/> Connectivity Type <input type="checkbox"/> Network Boundary <input type="checkbox"/> Provider <input type="checkbox"/> Traffic Origination <input type="checkbox"/> Interface Capacity <input type="checkbox"/> VLAN <input type="checkbox"/> MAC Address	<input type="checkbox"/> Interface <input type="checkbox"/> Connectivity Type <input type="checkbox"/> Network Boundary <input type="checkbox"/> Provider <input type="checkbox"/> Traffic Termination <input type="checkbox"/> Interface Capacity <input type="checkbox"/> VLAN <input type="checkbox"/> MAC Address	<input type="checkbox"/> Ultimate Exit Interface <input type="checkbox"/> Ultimate Exit Connectivity Type <input type="checkbox"/> Ultimate Exit Network Boundary <input type="checkbox"/> Ultimate Exit Provider <input type="checkbox"/> Simple Traffic Profile <input type="checkbox"/> Traffic Profile <input type="checkbox"/> Site <input type="checkbox"/> Device <input type="checkbox"/> Site Market <input type="checkbox"/> Ultimate Exit Site Market <input type="checkbox"/> Ultimate Exit Site <input type="checkbox"/> Ultimate Exit Device <input type="checkbox"/> Host Direction <input type="checkbox"/> Device Sample Rate

<b>- IP &amp; BGP Routing</b>		
<input type="checkbox"/> IP/CIDR <input type="checkbox"/> Site by IP <input type="checkbox"/> Site Type by IP <input type="checkbox"/> Port Number <input type="checkbox"/> Route Prefix/LEN <input type="checkbox"/> Route LEN <input type="checkbox"/> AS Number <input type="checkbox"/> Next Hop IP/CIDR <input type="checkbox"/> Next Hop AS Number <input type="checkbox"/> 2nd Hop AS Number <input type="checkbox"/> 3rd Hop AS Number <input type="checkbox"/> AS Path <input type="checkbox"/> BGP Community <input type="checkbox"/> VRF Name <input type="checkbox"/> VRF Route Distinguisher <input type="checkbox"/> VRF Route Target <input type="checkbox"/> VRF Extended Route Distinguisher	<input type="checkbox"/> IP/CIDR <input type="checkbox"/> Site by IP <input type="checkbox"/> Site Type by IP <input type="checkbox"/> Port Number <input type="checkbox"/> Route Prefix/LEN <input type="checkbox"/> Route LEN <input type="checkbox"/> AS Number <input type="checkbox"/> Next Hop IP/CIDR <input type="checkbox"/> Next Hop AS Number <input type="checkbox"/> 2nd Hop AS Number <input type="checkbox"/> 3rd Hop AS Number <input type="checkbox"/> AS Path <input type="checkbox"/> BGP Community <input type="checkbox"/> VRF Name <input type="checkbox"/> VRF Route Distinguisher <input type="checkbox"/> VRF Route Target <input type="checkbox"/> VRF Extended Route Distinguisher <input type="checkbox"/> RPKI Validation Status <input type="checkbox"/> RPKI Quick Status Segment Routing SID Segment Routing SID Path	<input type="checkbox"/> Protocol <input type="checkbox"/> INET Family <input type="checkbox"/> DSCP <input type="checkbox"/> ToS <input type="checkbox"/> Packet Size <input type="checkbox"/> Packet Size (nearest 100) <input type="checkbox"/> Sampling Rate * 100

# IP addresses, ports and protocols are not enough

- It is awesome to see what traffic is flowing on the network.
- But what does any of this mean in terms of users, content, or network costs?



# Telemetry Enrichment

Enrichment with metadata provides context

Geo-location

Threat feeds

Transit costs

BGP table information

Pod names

Public BGP data

PeeringDB information

IPAM

OTT service name

Application identifiers

Process IDs

CDN names

DNS information

Synthetic test results

Customer names

# Telemetry Enrichment

Enrichment with metadata provides context

Geo-location

Threat feeds

Transit costs

BGP table information

Pod names

Public BGP data

PeeringDB information

IPAM

OTT service name

Application identifiers

Process IDs

CDN names

DNS information

Synthetic test results

Customer names

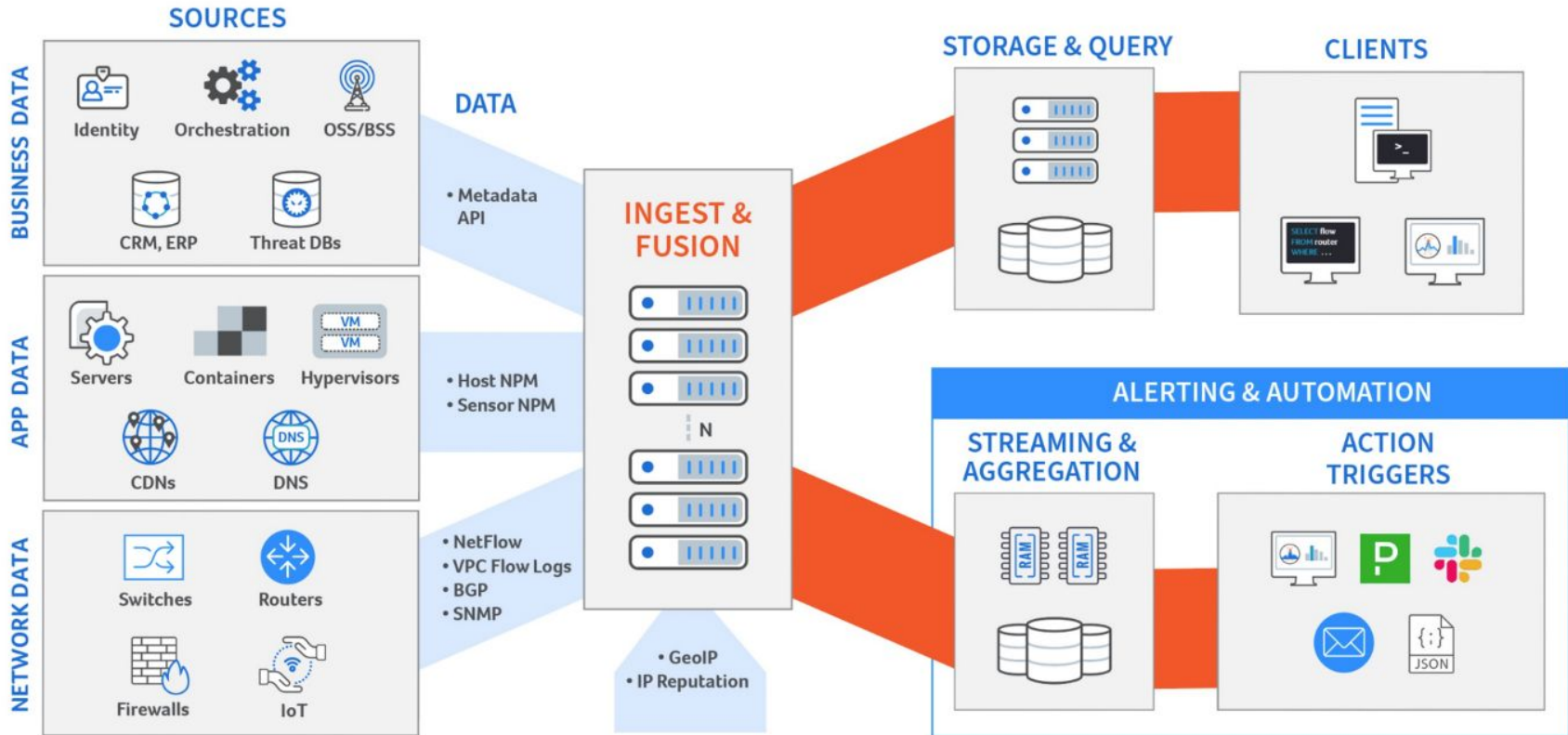


## But how?

- ✓ There is no single source of truth
- ✓ The data exists but is spread across numerous sources
- ✓ Automation can pull this data together
- ✓ Using APIs, push it into a network observability platform that can enrich the network traffic



# Best practices for leveraging contextual data



# Results



**Do we use our  
IX port well?**



Do we use our IX port well?

# How much traffic on transit to AMS-IX

**Dimensions**

No dimensions selected

[Edit Dimensions](#)

**Metrics**

bits/s

[Customize Metrics](#)

**Time**

Compare over previous period

Last Week

UTC

Use AWS Timestamps (Beta)

**Filtering**

Include all

- Source Network Boundary equals External
- Source Connectivity Type equals Transit
- Source ASN is member of IX equals AMS-IX

Include any

- Source ASN peering policy equals Open
- Source ASN peering policy equals Selective

[Edit Filters](#)



Do we use our IX port well?

# Which transit providers?

**Dimensions**

Source Provider

Edit Dimensions

**Metrics**

bits/s

Customize Metrics

**Time**

Compare over previous period

Last Week

UTC

Use AWS Timestamps (Beta)

**Filtering**

Include all

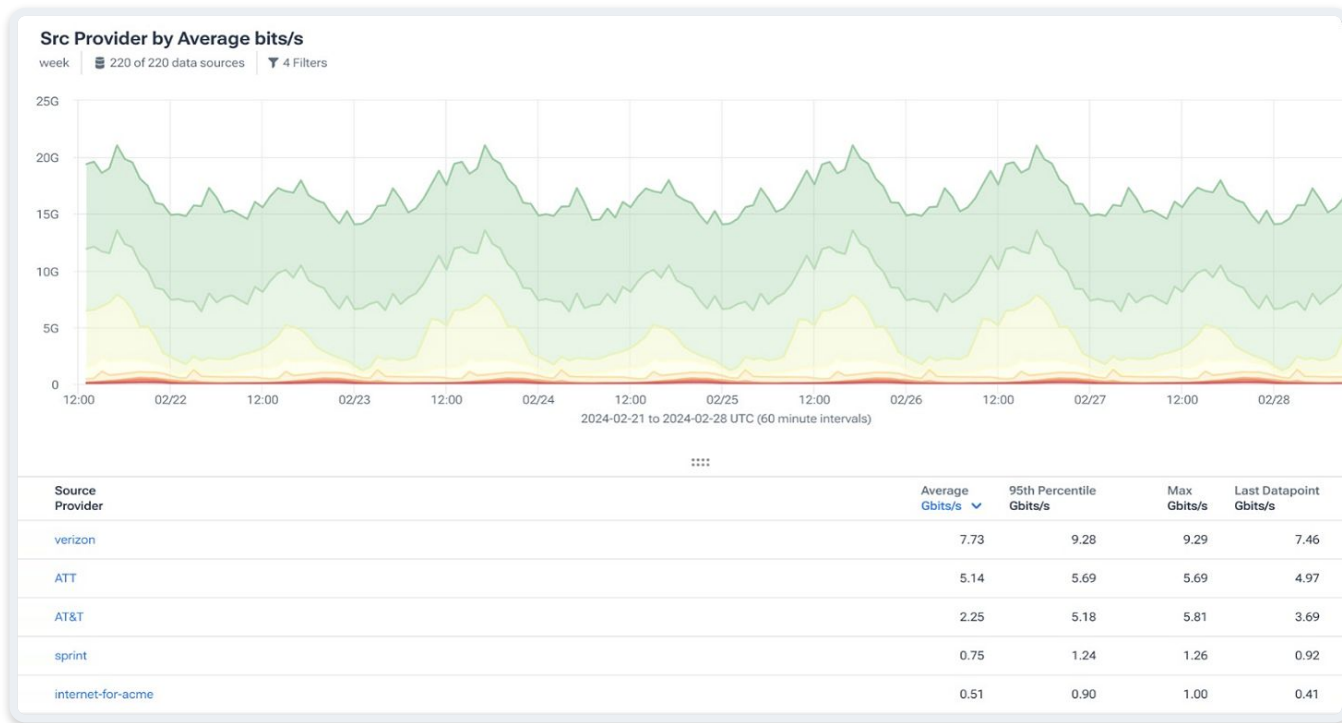
- Source Connectivity Type equals Transit
- Source Network Boundary equals External
- Source ASN is member of IX equals AMS-IX

Include any

- Source ASN peering policy equals Open
- Source ASN peering policy equals Selective

Edit Filters

**Bracketing**



Do we use our IX port well?

# Transit cost

Edge > Connectivity Costs Share Actions Calendar

Legend: Equinix (IX), NTT Communications (Transit), Cogent (Transit), NTT (Free Private Peering), CenturyLink (Paid Private Peering), Cablevision (Free Private Peering), Charter (Free Private Peering), XO Communications (Free Private Peering)

February 2024 Providers 18

Provider	Cost	Cost per Mbps	Ingress (Mbps)	Egress (Mbps)	Traffic (Mbps)
NTT Communicati...	9,898,12 US\$	1,84 US\$	4,420.13	2,035.79	5,382.78
CenturyLink	6,000 US\$	5,29 US\$	1,134.67	357.21	1,134.67
XO Communications	1,440 US\$	0,60 US\$	1,270.79	2,393.63	2,393.63
ATT	1,289,19 US\$ <span>↘ 1%</span>	0,50 US\$	2,578.38 <span>↘ 1%</span>	1,447.99	2,578.38
Sprint	1,104,88 US\$	0,58 US\$	1,297.87	1,909.75	1,909.75
Savvis	1,000 US\$	0,23 US\$	4,409.55	1,062.56	4,409.55
Charter	1,000 US\$	2,99 US\$	334.65	3.35	334.65
Cablevision	1,000 US\$	0,88 US\$	1,132.29	538.59	1,132.29
NTT	1,000 US\$	1,03 US\$	10.58	973.23	973.23
Telia	1,000 US\$	0,35 US\$	2,853.19	1,673.32	2,853.19
Comcast	1,000 US\$	0,44 US\$	415.05	2,266.80	2,266.80
Cogent	1,000 US\$	18,55 US\$	53.91	5.39	53.91
RJ Provider	587,29 US\$	0,04 US\$	4,343.81	13,563.15	14,390.11
Network A	150 US\$	0,15 US\$	10.58	973.23	973.23
Equinix	100 US\$	100,00 US\$	0.00	0.00	0.00
DTAG	56,08 US\$	0,00 US\$	18,059.99	7,359.33	18,059.99
SP-Fabric	0 US\$	0,00 US\$	<0.01	0.01	0.01
Verizon	0 US\$	0,00 US\$	4.00	0.40	4.00

Do we use our IX port well?

# Which new peers?

**Dimensions**

Source AS Number

Edit Dimensions

**Metrics**

bits/s

Customize Metrics

**Time**

Compare over previous period

Last Week

UTC

Use AWS Timestamps (Beta)

**Filtering**

Include all

- Source Connectivity Type equals Transit
- Source Network Boundary equals External
- Source ASN is member of IX equals AMS-IX

Include any

- Source ASN peering policy equals Open
- Source ASN peering policy equals Selective

Edit Filters

**Bracketing**



**If we build in  
Ashburn, which  
IX would we join?**





If we build in Ashburn, which IX would we join?

# How much traffic do we send to members of each?

**Data Sources** 208 of 208

**Dimensions**

Filter-Based Total

Edit Dimensions

**Metrics**

bits/s

Customize Metrics

**Time**

Compare over previous period

Last Week

UTC

Use AWS Timestamps (Beta)

**Filtering**

Include all

- Source Network Boundary equals External
- Source Connectivity Type equals Transit

Include any

- Source ASN peering policy equals Open
- Source ASN peering policy equals Selective

Edit Filters



If we build in Ashburn, which IX would we join?

# Filters to dimensions

### Group By Dimensions

Preset **Filter-Based**

Includes all traffic that does not match any of the series defined below

Series Remove All Series

Name: LINX NoVa

✓ Include results matching All of the following conditions:

Source ASN is member of IX equals LINX NoVA ×

+ Add Ad Hoc Filter   + Add Saved Filter   + Add Nested Group Remove Series

Name: Equinix Ashburn

✓ Include results matching All of the following conditions:

Source ASN is member of IX equals Equinix Ashburn ×

+ Add Ad Hoc Filter   + Add Saved Filter   + Add Nested Group Remove Series

Name: Digital Realty

✓ Include results matching All of the following conditions:

Source ASN is member of IX equals Digital Realty Ashburn ×

+ Add Ad Hoc Filter   + Add Saved Filter   + Add Nested Group Remove Series

Cancel Save

**Where should  
we build next?**



Where should we build next?

# Where does the transit traffic go?

### Dimensions

- Destination Region
- Destination City

Edit Dimensions

### Metrics

bits/s

Customize Metrics

### Time

Compare over previous period

Last Week

UTC

Use AWS Timestamps (Beta)

### Filtering

Include all

- Destination Network Boundary equals External
- Destination Connectivity Type equals Transit

Include any

- Destination ASN peering policy equals Open
- Destination ASN peering policy equals Selective

Edit Filters

Library > where to build

Refresh Share Actions Saved Views Query

### where to build

Destination Region	Destination City	Average Mbits/s	95th Percentile Mbits/s	Max Mbits/s	Last Datapoint Mbits/s
Ohio	Columbus	53.58	58.00	68.53	55.36
Emilia-Romagna	Ravenna	46.50	70.13	74.34	63.61
California	Mountain View	49.19	106.10	166.57	55.64
Iowa	Council Bluffs	40.74	44.52	47.68	40.73
New York	New York City	24.21	46.43	97.27	7.14
California	San Francisco	20.72	28.01	428.45	20.85
Virginia	Ashburn	16.09	32.02	191.58	16.76

Where should we build next?

# Which data center to build in?

**Dimensions**

Filter-Based DC comparison

Edit Dimensions

**Metrics**

bits/s

Customize Metrics

**Time**

Compare over previous period

Last Week

UTC

Use AWS Timestamps (Beta)

**Filtering**

Include all

- Destination Network Boundary equals External
- Destination Connectivity Type equals Transit
- Destination Region equals Ohio

Include any

- Destination ASN peering policy equals Open
- Destination ASN peering policy equals Selective

Edit Filters



Where should we build next?

# Filters to dimensions

### Group By Dimensions

Preset **Filter-Based**

Series

Name

✓ Include ▾ results matching All ▾ of the following conditions:

Destination ASN is available at Facility ▾ ↕ equals ▾ Cologix COL1

+ Add Ad Hoc Filter   ≡\* Add Saved Filter   ≡\* Add Nested Group

Name

✓ Include ▾ results matching All ▾ of the following conditions:

Destination ASN is available at Facility ▾ ↕ equals ▾ Cologix COL2

+ Add Ad Hoc Filter   ≡\* Add Saved Filter   ≡\* Add Nested Group

Name

✓ Include ▾ results matching All ▾ of the following conditions:

Destination ASN is available at Facility ▾ ↕ equals ▾ Cologix COL3

+ Add Ad Hoc Filter   ≡\* Add Saved Filter   ≡\* Add Nested Group



# SHOUT

Big shout **OUT** to the team and the community for creating and maintaining PeeringDB

There is a talk from PeeringDB already, but let us call out:

- ✓ Support the team
- ✓ Keep your records updated
- ✓ Bring in your ideas for improvements to the team

# Enriched data is a way to create efficient workflows



The data shared from the community is valuable.  
Imagine what else we could share and use?





# Thank you!

Jac Kloots  
jac@kentic.com

 in/jkloots

 [Join Kentik on Slack](#)

