



**RIPE NCC**  
RIPE NETWORK COORDINATION CENTRE

# IXP Workshop

What tooling is missing?

November 2016 | EURO-IX Forum | Krakow, PL

# Goals

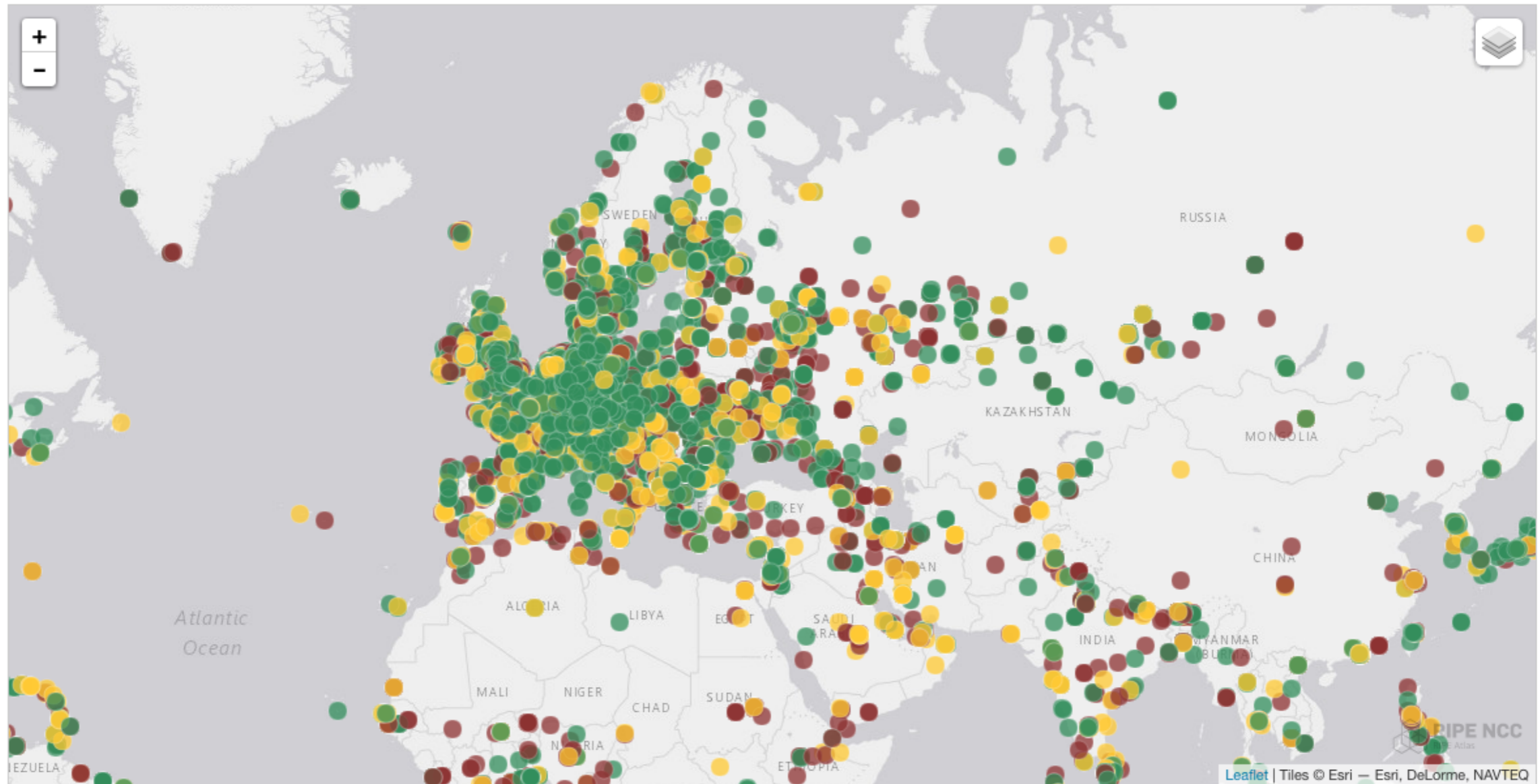


- Improve use of RIPE NCC platforms and data for IXPs
- Can the RIPE NCC and IXP community work together to build tools?



**Data**

# RIPE Atlas



<https://atlas.ripe.net>

# RIPE Atlas Devices



- Probes (9,300+)
  - Small Linux devices
- Anchors (220+)
  - Large probes
  - Stable, regional targets
- Do measurements (ping, traceroute, DNS...)
  - Towards DNS root servers and probes to anchors
  - On demand





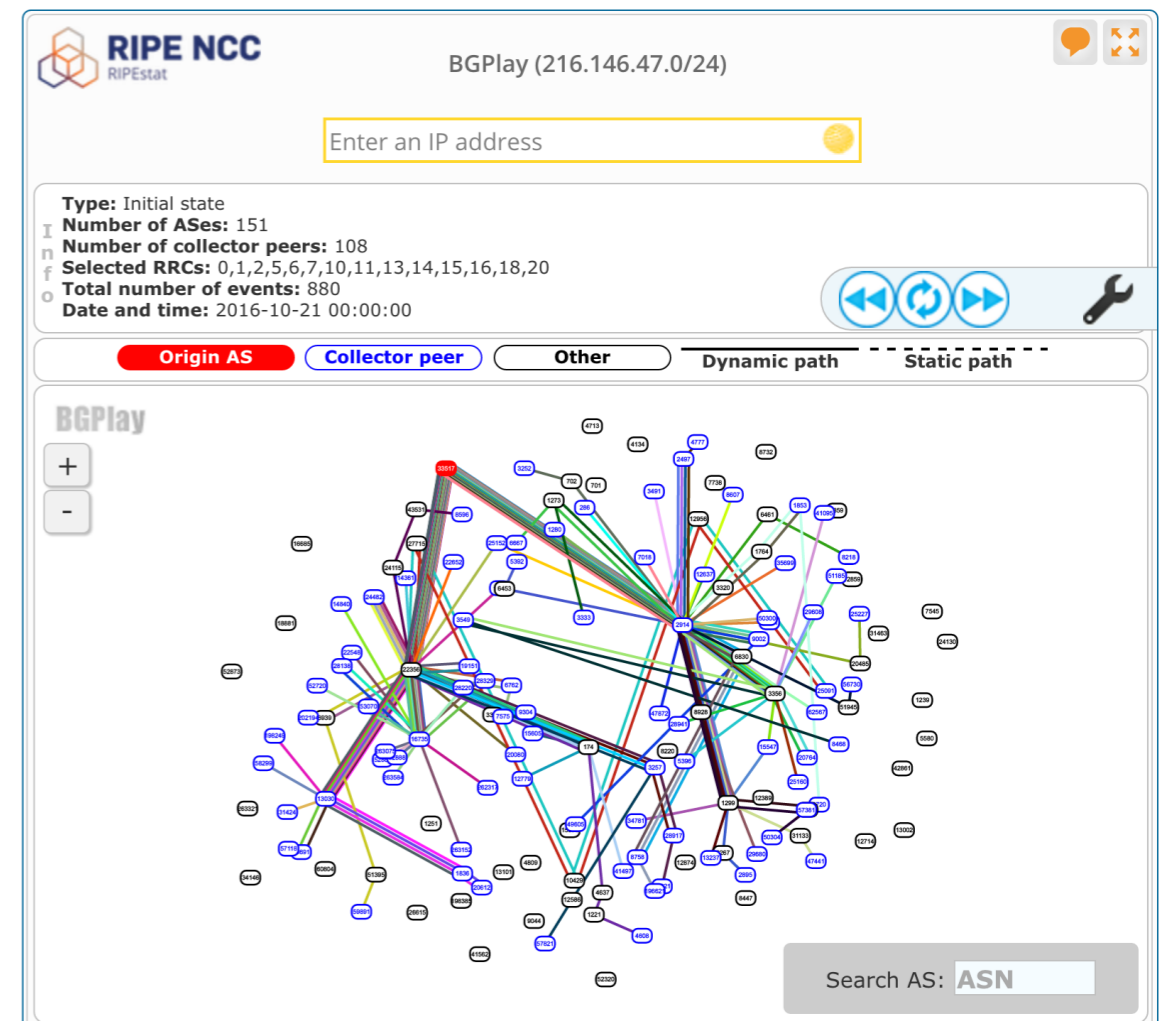
# RIPE Atlas and IXPs

- 84 RIPE Atlas probes self-tagged as **IXP**
- 17 RIPE Atlas anchors at IXPs
- Many more in IXP participants, i.e. INEX:
  - 27 participants with RIPE Atlas probes in IE
  - 6 non-participants with RIPE Atlas probes in IE
  - 60 participants without RIPE Atlas probes in IE
- PeeringDB: 68 networks in facilities in Dublin
- We all have little pieces of the puzzle!

# Routing Information Service (RIS)



- BGP route collector system
  - Collectors: 14 Quagga based, 4 ExaBGP based
  - Mix of full and partial feeds
  - Most at IXPs
  - Powers part of RIPEstat / BGPlay
  - Real-time data feeds
  - <https://ris.ripe.net/>



# RIS and IXPs



- Not taking IXP route server data right now
- Problem: At IXP route servers, we'd only get best path
  - Working to fix this: MRT / ADD\_PATH capability
  - In the future, we could have a separate route collector with multi-hop sessions to all the interested IXPs





# Other Data

- Other route collectors (PCH, IXPs)
- Flow data
  - At the IXP and/or IXP participant
- PeeringDB
- EURO-IX JSON
- What else?



# Current Tools





# IXP-Country-Jedi



- Framework to do mesh-traceroute between probes:
  - In a country
  - In a city
- Detect IXPs (from PeeringDB)
- Uses OpenIPMap (crowdsourced infrastructure geolocation) for IP geolocation
- Prototype!

# IXP-Country-Jedi



-  IXP IPs: YES, out-of-country IPs: NO
-  IXP IPs: NO, out-of-country IPs: NO
-  IXP IPs: YES, out-of-country IPs: YES
-  IXP IPs: NO, out-of-country IPs: YES



[sg-pub.ripe.net/emile/ixp-country-jedi/history/2016-11-01/PL/](http://sg-pub.ripe.net/emile/ixp-country-jedi/history/2016-11-01/PL/)

# IXP-Country-Jedi



- Data runs monthly:

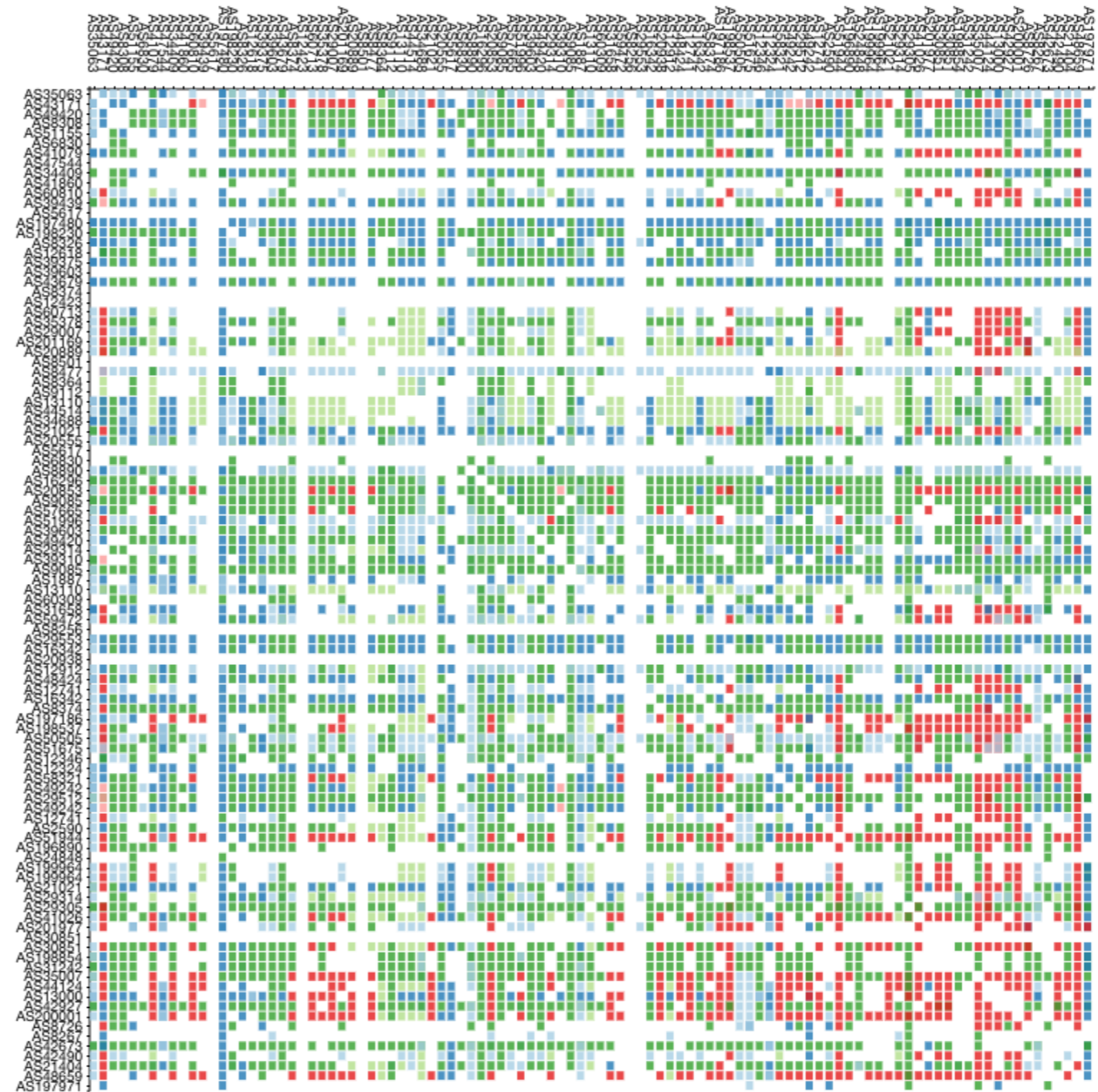
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# IXP-Country-Jedi



- Coloured by IXP LAN
- Not quantitative



[sg-pub.ripe.net/emile/ixp-country-jedi/history/2016-11-01/PL/](http://sg-pub.ripe.net/emile/ixp-country-jedi/history/2016-11-01/PL/)

# RIPE NCC IXP Tools Hackathon



**AUTOMATE ALL THE THINGS**



<https://labs.ripe.net/Members/becha/ixp-tools-hackathon-results>

# IXP Tools Hackathon Projects



- Universal looking glass
  - Load MRT dumps from any collector and query it "looking-glass style"
- Bird's eye
  - An API (and UI, and CLI) for insight into BIRD
- Remote Peering Jedi
  - Detects remote peers at IXPs and geolocate them
- Peer Match-making
  - Which peerings may be useful for me?



# IXP Tools Hackathon Projects



- IXP Valuator
  - Measure IXPs' role in connecting local eyeballs with local content
- PeerMe ("make peering great again")
  - Discover and generate possible peering (configurations) between ASNs
- Pinder (Tinder for Peering)
  - Swipe right for a new peering relationship

<https://github.com/RIPE-Atlas-Community/ripe-atlas-community-contrib/blob/master/README.md>

# Asymmetric Routing Over IXPs



- Helps improve IXP

## Asymmetric Routing Over IXPs

A tool to detect asymmetric routing over IXPs using bi-directional traceroutes from [RIPE Atlas](#) probes.

This tool will identify networks with asymmetric routing over an IXP. The two qualifying criteria are:

- the IXP must have a publically accessible [JSON export](#);
- the IXP member / customer must have at least one public RIPE Atlas probe within their directly connected ASN (on a per protocol basis)
- do you want to get your IXP added? Open a issue on [GitHub](#) with your JSON export URL. Or contact [barry.odonovan \(at\) inex \(dot\) ie](mailto:barry.odonovan@inex.ie)

## Create a Detection Request

### Step 1: Choose an IXP

INEX

### Step 2: Choose a protocol

IPv4

### Step 3: Choose a member/customer

HEAnet - AS1213

### Step 4: Submit!

Submit

<http://ard.inex.ie>

A Project of the [RIPE Atlas Interface Hackaton](#), at [RIPE72](#), Copenhagen, Denmark. May 2016. [MIT License](#).



# Future Tools?

# Audiences & Incentives



- IXPs:
  - Attract new participants
  - Add value to existing participants
- Network operators:
  - Who should I peer with?
  - Where should I peer next?
  - Improve existing peering
- Internet community:
  - For the good of the Internet



# Value of an IXP

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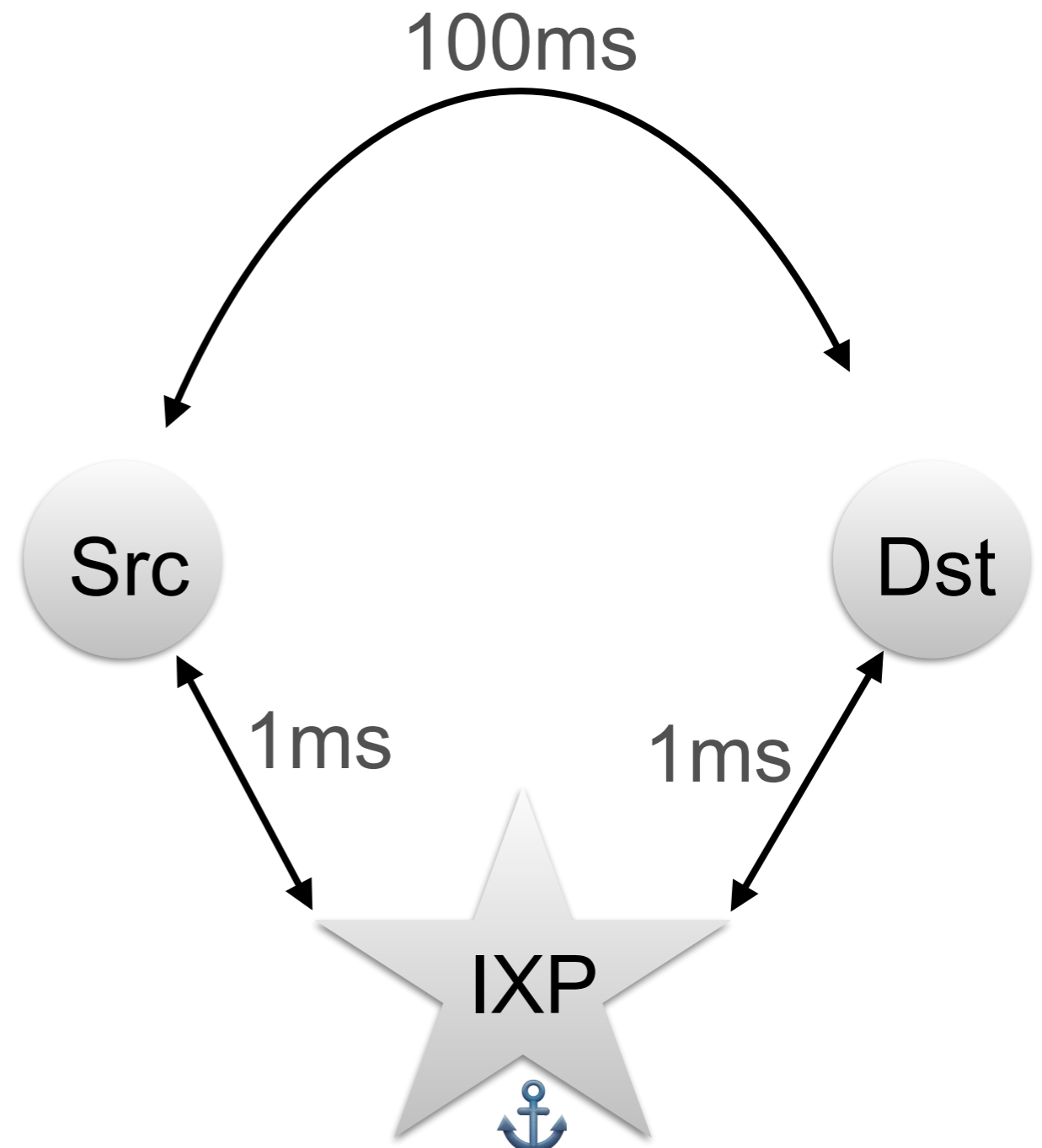
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  - Quality : Translate to latency? Locality?
  - Cost : Data volume, not things we can measure from the outside
  - Other?

# Concept: Demonstrating Improved Latency



- Latency between two points compared to latency to IXP
- Could use RIPE Atlas anchor at IXP for this





# Idea: Where To Peer Next?

- A tool to help potential members show the value of peering at your IXP
- Is this possible?
- What is the value proposition of your IXP?
  - Keeping local traffic local
  - “By connecting to <IXP> you’ll improve <metric> by <huge-number>”

# Idea: *Where To Peer?* (continued)

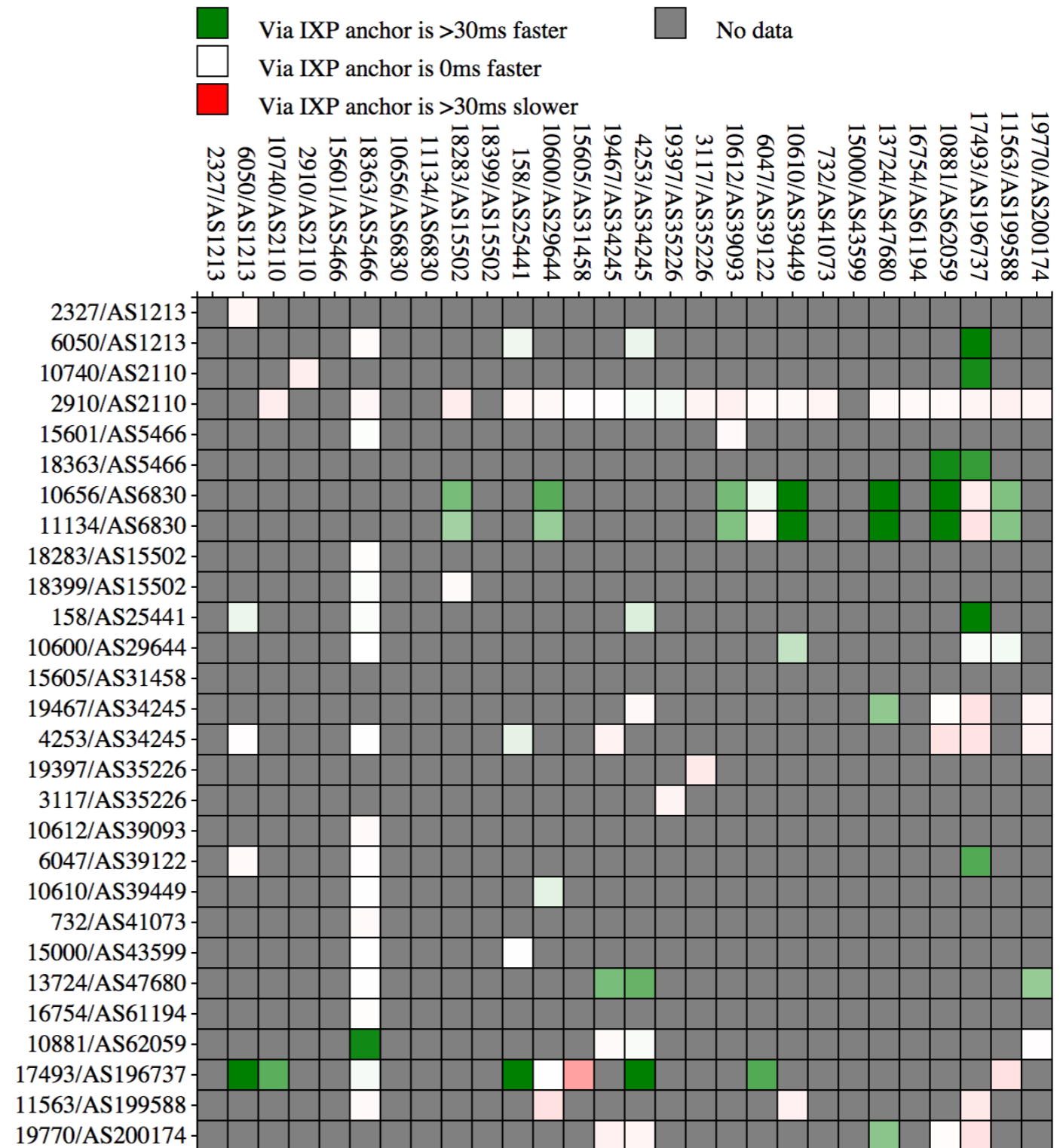
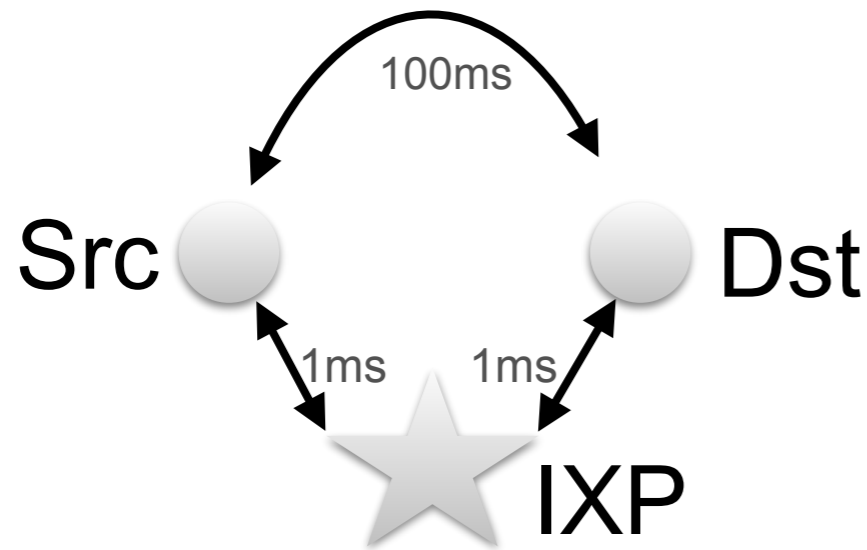


- IXP manually finds the interesting targets
- Ask IXP participants what interesting things they host
- Automate finding the cases where your IXP shines
  - Prefixes at your route servers?
  - How else?
- Your bright ideas here!

# Idea: *Whom to Peer With?*



- Hackathon projects focused on automation around peering
- Can we help make this data assisted?





# Idea: IXP Meta-Looking Glass

- What if your looking glass also contained many views from your members?
- Better facilitate debugging by your members
- RIPE Atlas probes can ping/traceroute in near real time (typically within 1 min)
- Tool: Create a view of RIPE Atlas specific to your IXP that contains:
  - Sources: RIPE Atlas probes close to the IXP/in IXP participant
  - Destinations: Useful destinations at the IXP



# Idea: Extended Looking Glass



## INEX Looking Glass (Dublin, Ireland)

Only for

Type of Query	Additional parameters	Node
<input type="radio"/> bgp		
<input type="radio"/> bgp received-routes		
<input type="radio"/> bgp routes		
<input type="radio"/> bgp advertised-routes		
<input type="radio"/> bgp summary		
<input type="radio"/> ping		
<input checked="" type="radio"/> trace		
	IPv4	
	<input type="button" value="Submit"/>	<input type="button" value="Res"/>

INEX Routers

- ✓ INEX Route Collector

INEX Route Servers

- Route Server 1, Peering LAN 1, IPv4
- Route Server 1, Peering LAN 1, IPv6
- Route Server 1, Peering LAN 2, IPv4
- Route Server 1, Peering LAN 2, IPv6

INEX Members - HEAnet

- Citywest - ar3-cwt.hea.net \*
- Blanchardstown - blanch-sr1.services.heanet \*

Public Route Servers

- AT&T (AS 7018)
- Global Crossing (AS 3549)
- Oregon Exchange (AS 6447)
- Energis (AS 5388)
- Colt (AS 8220)
- Exodus Communications (AS 3561)
- Tiscali (AS 3257)
- TELUS Ontario (AS 852)
- Group Telecom
- Opentransit (AS 5511)

stics. If you don't like this policy, please disconnect now!

Please email questions or comments

... extend with RIPE Atlas probes

# Your Ideas Here!



● . . . .

# What Can IXPs Do for the RIPE NCC?

- Distribute probes
- Become an RIPE Atlas ambassador
- Host a K-root server
- Host a RIPE Atlas anchor
- Host a RIS Remote Route Collector