RIPE NCC
RIPE NETWORK COORDINATION CENTRE

Can we measure the (de)centralisedness of the Internet with RIPE Atlas?

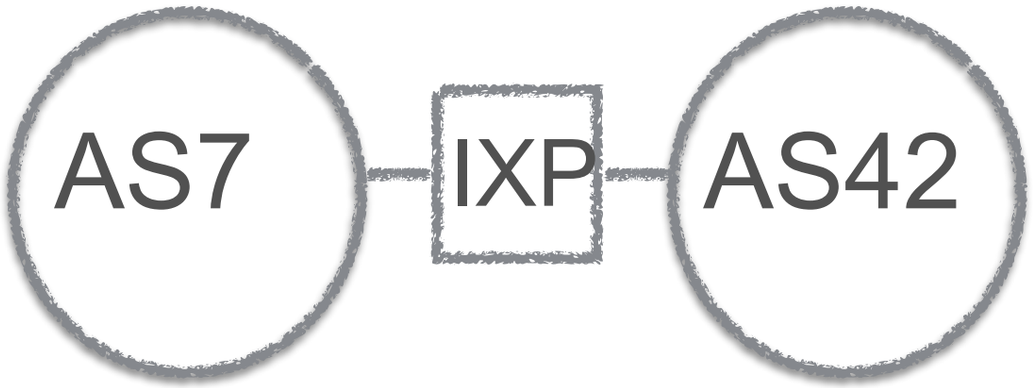
emile.aben@ripe.net | 2018 | FOSDEM

(De)centralisedness? Disclaimers

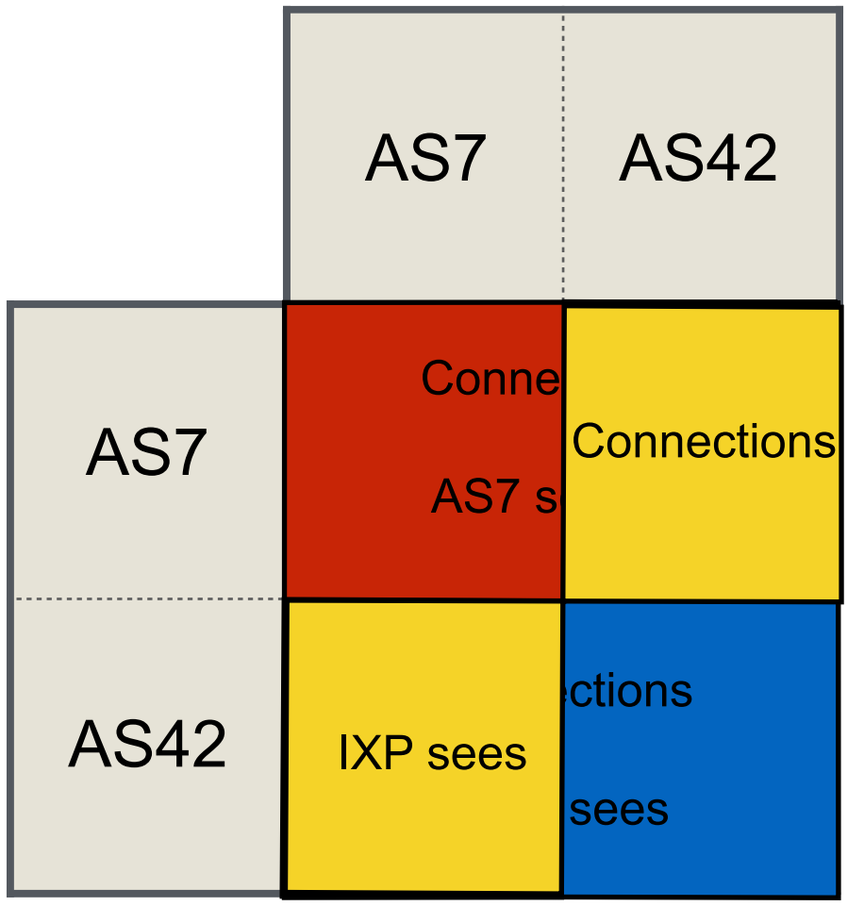
- What is the (de)centralised Internet?
- My focus
  - (De)centralised infrastructure
- Current Internet: client -> server (server is centralised)
- For (de)centralisedness -> go back to true end-to-end (ie. user to user)?

Toy Example

- 2 networks
  - 50% users each,
  - 1 IXP between



- Networks both see 75% of connections
- IXP sees 50%
- nr. users != nr. connections



Measure this (de)centralisedness?

- Assuming all user to user communication channels are equally important, we need:

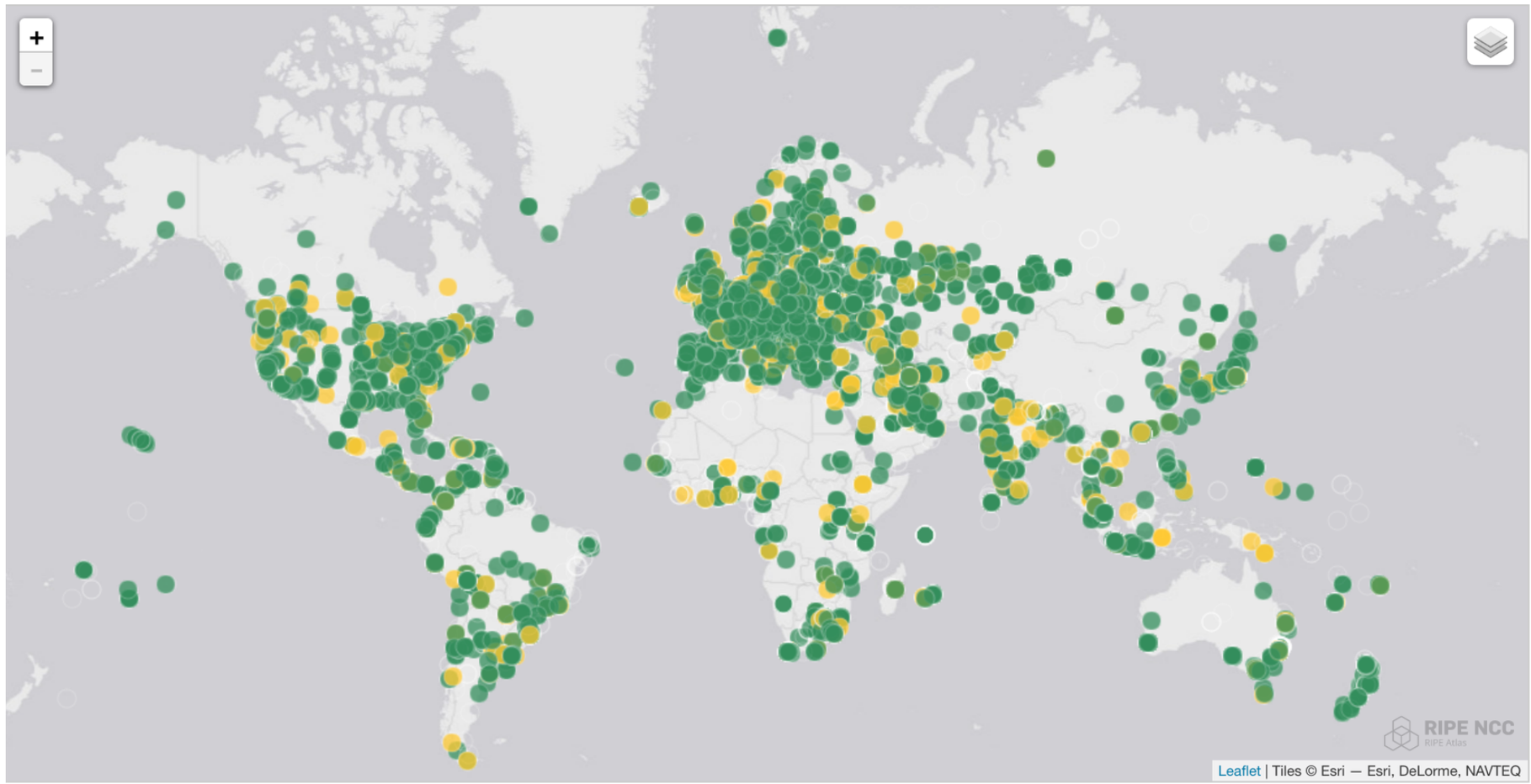
  A. Representative vantage points in all user networks

  B. Estimates of populations in user networks

  C. A tool that measures all the “things” between these vantage points

Ingredient (A): RIPE Atlas

- Measure the Internet!
  - By community, for community
- It's on Wikipedia: https://en.wikipedia.org/wiki/RIPE_Atlas



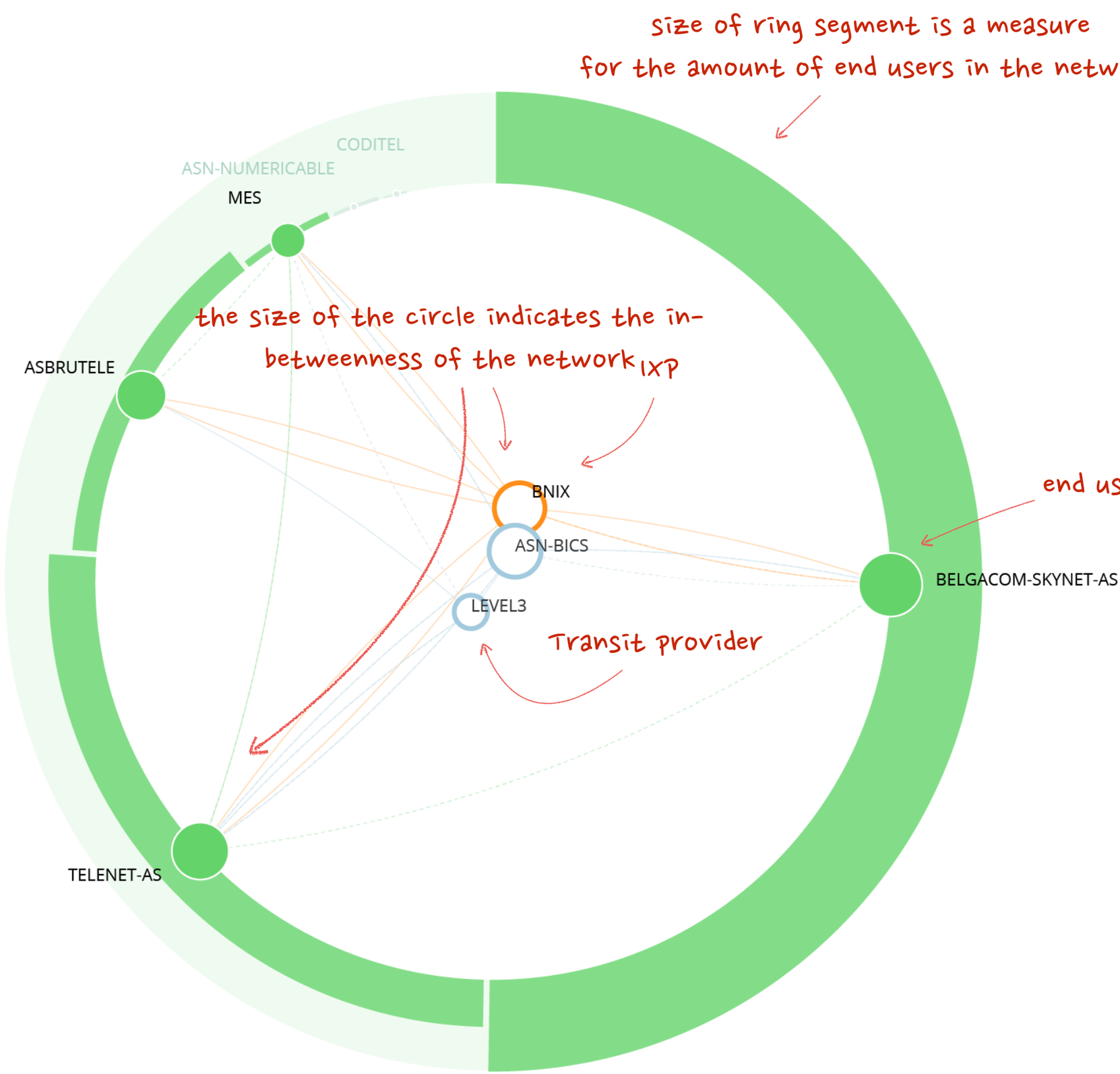
Ingredients (B) + (C)

- (B) User population estimates (APNIC data)
  - measurement-based rough estimate
  - https://stats.labs.apnic.net/aspop/
- (C) IXP-country-jedi
  - https://www.ripe.net/ixp-country-jedi/
  - mesh traceroutes between RIPE Atlas probes in a country
  - measures and analyses (using OpenIPMap)
- Many caveats: Results are ‘sketches’

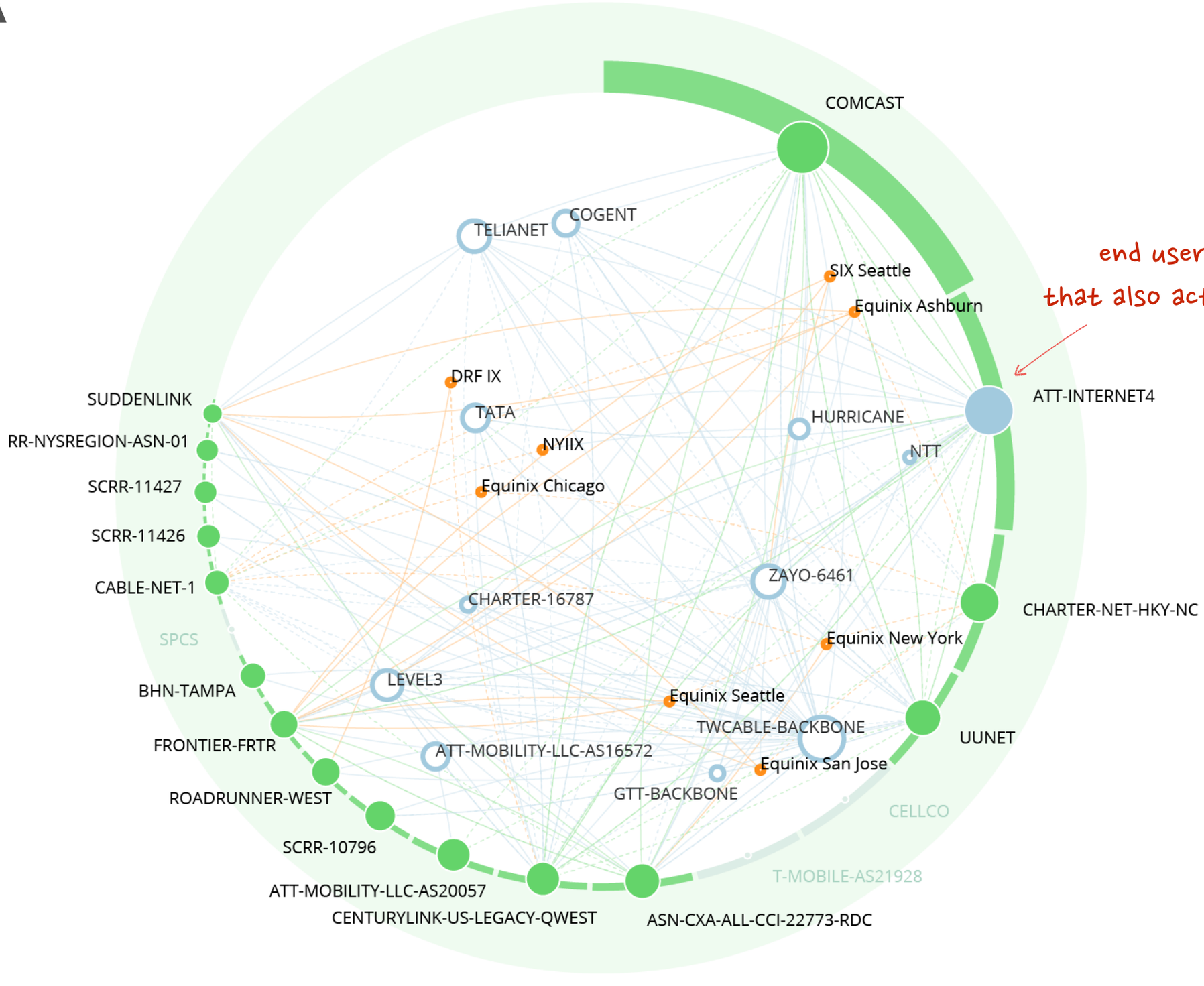
Show me the Data!

Section subtitle

Belgium

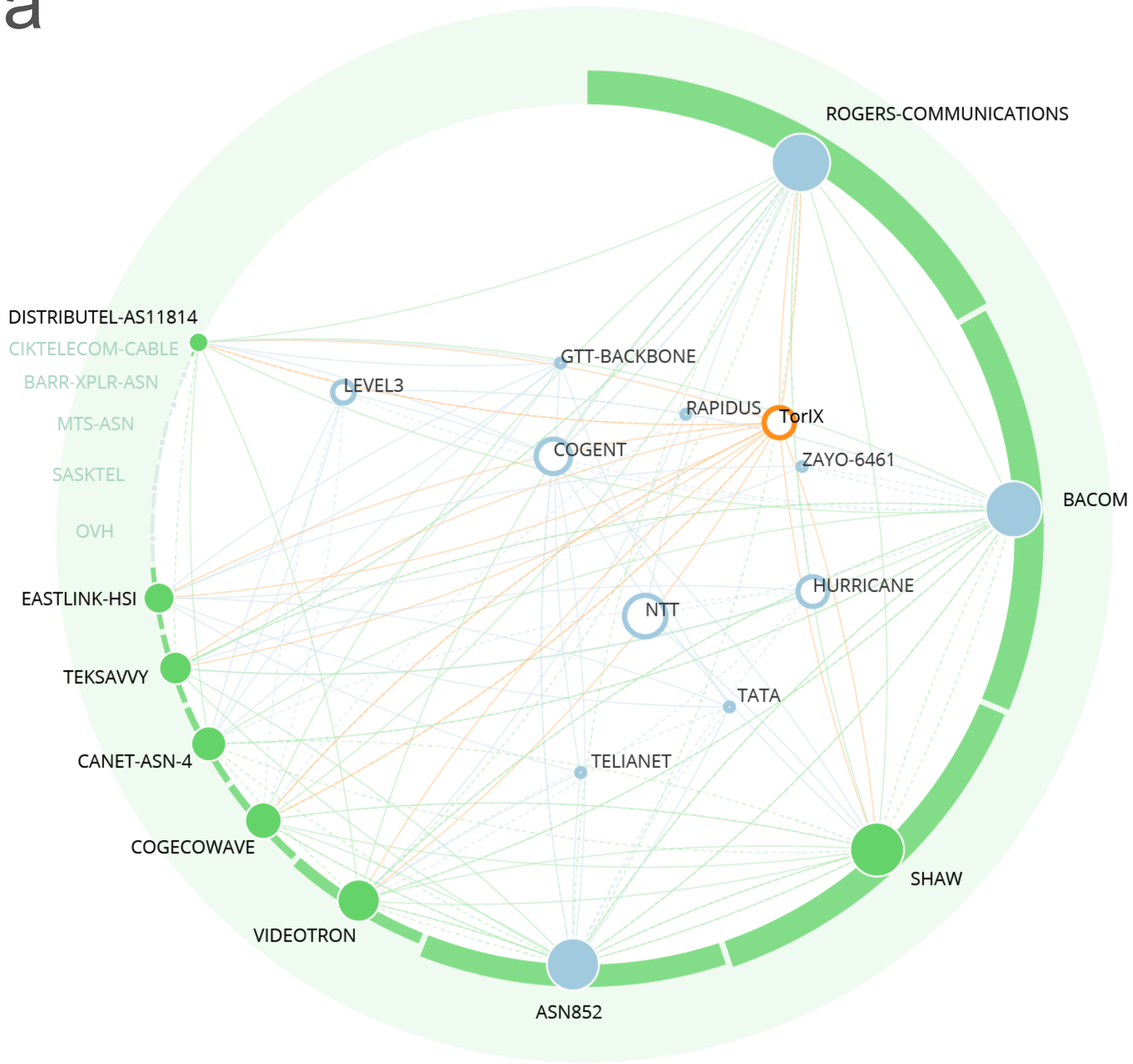

size of ring segment is a measure
for the amount of end users in the network
CODITEL
ASN-NUMERICABLE
MES
the size of the circle indicates the in-
betweenness of the network
ASBRUTELE
IXP
BNIX
ASN-BICS
end users network
BELGACOM-SKYNET-AS
LEVEL3
Transit provider
TELENET-AS

USA

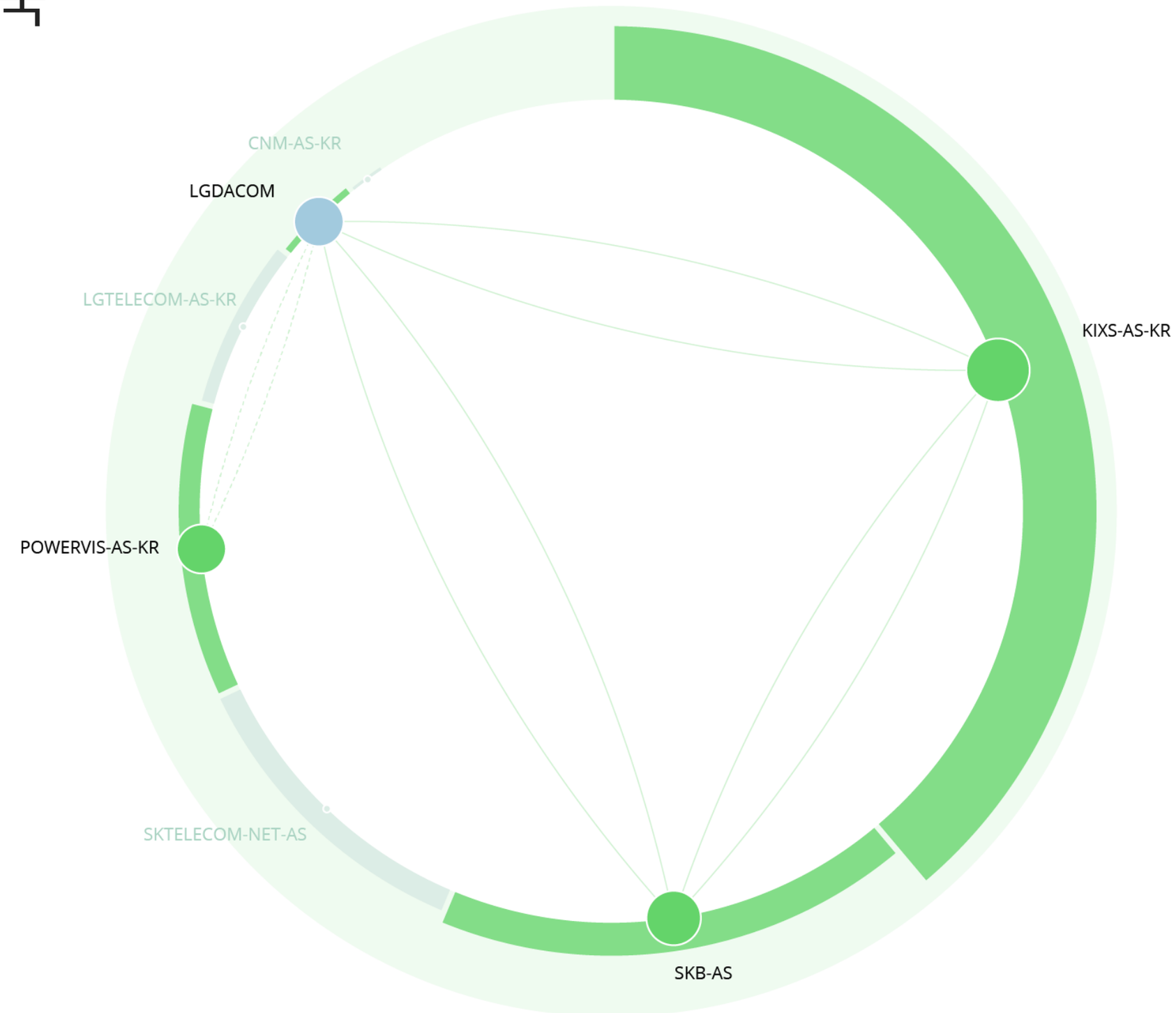


end users network
that also acts as a transit

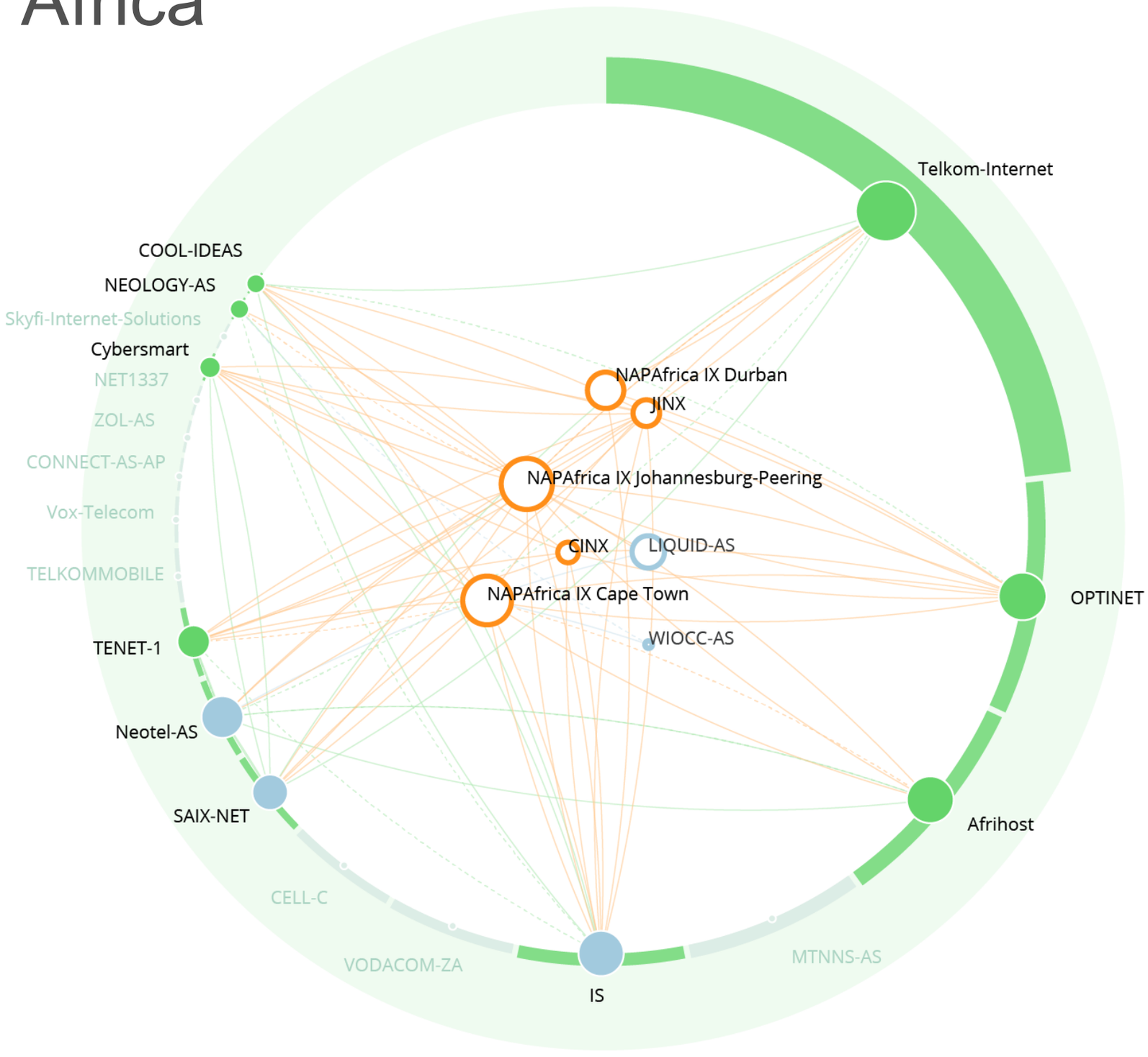
Canada


ROGERS-COMMUNICATIONS
DISTRIBUTEL-AS11814
CIKTELECOM-CABLE
BARR-XPLR-ASN
MTS-ASN
SASKTEL
OVH
EASTLINK-HSI
TEKSAVVY
CANET-ASN-4
COGECOWAVE
VIDEOTRON
ASN852
SHAW
BACOM
GTT-BACKBONE
LEVEL3
RAPIDUS
TorIX
COGENT
ZAYO-6461
HURRICANE
NTT
TATA
TELIANET

대한민국


CNM-AS-KR
LGDACOM
LGTELECOM-AS-KR
KIXS-AS-KR
POWERVIS-AS-KR
SKTELECOM-NET-AS
SKB-AS

South Africa



Mexico

RadioMovil
Cablevision
Cablemas
Cablemas
Axtel
Cablemas
Television
Operbes
COGENT
TRANSTELCO-INC
TELIANET
GTT-BACKBONE
BTN-ASN
Uninet
TOTAL
Cablevisión
Mega

RIPE NCC
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Can we measure the (de)centralisedness of the Internet with RIPE Atlas?

Yes! We can create sketches of what infrastructure is between users

emile.aben@ripe.net | 2018-01-28 | FOSDEM

Next Steps

- Validate the model
  - Can you poke holes in it?
  - Does it look right for countries you know?
- Do this for decentralised networks?
  - Any takers?
  - Add RIPE Atlas probes to your networks, and label them
  - “hackerspaces-jedi”: https://labs.ripe.net/Members/becha/the-next-42-ripe-atlas-probes-at-hackerspaces
  - Or use similar methodology with data + path-measurement-tools at your disposal

More Info

- https://github.com/emileaben/ixp-country-jedi/

- http://sg-pub.ripe.net/ixp-country-jedi/XX/2018/01/01/

Your country code here!!

- Upcoming: RIPE Labs blog post about this!

https://labs.ripe.net/

Questions

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@meileaben

credits:
viz: Jasper Den Hertog @density215
ideas: Vesna Manojlovic @Ms_Multicolor
analysis: Petros Gkigkis @GigisPetros

RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE NCC Community Building

Vesna Manojlovic
BECHA@ripe.net

FOSDEM | 2018 | Brussels

RIPE NCC Community Building

- RIPE meetings
  - RACI programme / RIPE Fellowship / Diversity TF
- Other events organised by RIPE NCC
  - Regional meetings / Training courses & on-line education / Hackathons
- Community support
  - NOG support / Community Projects Fund
- RIPE Atlas
  - Probe hosts / Anchor hosts / Ambassadors / Sponsors / FLOSS Devs
- RIPE Labs

RIPE Meetings

RIPE Meetings

- Twice a year, whole week long
- Working groups, plenary sessions, tutorials
  - Remote participation possible
  - tickets: week (€ 350), day (€ 125), student/week (€ 50)
  - new LIRs get two “gratis” tickets
- RIPE 76: Marseille, France: 14-18 May, 2018
  - https://ripe76.ripe.net
- RIPE 77: Amsterdam: 15-19 October 2018
  - https://www.ripe.net/participate/meetings

- Students and researchers:
  - Present your Internet-related research at RIPE Meetings
  - Complimentary tickets, travel and accommodation
  - Topics: network measurement and analysis, security, IPv6 deployment, BGP routing, Internet governance, peering and interconnectivity, IoT
- ripe.net/raci

RIPE Fellowship

- Get support to attend RIPE meeting
  - Removing the cost barrier
  - Increasing diversity
  - https://labs.ripe.net/Members/agowland/apply-now-for-new-ripe-fellowship-programme
- Five fellows/felow-esses per meeting
  - Complimentary tickets, travel and accommodation provided
- Apply from February 2018
  - https://www.ripe.net/participate/ripe/ripe-fellowship

RIPE Diversity Task Force

- Diversity is important!
- Started a Task Force to coordinate the efforts
  - https://www.ripe.net/participate/ripe/tf/ripe-diversity-task-force
- Mailing list:
  - https://lists.ripe.net/mailman/listinfo/diversity
- Articles:
  - https://labs.ripe.net/diversity

Other Meetings

Regional Meetings

- Once a year:
- MENOG
- ENOG
- SEE

- https://www.ripe.net/participate/meetings/regional-meetings
- Open to everyone
- Also: mailing lists for regional cooperations

Training courses

- Six different types
- Every week, all over RIPE NCC region
  - LIRs/members only
  - One day, or two day, or with a lab / workshop
- On-line options: Academy, Webinars, Tutorials
  - open to everyone
- ripe.net/training / training@ripe.net

Community Support

NOG Support

- (country) Network Operators Groups
  - e.g. SwiNOG, iNOG, NLNOG, UKNOF, RSNOG, DENOG…
- labs.ripe.net/nogs
- An overview of events, a calendar, and a map
- RIPE NCC has funding for NOG meetings
  - supporting mostly new or smaller NOGs
- Please ask if you want us to send a speaker

Community Projects Fund

- Very new, first time this year!
- RIPE NCC is financially supporting projects that benefit Internet community (250,000 Euro)
- Info: https://www.ripe.net/support/cpf/ripe-ncc-community-projects-fund
- Apply: https://www.ripe.net/support/cpf/application-for-good-of-the-internet-funding
- Deadline: 24 November!

net-grrl
IT WOMEN
lacnic
lacnic
Internet Society
I Peering
de-cix.net
DNS
lacniclabs
labs.lacnic.net
TIC/ICT
AdviceMeTech

Selectel
ThinkPad
LINUX PITER
Selectel
lenovo
Jenkins
JET BRAINS
GitLab
PostgreSQL
THE X FILES
THE TRUTH IS OUT THERE!

DISOBEY
Tor
DRG
Here Be Dragons
18-20 OCTOBER 2016
NOTHING IS BEYOND A GOOD HACK
HACK.LU
MISP
Threat Sharing
SHARE YOUR BLOODY INDICATORS
I DO NOT CONSENT TO THE SEARCH OF THIS DEVICE.
EFF.ORG
SANS NetWars Competition
NETWARS
INTERACTIVE CYBER RANGE
NATIONAL SECURITY AGENCY
MONITORED DEVICE
OISF
OPEN INFORMATION SECURITY FOUNDATION

I Support Online Rights
ELECTRONIC FRONTIER FOUNDATION EFF.ORG
#fiber4you
I HAVE IPv6
IPv6 IS DA SHIT
ENGINEERING ADVISORY
I WANT YOU TO USE IPv6
FundedByMe
I DO NOT CONSENT TO THE SEARCH OF THIS DEVICE
SWEDEN

Previous RIPE NCC Hackathons

- labs.ripe.net/hackathons
  - RIPE Atlas DataViz (March 2015)
  - RIPE Atlas Tools for Operators (October 2015)
  - RIPE Atlas Interfaces (April 2016)
  - IXP Tools (October 2016)
  - IXP Tools Code-Sprint (April 2017)
  - DNS Measurements (April 2017)
  - Version6 (November 2017)
- All code on GitHub

Future Participation in Hackathons

- Use the software and tools
  - Share your use cases and success stories
- Modify the code, contribute improvements
  - All the code is on GitHub
- Early call for 2018
  - Two events planned: Spring and Autumn 2018
  - Be a host / local partner / juror / sponsor
  - Be a participant again :)
- Watch this page: https://labs.ripe.net/hackathons

RIPE Atlas

RIPE Atlas – Wikipedia, the free encyclopedia

https en.wikipedia.org/wiki/RIPE_Atlas

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RIPE Atlas

From Wikipedia, the free encyclopedia

RIPE Atlas is a global, open, distributed Internet measurement platform, consisting of thousands of measurement devices that measure Internet connectivity in real time.

Contents [hide]

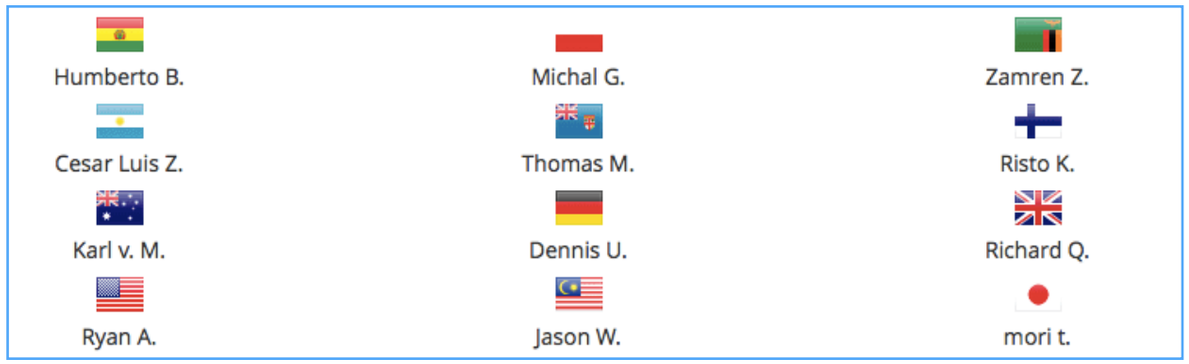
1 History
2 Technical details
3 Community
4 Research papers
5 Similar projects
6 References
7 External links
8 Categories

Most Popular Features

- Six types of measurements: ping, traceroute, DNS, SSL/TLS, NTP and HTTP (to anchors)
- APIs to start measurements and get results
- Powerful and informative visualisations
- CLI tools
- Streaming data: real-time results
- “Time Travel”, LatencyMON, DomainMON, TraceMON
- Roadmap shows what’s completed and coming

RIPE Atlas Community Participation

- 19,000 probes given to volunteers / hosts
  - out of that, 10,000+ active
- 36,000 users
- 311 anchors hosted by operators



- On average five sponsors every year
- 400+ ambassadors, at many conferences
  - https://atlas.ripe.net/landing/get-involved/
  - https://atlas.ripe.net/get-involved/community/

Get Involved!

- Use RIPE Atlas for your operations: monitoring, troubleshooting, measuring
- Do scientific research
- Participate in a webinar
- Add multi-lingual content
- Become an ambassador or a sponsor
- Host a RIPE Atlas anchor
- Place a probe in a new exotic location

More info & contacting RIPE Atlas

- https://atlas.ripe.net

- Use cases and updates: https://labs.ripe.net/atlas
- Mailing list for active users:
  - ripe-atlas@ripe.net
  - https://www.ripe.net/participate/mail/forum/ripe-atlas
- Questions: atlas@ripe.net
- Twitter: @RIPE_Atlas and #RIPEAtlas

- Publish your research or use case
- Reach out to RIPE Community
- Read about latest analysis or conferences
- labs.ripe.net

End of hackathon: GRATITUDE!

- Big thanks to:
  - Comcast - our sponsor!
  - DKNOG - local support!
  - ITU.dk - our location host!
  - JURORS!
  - … and of course ALL OF THE PARTICIPANTS!!!
  - and to your families who are missing you this weekend, and gave you support to prepare, travel & recover :)

End of hackathon: Give us feedback!

- What did you like?
  - coffee? stickers? T-shirts?
  - VMs?
  - communications channels?
  - stroopwafels??
- What could have been better?
  - we’d like to improve for the next time!
- BECHA@ripe.net