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Brasil Peering Forum

MANRS

Introduction to MANRS

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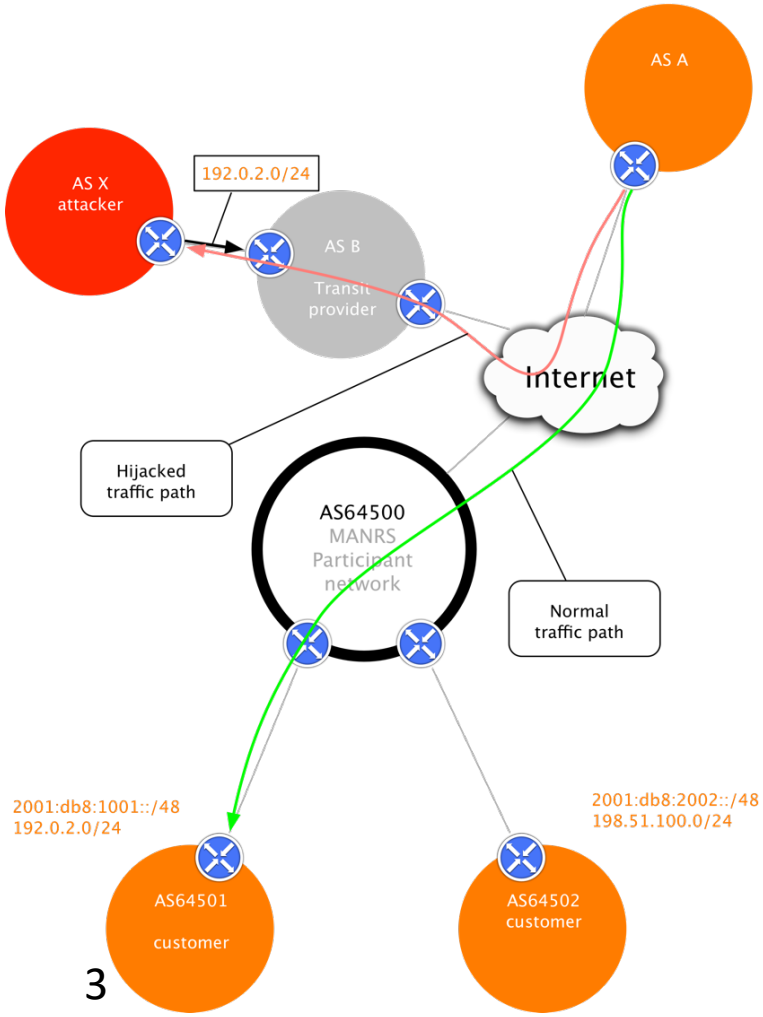
Disclaimer

Opinions expressed are solely my own and do not express the views or opinions of my employer.

Why MANRS

How routing works

- PACKETS
- DESTINATIONS / ANNOUNCEMENTS
- REACHABILITY
- FORWARDING



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What problems are we trying to mitigate: Routing incidents

Event	Explanation	Repercussions	Example
Prefix/Route Hijacking	A network operator or attacker impersonates another network operator, pretending that a server or network is their client.	Packets are forwarded to the wrong place, and can cause Denial of Service (DoS) attacks or traffic interception.	*The 2008 YouTube hijack*
Route Leak	A network operator with multiple upstream providers (often due to accidental misconfiguration) announces to one upstream provider that is has a route to a destination through the other upstream provider.	Can be used for traffic inspection and reconnaissance.	*September 2014. VolumeDrive began announcing to Atrato nearly all the BGP routes it learned from Cogent causing disruptions to traffic in places as far-flung from the USA as Pakistan and Bulgaria.*
IP Address Spoofing	Someone creates IP packets with a false source IP address to hide the identity of the sender or to impersonate another computing system.	The root cause of reflection DDoS attacks	*March 1, 2018. Memcached 1.3Tb/s reflection-amplificationattack reported by Akamai*

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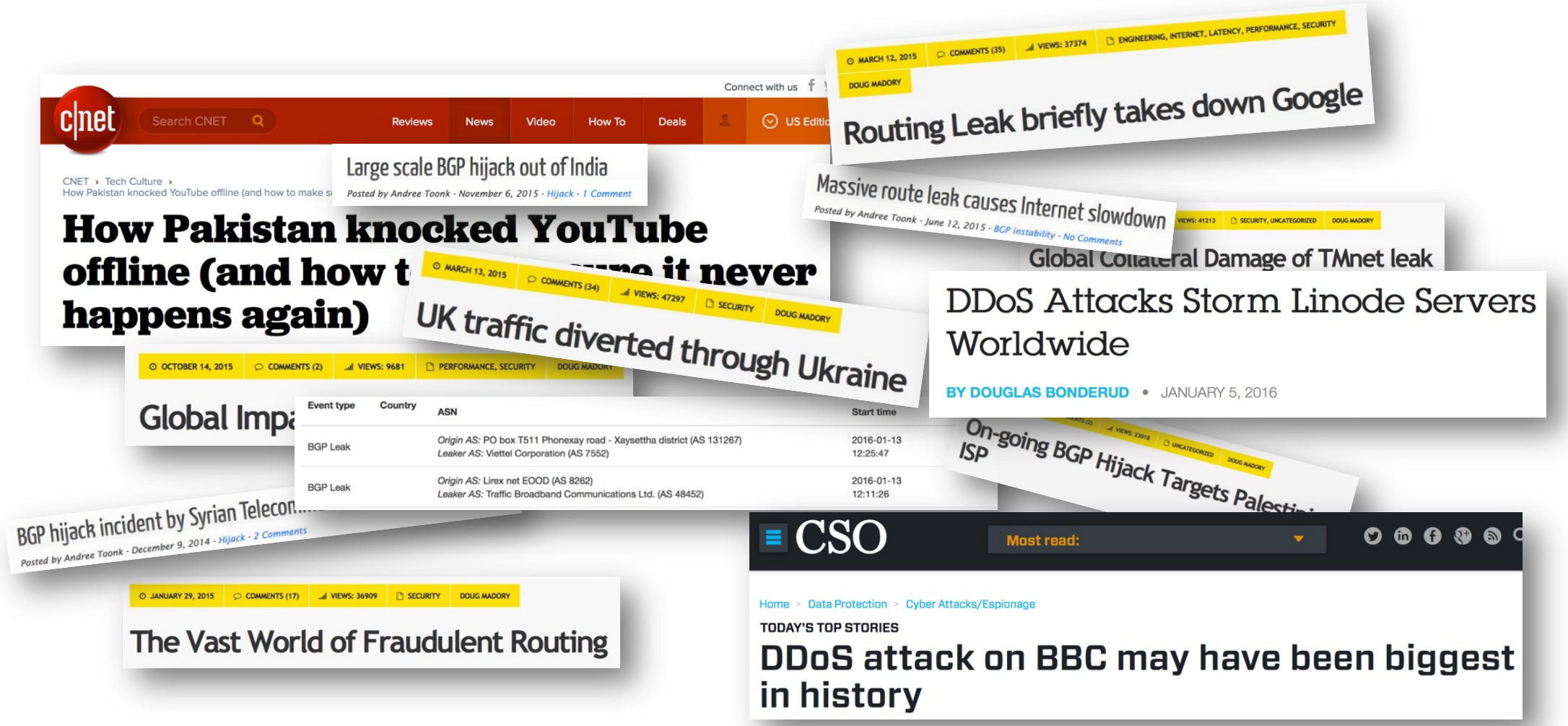
How users are affected



Event type	Country	ASN	Start time
BGP Leak		*Origin AS:* PO box T511 Phonexay road - Xaysettha district (AS 131267) *Leaker AS:* Viettel Corporation (AS 7552)	2016-01-13 12:25:47
BGP Leak		*Origin AS:* Lirex net EOOD (AS 8262) *Leaker AS:* Traffic Broadband Communications Ltd. (AS 48452)	2016-01-13 12:11:26

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How can MANRS actions prevent incidents:

- MANRS defines four simple but concrete actions that network operators must implement to improve Internet security and reliability.
- The first two operational improvements eliminate the root causes of common routing issues and attacks, while the second two procedural steps improve mitigation and decrease the likelihood of future incidents.

- MANRS builds a visible community of security minded network operators and IXPs

How can MANRS actions prevent incidents: MANRS Actions

- ## Filtering

  Prevent propagation of incorrect routing information

  - Ensure the correctness of your own announcements and announcements from your customers to adjacent networks with prefix and AS-path granularity

Anti-spoofing

Prevent traffic with spoofed source IP addresses

Enable source address validation for at least single-homed stub customer networks, their own end-users, and infrastructure

Coordination

Facilitate global operational communication and coordination between network operators

Maintain globally accessible up-to-date contact information in common routing databases

Global Validation

Facilitate validation of routing information on a global scale

Publish your data, so others can validate

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Where are those actions configured and how users are protected?

- Actions 1 BGP configuration
  - core network team
  - network planning & engineering
  - Prevents route leaks & Hijacking
- Action 2 RPF & packet filtering
  - user port configuration
  - service delivery team, process and BCOP implementation
  - DDoS impact
- Action 3 (core team socialization)
- Action 4 core team
  - IRR
  - AFRINIC on RPKI

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MANRS: Filtering

- Filtering

  Prevent propagation of incorrect routing information
  - Ensure the correctness of your own announcements and announcements from your customers to adjacent networks with prefix and AS-path granularity

- BGP filtering tips:
  - Verify your customer is the owner of the prefix
    - NEVER, EVER, accept any prefixes from your customer!
    - NEVER, EVER, use AS-PATH ACL only
    - 1 customer = 1 prefix list
    - Best practice: prefix-list + as-path checking
    - Use BGP Communities to identify customer prefixes (per location, region, continent, etc)
  - If supported, deploy RPKI for your prefixes

MANRS: Anti-spoofing

Anti-spoofing

Prevent traffic with spoofed source IP addresses

Enable source address validation for at least single-homed stub customer networks, their own end-users, and infrastructure

- Anti-spoofing tips
  - In access networks, use ACLs to block ALL traffic whose source IP DOESN'T belong to your own AS IP addresses
    - Block it as closest as possible of your access customer
  - For transit/peering, filter ALL:
    - Your own prefixes (do not rely only on BGP AS-PATH checking…)
    - ALL BOGONS addresses (RFC1918, RFC6598, RFC1122, RFC2544, RFC5737, etc) from BGP neighbors.

MANRS: Coordination

Coordination

Facilitate global operational communication and coordination between network operators

Maintain globally accessible up-to-date contact information in common routing databases

- Coordination tips (for all ASNs)
  - Create (if you still don't have one) and maintain:
    - PeeringDB record: www.peeringdb.com
    - IRR objects: http://www.irr.net/docs/list.html
      - Aut-num, maintainer, route/route6, routing-policy

MANRS: Global Validation

Global Validation

Facilitate validation of routing information on a global scale

Publish your data, so others can validate

- Global Validation tips
  - Join MANRS
    - Submit your data
    - Be engaged, Be part of the community:
      - Join your local/regional/national NOG mailing lists
      - Report misconfigured ASNs so they can take appropriate action!
        - No ones like no MANNERS person, right?

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WWW.MANRS.ORG

SEARCH

COPY CSV PRINT Show 10 entries

Organization Name	Areas Served	ASNs	Action 1 - Filtering	Action 2 - Anti-Spoofing	Action 3 - Coordination	Action 4 - Global Validation
TDS Telecom	US	4181	✓	✓	✓	✓
Telia Carrier	EU US	1299	✓	✓	✓	✓
TelNet Worldwide, Inc.	US	27553	✓	✓	✓	✓
The George Washington University	US	11039	✓	✓	✓	✓
Three Rivers Optical Exchange (3ROX)	US	5050	✓	✓	✓	✓
TransIP B.V.	NL	20857	✓	✓	✓	
TransWorld Associates Pvt Ltd	PK	38193 45843	✓	✓	✓	✓
Trunk Networks Limited	EU GB	49375	✓		✓	✓
United Information Highway	TH	45796	✓		✓	✓
United Information Highway	TH	38794	✓	✓	✓	✓
Organization Name	**Areas Served**	**ASNs**	**Action 1 - Filtering**	**Action 2 - Anti-Spoofing**	**Action 3 - Coordination**	**Action 4 - Global Validation**

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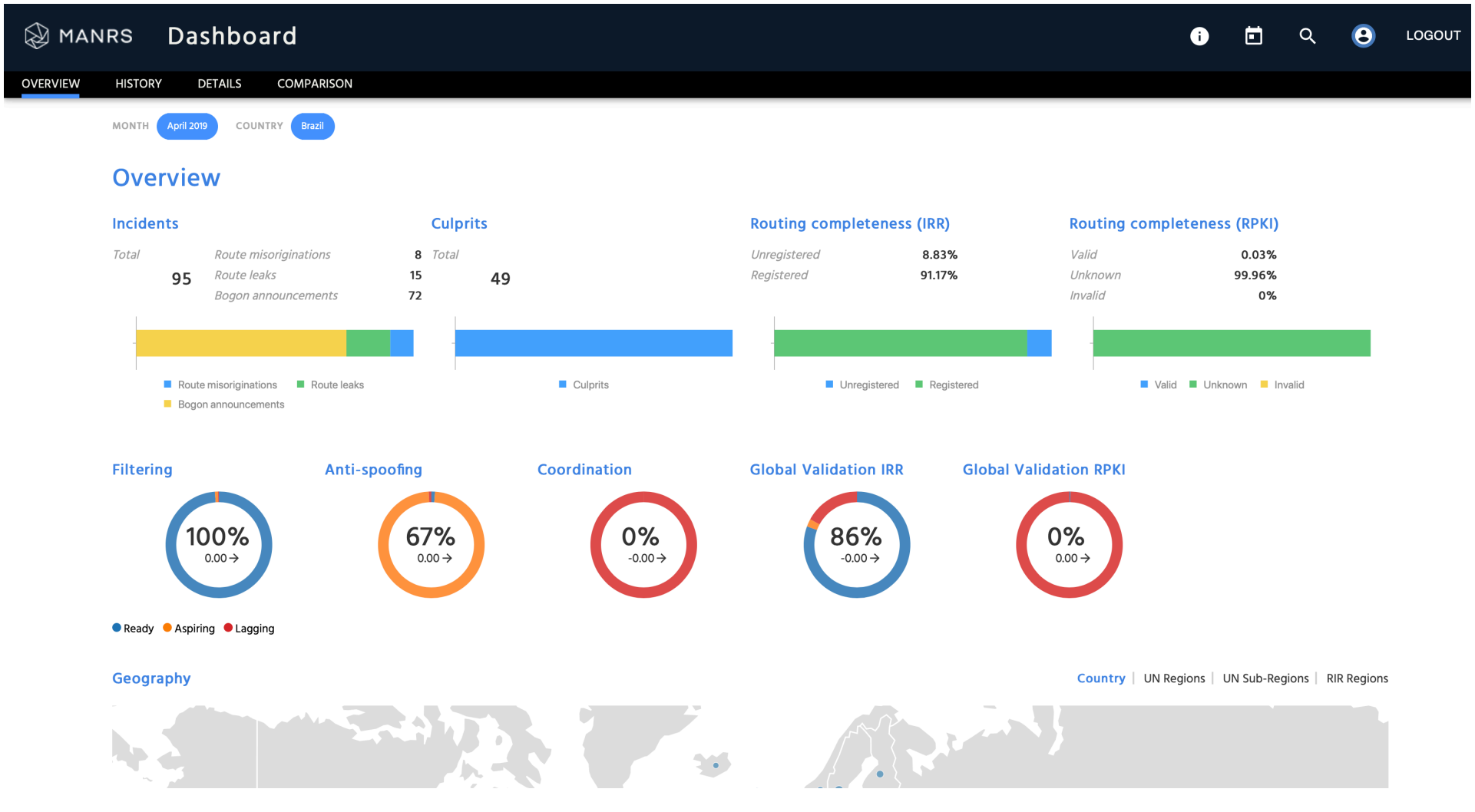
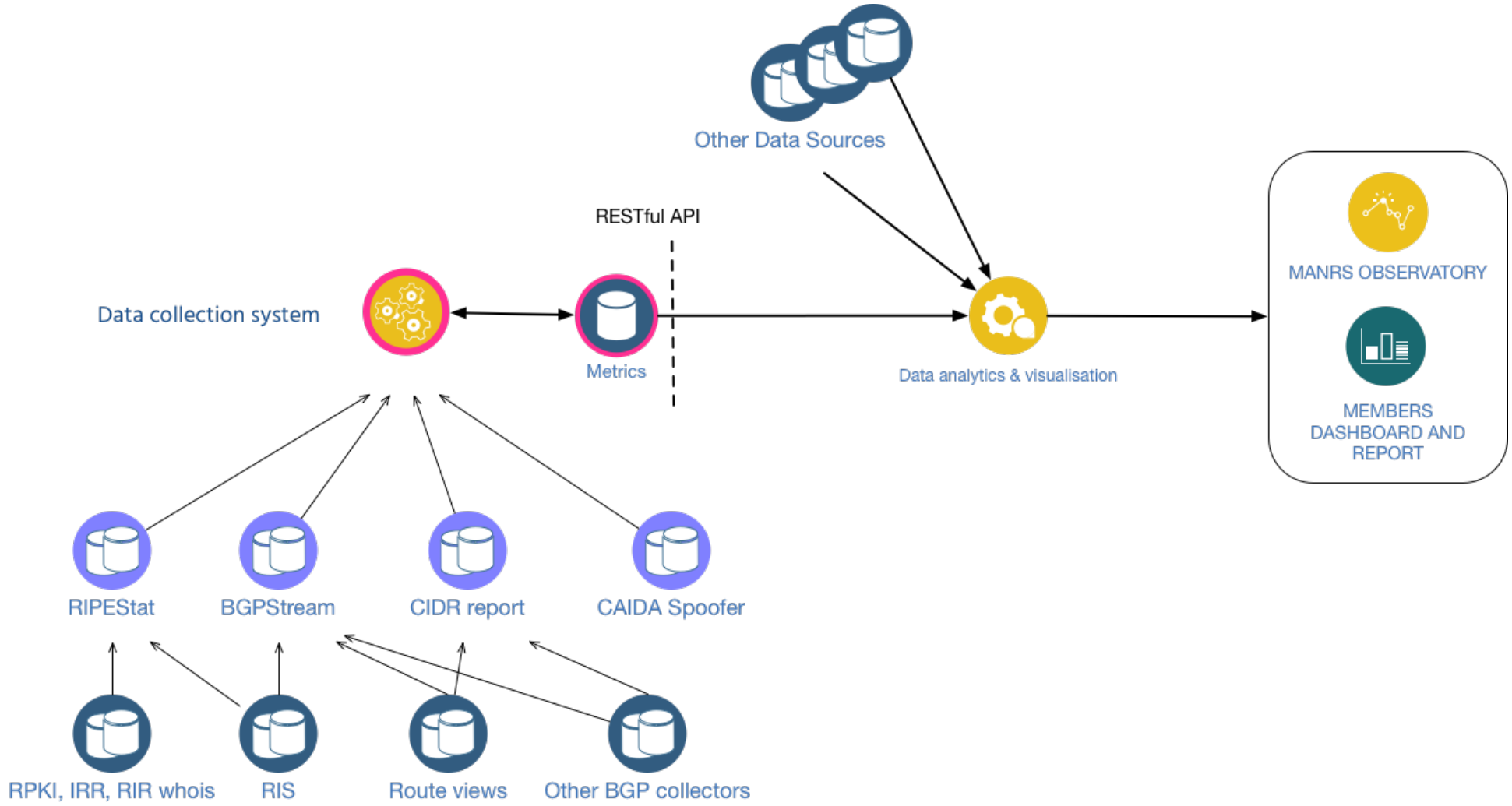
How to use MANRS information for your own benefit

- Where is the information available ?
  - BGP Stream https://bgpstream.com
  - Caida Report http://www.caida.org/data/overview/
  - RIPE Stat
  - CAIDA Spoofer Project https://www.caida.org/projects/spoofer/
  - QRator https://radar.qrator.net/
  - Whois.[RIR].net
  - Afrinic RPKI, IRRs
    - Radb, RIPE, Level3, etc.
    - https://rpki.afrinic.net/
- MANRS observatory https://observatory.manrs.org/

MANRS observatory



MANRS Observatory



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Practical steps to comply your network with MANRS

- Brazil Peering Forum (BPF) – Author: Marcelo Gondim
  - Published a **PORTUGUESE** ‘how-to’ to guide network operators to easily comply with MANRS – check it out:

    https://wiki.brasilpeeringforum.org/w/MANRS

  - In Brazil we have been working to spread out MANRS word, mainly targeting local/regional ASNs (we have 6000+ only in Brazil!!!)

  - Anyone and any help is really welcome: join our mailing list: https://wiki.brasilpeeringforum.org/w/Participar

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Closing remarks

MANRS is a community effort

CSIRTs can contribute significantly

Message to Network Operators:

”Your security is in someone else’s hands. The actions of others directly impact you and your network security (and vice versa)”

QUESTIONS? CONCERNS? COMMENTS?

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Closing remarks

Special thanks to Christian O'Flearty (ISOC LATAM) and Lucimara Ribeiro (NIC.br) who gently provided some of the material for this presentation.

Thanks for attending AONOG/APF 2019, and see you in 2020!

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