October 2016

Two years of good MANRS
https://www.manrs.org/

Internet
Society

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What problem are we trying to address?

Border Gateway Protocol (BGP) is based on trust

- No build-in validation of the legitimacy of updates

- Chain of "trust" spans continents

- Lack of reliable resource data

Do we have enough tools?

Probably yes

- Prefix and AS-PATH filtering, RPKI, IRR, ...

- BGPSEC under development at the IETF

- Whois, Routing Registries and Peering databases

Are they effectively deployed?

Probably not

- BGPStream

Event type	Country	ASN	Start time	End time	info
BGP Leak		*Origin AS:* AS number for New World Telephone Ltd. (AS 17444) *Leaker AS:* Suite 2101~02, 21/F, Tower 2, Nina Tower (AS 45474)	2016-11-16 15:39:21		More detail
Outage		Assoc do Inst Nac de Matematica Pura e Aplicada (AS 262829)	2016-11-16 15:32:00	2016-11-16 15:35:00	More detail
Outage		ETAPA EP (AS 27668)	2016-11-16 15:28:00	2016-11-16 15:32:00	More detail
BGP Leak		*Origin AS:* TECHSPACE INC. (AS 20277) *Leaker AS:* ViaWest (AS 13649)	2016-11-16 15:19:57		More detail
Outage		ETAPA EP (AS 27668)	2016-11-16 15:10:00	2016-11-16 15:14:00	More detail
Outage		MGNET INFORMATICA E SERVIÇOS LTDA (AS 262569)	2016-11-16 15:05:00		More detail
Outage		Global Conect Ltda (AS 262735)	2016-11-16 14:52:00		More detail
BGP Leak		*Origin AS:* iPi9 (AS 37390) *Leaker AS:* OPENTRANSIT (AS 5511)	2016-11-16 14:35:59		More detail
Outage		POWERSAT SERVICOS DE TELECOMUNICACOES LTDA (AS 262337)	2016-11-16 14:13:00	2016-11-16 14:17:00	More detail

It is a socio-economic problem

From the routing perspective securing one's own network does not make it more secure. The network security is in someone else's hands

- The more hands – the better the security

Is there a clear, visible and industry supported line between good and bad?

- A cultural norm

A clearly articulated baseline –
a minimum requirement (MCOP)

+

Visible support with commitment

Mutually Agreed Norms for Routing Security (MANRS)

MANRS defines four concrete actions that network operators should implement

- Technology-neutral baseline for global adoption

MANRS builds a visible community of security-minded operators

- Promotes culture of collaborative responsibility

Comcast Example

- Before MANRS, Comcast implemented these actions within their 33 networks covering 20 million customers in North America.

- But they realized their actions *alone* would not be sufficient.

- Recognized need to join with others and to promote this type of conduct by all network operators.

Comcast is committed to helping drive improvements to the reliability of the Internet ecosystem. **We are thrilled to be engaged with other infrastructure participants** across the spectrum and around the globe in pursuit of these goals.

- Jason Livingood, Vice President, Internet Services, Comcast

Good MANRS

1. Filtering – Prevent propagation of incorrect routing information.

2. Anti-spoofing – Prevent traffic with spoofed source IP addresses.

3. Coordination – Facilitate global operational communication and coordination between network operators.

4. Global Validation – Facilitate validation of routing information on a global scale.
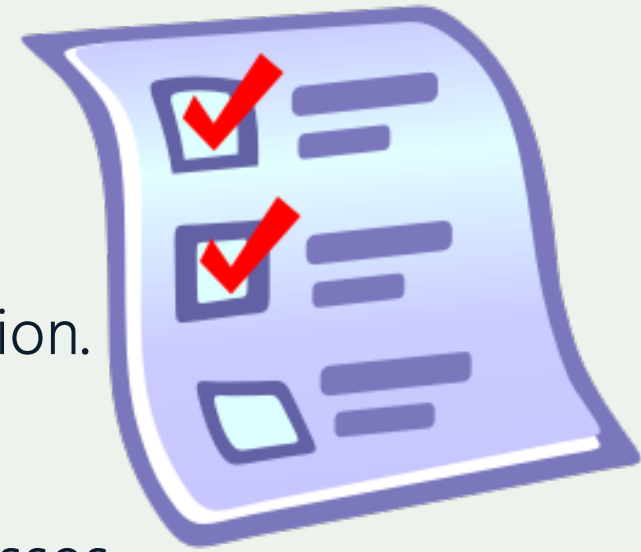
MANRS use case: the network and topology
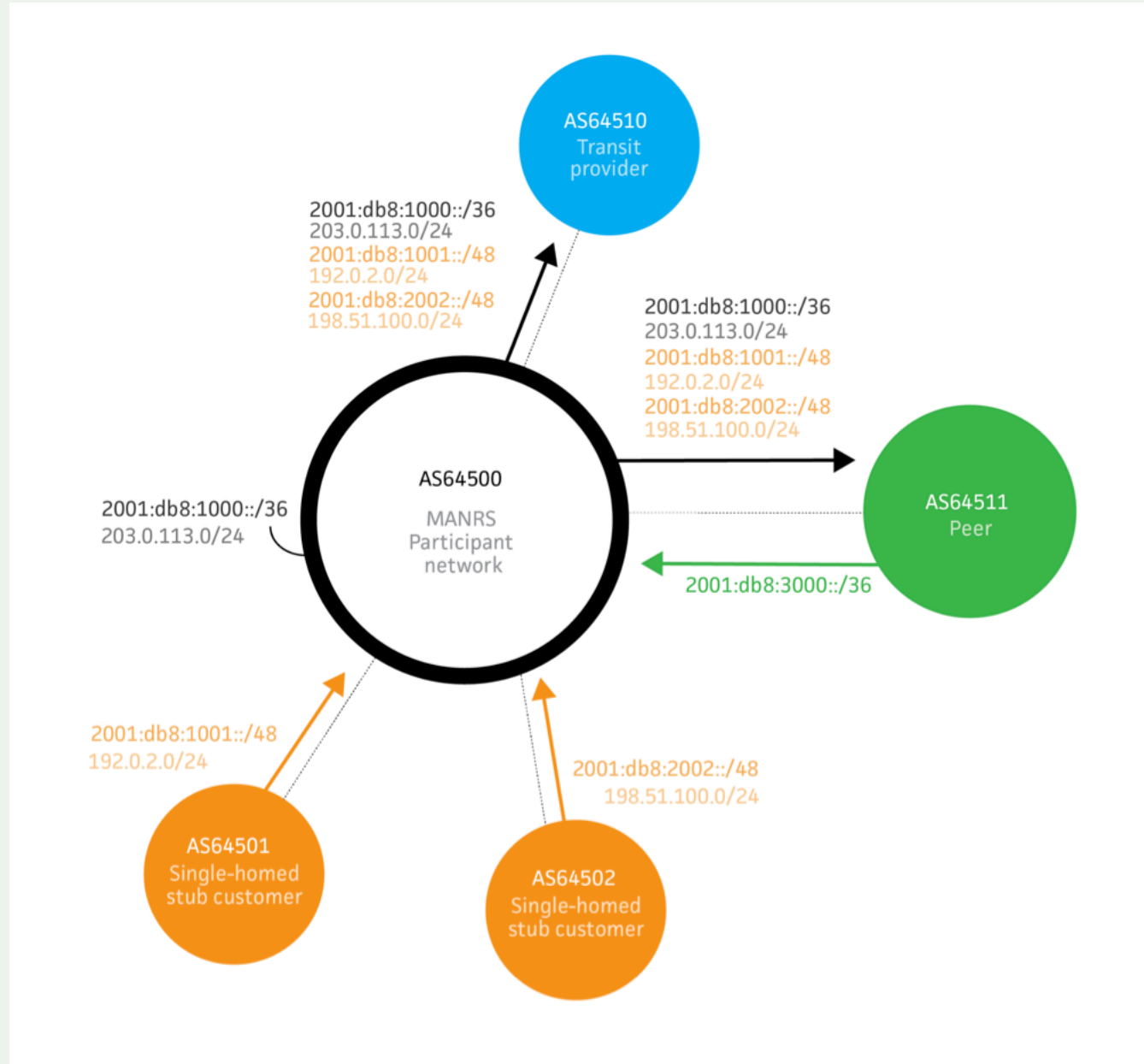
MANRS is not (only) a document – it is a commitment

1) The member <u>supports</u> the Principles and <u>implements</u> at least one of the Actions for the majority of its infrastructure.

2) The member becomes a Participant of MANRS, helping to <u>maintain and improve</u> the document and to <u>promote</u> MANRS objectives

MANRS is not a firewall that will protect your network.

MANRS is a commitment – and a community.

MANRS is a mark of quality.

Good network routing practice is **the fundamental requirement for trust** between providers, and ultimately creates a safer and stronger Internet for customers.

Jaya Baloo, Chief Information Security Officer, KPN

# Public launch of the initiative - 6 November 2014

A growing list of participants

	Country	ASNs	Filtering	Anti-spoofing	Coordination	Global Validation
KPN	NL	1136, 5615, 8737	✔	✔	✔	✔
Seeweb	IT	12637	✔	✔	✔	✔
Gigas	ES, US	57286, 27640	✔	✔	✔	✔
NTT	US	2914	✔	✔	✔	✔
BIT BV	NL	12859	✔	✔	✔	✔
Algar Telecom	BR	16735, 53006, 27664	✔		✔	✔
OpenCarrier eG	DE	41692		✔	✔	✔
SpaceNet	DE	5539	✔	✔	✔	✔
CERNET	CN	4538	✔		✔	✔
SpeedPartner GmbH	DE	34225	✔	✔	✔	✔
Comcast	US	7015, 7016, 7725, 7922, 11025, 13367,	✔	✔	✔	✔

Two years of MANRS

MANRS members by # of AS'es

# of AS

# of AS

2014 | 2015 | 2016

100
80
60
40
20
0
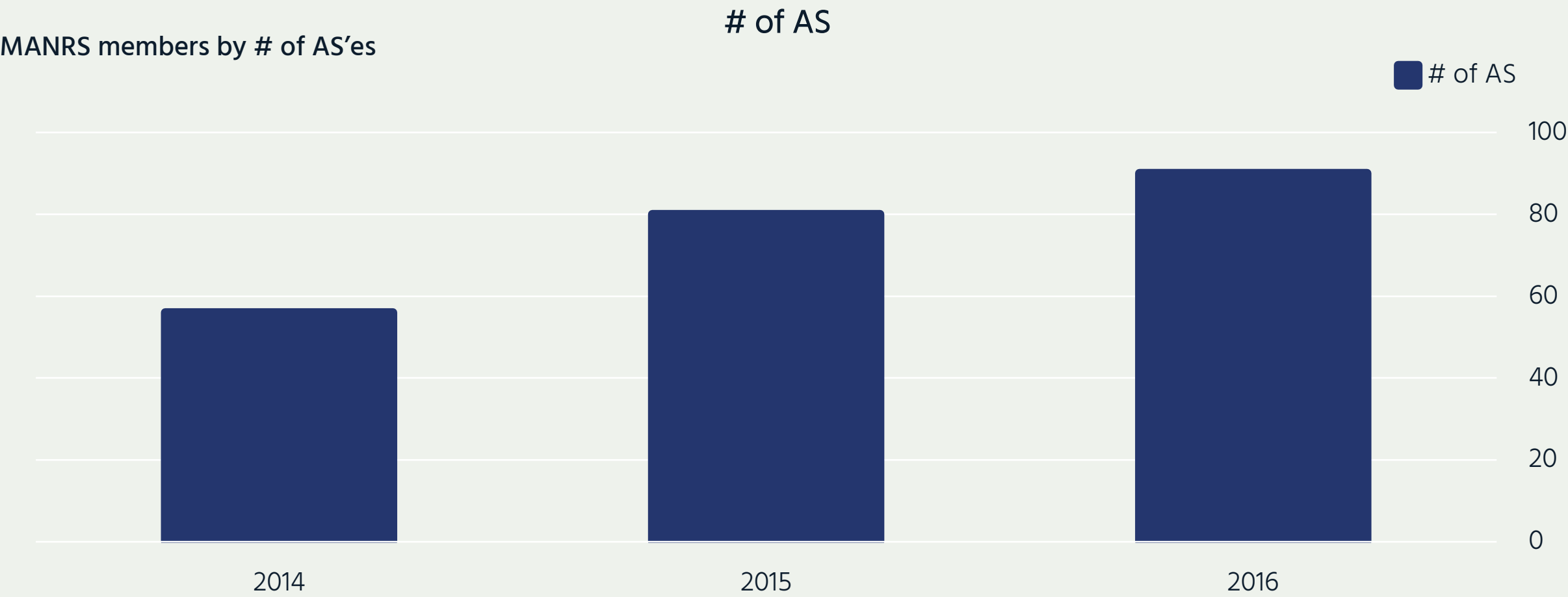
You may say we're dreamers...

MANRS members by # of AS'es

# of AS

How to bridge this gap?

Increasing gravity by making MANRS a platform for related activities

Developing better guidance

- MANRS Best Current Operational Practices (BCOP) document: http://tinyurl.com/MANRS-BCOP

Potential training/certification programme

- Based on BCOP document and an online module

Bringing new types of members on board

- IXPs, vendors

Developing a better "business case" for MANRS

- MANRS value proposition for your customers

Creating a trusted community

- A group with a similar attitude towards security

MANRS training and certification

Routing security is hard

— The MANRS BCOP was envisaged as a simple instruction set
— Instead we have a 50-page document that assumes certain level of expertise
— How can we make it more accessible?

A set of online training modules

— Based on the MANRS BCOP
— Walks a student through the tutorial with a test at the end
— Working with and looking for partners that are interested in integrating it in their curricula

A hands-on lab to achieve MANRS certification

— Completing an online module as a first step in MANRS certification
— Looking for partners

MANRS IXP Partnership Programme

There is synergy between MANRS and IXPs in this area

— IXPs form a community with a common operational objective
— MANRS is a reference point with a global presence – useful for building a "safe neighborhood"

How IXPs can contribute?

— Technical measures: Route Server with validation, alerting on unwanted traffic, providing debugging and monitoring tools
— Social measures: MANRS ambassador role, local audit as part of the on-boarding process

One membership or a separate category?

— The existing set may not be directly applicable
— A development team is working on a set of useful actions

How to sign up

Go to http://www.routingmanifesto.org/signup/

- Provide requested information

- Please provide as much detail on how Actions are implemented as possible

We may ask questions and ask you to run a few tests

- Routing "background check"

- Spoofer https://www.caida.org/projects/spoofer/

Your answer to "Why did you decide to join?" may be displayed in the testimonials

Download the logo and use it

Become an active MANRS participant

Join us to make routing more secure

https://www.manrs.org/

Visit us at
www.internetsociety.org
Follow us
@internetsociety

Adherence to MANRS is an important commitment that operators make back to the Internet community. Together we aim to remove the havens from which miscreants maintain the freedom and anonymity to attack our network and our customers. David Freedman, Claranet Group

Comcast is committed to helping drive improvements to the reliability of the Internet ecosystem. We are thrilled to be engaged with other infrastructure participants across the spectrum and around the globe in pursuit of these goals. Jason Livingood, Vice President, Internet Services, Comcast

We believe the security, stability, and resiliency of the Internet operation can be improved via distributed and shared responsibilities as documented in MANRS. As one of the largest academic networks in the world, CERNET is committed to the MANRS actions. Xing Li, Deputy Director, CERNET

We believe that the objectives and scope match our beliefs and our behaviour, and that by signing up, we may help encourage others to do so. Ian Dickinson, Network Architect, Sky

Zayo is interested and desires to be more active in promoting global routing security; the MANRS document is in our (and my) opinion a really good initial level of recommendations. I think that the more participation in MANRS, the safer our routing ecosystem. And a safer routing system is good for all of us! Robert Hagens, VP, IP Architecture, Zayo

Workonline implements the recommendations contained in the MANRS document by default. By publicly stating the measures that we take to ensure the robustness of our network, we hope to encourage our customers and peers to do the same. Ben Maddison, Director - Network Operations & Strategy