

January 2017

Two years of good MANRS

Improving Global Routing Security and Resilience

<https://www.manrs.org/>



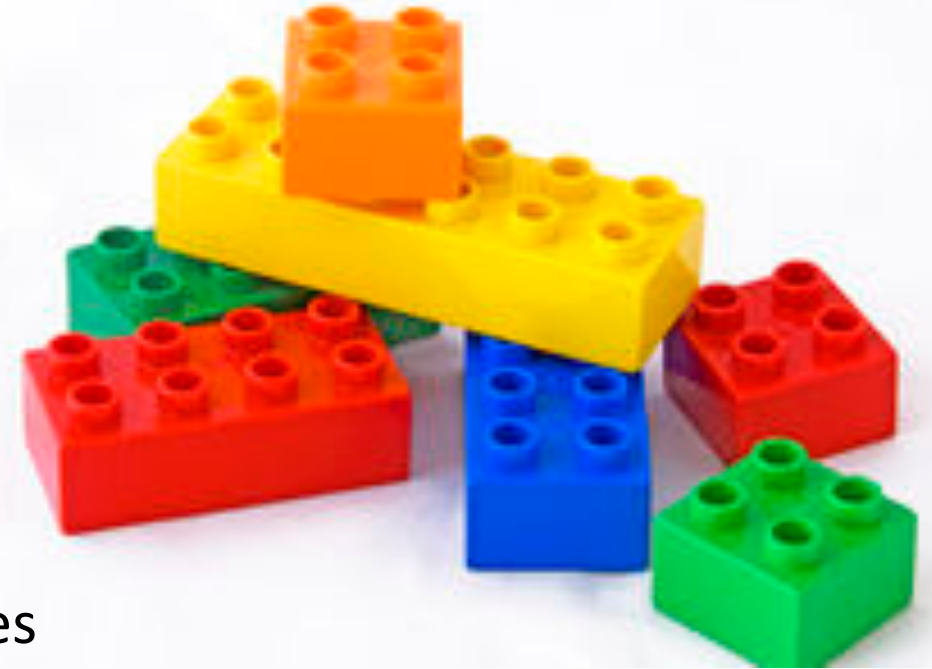
Is there a problem?

- Internet routing infrastructure is vulnerable
 - Traffic can be hijacked, blackholed or detoured
 - Traffic can be spoofed
 - Fat-fingers and malicious attacks
- BGP is based on trust
 - No built-in validation of the legitimacy of updates



Are there solutions?

- Yes!
 - Prefix and AS-PATH filtering, RPKI, IRR, ...
 - BGPSEC under development at the IETF
 - Whois, Routing Registries and Peering databases
- But...
 - Lack of deployment
 - Lack of reliable data



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 – a tragedy of the commons

- 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



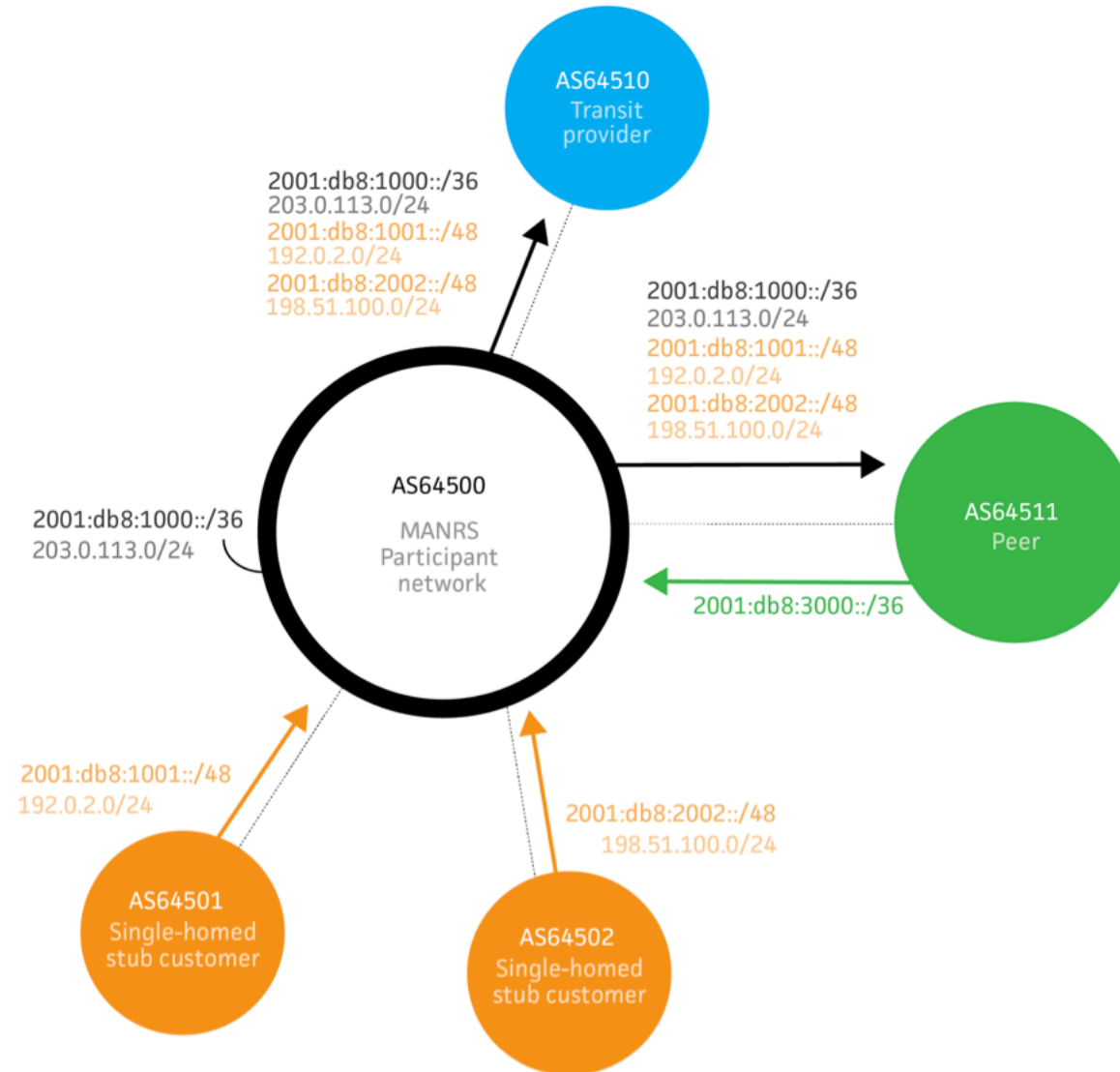
MANRS

Good MANRS



- **Filtering** – Prevent propagation of incorrect routing information
 - *Own announcements and the customer cone*
- **Anti-spoofing** – Prevent traffic with spoofed source IP addresses
 - *Single-homed stub customers and own infra*
- **Coordination** – Facilitate global operational communication and coordination between network operators
 - *Up-to-date and responsive public contacts*
- **Global Validation** – Facilitate validation of routing information on a global scale
 - *Publish your data, so others can validate*

MANRS use case: the network and topology












































MANRS is not (only) a document – it is a commitment

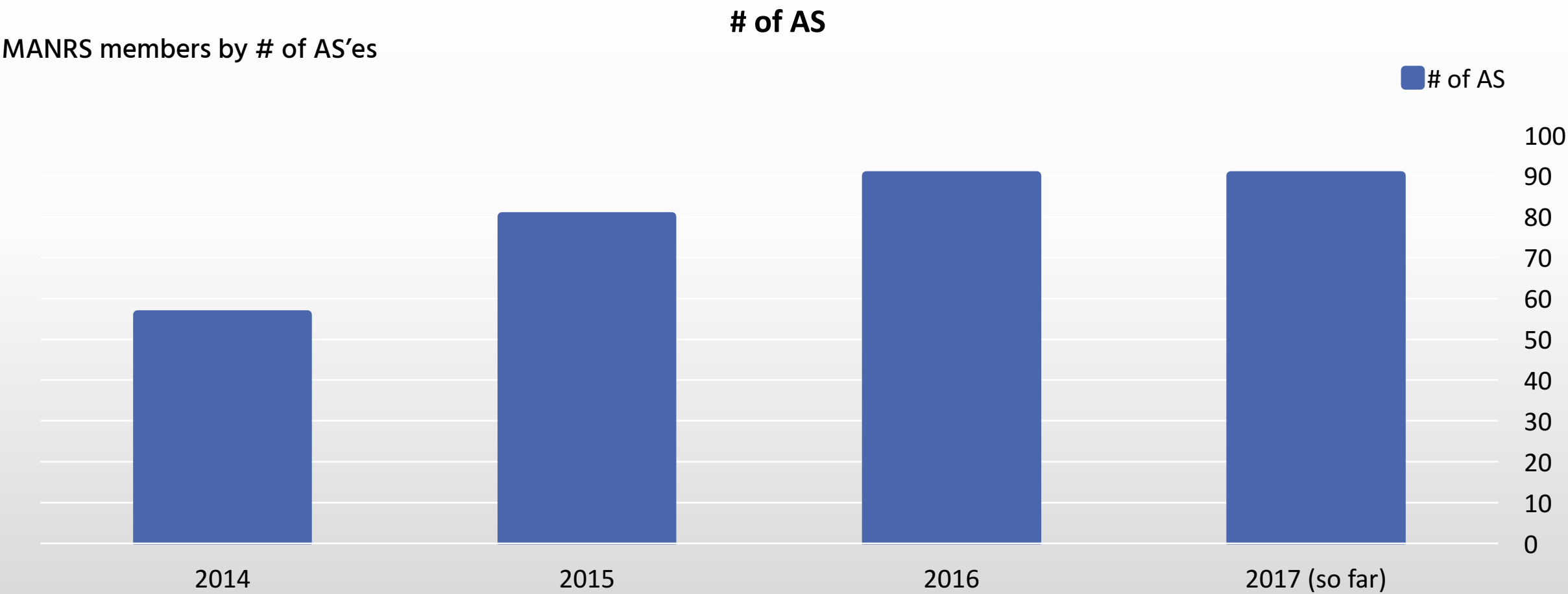
- The members **support** the Principles and **implement** the majority of the Actions in their networks.

- A member becomes a Participant of MANRS, helping to **maintain and improve** the document and to **promote** MANRS objectives

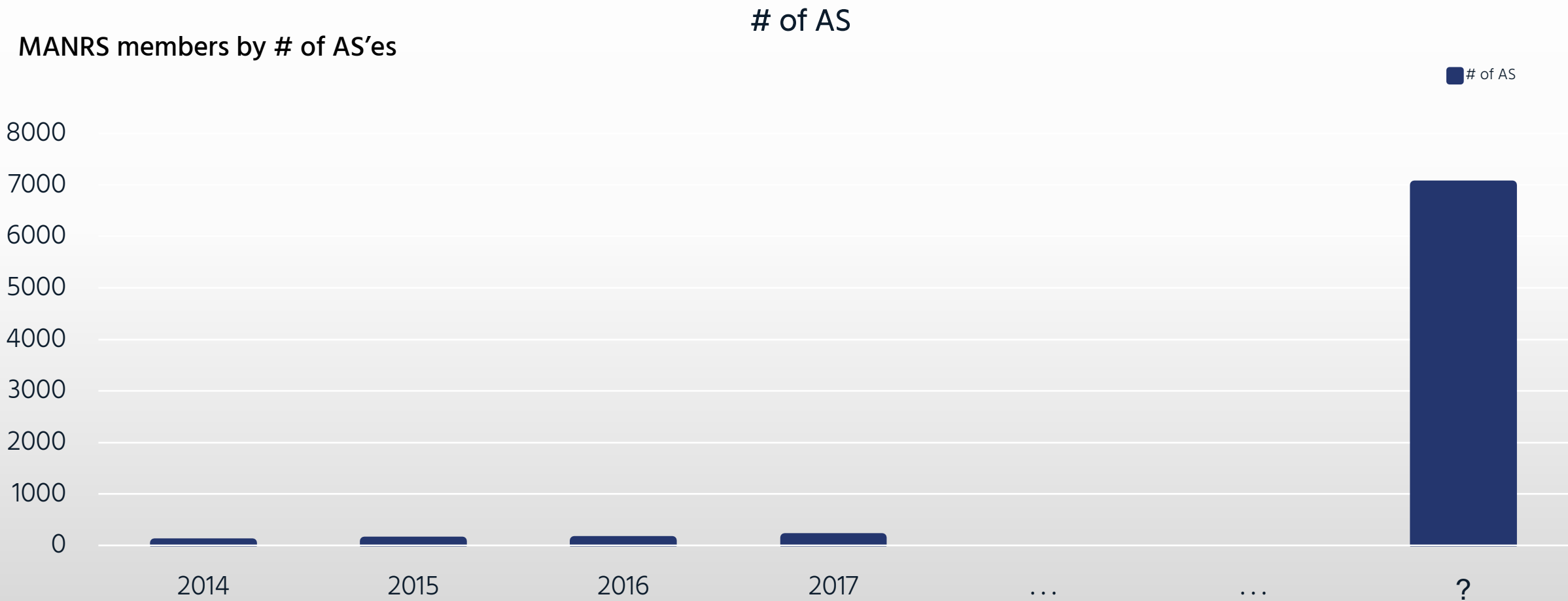
A growing list of participants

	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



You may say we're dreamers...



- How to bridge this gap?

Leveraging market forces and peer pressure

- Developing a better “business case” for MANRS
 - MANRS value proposition for your customers and your own network
- Creating a trusted community
 - A group with a similar attitude towards security

Increasing gravity by making MANRS a platform for related activities

- Developing better guidance
 - MANRS Best Current Operational Practices (BCOP) document:
<http://www.routingmanifesto.org/bcop/>
- Training/certification programme
 - Based on BCOP document and an online module
- Bringing new types of members on board
 - IXPs

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 can IXPs 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
 - A development team is working on a set of useful actions

How to sign up

- Go to <https://www.manrs.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

Questions?

Please join us to make routing more secure

- Feel free to contact us if you are interested and want to learn more
 - <http://www.routingmanifesto.org/contact/>
 - [Mail: routingmanifesto@isoc.org](mailto:routingmanifesto@isoc.org)
- Looking forward to your sign-ups:
 - <http://www.routingmanifesto.org/signup/>