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Mind your MANRS Mutually Agreed Norms for Routing Security

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

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What problems are we trying to address?

Border Gateway Protocol (BGP) is based on trust

- No built-in validation of the legitimacy of updates
- Chain of “trust” spans continents
- Lack of reliable resource data



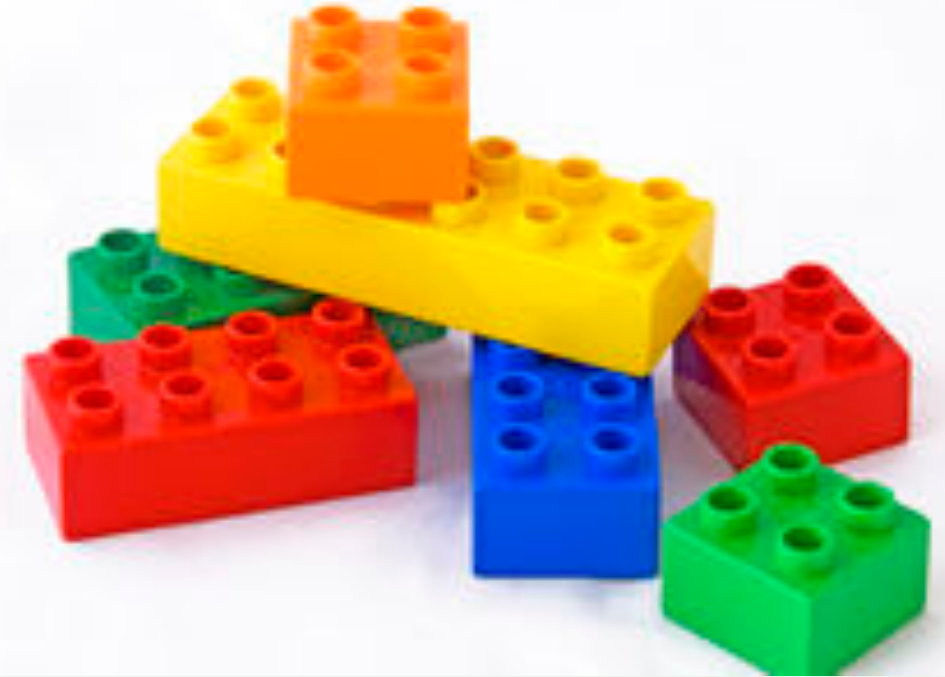
Do we have enough tools?

Probably yes

- Prefix and AS-PATH filtering, RPKI, IRR, ...
- BGPSEC? IETF SIDR working group
- Whois, Routing Registries and Peering databases

Are they effectively deployed?

Probably not



Event type	Country	ASN	Start time	End time	info
BGP Leak		<i>Origin AS:</i> AS number for New World Telephone Ltd. (AS 17444) <i>Leaker AS:</i> 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		<i>Origin AS:</i> TECHSPACE INC. (AS 20277) <i>Leaker AS:</i> 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		<i>Origin AS:</i> iPI9 (AS 37390) <i>Leaker AS:</i> 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

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

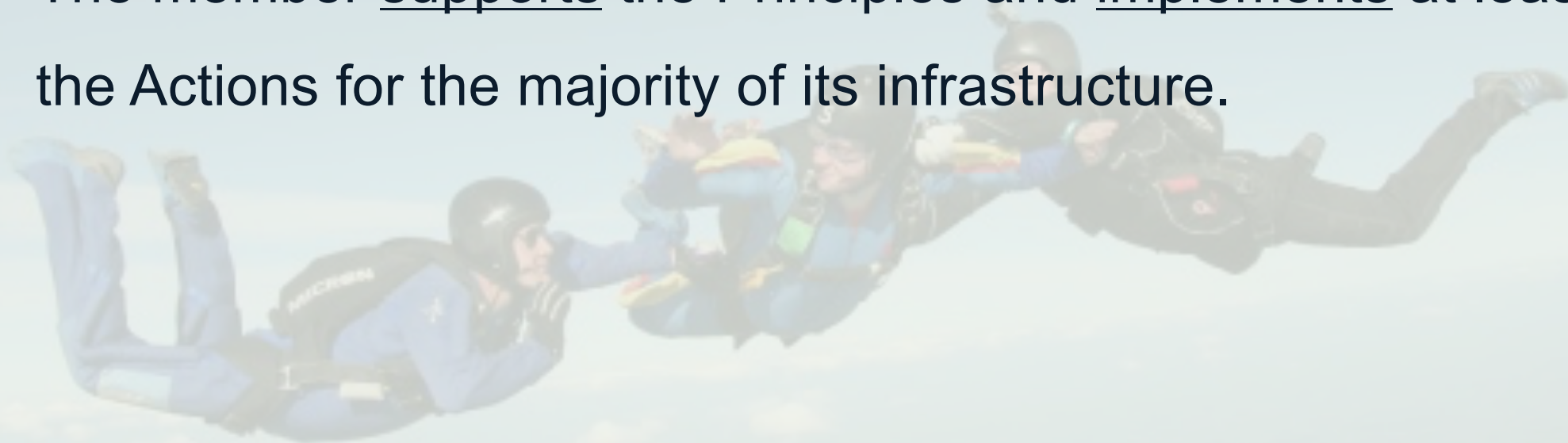
Good MANRS

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

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












































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

Public launch of the initiative - 6 November 2014



A growing list of participants

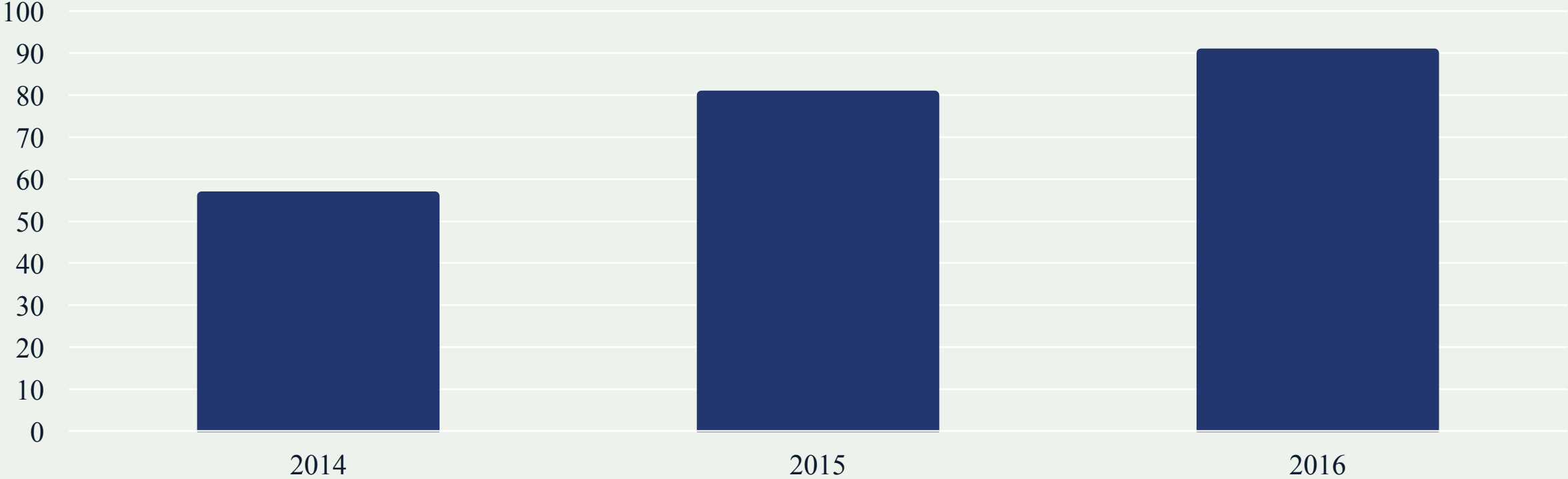
	Country	ASNs	Filtering	Anti-spoofing	Coordination	Global Validation
KPN	NL	1136, 5615, 8737				
Seeweb	IT	12637				
Gigas	ES, US	57286, 27640				
NTT	US	2914				
BIT BV	NL	12859				
Algar Telecom	BR	16735, 53006, 27664				
OpenCarrier eG	DE	41692				
SpaceNet	DE	5539				
CERNET	CN	4538				
SpeedPartner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

Two years of MANRS

of AS

MANRS members by # of AS'es

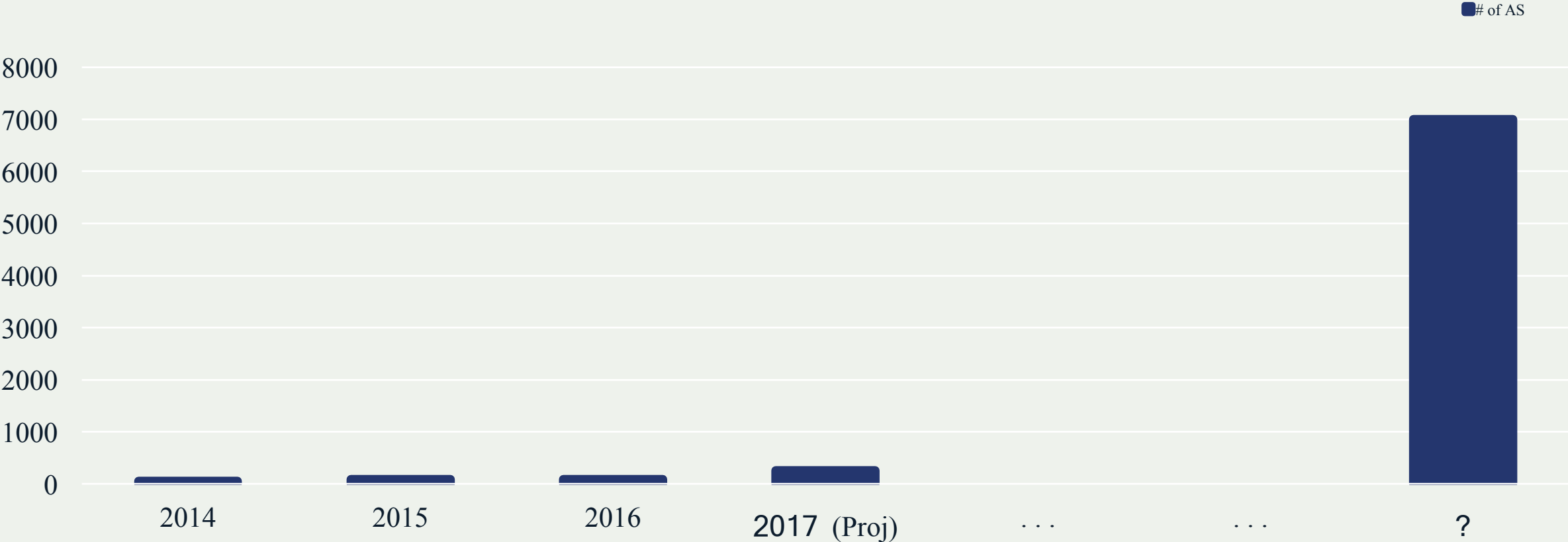
■ # of AS



Are we dreaming?

of AS

MANRS members by # of AS'es



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

What you can do today?
(Don't put off until tomorrow)

Take Part in Survey

BGP Prefix Hijacking Survey

Please help by answering this short (< 10min, 21 questions) and anonymous survey.

Survey URL: <http://tinyurl.com/hijack-survey>

*** This survey is part of a joint research effort by CAIDA (www.caida.org) and the ICS-FORTH (www.ics.forth.gr) research institute.

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



Spoof Results for Thailand

Session	Timestamp	Client Prefix	ASN	Country	NAT	Spoof Private	Spoof Routable	Adjacency Spoofing	Results
217345	2017-05-11 19:07:08	49.228.251.x/24	133481 (AIS-Fibre-AS-AP)	tha (Thailand)	yes	rewritten	rewritten	none	Full report
		2405:9800:b8xx::/40	133481 (AIS-Fibre-AS-AP)		no	received	received	/16	
202064	2017-04-27 19:36:41	49.228.217.x/24	133481 (AIS-Fibre-AS-AP)	tha (Thailand)	yes	rewritten	rewritten	none	Full report
		2405:9800:b8xx::/40	133481 (AIS-Fibre-AS-AP)		no	received	received	/16	
194499	2017-04-20 11:04:48	49.228.249.x/24	133481 (AIS-Fibre-AS-AP)	tha (Thailand)	yes	rewritten	rewritten	none	Full report
		2405:9800:b8xx::/40	133481 (AIS-Fibre-AS-AP)		no	received	received	/16	
157902	2017-03-02 19:18:45	49.49.245.x/24	45758 (TRIPLETNET-AS-AP)	tha (Thailand)	yes	rewritten	rewritten	none	Full report
		2403:6200:88xx::/40	45629 (JASTEL-NETWORK-TH-AP)		no	blocked	received	none	
117886	2016-12-25 21:12:04	203.150.39.x/24	55802 (ISSP-AS-AP)	tha (Thailand)	no	received	received	/8	Full report

Bogus Prefixes/ASNs

<u>103.243.168.0/22</u>	<u>AS38794</u>	UIH-BBB-AS-AP UIH / BB Broadband, TH
<u>103.243.168.0/23</u>	<u>AS38794</u>	UIH-BBB-AS-AP UIH / BB Broadband, TH
<u>103.243.170.0/23</u>	<u>AS38794</u>	UIH-BBB-AS-AP UIH / BB Broadband, TH
<u>103.251.68.0/24</u>	<u>AS132900</u>	TSIC-AS-AP Thai System Integration Co, Ltd, TH
<u>103.251.71.0/24</u>	<u>AS132900</u>	TSIC-AS-AP Thai System Integration Co, Ltd, TH

<u>AS45606</u>	Announced by	<u>AS45328</u>	NIPA-AS-TH NIPA TECHNOLOGY CO., LTD, TH
<u>AS56096</u>	Announced by	<u>AS45455</u>	TH-2S1N-AP Two S One N Co Ltd, Internet Service Provider and IT Solutions, TH

Join us to make routing more secure

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

<http://www.routingmanifesto.org/>

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