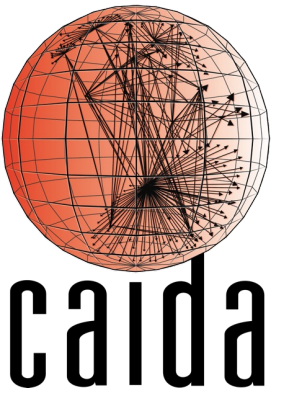# Mind Your MANRS [1] :
Do MANRS Participants Comply with Require Actions?

Ben Du

Center for Applied Internet Data Analysis (CAIDA) / UC San Diego

NANOG 89
Oct 17, 2023

[1] Ben Du et al. 2022. *Mind Your MANRS: Measuring the MANRS Ecosystem*. ACM Internet Measurement Conference 2022.

The MANRS Initiative

- The [Mutually Agreed Norms on Routing Security](https://www.manrs.org/about/) initiative was launched by network operators in 2014.

- "MANRS provides crucial fixes to reduce the most common routing threats[1]". -- About MANRS

1. https://www.manrs.org/about/

Internet routing vulnerability

- Attackers can advertise IP address space without authorization. (BGP Hijacking)

Crypto Exchange KLAYswap Loses $1.9M After BGP Hijack

Hackers Performed Border Gateway Protocol Hack to Conduct Illegal Transactions

Prajeet Nair (@prajeetspeaks) • February 16, 2022

BORDER GATEWAY PROTOCOL INSECURITY —

How 3 hours of inaction from Amazon cost cryptocurrency holders $235,000

For 2nd time in 4 years, Amazon loses control of its IP space in BGP hijacking.

DAN GOODIN - 9/23/2022, 11:04 AM

Infrastructure to improve routing security

- **Routing databases** provide reference information.
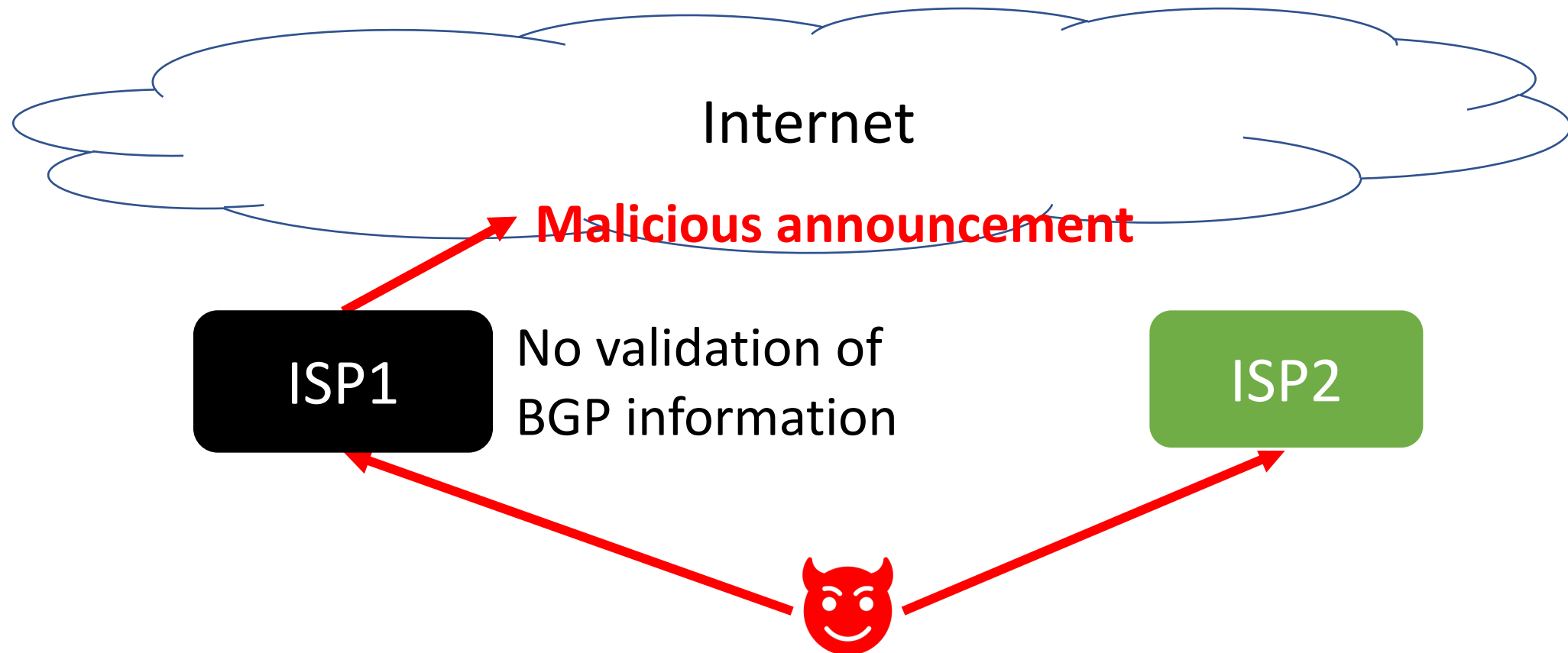
- Internet Routing Registry (IRR)

- Resource Public Key Infrastructure (RPKI)

Routing security is a collective action problem

- Networks need to **collectively** adopt routing security practices to improve overall routing security

Internet

Malicious announcement

ISP1

No validation of BGP information

ISP2

MANRS Actions

- Networks have misaligned incentive to implement security practices.

- MANRS encourages networks to adopt routing security practices.

- Register intended BGP announcements in IRR or RPKI.

- Use IRR/RPKI to check correctness of customers' BGP announcements.
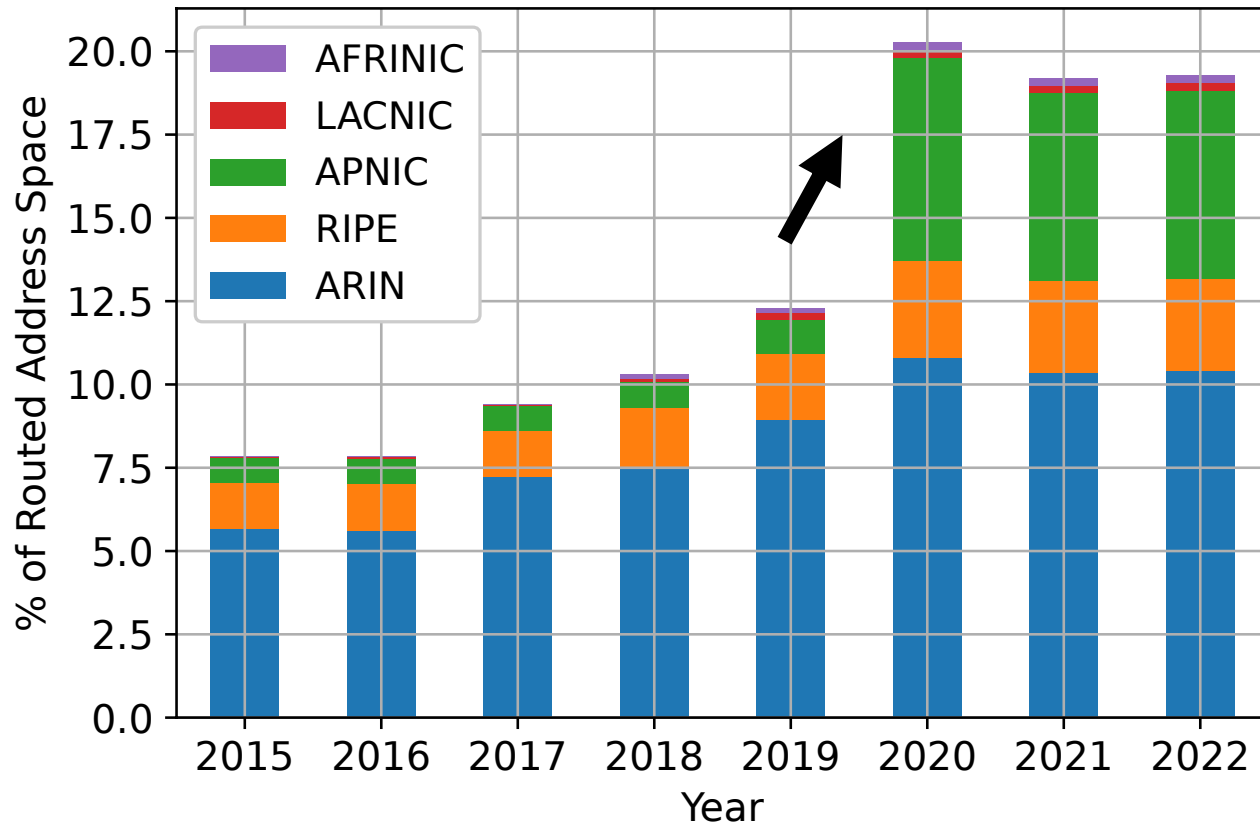
Outline

1. How has MANRS participation grown over the past 6 years?

2. Are MANRS networks properly implementing MANRS practices?

LACNIC has the most MANRS ASes
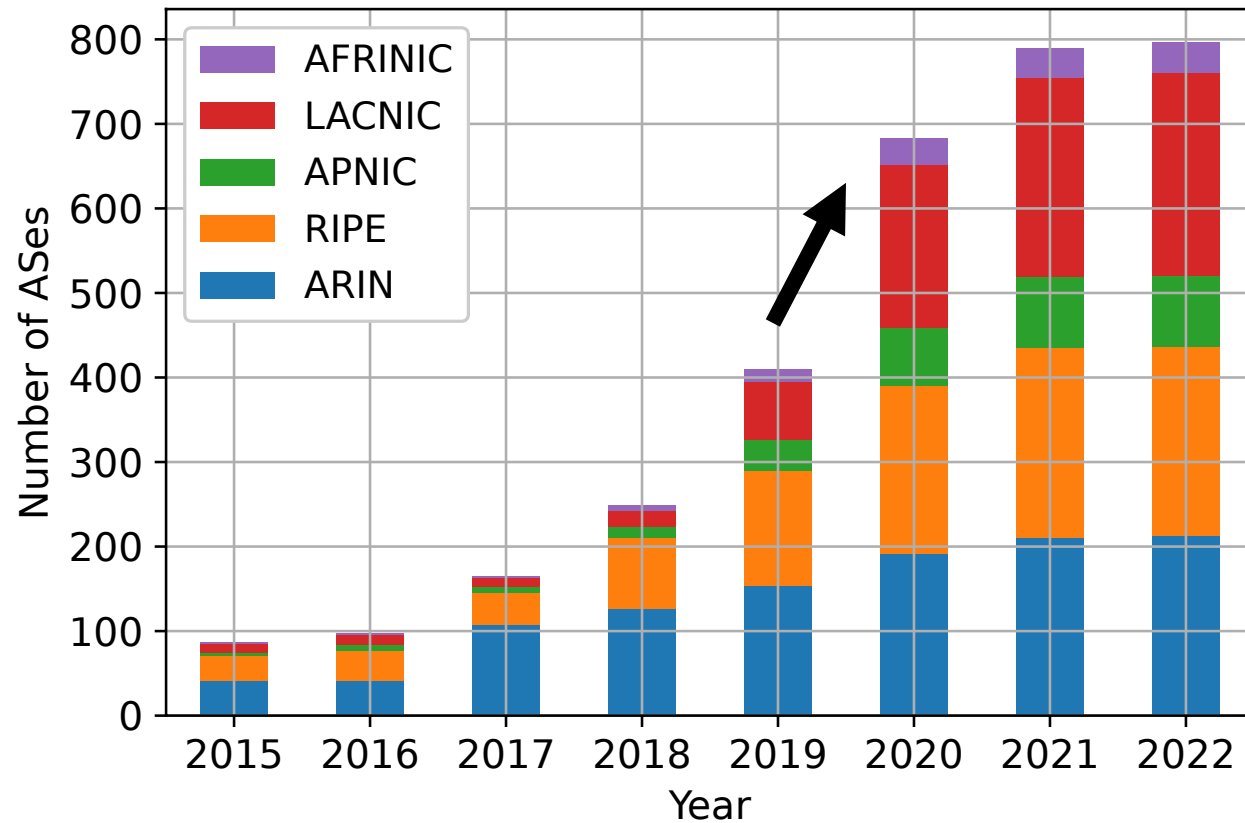
- Jump in LACNIC (Latin America) ASes between 2019 and 2020

- As of 2020, 184 ASes were registered in Brazil

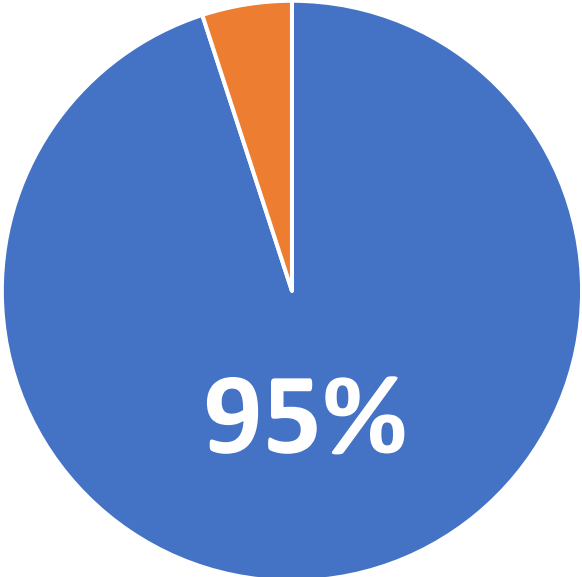# ARIN has the most address space

- China Telecom joined MANRS in 2020
  - 4% of routed v4 address space
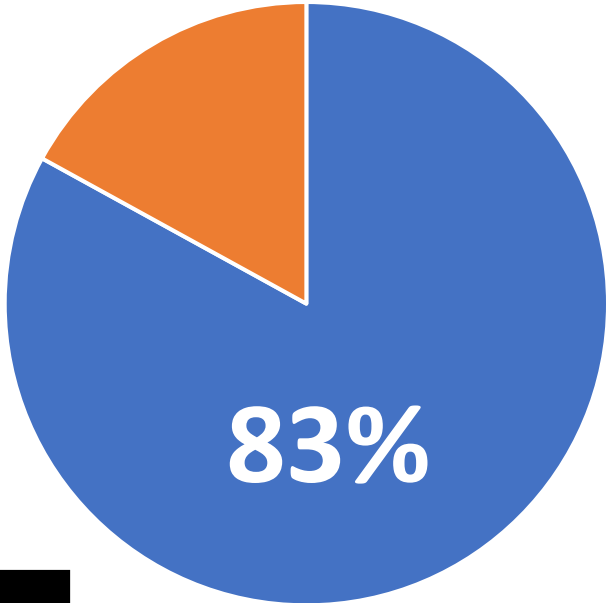- LACNIC ASes announce little address space

Outline

1. How has MANRS participation grown over the past 6 years?

2. Are MANRS networks properly implementing MANRS practices?

Most MANRS ASes are conformant
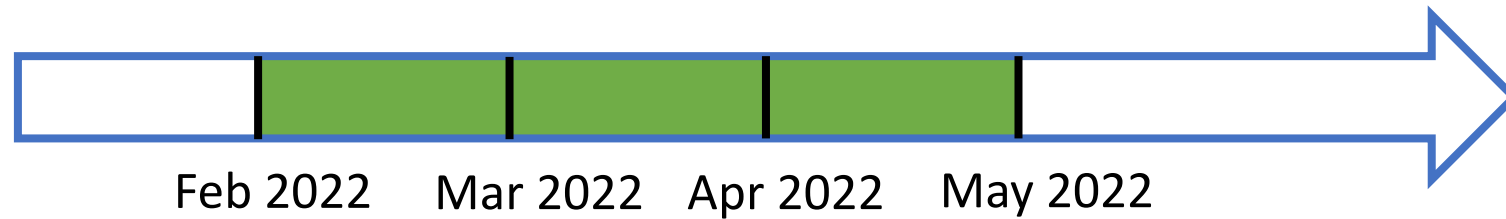
Register intended
BGP announcements

Filter incorrect customer
announcements

95%

83%

■ Conformant

■ Non-
conformant

May 1st 2022

11

Most MANRS ASes stayed conformant

Feb 2022   Mar 2022   Apr 2022   May 2022

- Between February 2022 and May 2022, 94% of MANRS ASes stayed conformant.
  - 803/849 in the MANRS Network Operators Program
  - 18/21 in the MANRS CDN program

- MANRS networks are more likely to keep routing database records up to date than non-MANRS networks

Some MANRS ASes didn't use RPKI

- In May 2022, 148 MANRS ASes only registered prefixes in the IRR
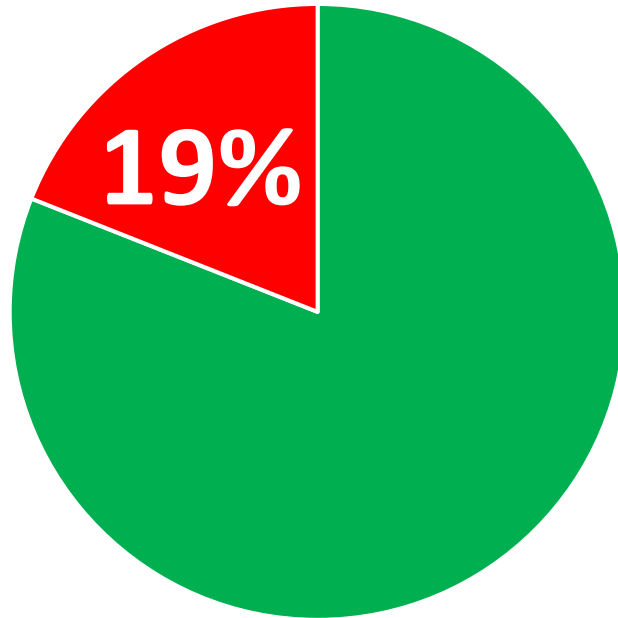
Summary

- We found MANRS participation has increased in the past 6 years.

- 83% MANRS networks are conformant to required MANRS practices.

- Should MANRS encourage using RPKI over IRR?

Questions?

- Email me: bendu@ucsd.edu