

5 October 2023

MANRS @ LACNIC 40/LACNOG 2023  
MANRS Community Meeting #13



# Agenda

1. MANRS Overview and Activities in 2023
2. MANRS Mentors and Ambassadors Program
3. Promoting MANRS in Brazil
4. RPKI Deployment in the LACNIC Region
5. Discussion: The Future of MANRS

# The MANRS Community



# What is the MANRS Community?

MANRS is a collaborative initiative of Internet operators

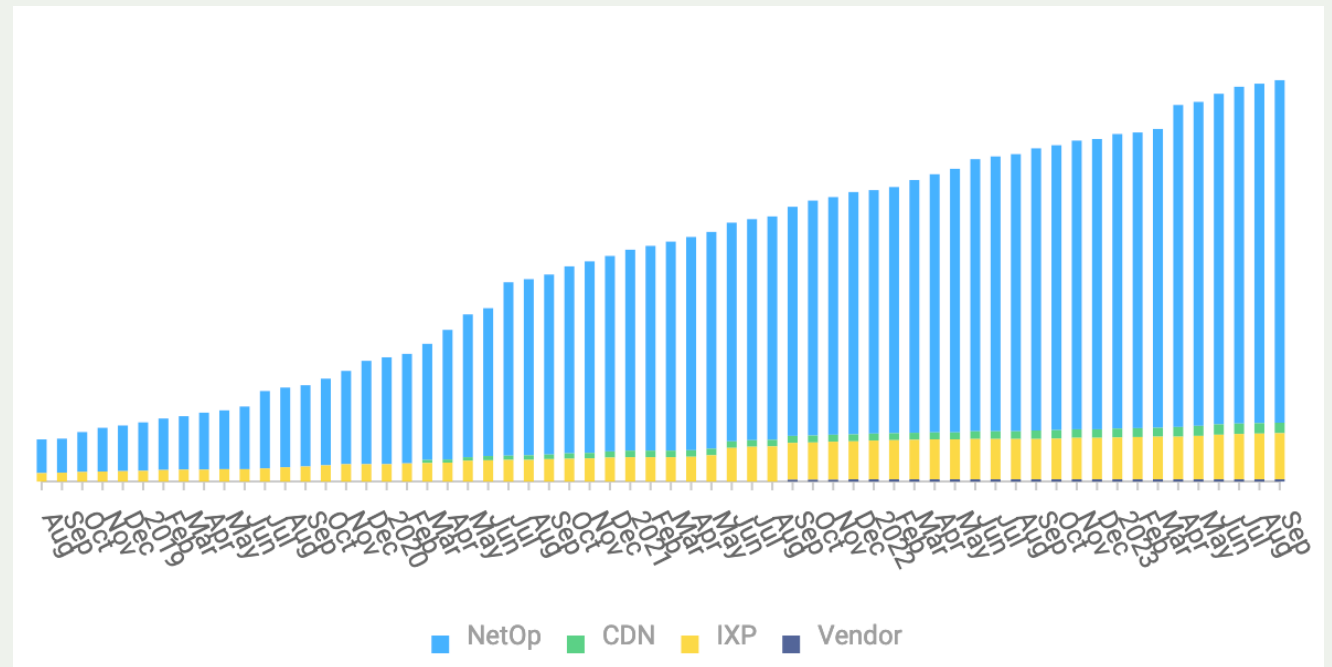
The MANRS Participants are the Internet operators that meet the requirements of the (currently) 4 MANRS programs:

Network Operators – 885 participants

IXPs – 119 participants

CDN/Cloud Providers – 27 participants

Vendors – 6 participants



# What is the MANRS Community?

MANRS Partners are 20 organizations recognized by the MANRS Community as supporting MANRS through promotion, training, resourcing and/or in other ways

# MANRS Participants in LACNIC Region

- 11,812 ASNs advertised in LACNIC region (~15% of total ASNs visible in the global routing table.)
- 354 ASNs in the LACNIC region participating in MANRS (~0.03% of total ASNs advertised in LACNIC region)
- Xx IXPs in the LACNIC region (out of xxx globally)
- Xx IXPs in the LACNIC region participating in MANRS (x.x%)

# MANRS Steering Committee

The Internet Society has developed and supported the MANRS initiative, which has grown quickly and also gained credibility outside of the operator community

MANRS has become bigger than what ISOC staff can support alone

Increasing number of decisions also need to be made :

- Auditing questions as they arise
- How to strengthen the existing MANRS Actions
- Development of ongoing MANRS conformance criteria
- How to handle participants failing to meet the necessary criteria for MANRS conformance
- Development of new programs
- Revenue

Aim is a self-regulating community – see <https://www.manrs.org/about/governance/community-charter/>

# MANRS Steering Committee Membership

Warrick Mitchell (AARNet) – Chair, until 31 Oct 2024

Andrew Gallo (GWU) – Deputy-Chair, until 31 Oct 2024

Melchior Aelmans (Juniper) - until 31 Oct 2025

Musa Steven Honlue (APNIC) – until 31 Oct 2025

Tony Tauber (Comcast) – until 31 Oct 2025

Flavio Luciani (NAMEX) – until 31 Oct 2024

Nick Hilliard (INEX) – until 31 Oct 2023

Arnold Nipper (DE-CIX) – until 31 Oct 2023

Arturo Sevrin (Google) – until 31 Oct 2023

**Nominations for 3 seats of the MANRS  
Steering Committee are now open!**

<https://www.manrs.org/about/governance/2023-manrs-steering-committee-elections/>



# MANRS Activities in 2023



# Monthly Reports

Sent to all MANRS Network Operators

Validate incident data -> tune down false positives

Raise awareness of network conformance status

Use as a regular communication channel (e.g. verify Action 3 contacts)

Can be sent to primary + any secondary contacts



MANRS

## MANRS Conformance Report

2022/02/01 - 2022/02/28

ASN '

### MANRS Readiness Scores

Anti-Spoofing: **100%**  
Coordination: **100%**  
Filtering: **41% ↑**  
Global Validation IRR: **59% ↑**  
Global Validation RPKI: **3% ↑**

### Non-Compliance Incidents

AS Route Misoriginations (BGPStream): **1**  
AS Route Misoriginations (GRIP): **2**  
Customer Route Hijacks (BGPStream): **1**  
Customer Route Hijacks (GRIP): **1**

Verify Incidents

# MANRS Observatory Developments

A lot of work to improve the MANRS Observatory:

- MANRS Observatory collates data from third-party data sources BGPStream, GRIP, CIDR Report, RIR databases, PeeringDB, and CAIDA Spoofer
- BGPStream is no longer actively maintained
- Started to use GRIP (Global Routing Intelligence Platform) but this tends to generate false positives so needs improvements to tune and improve accuracy
- Administrative bogons are a significant issue that need to be addressed
- More automated processing of MANRS applications to improve response times
- Self-management of MANRS Observatory accounts

# MANRS Research

## 2022 Overview

- Cleaning up false positives from GRIP data
- ROA History: It is a tool that collects historical RPKI data from RIPE NCC's RPKI repository. It provides an API to allow users to check whether a prefix was covered by a ROA in the past.
- Non-auth IRRs vs RIR IRRs: This tool compares information found in the non-authoritative Internet Routing Registries (IRRs) and compares the data with the RIRs' IRRs.
- Research Paper PAM 2023: RPKI Time-of-Flight: Tracking Delays in the Management, Control, and Data Planes
- Print ROA and Manifest (By Philip Paeps) :Python 3 port of the utility functions from Dragon Research Labs RPKI Toolkit
- 2 Research paper under review

# MANRS Research

## 2023 Activities

- Research ideas for Mentors and Ambassadors
  - Review of non-traditional vendors (those not part of MANRS Vendor program such as Mikrotik, FRRouting, Quagga etc)
  - Assess the potential impact of removing non-authoritative IRRs (radb, altdb, ntt etc) on BGP
  - A review of SAV (Source Address Validation) available methodologies
  - If you have any more ideas please reach out to us and keep an eye on the program announcement.
- Looking at various datapoints from IRR to resources transfers.

# MANRS+

- Discussions started for a new elevated tier of MANRS participation
- Established by network operators, service providers and their customers who require higher levels of routing security assurance
- Aims to develop a quality mark, certification, and possibly standards that can be incorporated into procurement recommendations and policies.
- MANRS+ WG is developing set of requirements around path security, DDoS attack protection, anti-spoofing protection, and validated routing information (e.g. ROAs and AS-SETs), plus auditing approaches to assure high levels of conformance
- Requirements focused on the needs of the relying parties and cover a broader set of risks compared to the existing MANRS programs.

<https://www.manrs.org/about/manrs-working-group/>

# Training

- Capacity building is an important part of MANRS
  - Internet Society moderated courses <https://www.isoc.org/learning/manrs/>
  - Self-paced online tutorials <https://www.manrs.org/resources/training/tutorials/>
  - Hands-on workshops (both directly and via our Mentors and Ambassadors Program)
- Training labs for network engineers and administrators to learn how to configure routing security features
- Implementation Guides provide step-by-step instructions to implement MANRS Actions <https://www.manrs.org/netops/guide/>

# Policymaker Engagement

- MANRS is often referenced by government agencies and has provided input to governmental inquiries (e.g. FCC Notice of Inquiry on Secure Internet Routing)
- MANRS will continue to monitor and provide input where appropriate to regulatory-related developments as these happen
- Read <https://www.manrs.org/2023/09/good-manrs-make-an-impression-on-governments/>



# MANRS Mentors and Ambassadors Program



# MANRS Mentors and Ambassadors Program 2023

*formerly known as MANRS Ambassadors and Fellows Program*

**Aim: to extend outreach and involve the wider Internet community in routing security**

**3 x Mentors and 9 Ambassadors**

- **Mentors** are individuals well established in the MANRS Community who provide mentorship, guidance, and feedback to others in the routing security community
- **Ambassadors** are emerging leaders who can enthusiastically bring knowledge and skills about routing security to their communities

# MANRS Mentors and Ambassadors Program 2023

*formerly known as MANRS Ambassadors and Fellows Program*

## Tracks:

- **Training** – Conduct online tutorials and workshops; help improve existing contents and labs.
- **Research** – Collect and analyze relevant information on routing incidents; collect feedback from the community.
- **Policy** – Review documents targeting issues that can be addressed through MANRS actions; help improve existing policy documents for MANRS.

Applications for 2024 open in April <https://www.manrs.org/champions/>

# Promoting MANRS in Brazil

Gilberto Zorello, NIC.br



# Program for a Safer Internet

## *Objectives*

Act in support of the Internet technical community

- Reduction of Denial of Service attacks
- Improving Network Routing Security
- Spread DNS security best practices
- Disseminate best security practices for configuring websites and email services
- Encourage the implementation of IPv6 in final users and services on the network



# Program for a Safer Internet

## *Plan of Actions*



### Actions Performed by NIC.br

- Several internal departments of NIC.br participate in the Program (CERT.br, CEPTRO.br, Registro.br, IX.br, Systems)
- **Creation of teaching materials**
- Raising awareness in the technical community through lectures, courses and training
- **Direct interaction with network operators through bilateral meetings to explain how to implement the best practices recommended in each situation**
- Definition of KPIs to monitor the effectiveness of actions

# Program for a Safer Internet

*Bilateral meetings with ISPs and incumbents*



Bilateral online meetings with those responsible for the ASes with the highest number of IP addresses notified

Program actions discussed in bilateral meetings:

- Correction of misconfigured services reported by CERT.br, which can be abused to take part in DDoS attacks
- **Adoption of Good Routing Practices (MANRS)**
- Verification of adoption of best configuration practices recommended by TOP (final user, Web Site and E-mail services)
- Presentation of measurements, by AS, on the status of adoption of recommended good practices (MANRS Observatory, TOP, Internal Tools)

# Program for a Safer Internet

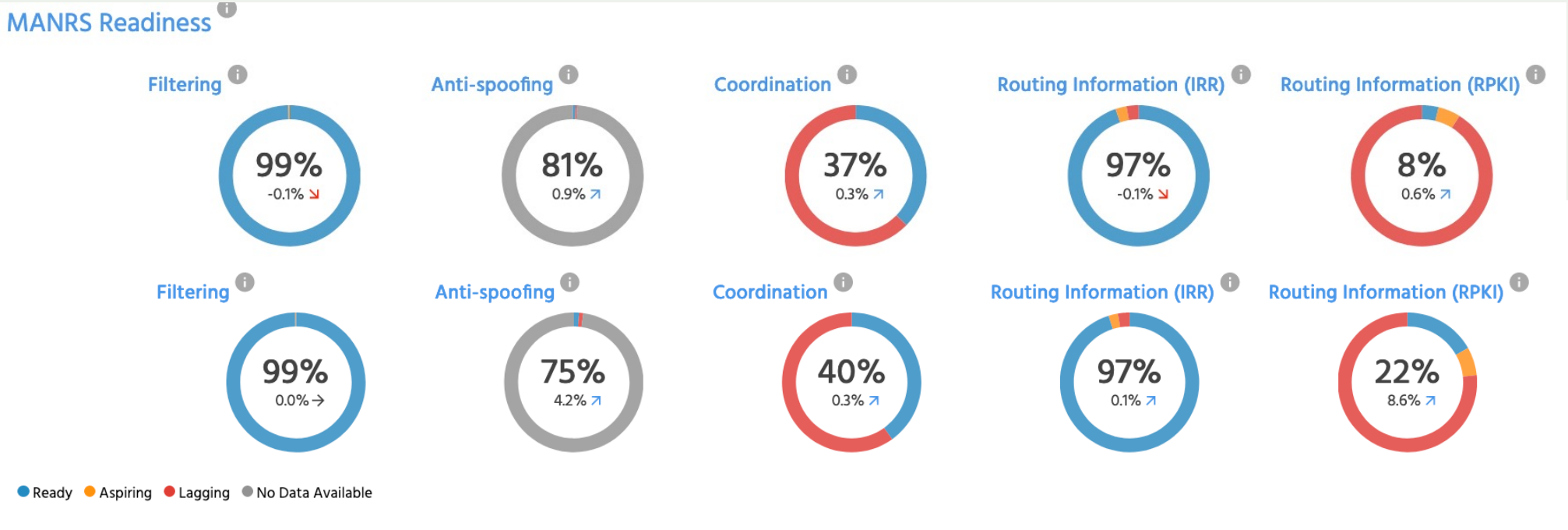
MANRS Participants in Brazil



286 Netops Participants serve Brazil (54 new in 2023!)

2022

2023

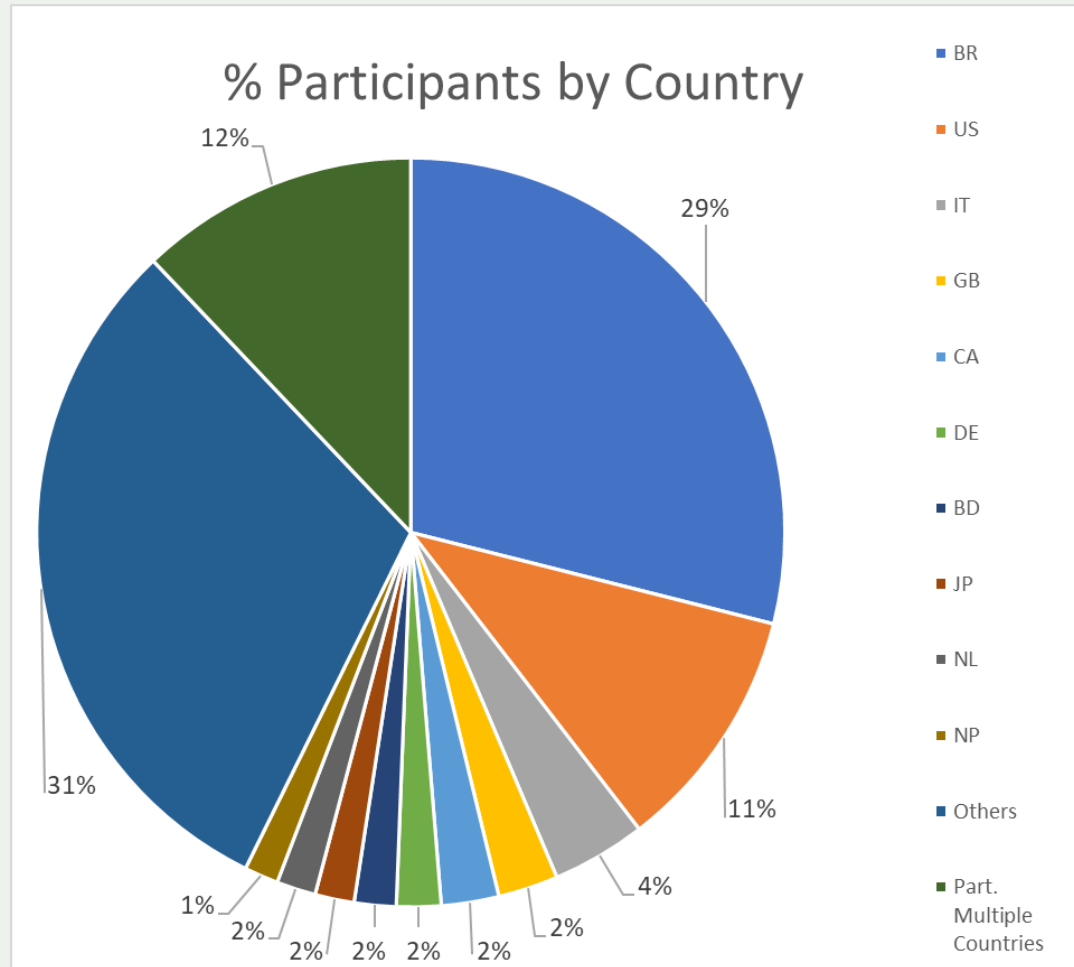


—                      -6%                      +3%                      —                      +14%



# Program for a Safer Internet

## Statistics of MANRS Participants by Country



Total of MANRS participants: 885

Participants in Brazil: 256 (Set/23)

206 (2022)

174 (2021)

140 (2020)

Source: <https://www.manrs.org/netops/participants/> Acess set/23

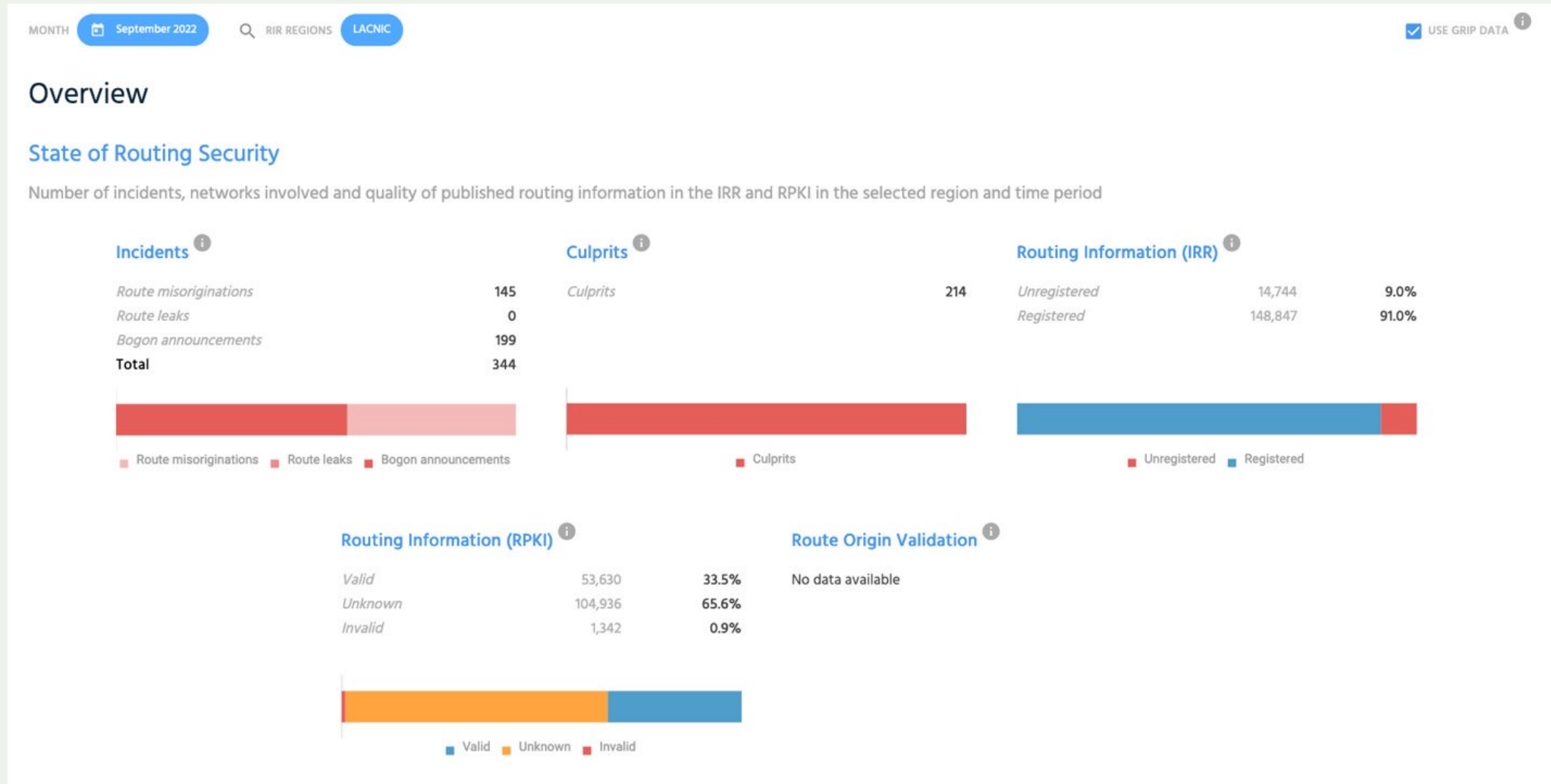
# RPKI deployment in the LACNIC region

Carlos Martinez, LACNIC



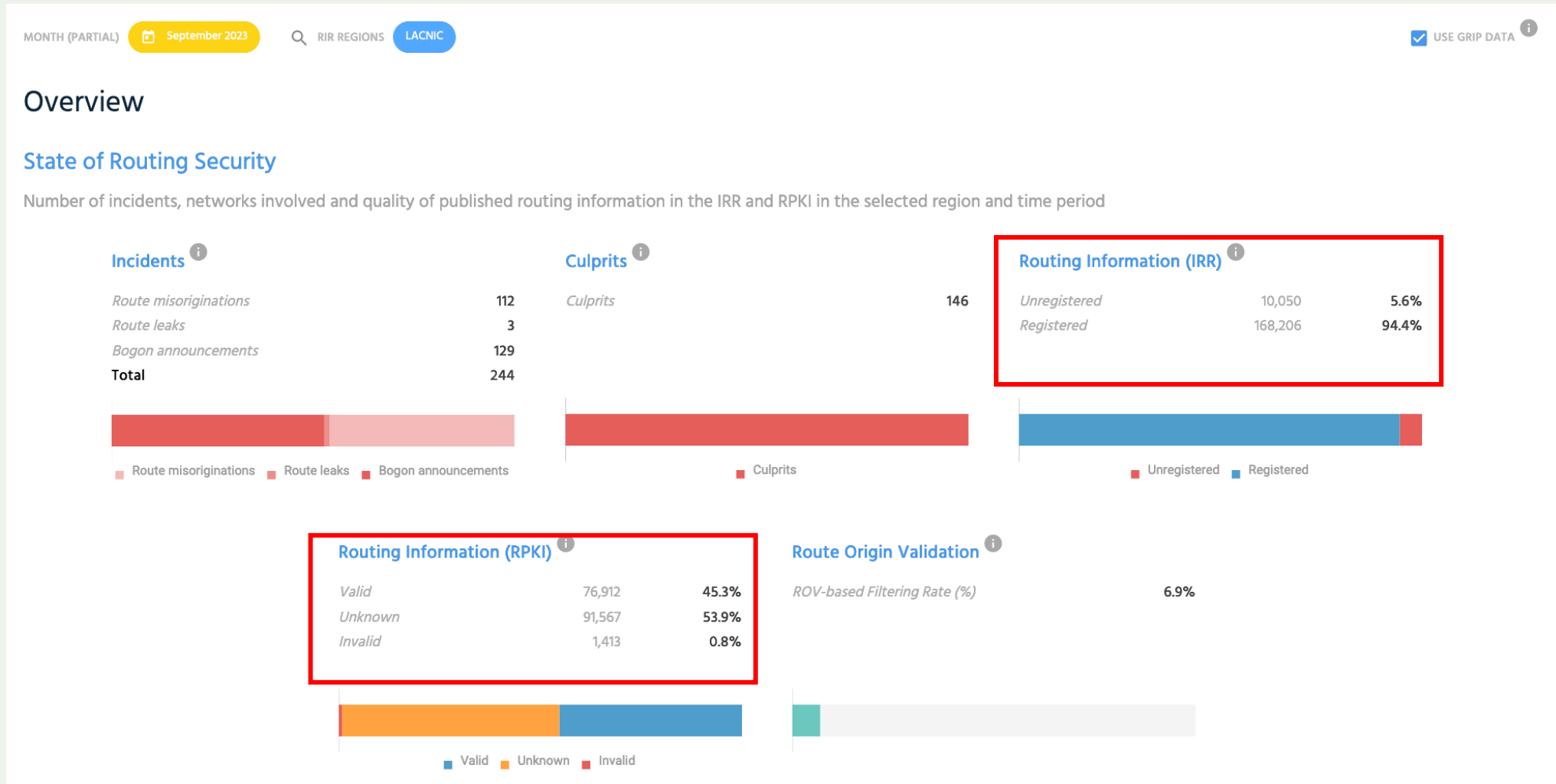
# State of Routing Security in the LACNIC Region

## September 2022



# State of Routing Security in the LACNIC Region

## September 2023



# MANRS: Looking Ahead



## MANRS after 2023

ISOC renewed its commitment to supporting MANRS for at least 3 more years

The MANRS Community / Steering Committee needs to develop a 3-5 year strategy:

- What does the community want to see at the end of 3-5 years (e.g. separate self-funding entity)?
- Revenue sustainability (e.g. organizational memberships, industry donations, sponsorship, other etc.)?
- Increase value of programs (e.g. MANRS+)
- What activities should MANRS be undertaking (e.g. auditing, certification, measurement, outreach, training, research, policy engagement)

# MANRS Activities

## Essential Services

Application Auditing

Ongoing Conformance  
Checking

MANRS Observatory hosting  
and maintenance

Steering Committee support

## Desirable Activities

MANRS Observatory  
development

MANRS Program development

Training and Knowledge  
Transfer

Promotion and Outreach

## Value-Add Activities

Mentors and Ambassadors and  
Program

Development of different  
maturity levels, including  
quality mark?

## Funding and Sustainability

- ISOC has funded MANRS initiative for past 8 years, but also needs your support to continue to grow and strengthen the routing security community
- We are looking for industry sponsors interested in supporting the **MANRS Observatory, Mentors and Ambassadors Program, Training Program**, and community events including the **Routing Security Summit**
- If you are a MANRS participant such as a network operator, IXP, CDN/Cloud Provider or Vendor, please also consider becoming an **ISOC Organizational Member** to help us continue to secure the global Internet for everyone



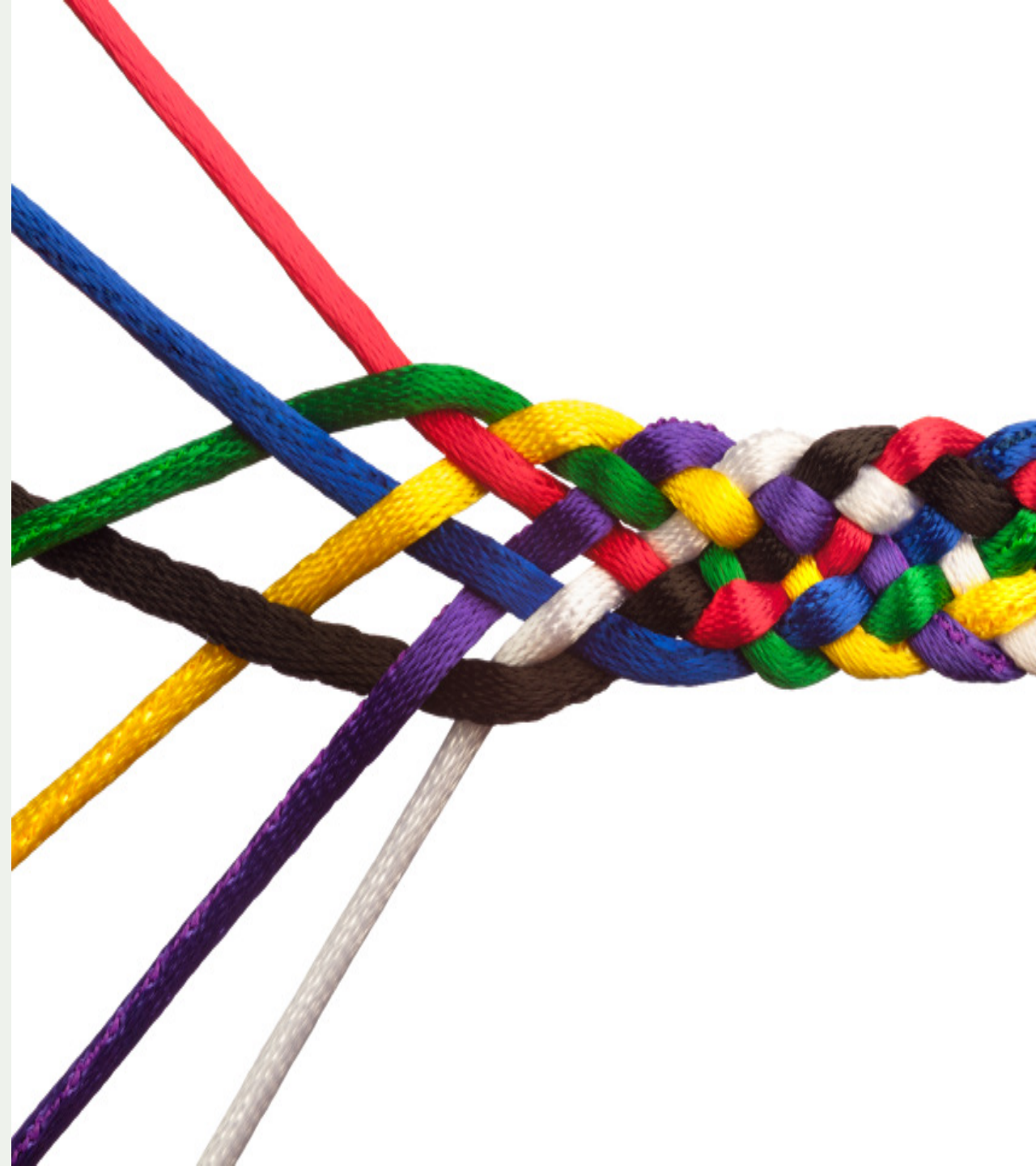
# Join the MANRS Community

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

- Fill out the sign-up form with as much detail as possible
- We will create MANRS Observatory account for your network

## Get Involved in the Community

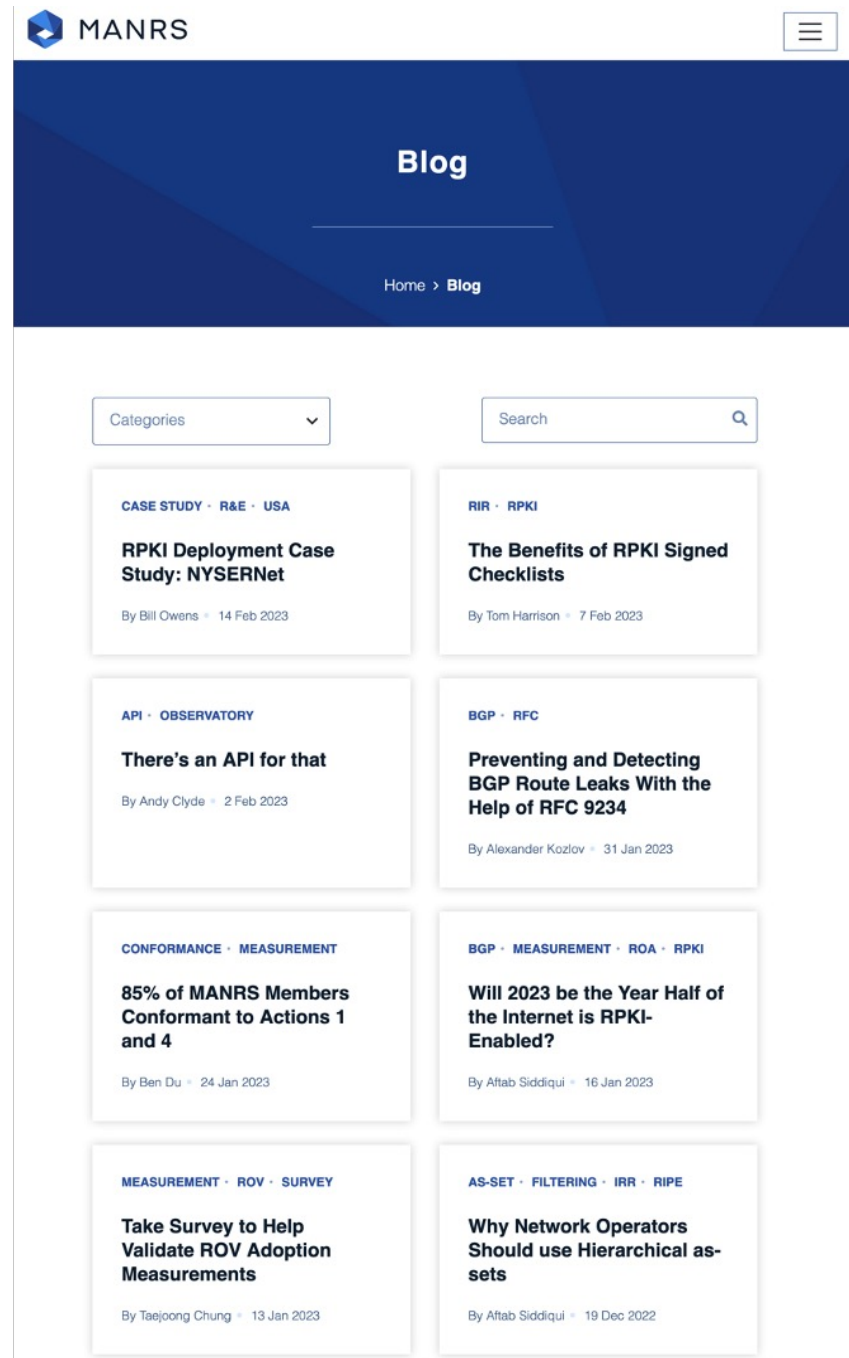
- Members support the initiative and implement the actions in their own networks
- Members maintain and improve the MANRS Actions



# Join the MANRS Community

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

- Stay up to date with current routing security research and news
- Share your successes and challenges for the community to learn from and comment on
- Discuss research and best current practices
- Grow your profile as a leader in routing security



The screenshot shows the MANRS website's blog page. At the top left is the MANRS logo, and at the top right is a hamburger menu icon. The main header is a dark blue banner with the word "Blog" in white. Below the banner, there is a breadcrumb trail: "Home > Blog". The content area features a grid of blog posts. Each post card includes a category tag (e.g., "CASE STUDY · R&E · USA"), a title, and the author's name and date. The posts are:

- RPKI Deployment Case Study: NYSErNet** by Bill Owens, 14 Feb 2023 (Category: CASE STUDY · R&E · USA)
- The Benefits of RPKI Signed Checklists** by Tom Harrison, 7 Feb 2023 (Category: RIR · RPKI)
- There's an API for that** by Andy Clyde, 2 Feb 2023 (Category: API · OBSERVATORY)
- Preventing and Detecting BGP Route Leaks With the Help of RFC 9234** by Alexander Kozlov, 31 Jan 2023 (Category: BGP · RFC)
- 85% of MANRS Members Conformant to Actions 1 and 4** by Ben Du, 24 Jan 2023 (Category: CONFORMANCE · MEASUREMENT)
- Will 2023 be the Year Half of the Internet is RPKI-Enabled?** by Aftab Siddiqui, 16 Jan 2023 (Category: BGP · MEASUREMENT · ROA · RPKI)
- Take Survey to Help Validate ROV Adoption Measurements** by Taejoong Chung, 13 Jan 2023 (Category: MEASUREMENT · ROV · SURVEY)
- Why Network Operators Should use Hierarchical as-sets** by Aftab Siddiqui, 19 Dec 2022 (Category: AS-SET · FILTERING · IRR · RIPE)