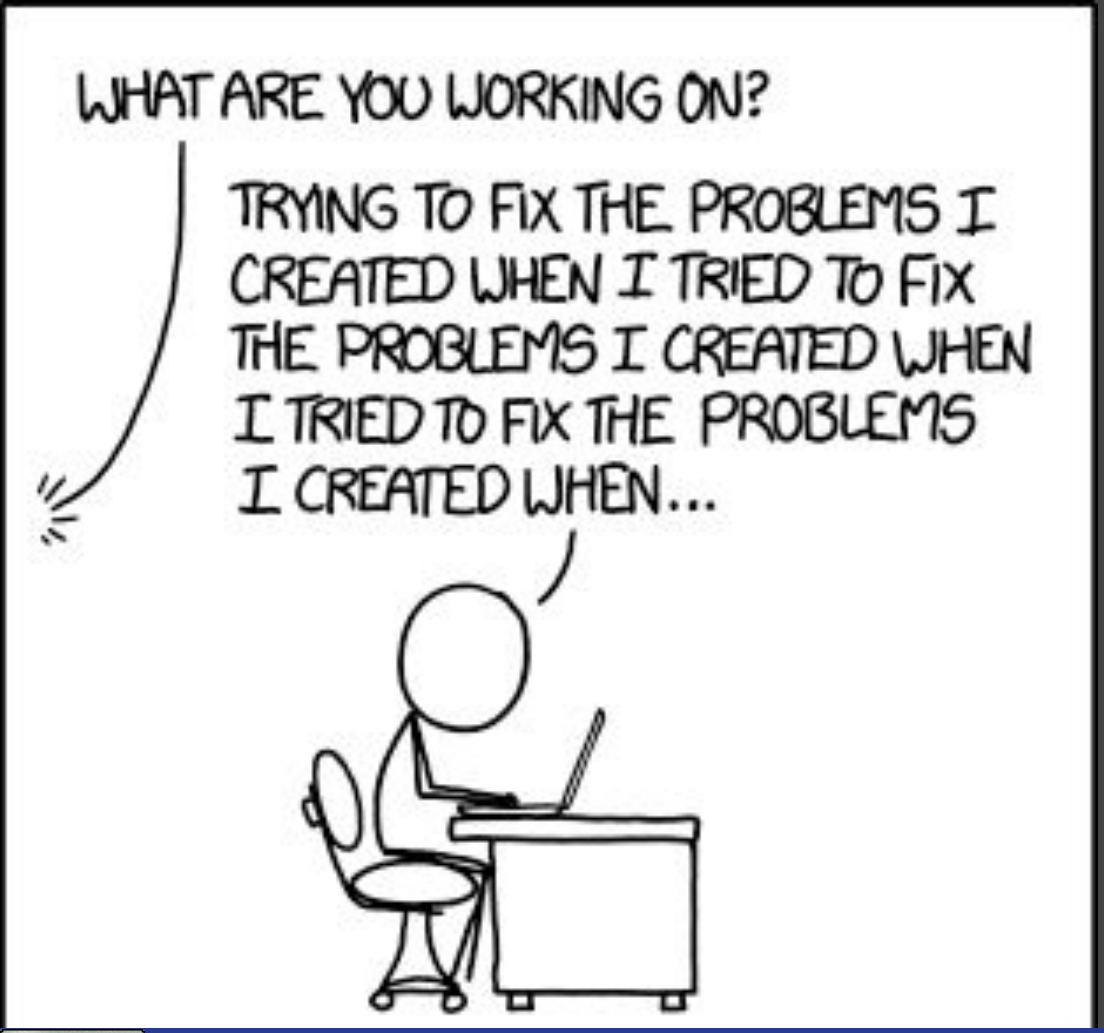
What if Public Administration demanded educated MANRS from ISPs?

What is the problem we would like to solve?



The Problem

A Routing Security Overview

In 2017 alone, 14,000 routing outages or attacks – such as hijacking, leaks, and spoofing – led to a range of problems including stolen data, lost revenue, reputational damage, and more. About 40% of all network incidents are attacks, with the mean duration per incident lasting 19 hours.

Imagine the outrage if a route leak impacted the ability of Italians to watch the Serie A Final next year!

The Honor System: Routing Issues

Border Gateway Protocol (BGP) is based entirely on trust between networks

- Created before security was a concern
- Assumes all networks are trustworthy
- No built-in validation that updates are legitimate
- The chain of trust spans continents
- Lack of reliable resource data

The Threats: What's Happening?

Event	Explanation	Repercussions	Solution
Prefix/Route Hijacking	A network operator or attacker impersonates another network operator, pretending that a server or network is their client.	Packets are forwarded to the wrong place, and can cause Denial of Service (DoS) attacks or traffic interception.	Stronger filtering policies
Route Leak	A network operator with multiple upstream providers (often due to accidental misconfiguration) announces to one upstream provider that it has a route to a destination through the other upstream provider.	Can be used for traffic inspection and reconnaissance.	Stronger filtering policies
IP Address Spoofing	Someone creates IP packets with a false source IP address to hide the identity of the sender or to impersonate another computing system.	The root cause of reflection DDoS attacks	Source address validation

Collaboration and Consensus

Your security is in someone else's hands. The actions of others directly impact you and your network security (and vice versa).

Why should they help you? You can start by helping them.

Where is the line between good and bad routing security?

We need globally recognized security expectations for all network operators to raise the bar on routing security.

We Are In This Together

Network operators have a responsibility to ensure a globally robust and secure routing infrastructure.

Your network's safety depends on a routing infrastructure that weeds out bad actors and accidental misconfigurations that wreak havoc on the Internet.

The more network operators work together, the fewer incidents there will be, and the less damage they can do.

Solutions?

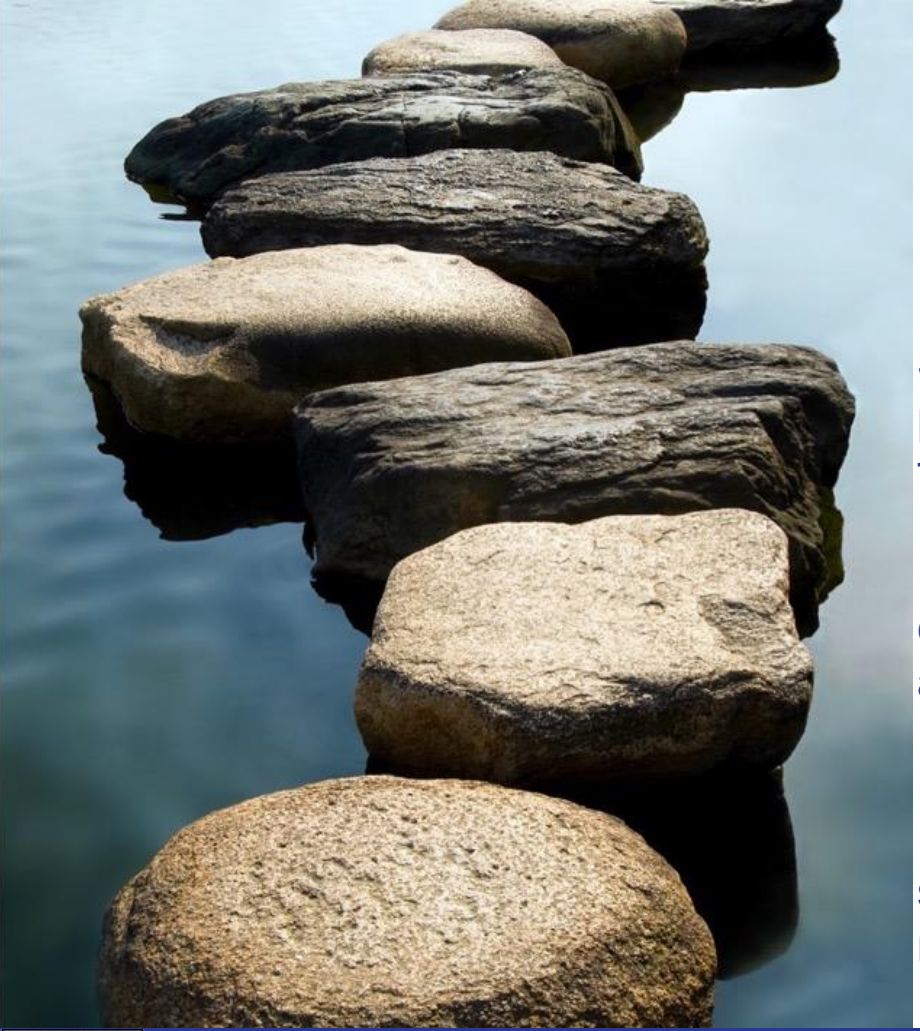
BLOCKCHAIN

The Solution: Mutually Agreed Norms for Routing Security (MANRS)

Provides crucial fixes to reduce the most common routing threats

MANRS improves the security and reliability of the global Internet routing system based on collaboration among participants and shared responsibility for the Internet infrastructure.

MANRS sets a new norm for routing security.



MANRS is an Important Step

Security is a process, not a state. MANRS provides a structure and a consistent approach to solving security issues facing the Internet.

MANRS is the minimum an operator should consider, with low risk and cost-effective actions.

MANRS is not a one-stop solution to all of the Internet's routing woes, but it is an important step toward a globally robust and secure routing infrastructure.

Mutually Agreed Norms for Routing Security

MANRS defines four simple but concrete actions that network operators must implement to dramatically improve Internet security and reliability.

- The first two operational improvements eliminate the root causes of common routing issues and attacks, while the second two procedural steps improve mitigation and decrease the likelihood of future incidents.

MANRS

MANRS Actions for Operators

Filtering

Prevent propagation of incorrect routing information

Ensure the correctness of your own announcements and announcements from your customers to adjacent networks with prefix and AS-path granularity

Anti-spoofing

Prevent traffic with spoofed source IP addresses

Enable source address validation for at least single-homed stub customer networks, their own end-users, and infrastructure

Coordination

Facilitate global operational communication and coordination between network operators

Maintain globally accessible up-to-date contact information in common routing databases

Global Validation

Facilitate validation of routing information on a global scale

Publish your data, so others can validate

Why Italian SERVICE PROVIDERS Should Join MANRS

To help solve global network problems

- Lead by example to improve routing security and ensure a globally robust and secure routing infrastructure
- Being part of the MANRS community can strengthen enterprise security credentials

To add competitive value and differentiate in a flat, price-driven market

- Growing demand from enterprise customers for managed security services (info feeds)
- To signal security proficiency and commitment to your customers

To "lock-in" - from a connectivity provider to a security partner

- Information feeds and other add-on services may increase revenue and reduce customer complaints
- Enterprises indicate willingness to pay more for secure services

How the Italian Government can strengthen routing security

Leading by example

- Improve infrastructure reliability and security by adopting best practices in their own networks.

Driving the development or adoption of best practices across the country

- Encourage industry associations to develop or strengthen and promote existing voluntary codes of conduct for network operators. MANRS can serve as both a baseline set of best practices and as a foundation to complimentary voluntary codes of conduct.

Encouraging the use of routing security as a competitive best practice

- Encourage local industry to better convey security to consumers, and specify security during procurement practices.

Italian PA - Some Background

SPC(1)

Public System for Connectivity first edition 2005

Won by

Fastweb (AS12874), **BT Italia** (AS8968)

Wind Telecomunicazioni (AS1267) e **Telecom Italia** (AS3269)

SPC1 contents:

Connectivity (transport, support, voip, interoperability, maintenance)

Security (firewall, antivirus, network intrusion detection, log, vpn...)

SPC1 **ended** in May, 2017

Italian PA - Some Background

SPC2

Public System for Connectivity second edition 2015

Won by

Fastweb (formerly Tiscali) (AS12874)

BT Italia (AS8968), **Vodafone Italia** (AS30722)

SPC2 contents: IP data transport, network security services and VOIP services

IP, SECURITY, VOIP

Duration **7** years

Value not to exceed **2.4 billion** euros

Italian PA - Some Background

Central State administrations distribution to winning ISPs

60%

Agenzia Spa[illegible]taliana
Agenzia de[illegible] Do[illegible]ne e [illegible]Mo[illegible]poli
Agenzia IC[illegible]
Agenzia N[illegible]zionale per i[illegible]urismo - ENIT
Agenzia N[illegible]zionale Sicu[illegible]zza Fe[illegible]ovie - ANSF
Agenzia p[illegible]r le [illegible]ogazio[illegible] in Agri[illegible]ltur[illegible] - A[illegible]EA
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Ente Naz[illegible]ale Av[illegible]zio[illegible] Civile - ENAC
INPS
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Istituto Su[illegible]eriore d[illegible]Sa[illegible]a - ISS
Istituto S[illegible]eriore [illegible]per [illegible]a Pro[illegible]zione e [illegible]a R[illegible]erca Ambientale - ISPRA
Ministero E[illegible]a e Fin[illegible] - MEF ed Agenzie fiscali
Scuola Nazio[illegible]e dell'Amm[illegible]trazione
Istituto per lo sviluppo della formazione professionale dei lavoratori
Istituto Nazionale di Ricerca per gli Alimenti e la Nutrizione

FASTWEB

20%

Age[illegible]aliana [illegible]la co[illegible]zione [illegible]allo svil[illegible]po
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Mini[illegible]ro dell'Is[illegible]zione, [illegible]ell'Univers[illegible]à e [illegible]della Ric[illegible]ca
Mi[illegible]tero dello Sv[illegible]ppo [illegible]conomico - MISE
P[illegible]el Co[illegible]dei Ministri
Presidenza [illegible]del C[illegible]siglio dei Ministri
Dipartimento Protezione Civile

BT

20%

ACI
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Co[illegible]siglio d[illegible]Stato
Co[illegible]siglio p[illegible] la [illegible]cerca [illegible]agr[illegible]coltu[illegible] e [illegible]nalisi dell'econom[illegible] ag[illegible]ria
Guardia di [illegible]nan[illegible]a
INAIL
Istituto N[illegible]zionale di Statis[illegible]ca - ISTAT
Istituto P[illegible]grafi[illegible]o e Zecca [illegible]dello Stato
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Mi[illegible]tero delle In[illegible]str[illegible]e e dei Tr[illegible]sporti - MIT
M[illegible] Inter[illegible]

SBT 5 9 7 1 5 AP

Italian PA - Some Background

Territorial administrations

20 Regions

14 Big Cities

93 Provinces

7984 Municipalities

MANRS as a requirement

A suggestion for **CONSIP** or other public procurement entities in Italy:

To strengthen routing security in Italy, MANRS participation should be a **requirement** (or at least a strong **consideration**) for an ISP to win the next main Internet transit agreement valid for the

MANRS: who is there?

Currently only 5 Italian ASes out of 1,000 declare to be MANRS compliant

{None of the former or present winning Internet providers of the Italian PA has qualified for MANRS so far.}

Join Us

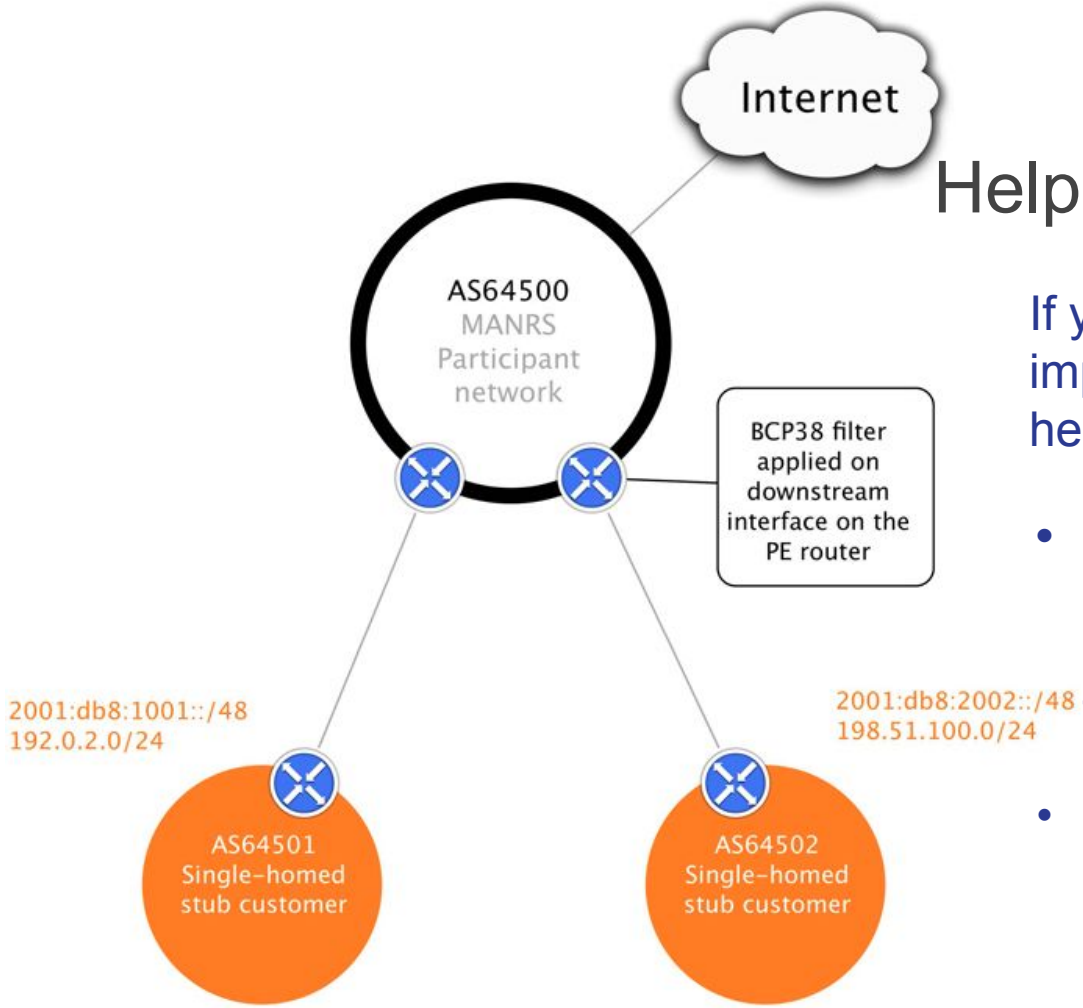
Visit https://www.manrs.org

- Fill out the sign up form with as much detail as possible.
- In response we may ask questions and test your network.

Get Involved in the Community

- Members support the initiative and implement the actions in their networks
- Members maintain and improve the MANRS document and promote its objectives

Help Is Available



If you're not ready to join yet, implementation guidance is available to help you:

- **an Implementation Guide** based on Best Current Operational Practices deployed by network operators around the world
- **six training modules** based on information in the Implementation Guide.

What's Next: MANRS Observatory

Provide a factual state of security and resilience of the Internet routing system and track it over time.
Measurements will be:

- Transparent – using publicly accessible data
- Passive – no cooperation from networks required
- Evolving – the MANRS community will decide what gets measured and how

rcynic summary 2016-09-18T17:36:43Z

Overview Repositories Problems All Details

Grand totals for all repositories

	Object accepted	Manifest interval overruns certificate	certificate has expired	Policy Qualifier CPS	Stale CRL or manifest
None .cer	5501			773	
None .crl	5496				1
None .gbr	3				
None .mft	5496	1	1	773	1
None .roa	5463			580	
Total	**21959**	**1**	**1**	**2126**	**2**

Current total object counts (distinct URIs)

Repository	.cer	.crl	.gbr	.mft	.roa
ca.rg.net					
ca0.rpki.net					
localcert.ripe.net					
repository.lacnic.net					
rpki-pilot.lab.dtag.de					
rpki.afrinic.net					
rpki.apnic.net					
rpki.ripe.net					
Total	**0**	**0**	**0**	**0**	**0**

Overview for repository ca.rg.net

	Object accepted	Manifest interval overruns certificate	certificate has expired	Policy Qualifier CPS	Stale CRL or manifest
None .cer	1				
None .crl	2				1
None .gbr	1				
None .mft	2				1
None .roa	35				

What's Next: Hands-on Lab

We are designing a lab that will allow engineers to practically implement MANRS in a simulated network environment. The lab will be available:

- Via MANRS training partners
- Online

Get in touch with us if you would like to host the MANRS training lab environment!