

ROAs (Route Origin Authorizations)

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APNIC

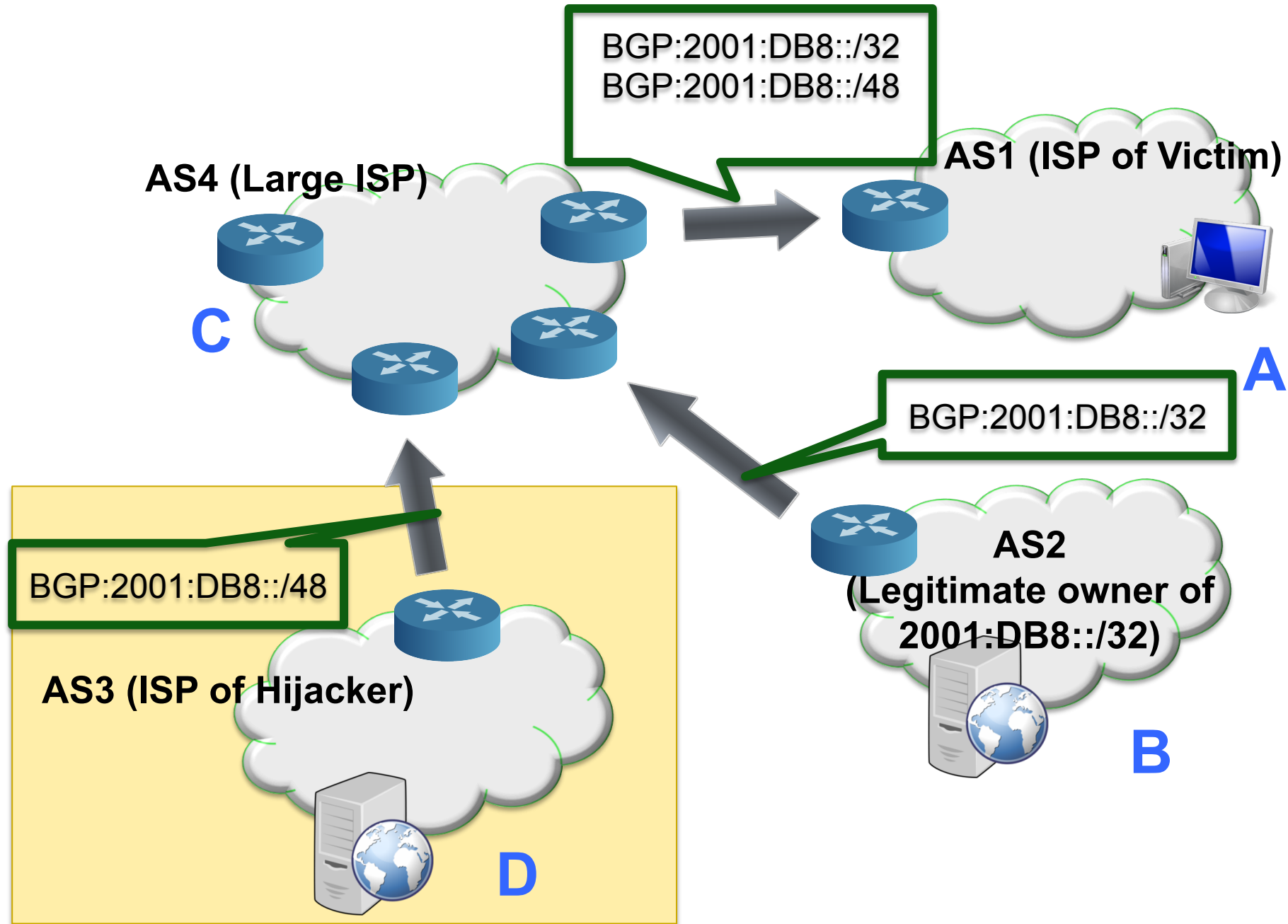
Issue Date:

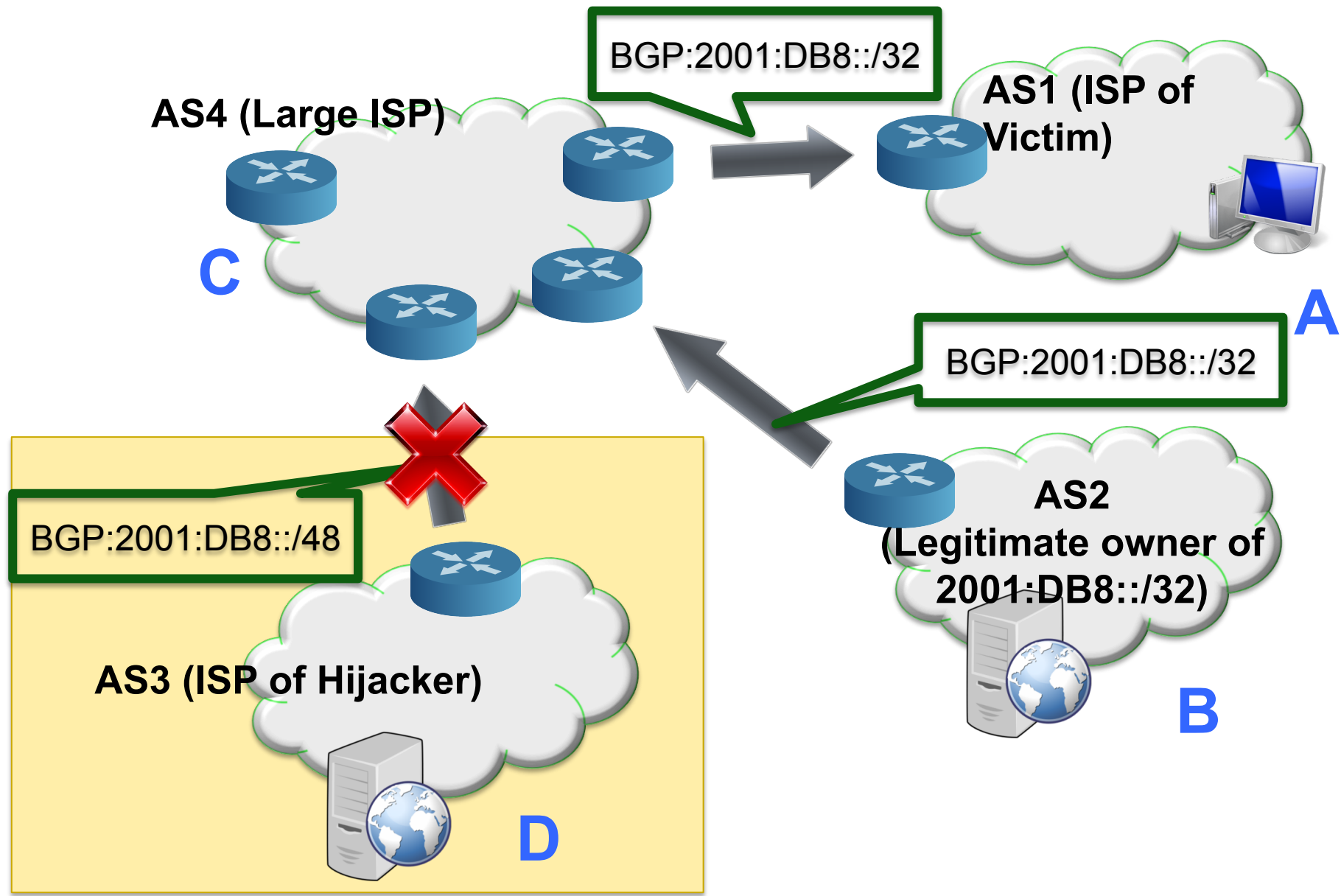
Revision:



Motivation

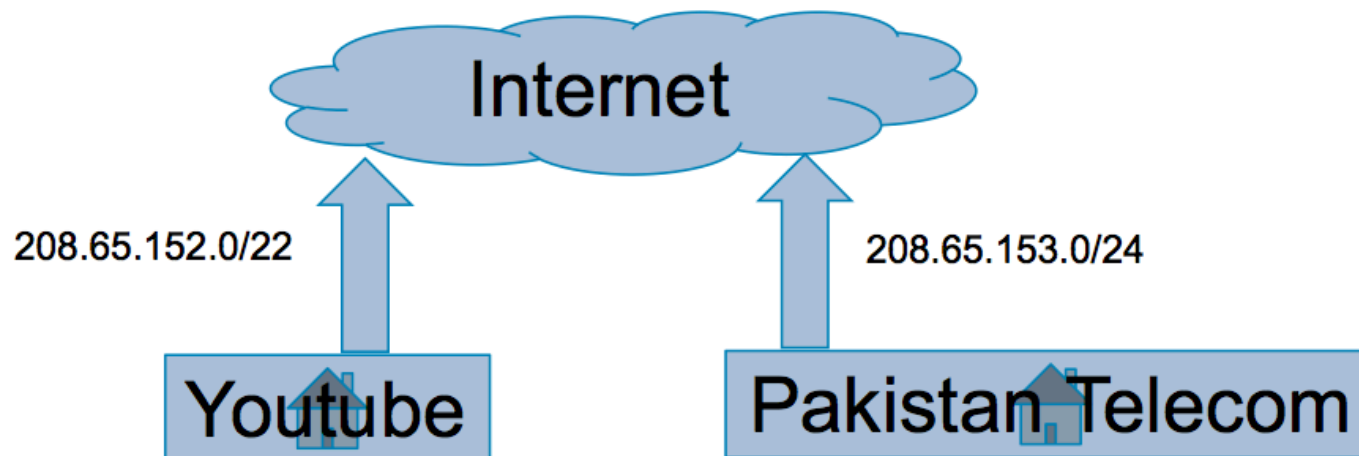
- Stops route hijacking
 - Only the rightful custodian can originate the prefix announcement
 - ISPs filter prefixes they propagate
- Mitigates erroneous route entries
 - Limits human errors
 - Prioritize routes with certificates



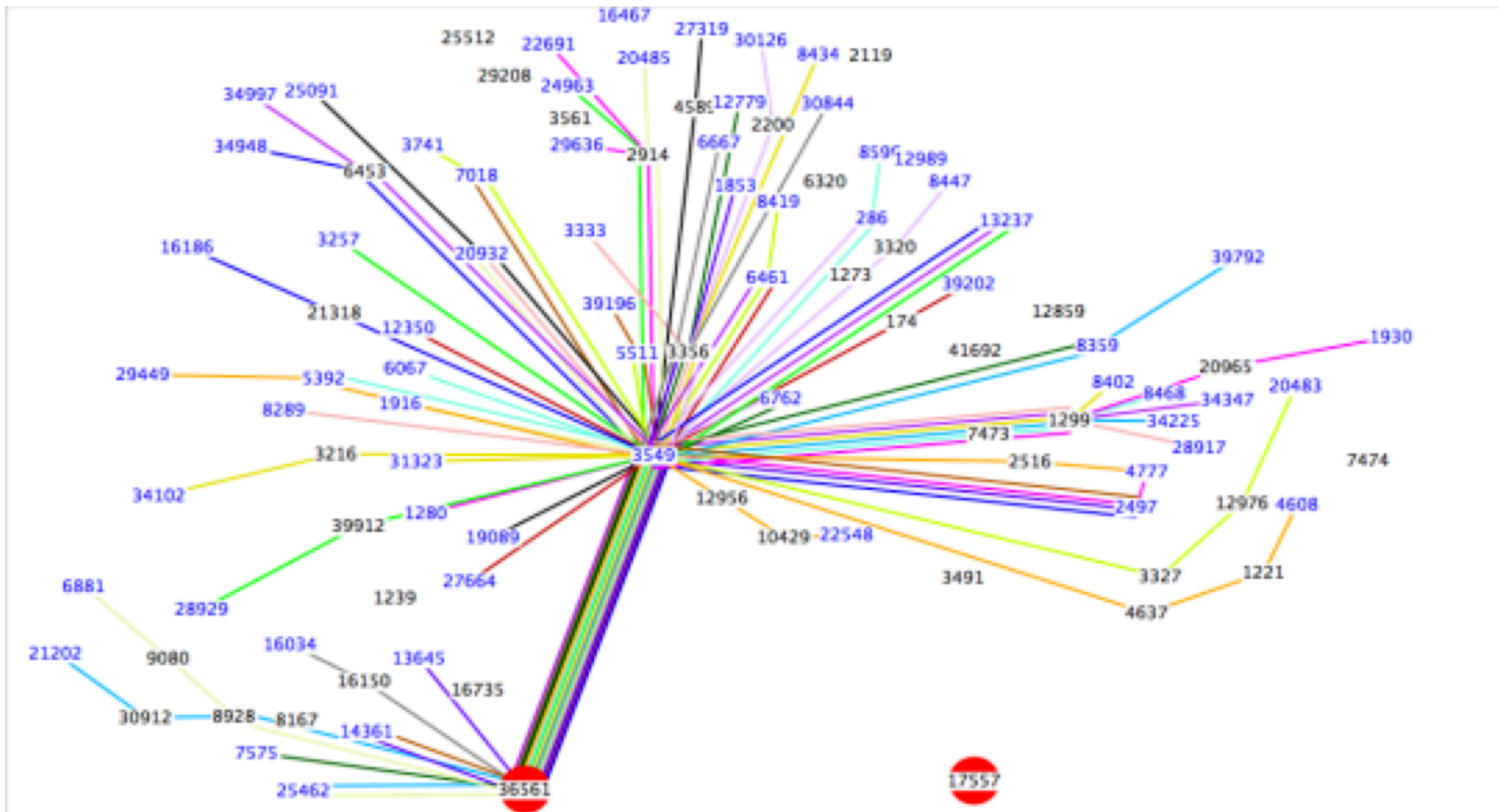


Real Life Example: YouTube Hijacking

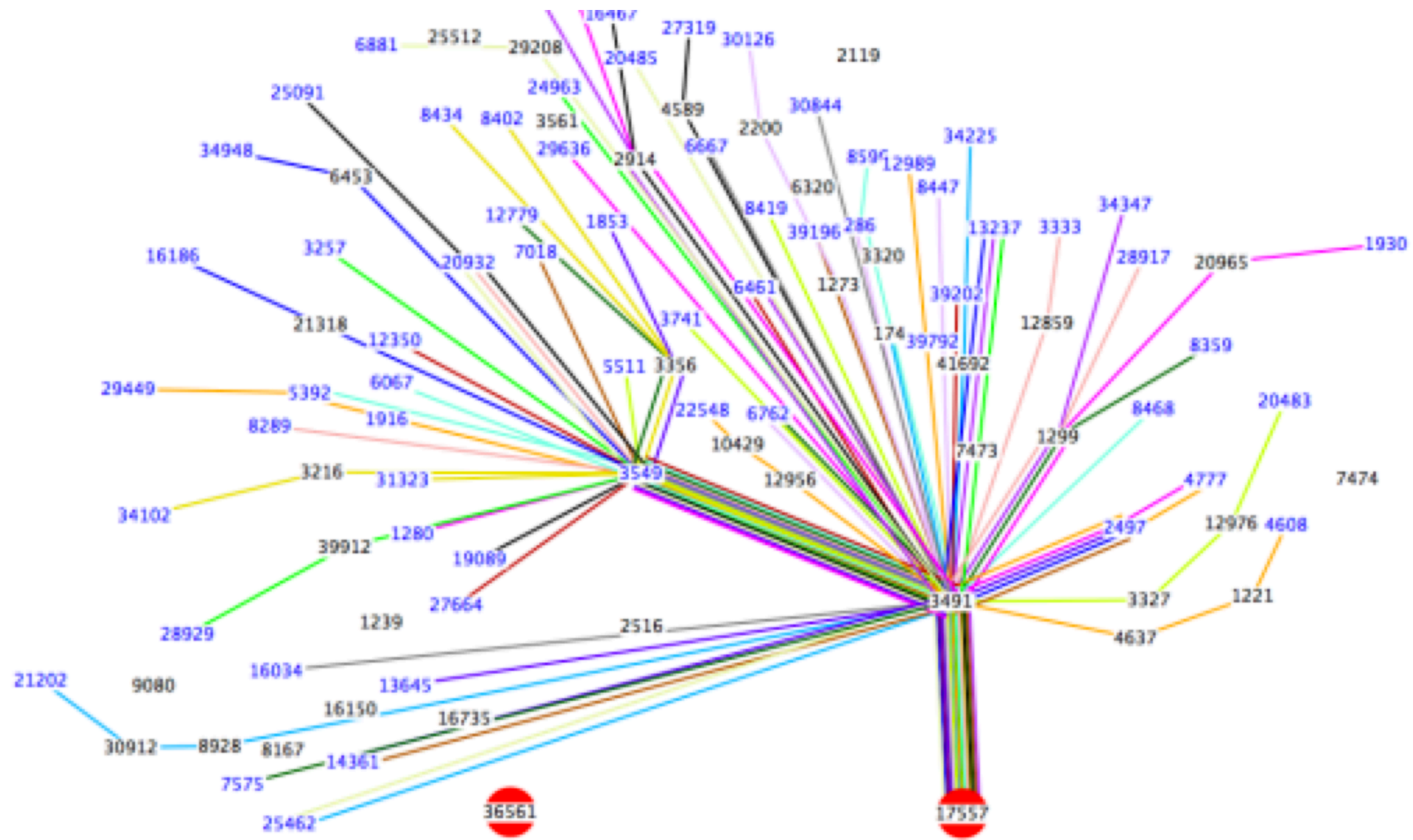
- Took place in 2008
- AS17557 (Pakistan Telecom) started announcing 208.65.153.0/24 (YouTube)
 - <https://www.ripe.net/publications/news/industry-developments/youtube-hijacking-a-ripe-ncc-ris-case-study>



YouTube – Life as normal



After misconfiguration



Resource Certification, ROA, RPKI

- APNIC offers Resource Certification as a tool to Members to create Route Origin Authorizations (ROAs) in MyAPNIC
- A ROA is a digitally signed, cryptographic object generated by the Resource Certification service
- The Resource Public Key Infrastructure (RPKI) is the framework that enables users of public networks to verify the authenticity of data that has been digitally signed by the originator of the data

What is a ROA object?

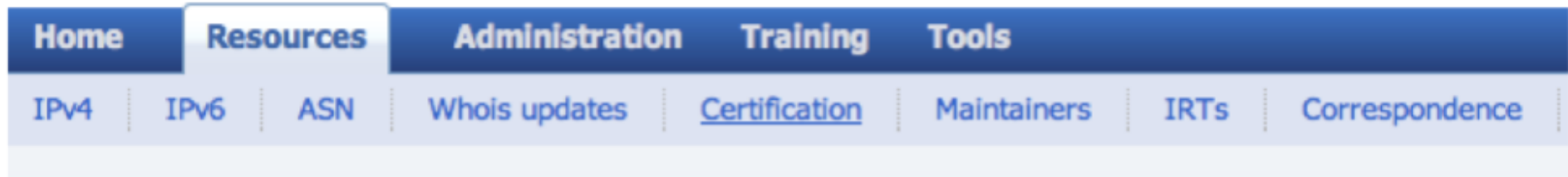
- What's contained in a ROA
 - The AS number you have authorized
 - The prefix that is being originated from it
 - The most specific prefix (maximum length) that the AS may announce

For example: *“ISP 4 permits AS 65000 to originate a route for the prefix 192.2.200.0/24”*

ROA and MyAPNIC

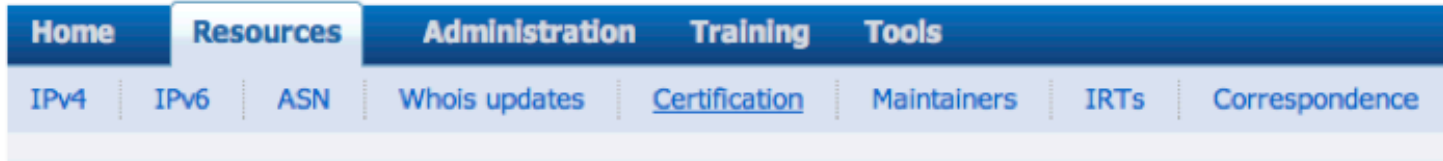
- What you need to have before creating a ROA
 - Must be an APNIC Member
 - Have access to MyAPNIC
 - Digital Certificate installed
- Takes only 5 minutes to create, and 10 minutes to be visible to the public

Activate Resource Certification



To start using the Resource Certification feature, click on the Certification menu under Resources

Activate RPKI Engine



Select if you want to operate in the MyAPNIC RPKI portal or if you want to host your own certificate authority.

Home / Resources / RPKI

RPKI

Enable Resource Certification

Currently, you have not enabled resource certification for your registry.

I want to operate in the MyAPNIC RPKI portal.

I want to host my own certification authority and run an RPKI engine myself.

[Next](#)

Creating your ROA

The screenshot shows the APNIC RPKI management interface. At the top, there are navigation tabs: Home, Resources, Administration, Events, Contact, and Tools. Below these are sub-tabs for IPv4, IPv6, ASN, Whois updates, Certification, Maintainers, and IRTs. The breadcrumb trail is Home / Resources / RPKI.

A green notification bar at the top states: "1 ROA successfully marked for addition. Remember to commit you changes."

BGP Route Validity

1) Select your BGP route(s) from the list

Origin AS	Prefix
<input checked="" type="checkbox"/> 45192	2001:df0:a::/48
<input type="checkbox"/> 45192	203.176.189.0/24

Items per page: 10 | Search by AS or IP..

Showing 1 to 2 of 2 entries

2) Click Suggest ROA button

ROA Configuration

Origin ASN: Prefix: Max Length:

Changes

Origin AS	Prefix	Max Length
45192	2001:df0:a::/48	48

Showing 1 to 1 of 1 entries

3) Click Commit

Certified Resources

- 61.45.248.0/23
- 61.45.251.0/24
- 61.45.253.0/24
- 203.176.189.0/24
- 2001:DF0:A::/48

Creating your ROA

ROA Configuration

1) Enter the Origin ASN you authorize to announce routes for your IP prefix

Origin ASN Prefix Max Length

2) Enter your IP prefix that is being announced

3) Enter the Max Length of prefix that you authorize for this ROA

4) Click Add

All Changes Items per page 10 Search by AS or IP...

Origin AS	Prefix	Max Length	
45192	2001:df0:a::/48	48	
45192	203.176.189.0/24	24	

Showing 1 to 2 of 2 entries

<< < 1 of 1 > >>

Certified Resources

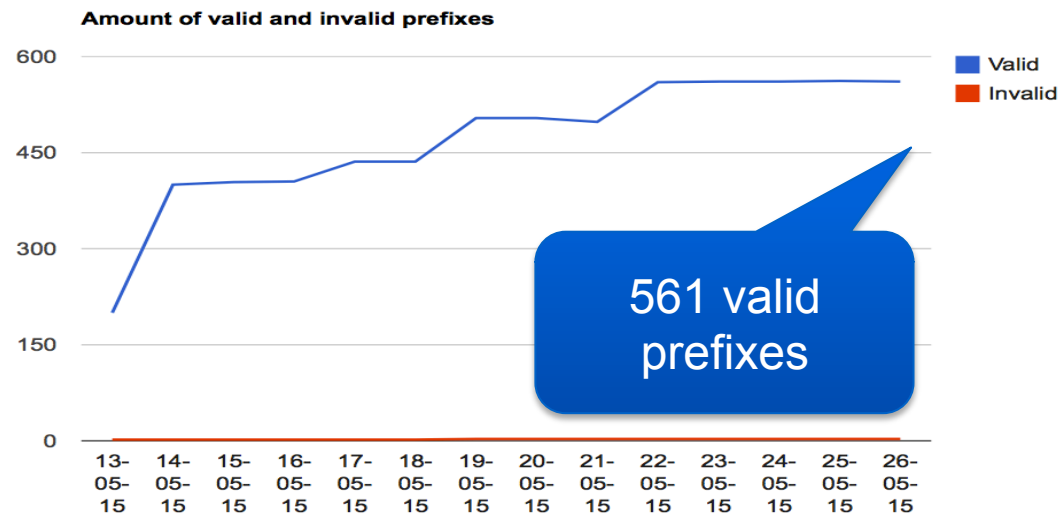
- 61.45.248.0/23
- 61.45.251.0/24
- 61.45.253.0/24
- 203.176.189.0/24
- 2001:DF0:A::/48
- 2406:6400::/32

Created your ROA, what's next?

- **Maintain your ROAs**
 - Changed BGP announcement
 - New delegation
 - Transferred resources
- **RPKI validator**
 - <https://trac.rpki.net/wiki/doc/RPKI>

Success Story

- May 2015: APNIC Outreach in Bangladesh
 - 13 organizations visited
 - Onsite support to create ROA objects



<http://rpki.surfnet.nl/bd.html>

World Leaderboard

Breakdown per Country

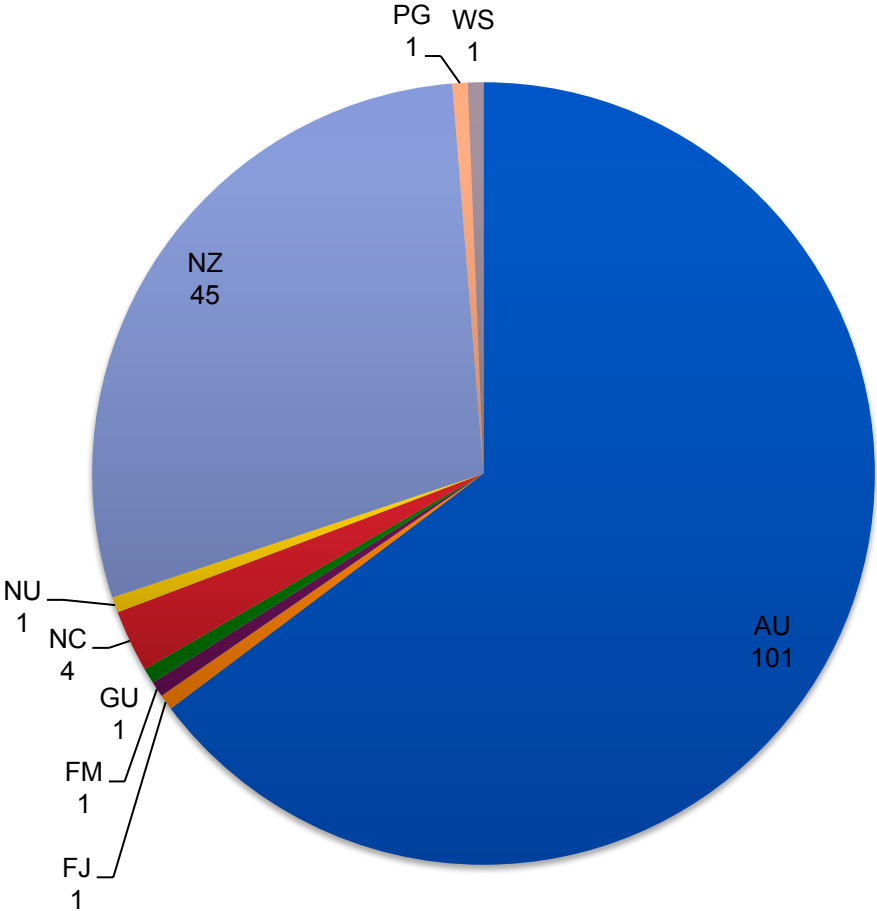
10 records per page Search:

Country	Total	Valid	Invalid	Unknown	Accuracy	RPKI Adoption Rate
BD	2336 (100%)	617 (26.41%)	5 (0.21%)	1714 (73.37%)	99.2%	26.63%
NL	5028 (100%)	656 (13.05%)	25 (0.5%)	4347 (86.46%)	96.33%	13.54%
FR	5834 (100%)	1154 (19.78%)	105 (1.8%)	4575 (78.42%)	91.66%	21.58%
US	174637 (100%)	1084 (0.62%)	331 (0.19%)	173222 (99.19%)	76.61%	0.81%

<http://rpki.surfnet.nl/country.html>

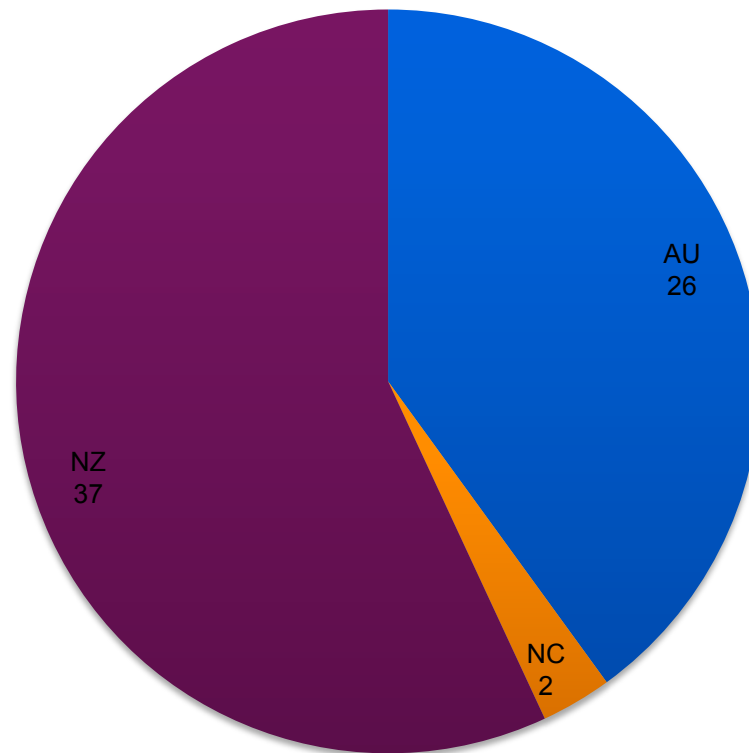
Story in Oceania

Resource certification enabled



Story in Oceania

ROA count



RPKI Initiatives



10 face-to-face and elearning RPKI training courses delivered

RPKI presentations to NOGs and conferences

Development of the 'Ready to ROA' Campaign – hands on sessions to help Members create ROAs

New shirts, stickers, web content to promote campaign

Ready to ROA launched in 2015

Questions?

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APNIC

