



RIPE NCC

RIPE NETWORK COORDINATION CENTRE

Increasing Routing Security through RPKI Deployathon

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Problem Statement

- **Some IRR data cannot be fully trusted**
 - often inaccurate
 - incomplete
 - out of date
- **Not every RIR has an IRR**
 - third-party databases need to be used (RADB, operators)
 - no verification of who holds IP addresses or AS numbers

Accidents Happen



- **Fat fingers**

- 2 and 3 are really close on your keyboard

- **Policy violations (leaks)**

- “Oops, we didn’t mean this to go to the public Internet”
- Infamous incident: Pakistan Telecom blackholes Youtube, for the world..



What is RPKI?

- **Resource Public Key Infrastructure**
 - RPKI Repository (digital certificate)
 - Router Origin Authorisation (ROA) - signed prefixes
 - RIPE NCC Validator (other validators also available)
- **Securing the Internet infrastructure and BGP routing**
 - Developed by the IETF
 - Endorsed by RIRs and network operators
 - Helps reduce the impact of some BGP hijacking attacks and accidental misconfigurations

RPKI in some European countries



Country	% Addresses	Accuracy
BE	78%	100,0%
BA	62%	100,0%
RS	57%	99,9%
HU	57%	99,9%
BG	54%	99,9%
SI	54%	100,0%
AL	52%	99,5%
CZ	46%	99,9%
HR	18%	100,0%
AT	18%	100,0%
SK	10%	100,0%

source: <https://lirportal.ripe.net/certification/content/static/statistics/world-roas.html>

RPKI Deployathon



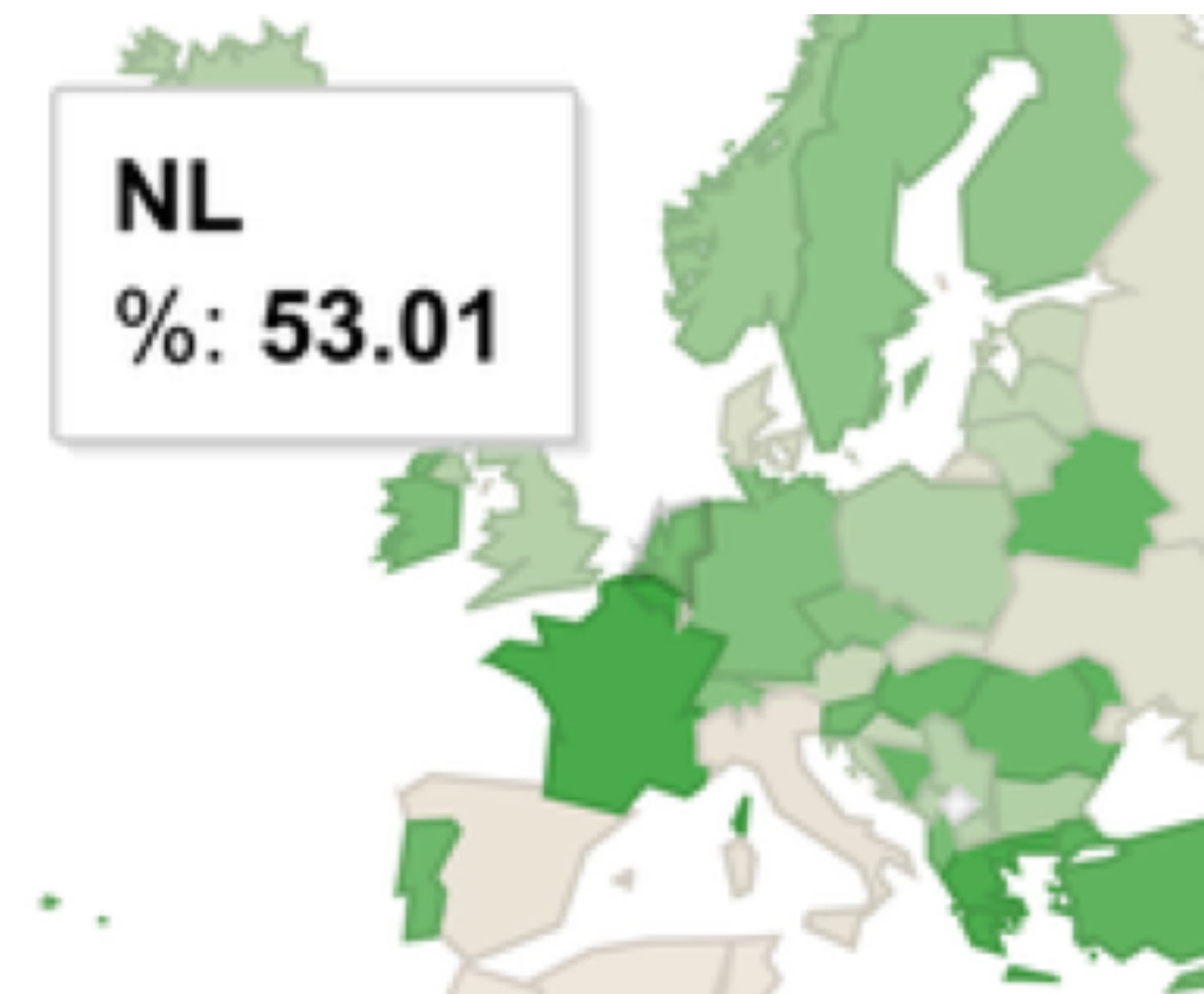
- **When**
 - 7-8 March 2019
- **Who**
 - Network operators, hackers, software developers and more
 - 40 participants from seven countries
- **It could be in your country next**

**RPKI
DEPLOYATHON**

Goals of the RPKI Deployathon



- Make progress towards a more secure Internet
 - Increase the number of ROAs
 - Increase confidence to enable invalid == reject
- Bring together network professionals
- Enhance collaboration
 - Deployathons at NOG events in other countries



Number of LIRs with RPKI in the Netherlands

RPKI Deployathon



Day 1
7 March 2019

Talks

- What is routing security and why it is important
- What is RPKI and how it works

Hands-on demonstration

- Setting up the RPKI Validator
- Generating certificates and ROAs
- Configuring the routers using the Validator

Day 2
8 March 2019

Talks

- Policy considerations
- How to deploy RPKI in a live network, implications for your helpdesk etc.

Hands-on demonstration

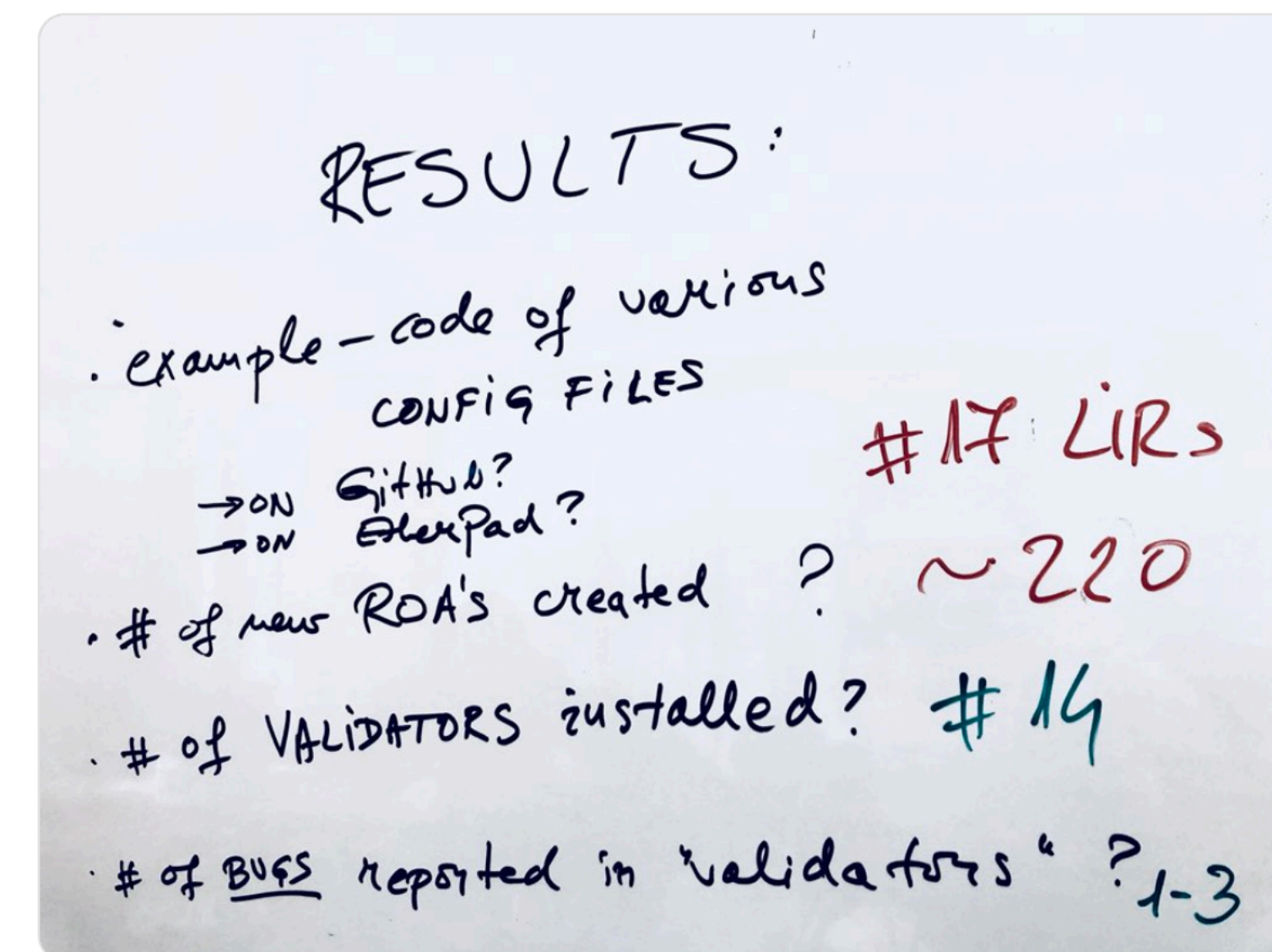
- Enabling routing security on live routers (build and implement policies)
- Enabling policies and so "active reject invalids"
- Handling exceptions and mitigating DDoS attacks



RPKI Deployathon Results

- > 200 ROAs created
- Deployed on live routers
- Worked with all three validators
 - and fixed some bugs
- Gained confidence for real deployment

Serious momentum is the end-of-day statement from @RIPE_NCC's #RPKIDeployathon day one. These numbers, curated by @Ms_Multicolor, are brilliant! A worthwhile day and a great step-forward for #RPKI and secure routing. 17 LIRs, ~220 ROAs, 14 validators installed. #progress



RPKI Deployathon Results



RPKI DEPLOYATHON 2019

Thanks
for joining
us!

WHAT WE'LL DO FROM NOW

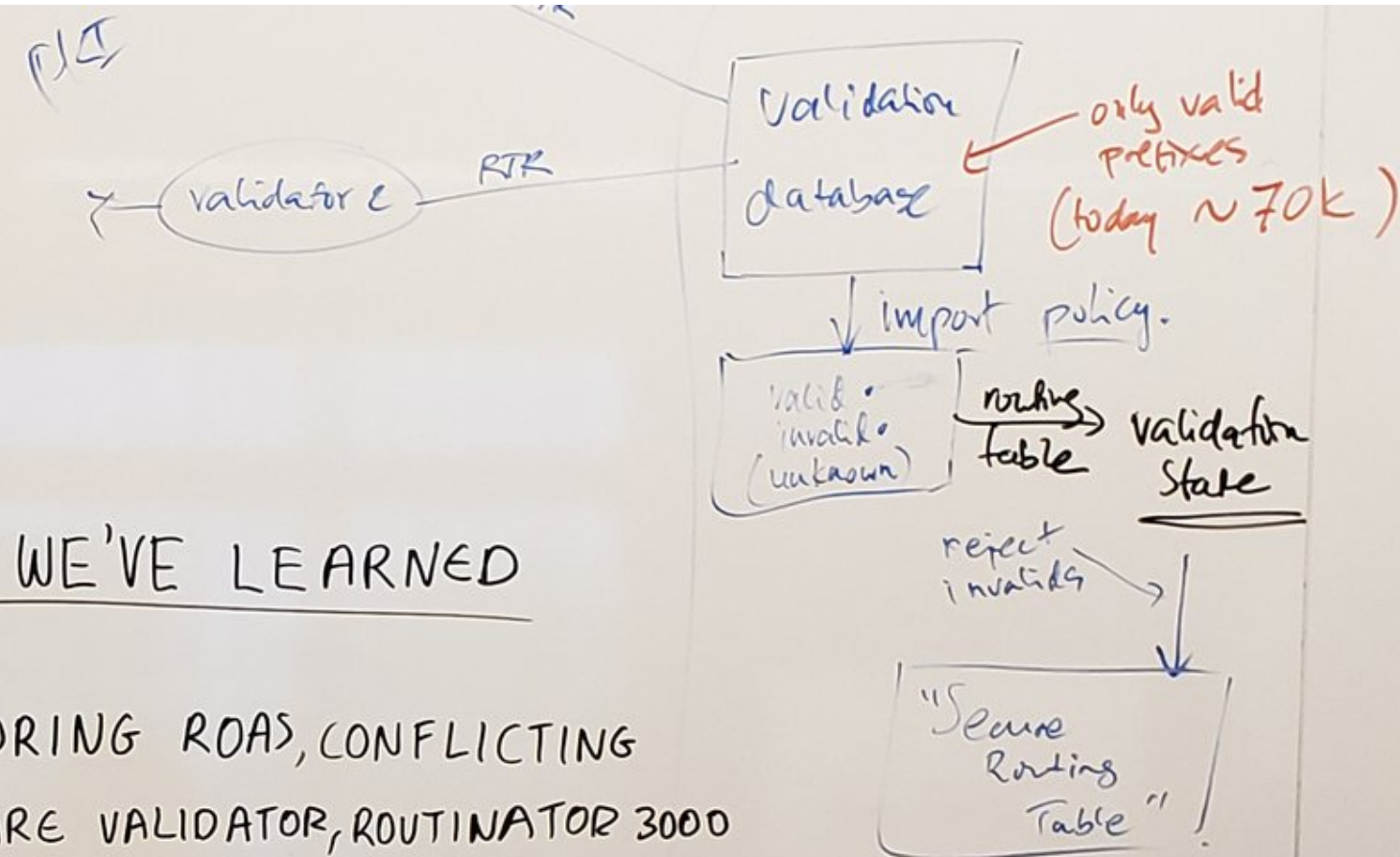
- IMPLEMENTING MONITORING
- HELP CUSTOMERS DEPLOY
- DEPLOY VALIDATORS
- ROLLOUT RPKI AND MONITORING
- ASSESS IMPACT ON LIVE ROUTERS
- DROP INVALIDS
- MAKE DOCUMENTATION AND PLANNING
- SHARE WITH TEAMS
- OFFER BETTER SUPPORT

WHAT ELSE WE NEED TO DO

- DROP INVALIDS (AFTER A FEW BEERS)
- FILTERING
- TOO MANY ROAS (HOW WE DO IT)
- BUILD CONFIDENCE IN DEPLOYING WITH THE REST OF THE COMMUNITY
- WHAT ARE WE DOING FOR THE NEXT NL DAY? (6 SEPTEMBER 2019)
- FIX VALIDATOR(S) BUG(S)
- FIX ROAS FOR CUSTOMERS
- JUNOS UPGRADES
- DECIDE WHAT WE'LL DO WITH EXPORTS

THINGS WE'VE LEARNED

- MONITORING ROAS, CONFLICTING
- CLOUDFARE VALIDATOR, ROUTINATOR 3000
- UPDATE JUNOS BEFORE IMPLEMENTING
- DEPLOYED ON LIVE ROUTERS! 😊
- DEPLOYED RPKI ON VIRTUAL LABS
- ASSIGN ROAS
- A LONG WAY SINCE 2011
- CREATED OVER 200 ROAS
- MORE INSIGHTS TO RPKI
- FIXED BUG 😊 (RIPE VALIDATOR/ (CLOUDFARE) + (NLNETLABS))
- SEE HOW PEOPLE USED THE VALIDATORS AND MAKE IMPROVEMENTS



WHAT NOT TO DO

- DON'T DEPLOY ON FRIDAY AFTERNOON
- DON'T DEPLOY ON LIVE ROUTERS BEFORE TESTING
- DON'T BE SCARED TO DEPLOY!



Previous Hackathons



- Nine Hackathons so far
- Themes:
 - RIPE Atlas
 - IXP Tools
 - DNS
 - Quantum Internet
- All code on GitHub
- labs.ripe.net/hackathons





APKI DEPLOYATHON

Mirjam Kühne | CEE Peering Days | March 2019

