

# Resource Certification

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# Internet Routing

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- Routing is non-hierarchical, open and free
- Freedom comes at a price:
  - You can announce any address block on your router
  - Route leaking happens frequently, impact is high
    - Entire networks become unavailable
  - Route hijacking is easy, as long as peers don't filter
- IPv4 address depletion may intensify issue

# Digital Resource Certificates

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- Based on open IETF standards (sidr)
- Issued by the RIRs
- States that an Internet number resource has been registered by the RIPE NCC
- Do not list any identity information
  - All resource information can be found in the registry

# What Certification offers

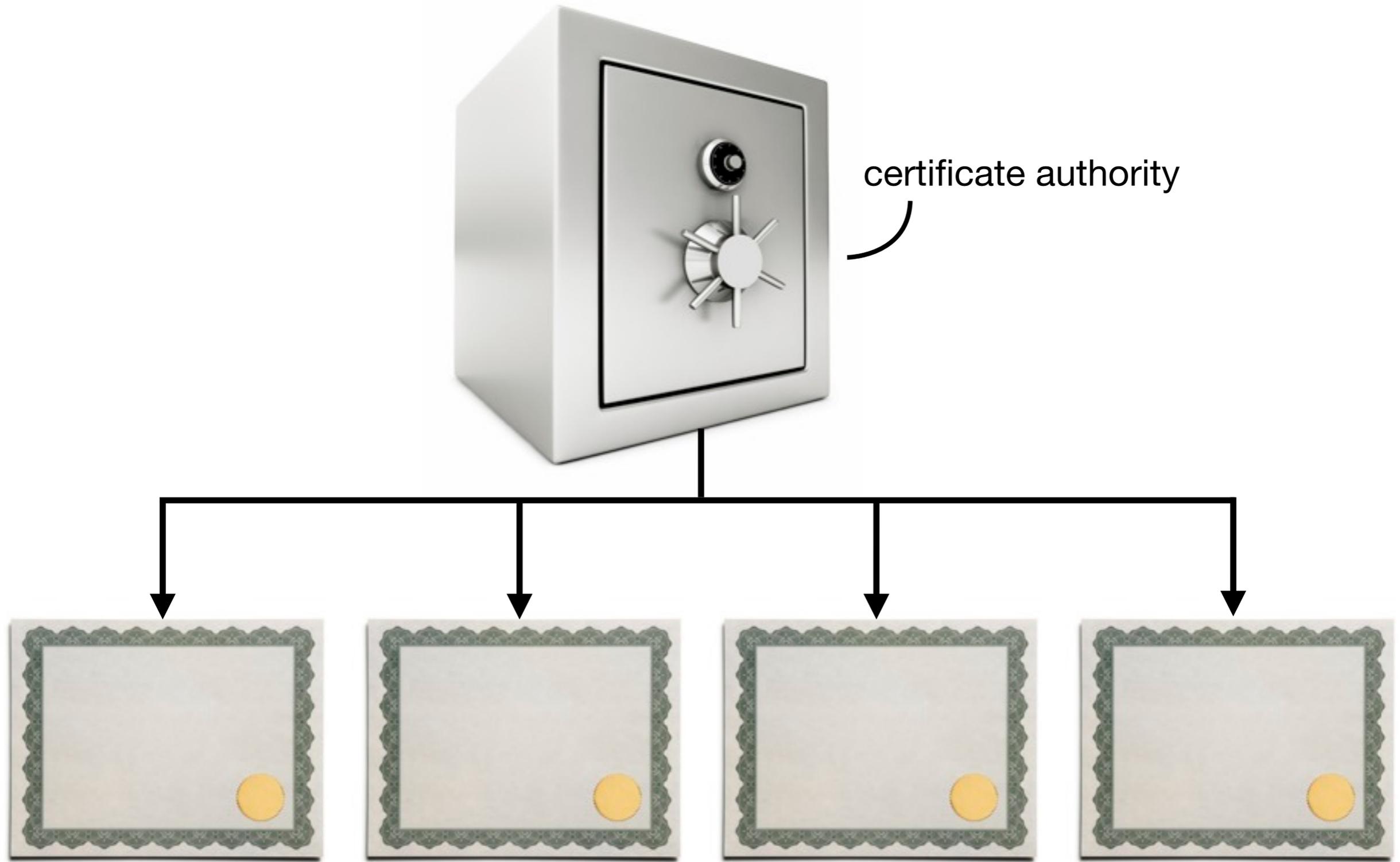
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- Proof of holdership
- Secure Inter-Domain Routing
  - Route Origin Authorisation
- Resource transfers



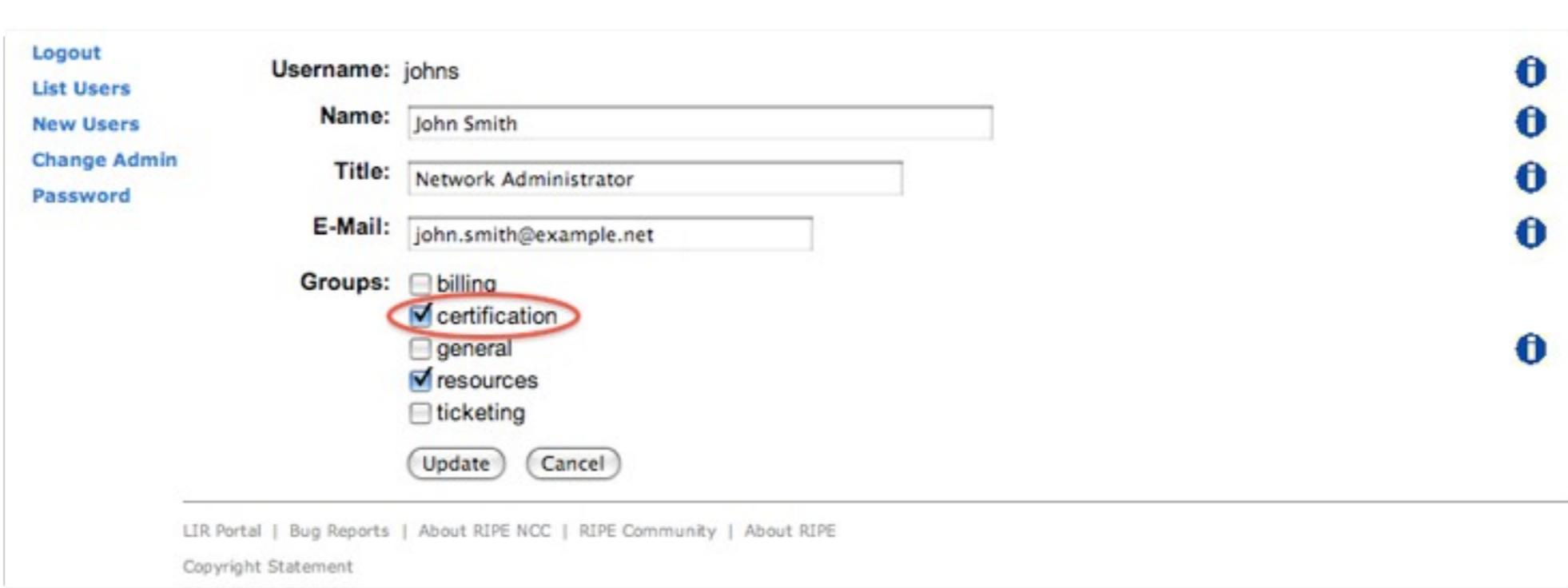
- Validation is the added value!

# The system



# The system (2)

- Accessible through the LIR Portal
- Administrator grants access to users



Logout  
List Users  
New Users  
Change Admin  
Password

Username: johns

Name: John Smith

Title: Network Administrator

E-Mail: john.smith@example.net

Groups:

- billing
- certification
- general
- resources
- ticketing

Update Cancel

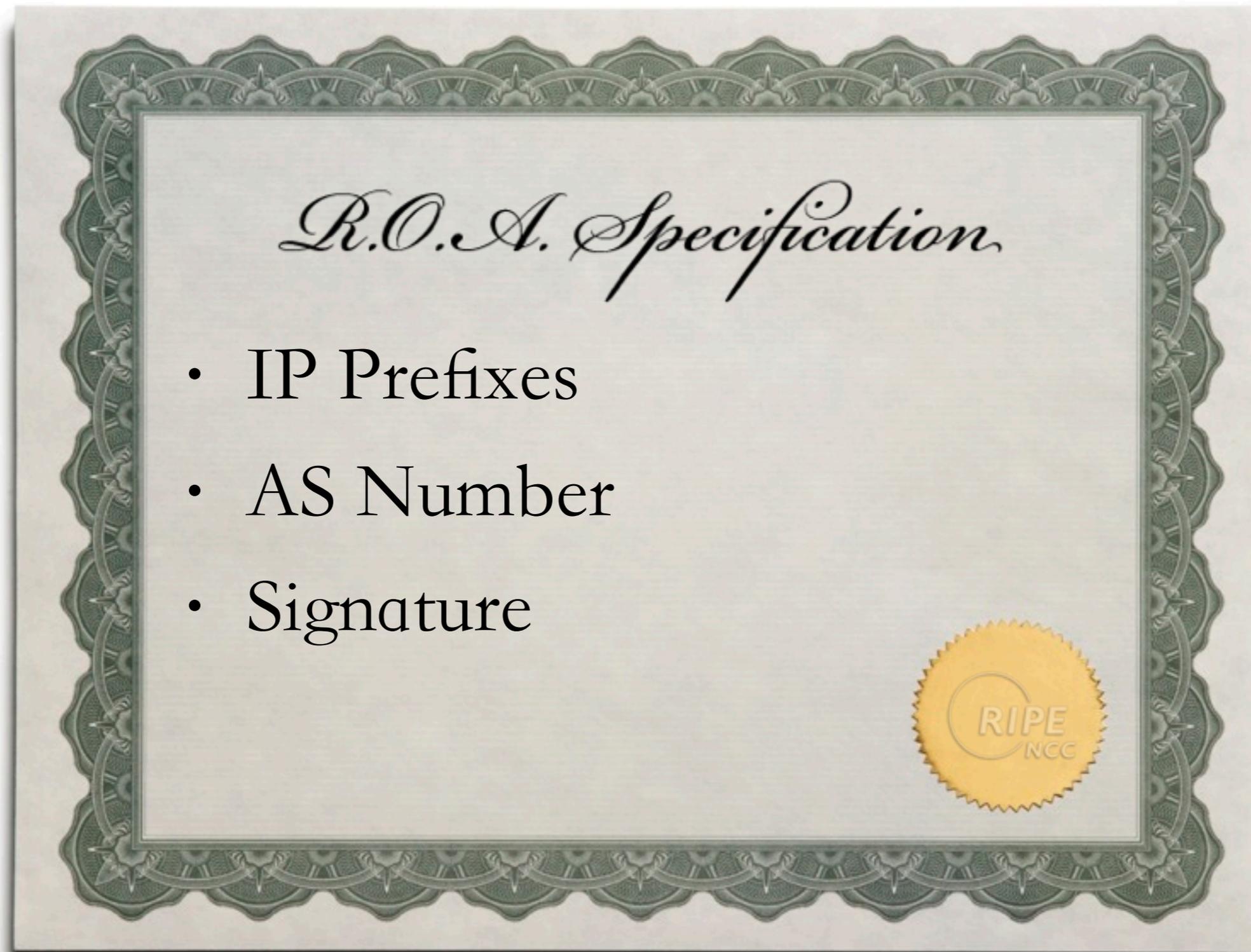
LIR Portal | Bug Reports | About RIPE NCC | RIPE Community | About RIPE  
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# Proof of holdership

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# Route Origin Authorisation (ROA)



# ROA Creation Demo

## ROA Specifications

Route Origination Authorisation (ROA) objects authorise Autonomous Systems to route your IP address resources.

On this page you can specify which Autonomous Systems you authorise to route your IP address resources. The system will then automatically publish the appropriate ROA objects.

Name	AS number	Prefixes	Not valid before	Not valid after	ROA object
invalid-ipv4	AS196615	93.175.147.0/24			<a href="#">View »</a> <a href="#">Edit</a> <a href="#">Delete</a>
invalid-ipv6	AS196615	2001:7fb:fd03::/48			<a href="#">View »</a> <a href="#">Edit</a> <a href="#">Delete</a>
valid-ipv4	AS12654	93.175.146.0/24			<a href="#">View »</a> <a href="#">Edit</a> <a href="#">Delete</a>
valid-ipv6	AS12654	2001:7fb:fd02::/48			<a href="#">View »</a> <a href="#">Edit</a> <a href="#">Delete</a>

[Add ROA Specification »](#)

# Software Validation of Certificates and ROAs

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- Validators access publicly accessible repository
- Three software tools available
  1. RIPE NCC Validator
    - Easy to set-up and use, limited feature set
  2. rcynic
  3. BBN Relying Party Software
    - Complex set-up, but more options and flexibility

<http://ripe.net/certification/validation>

# BGPmon ROA validation service

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- Relies heavily on RIPE NCC Validator

```
$ whois -h whois.bgpmon.net 200.7.86.0
```

```
Prefix:                195.157.0.0/16
Prefix description:    Netscalibur UK Ltd
Country code:         GB
Origin AS:            8426
Origin AS Name:       CLARANET-AS ClaraNET
RPKI status:          ROA validation successful
```

```
$ whois -h whois.bgpmon.net " --roa 8426 195.157.0.0/16"
```

```
0 - valid
```

```
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ROA Details
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```

```
Origin ASN:           AS8426
Not valid Before:     2011-01-01 13:56:21
Not valid After:      2012-07-01 00:00:00
Trust Anchor:         rpki.ripe.net
Prefixes:             213.165.128.0/19
                    195.157.0.0/16
                    194.112.32.0/19
```

# Hardware Validation: RPKI-RTR Protocol



```
route-map validity-0
  match rpki-invalid
  drop
route-map validity-1
  match rpki-not-found
  set localpref 50

// valid defaults to 100
```

# Hardware Validation: RPKI-RTR Protocol

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- Cisco roadmap has router validation for RLS12 / IOS-XR in 2011
- Juniper is actively working on validation as well

# Where are we now?

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## After 17 Days

175 LIRs have enabled the service  
and created 152 ROAs  
covering 419 prefixes

# The road ahead

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- Web-based validator
- Up / Down protocol
  - Run your own Certificate Authority
  - Allow PI holders to manage ROAs
  - Transfers between RIRs
    - ERX space
- ROA tools
  - Import using combination of IRR + BGP + Human
  - Receive alert if ROA does not match BGP

More information:  
<http://ripe.net/certification>

Questions?

