

# Resource Certification

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# Internet routing is fragile

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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 will intensify issue!

# Routing security today

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- Good practice:
  - to register routes in an Internet Routing Registry (IRR)
  - to filter routes based on IRR data
- Problem:
  - 34 different IRRs exist, only partly mirrored
  - Filtering only water tight if the registries are complete
- Result:
  - Less than half of all ~350,000 routes are registered
  - Real world filtering is laborious and limited

# Resource Certification - Definition

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*“Resource certification is a reliable method for proving the association between resource holders and Internet resources.”*



# Digital Resource Certificates

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- Based on open IETF standards (SIDR)
- Issued by the RIPE NCC
- The certificate states that an Internet number resource has been registered by the RIPE NCC
- The certificate does not give any indication of the identity of the holder
- All further information on the resource can be found in the registry



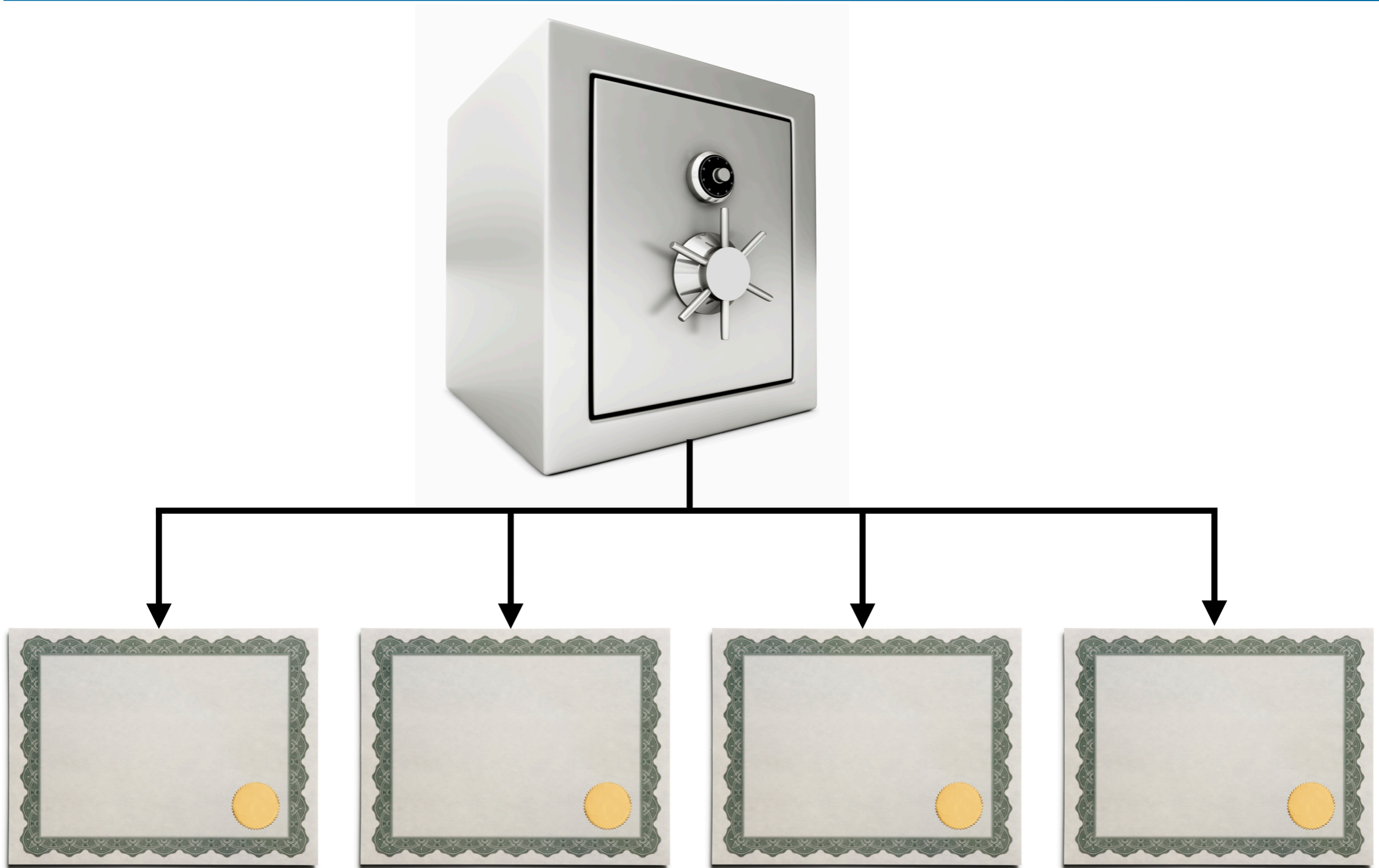
# What Certification offers

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- Proof of holdership
- Secure Inter-Domain Routing
  - Route Origin Authorisation
  - Preferred certified routing
- Resource transfers
- Validation is the added value!



# The system





# Proof of holdership



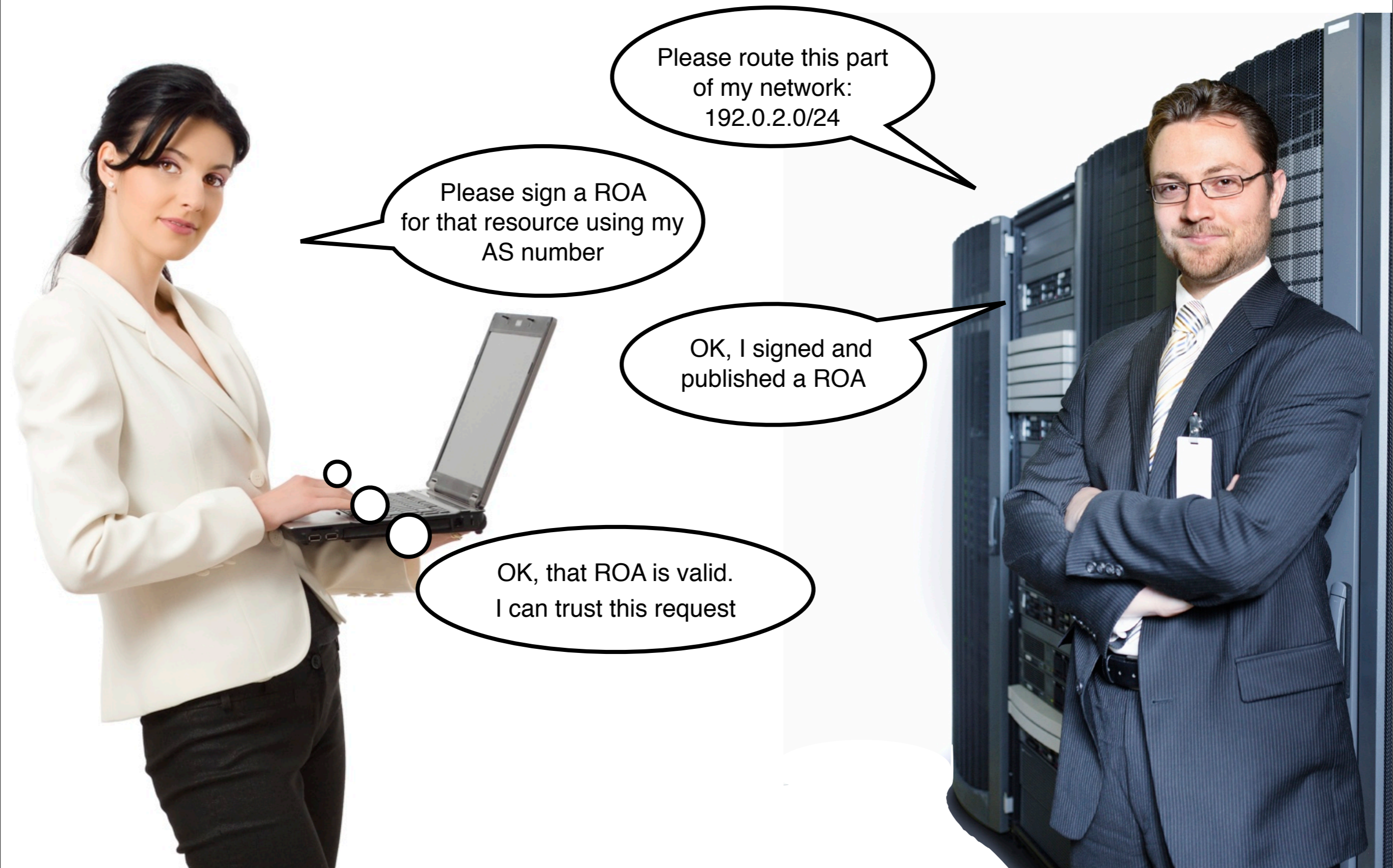


# Route Origin Authorisation (ROA) object





# Automated Provisioning using ROAs



Please route this part  
of my network:  
192.0.2.0/24

Please sign a ROA  
for that resource using my  
AS number

OK, I signed and  
published a ROA

OK, that ROA is valid.  
I can trust this request

# Validation tool

- Download validation tool from  
<https://certtest.ripe.net/content/downloads/certification-validator-1.16-bin.zip>
- Use Sun Java 1.6+ (java.com)
- Get Resource Trust Anchor certificate  
`rsync 'rsync://certrepo.ripe.net/rta/CN=RTA,O=RIPE NCC,C=NL.cer' ripe-ncc-ta.cer`
- Validate specific ROA  
`certification-validator -f roa-15567943.roa -t ripe-ncc-ta.cer`
- Validate and export all ROAs to a CSV file  
`certification-validator -t ripe-ncc-ta.cer --top-down -o out -r roas.csv`

	B	C	D	E	F
1	ASN	IP Prefix	Max Length	Not Before	Not After
2	AS12657	2001:1578::/32	40	22/07/10 08:41	01/07/11 00:00
3	AS29317	212.102.160.0/19		22/07/10 08:41	01/07/11 00:00
4	AS12657	212.72.64.0/19		22/07/10 08:41	01/07/11 00:00
5	AS12817	2001:1578:0200::/40		22/07/10 08:41	01/07/11 00:00
6	AS29317	2001:1578:0100::/40		22/07/10 08:41	01/07/11 00:00
7	AS12657	213.131.192.0/19		22/07/10 08:41	01/07/11 00:00
8	AS43939	91.145.128.0/18		11/08/10 09:42	01/07/11 00:00
9	AS8426	79.123.0.0/17	24	15/10/10 10:44	01/07/11 00:00
10	AS8426	80.168.0.0/16	24	15/10/10 10:44	01/07/11 00:00
11	AS8426	193.221.118.0/24		15/10/10 10:44	01/07/11 00:00
12	AS8426	195.8.64.0/19	24	15/10/10 10:44	01/07/11 00:00
13	AS8426	195.245.201.0/24	24	15/10/10 10:44	01/07/11 00:00
14	AS8426	212.126.128.0/19	24	15/10/10 10:44	01/07/11 00:00
15	AS8426	213.253.0.0/18	24	15/10/10 10:44	01/07/11 00:00





# Who controls routing?

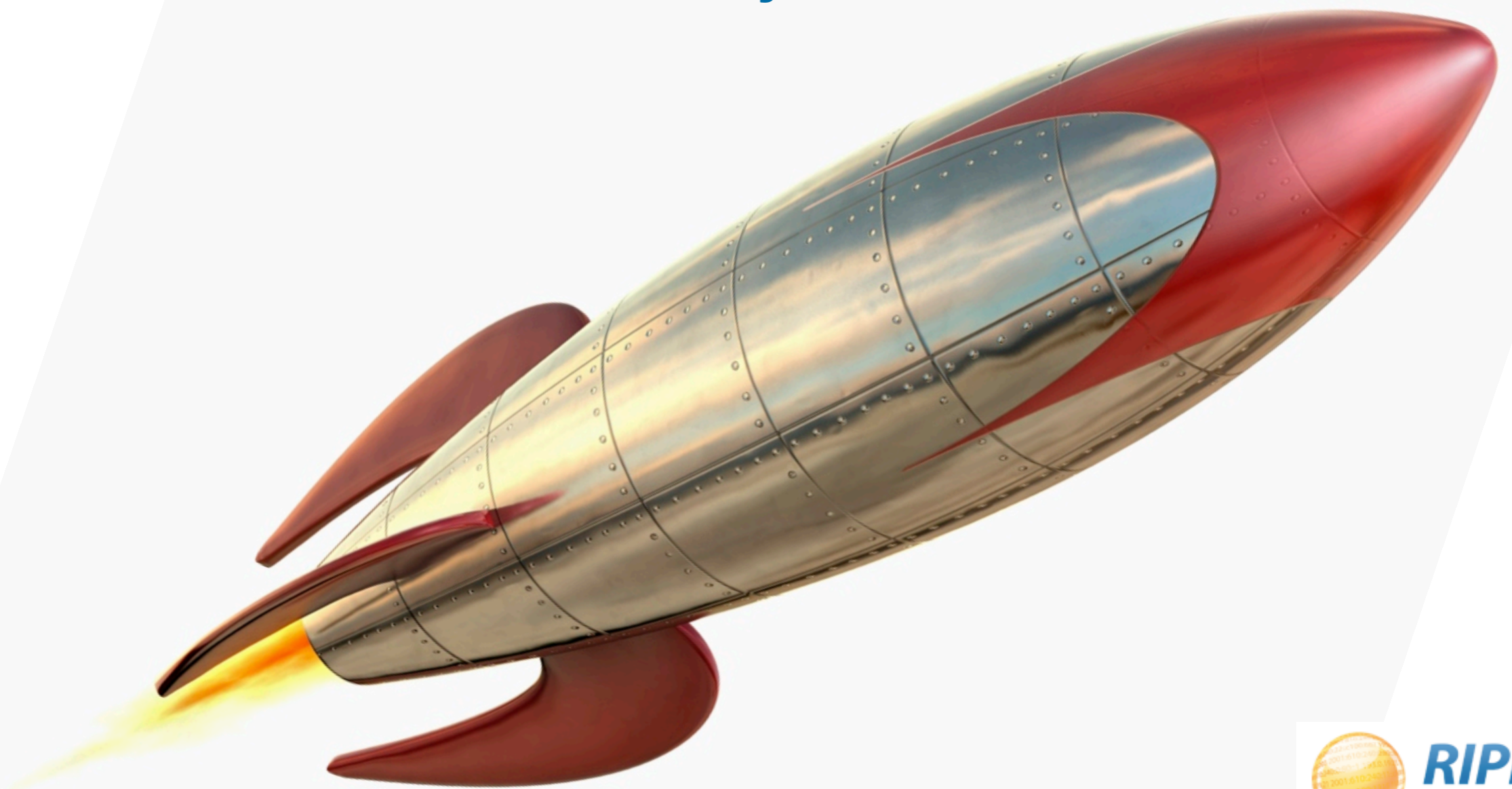
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- Certificates do not create additional powers for the Regional Internet Registries
- Certificates reflect the resource registration status
  - no registration → no certificate
  - the reverse is not true!
- Routing decisions are made by network operators!





All five Regional Internet Registries  
will launch production system on  
1 January 2011



**RIPE**  
NCC

Information and announcements:  
<http://ripe.net/certification>



# Questions?

email: [certtest@ripe.net](mailto:certtest@ripe.net)

