

The Future of IP Addressing

Enabling the Long-Term Growth and
Security of the Internet

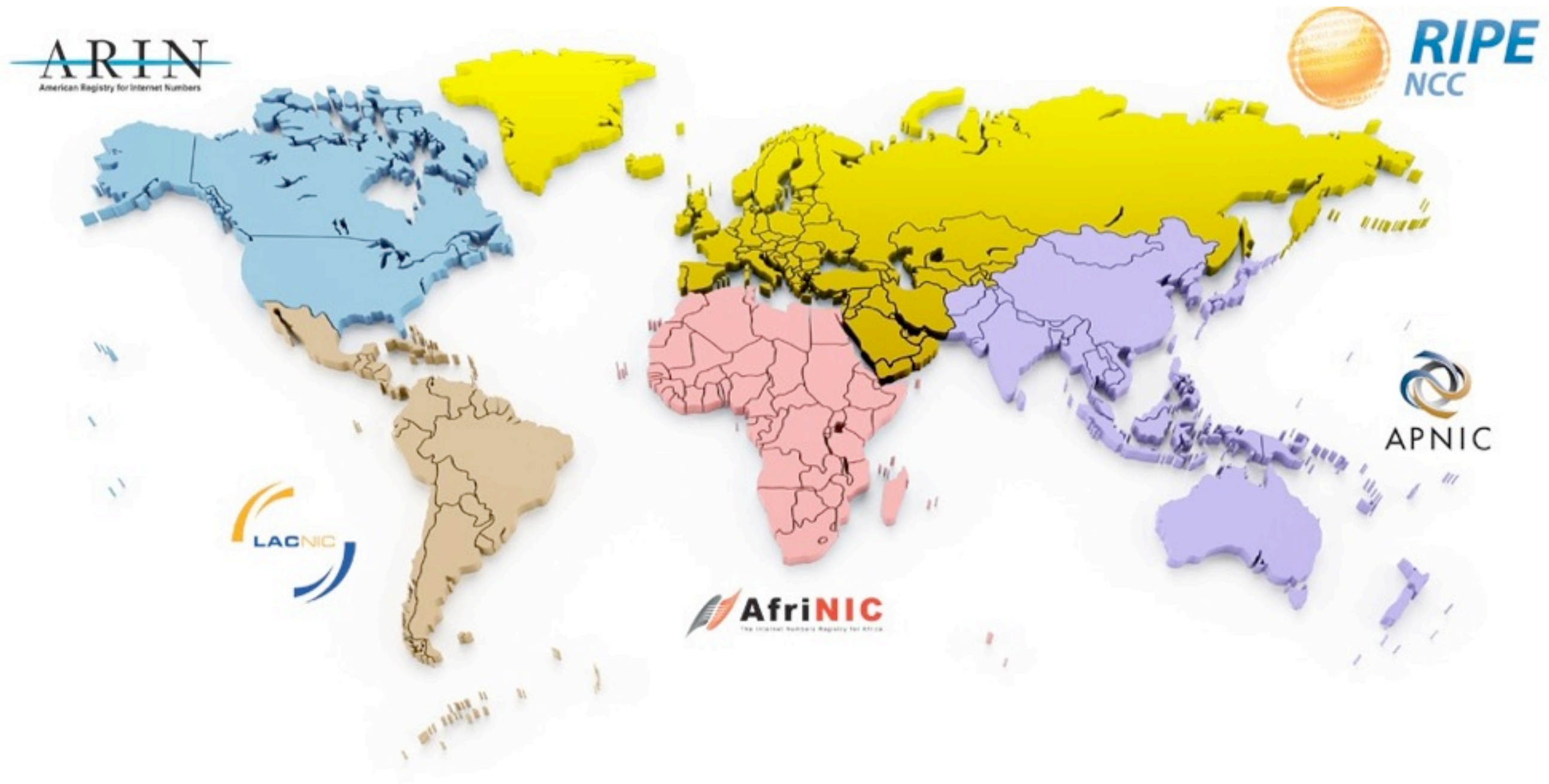
Alex Band – Product Manager



The RIPE NCC, a Regional Internet Registry

- Supports the infrastructure of the Internet
 - Since 1992
- Not-for-profit organisation
 - Around 7500 members
- The authority on who is the registered holder of an Internet Number Resource in our region
 - IPv4 and IPv6 Address Blocks
 - Autonomous System Numbers

The RIPE NCC – One of Five RIRs

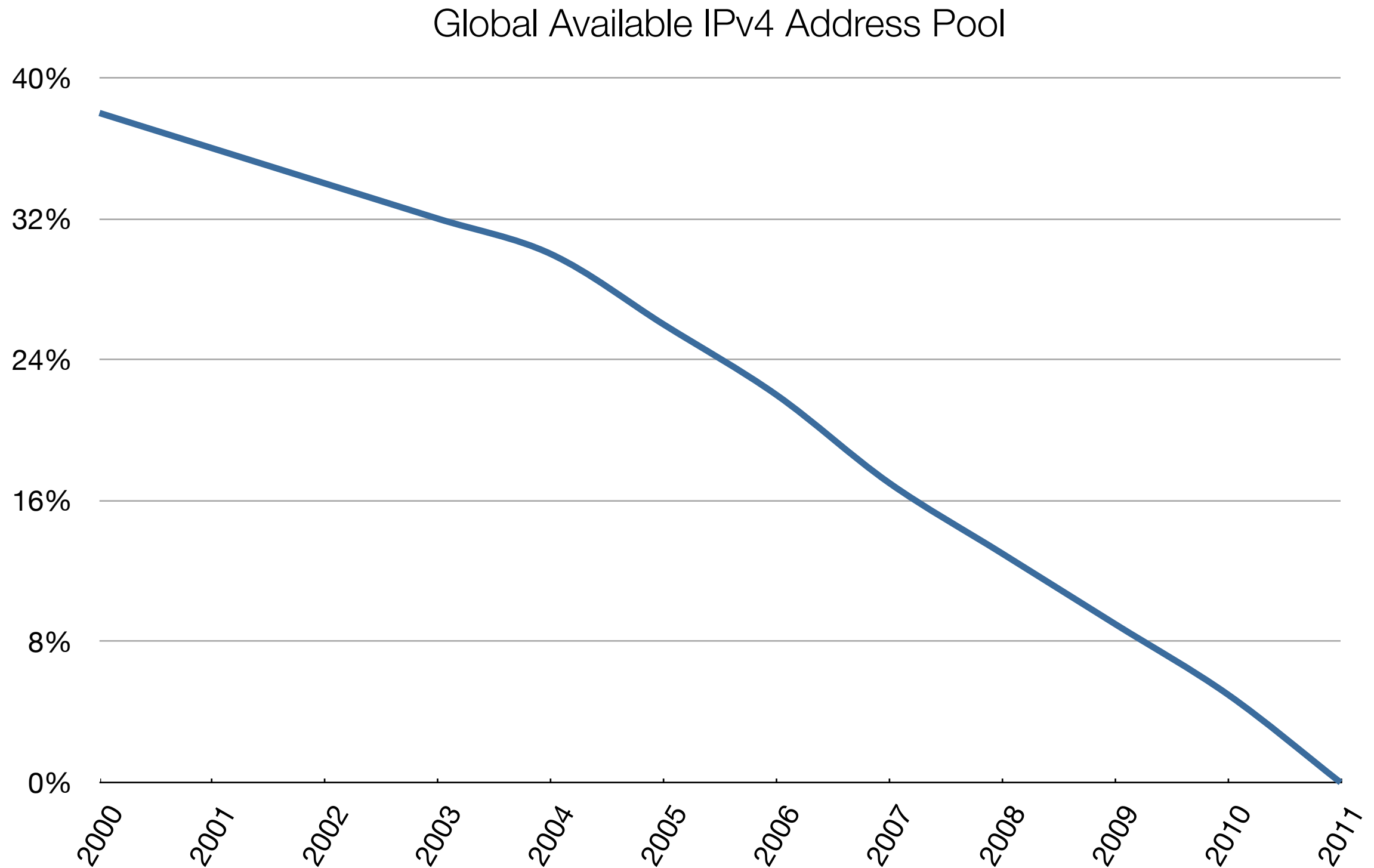


IP Addresses

- The telephone numbers of the Internet
- IPv4: the standard addressing format since 1981
- Allows for 4.3 billion unique addresses
 - Seemed like a limitless supply at the time

But then the Internet became
a commercial success...

Allocation of IPv4 Addresses



Depletion of IPv4 Address Pool

- Global pool ran out on 31 January 2011
- Asia Pacific region ran out on 14 April 2011
 - Caused by emerging markets like China and India
 - Drip feeding with the remaining addresses
- Other regions will run out soon

Reaching the Next Billion

- Around 2 billion Internet users now
 - 480% growth since the year 2000
 - around 30% of all people
- Mobile phones are becoming Internet devices
 - in 2010, 22% of all mobile handsets was a smartphone
- “The Internet of Things”
 - Smartphones and tablets now, what’s next?

Wait and See?



The Only Answer: IPv6

- A standard since 1996
- Approximately 340 undecillion or 3.4×10^{38} unique addresses
 - Should last us a lifetime...

‘Small’ detail:
Not backwards compatible with IPv4

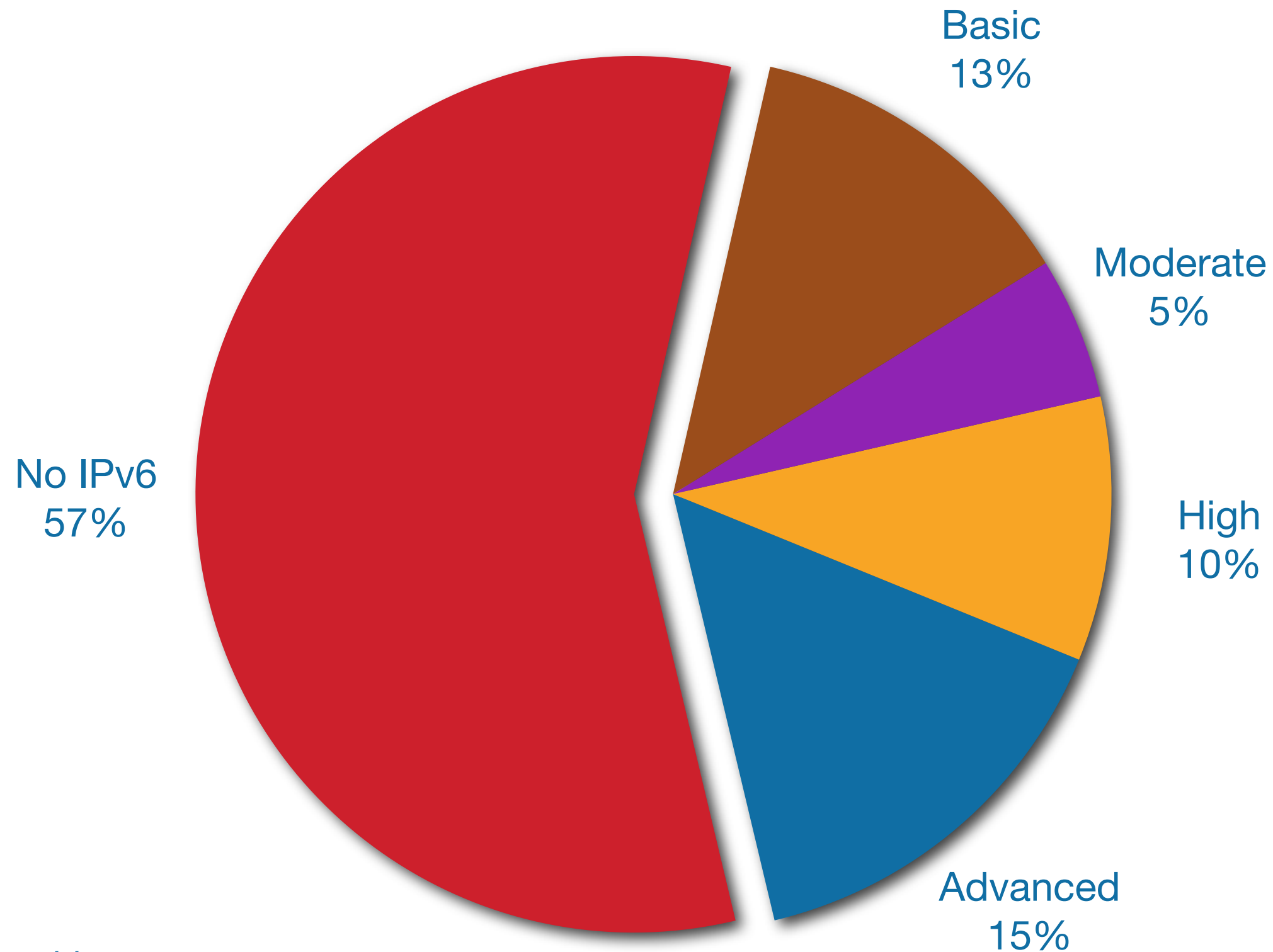
The Only Answer: IPv6

- You don't just need bandwidth for growth, you need addresses too!
- Squeezing more life out of IPv4 does not scale
 - Voice and peer-to-peer hit the hardest
- Only IPv6 allows continued IP networking growth

What do you want the
Internet to be like in 5 years?



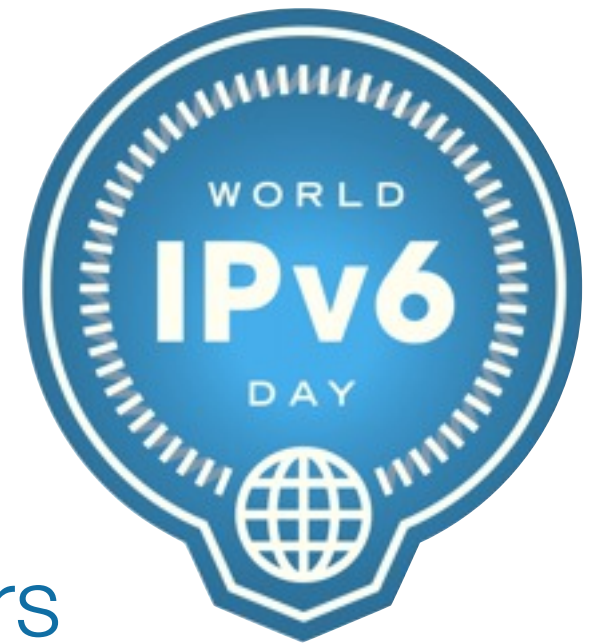
IPv6 Adoption Today – Total Membership




<http://ripeness.ripe.net>

World IPv6 Day

- More than 400 participants, including
 - the largest destinations on the Internet
 - content distribution networks
 - Internet service and infrastructure providers





*Run both protocols
while you can*

The Effects of Depletion: Trading

- An IPv4 address is now a scarce good
 - This affects the value, and could spur on trading

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Microsoft spends \$7.5m on net addresses

Microsoft has offered to pay \$7.5m (£4.7m) for net addresses from bankrupt telecoms firm Nortel.

The 666,624 IP version 4 (IPv4) net addresses were put up for auction as part of the sell-off of Nortel's assets.

Blocks of IPv4 are valuable because the pool of this generation of address is close to running dry.



AP

The pool of Version 4 net addresses has almost run dry

The Effects of Depletion: Stealing

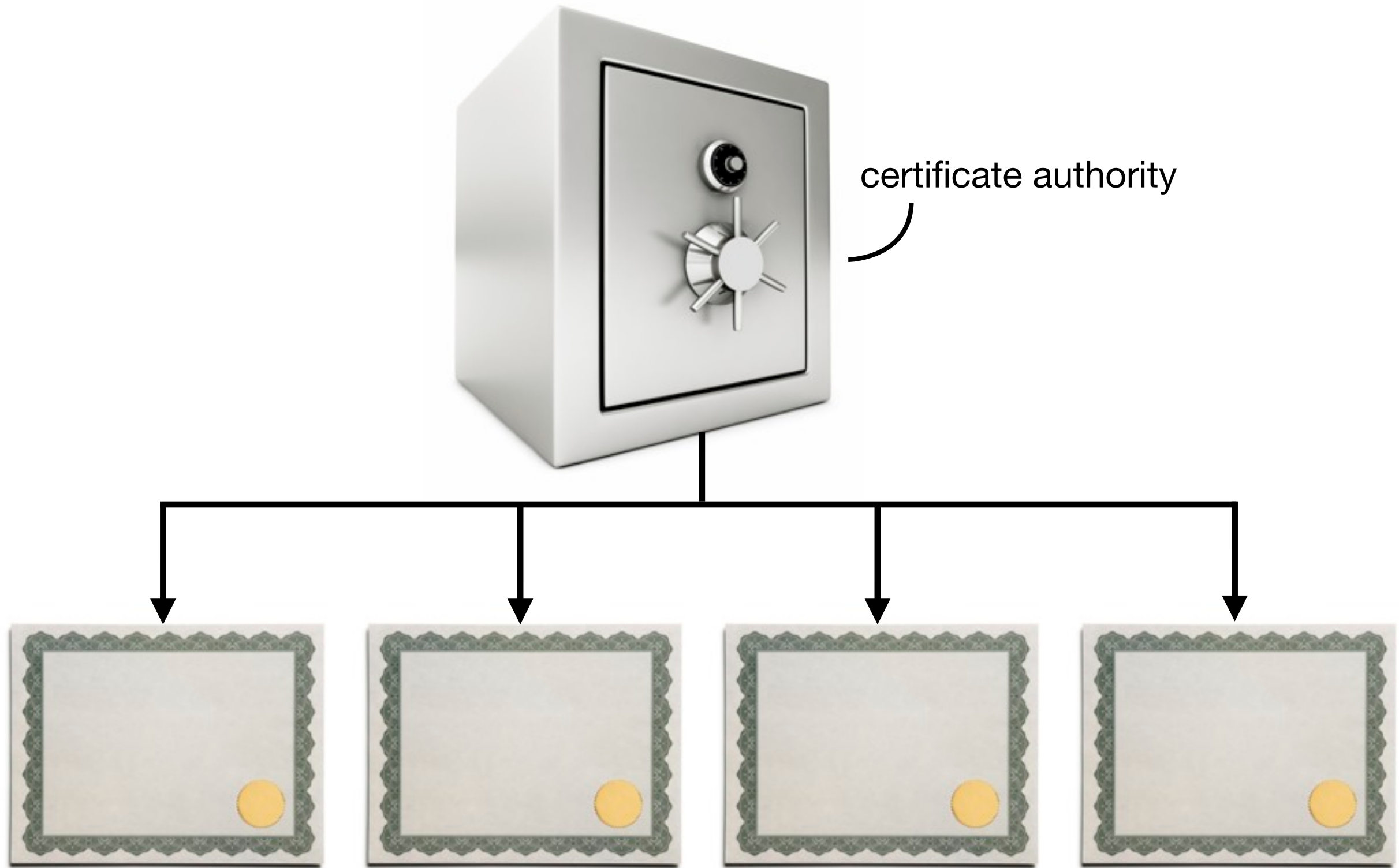
- Internet routing is non-hierarchical, open and free
- Freedom comes at a price:
 - You can announce any address block on your router
 - Accidental errors happen frequently, impact is high
 - Entire networks become unavailable
 - Malicious attacks are relatively easy
 - Mitigation requires intervention from operators

The Solution: Resource Certificates

- Issue digital certificates along with the allocation of Internet Resources
- Main purposes:
 - Make Internet routing more secure
 - Make the Registry more robust
 - Support trading of resources
- Validation is the added value



The System



Our Mission

- Quality

- Reliability and security of the platform are key
- Received highest possible rating in independent audit



- Usability

- 1-Click set-up of Certificate Authority
- Easy drag and drop management
- All crypto operations handled by the system

Management

- RIPE NCC Hosted Platform
 - WebUI to manage ‘Route Origin Authorisations’ (ROAs)

*“I authorise this network to originate
these IP address blocks”*

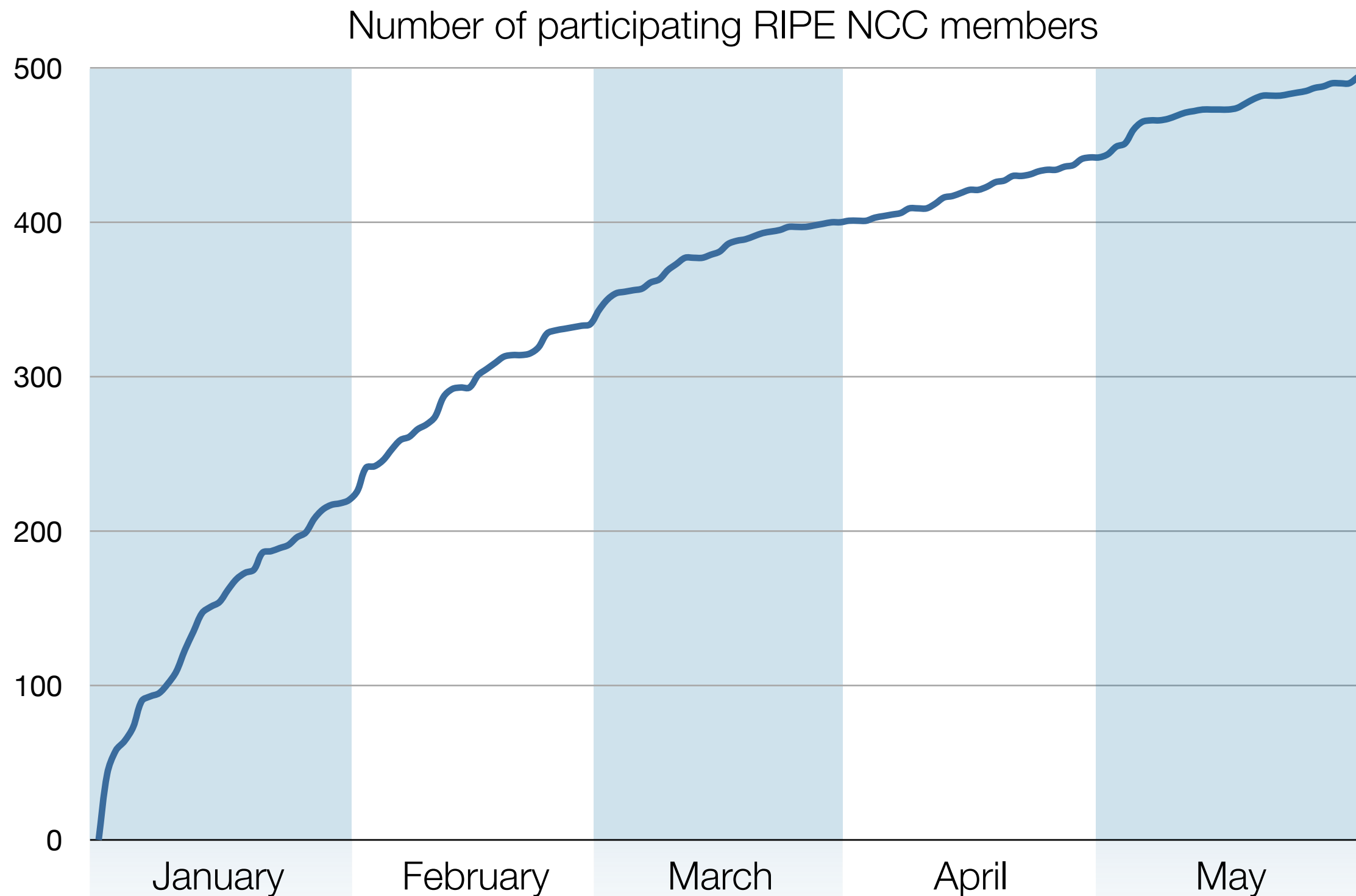
- A valid ROA can only be created by the legitimate holder of the IP address block

Validation, Hardware Router Support

- Based on open standards
 - Scheduled on Cisco roadmap for Q4, 2011
 - Juniper actively pursuing support as well
- RIPE NCC is actively working with Cisco to provide comprehensive open source toolset



Adoption of Resource Certification



Adoption of Resource Certification



The Future of IP Addressing

- IPv4 will no longer allow Internet growth
- IPv6 is the only long term answer
- The depletion of the IPv4 address pool
 - affects routing security, which Certification addresses
 - will spur on IPv4 resource trading (for a limited time)

Keep the Internet robust and
secure through self-regulation!

Information and Announcements

<http://www.ipv6actnow.org>

<http://ripe.net/certification>



Questions?



Talk to us!

Alex Band



alexb@ripe.net



[alexander_band](https://twitter.com/alexander_band)



[linkedin.com/in/alexanderband](https://www.linkedin.com/in/alexanderband)



Andrew de la Haye



andrew@ripe.net



<http://nl.linkedin.com/pub/andrew-de-la-haye/0/218/903>

