

# IPv6, Act Now!

---

Daniel Karrenberg, RIPE NCC Chief Scientist

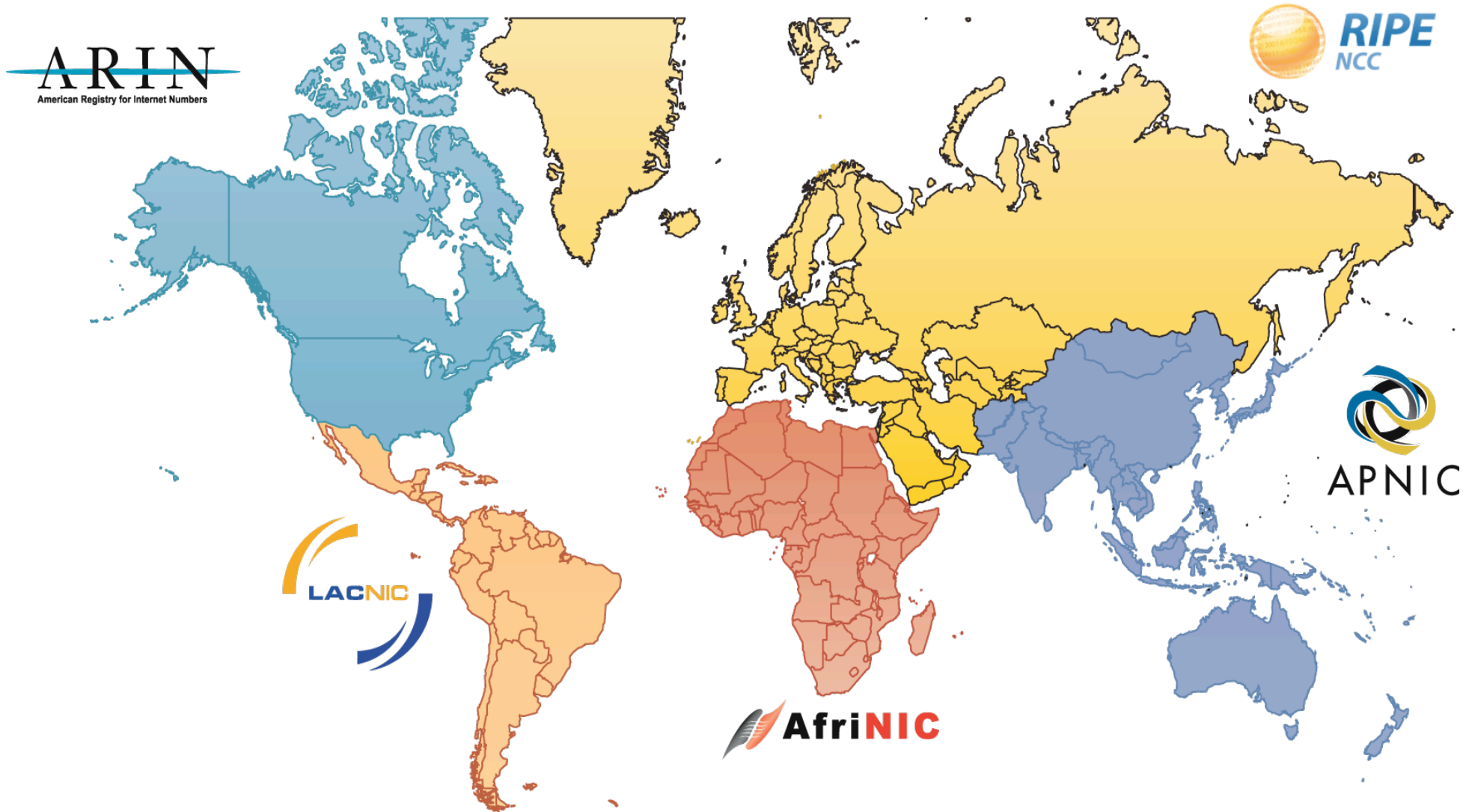


# Who is talking: Daniel Karrenberg

---

- 1980s: helped build Internet in Europe
  - EUnet, Ebone, IXes, ...
  - RIPE
- 1990s: helped build RIPE NCC
  - 1st CEO: 1992-2000
- 2000s: Chief Scientist & Public Service
  - Trustee of the Internet Society: IETF, ...
  - Interests: Internet measurements, stability, trust & identity in the Internet, ...

# The five Regional Internet Registries



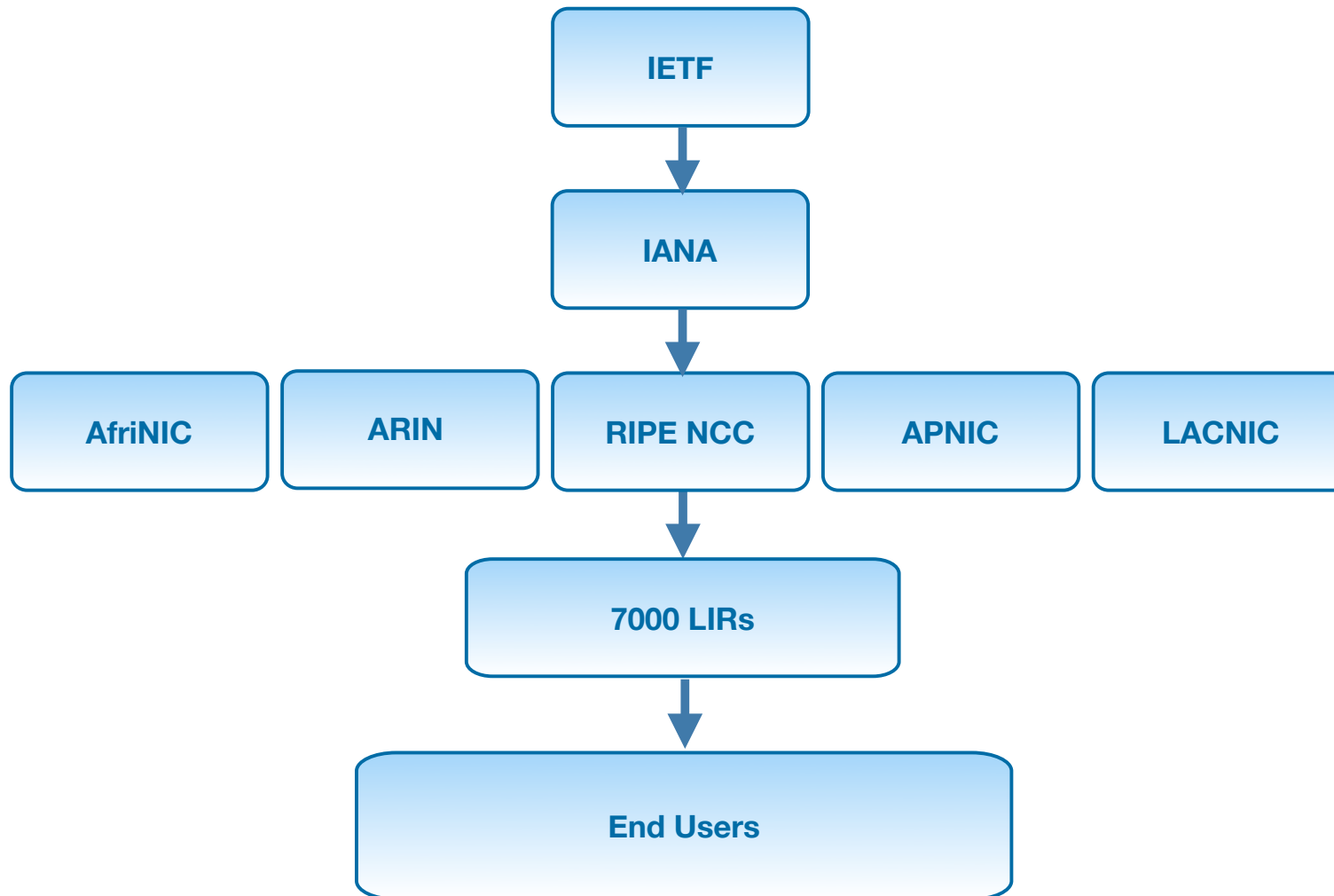
# RIPE NCC

---

- One of 5 Regional Internet Registries
- Supports coordination of Internet operations
- Not for profit membership organisation
- 7000+ members
- Distributes Internet resources to members
- RIPE DB, training, information services, measurements
- **RIPE**: Bottom-up, self-regulated, open to everyone
- Neutral, Impartial, Open, Transparent

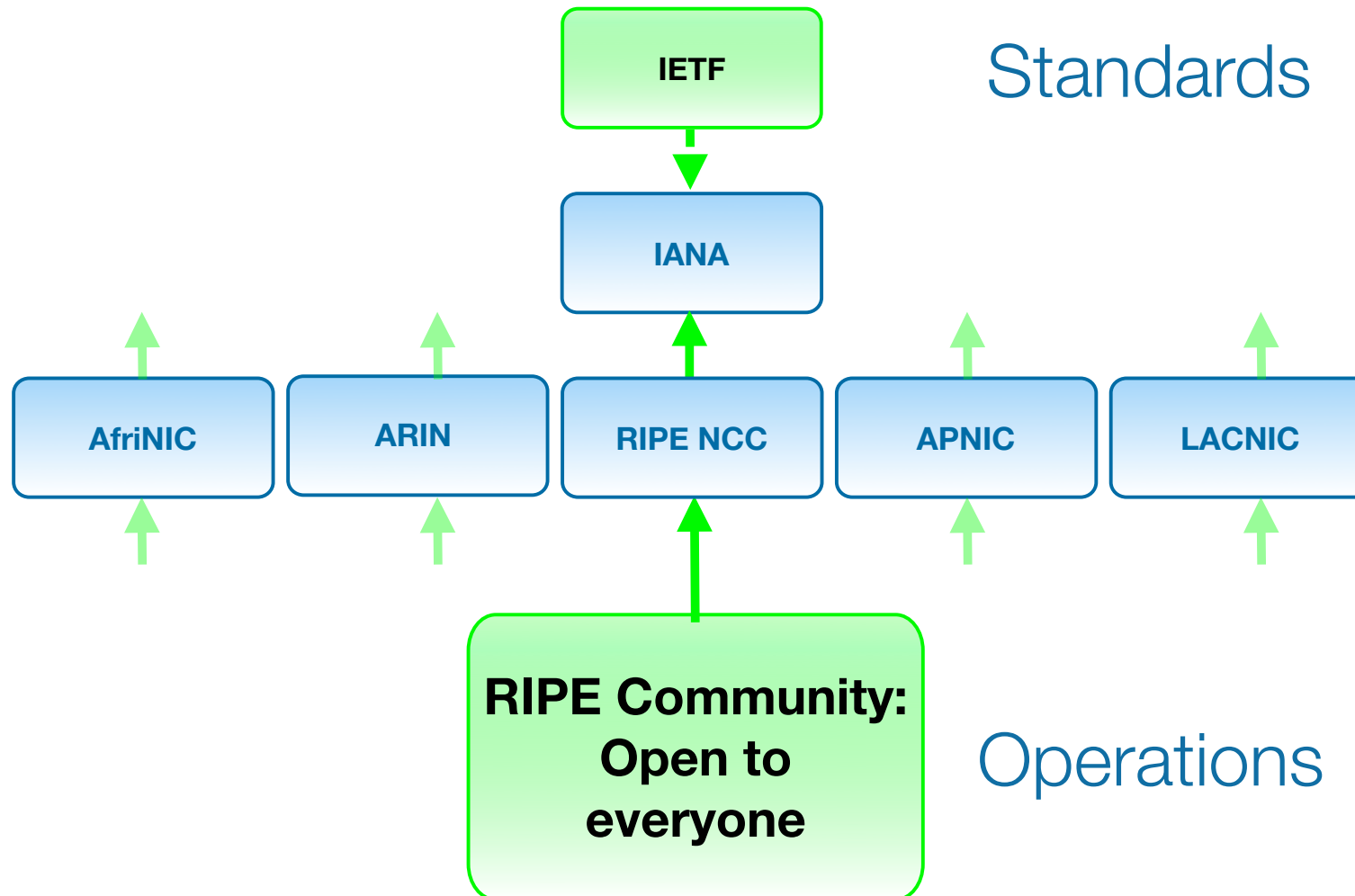
# Where do all the addresses come from?

---

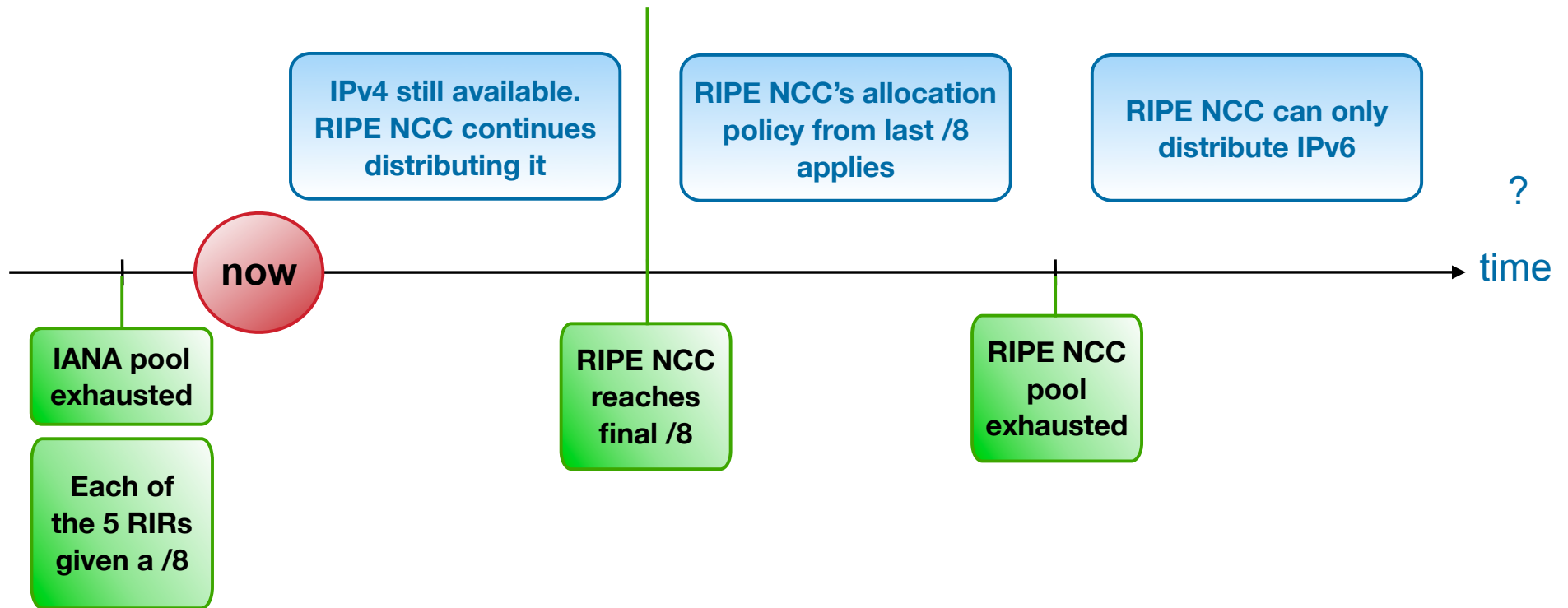


# Policy process: decision making

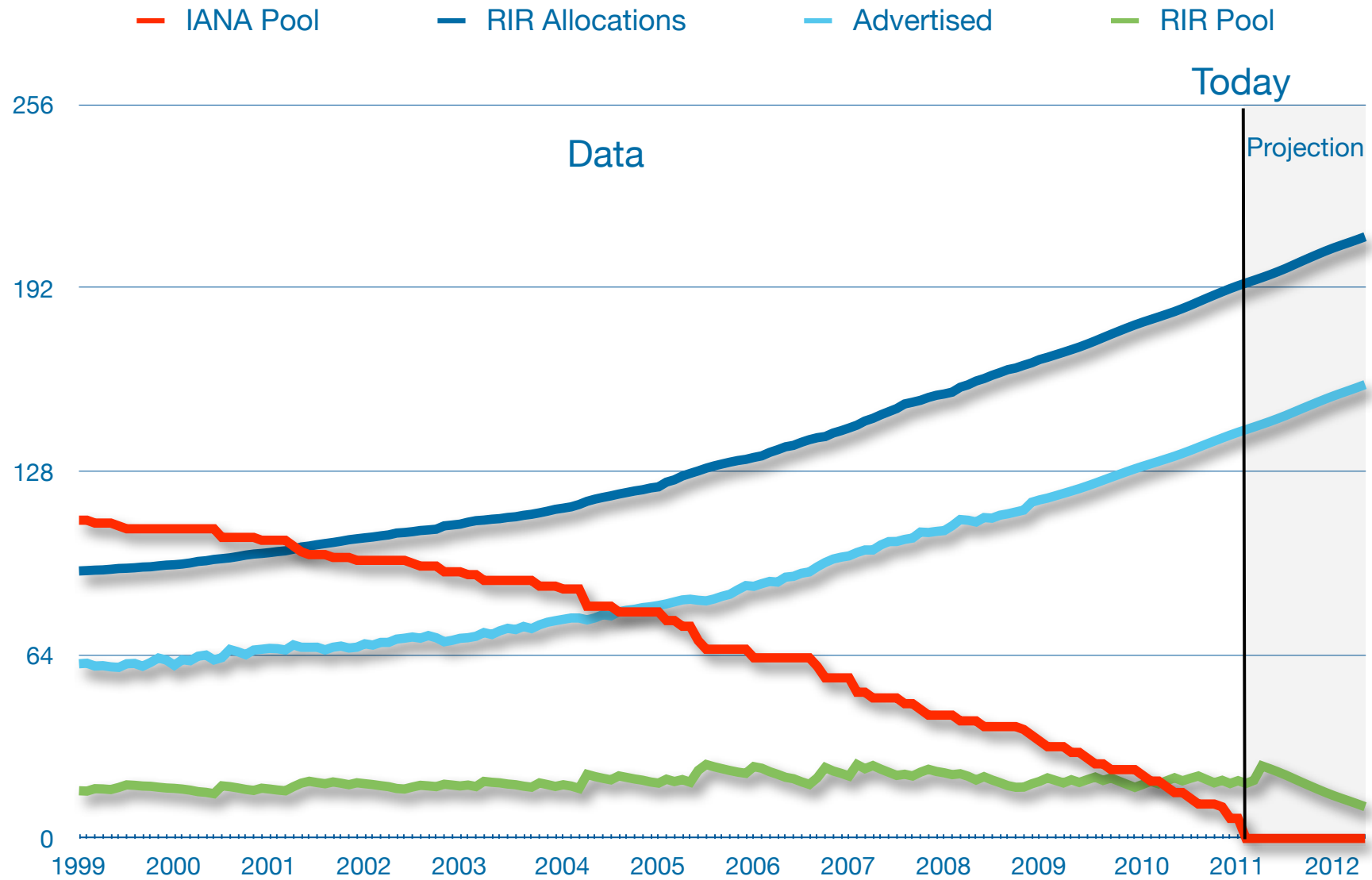
---



# IPv4 exhaustion phases

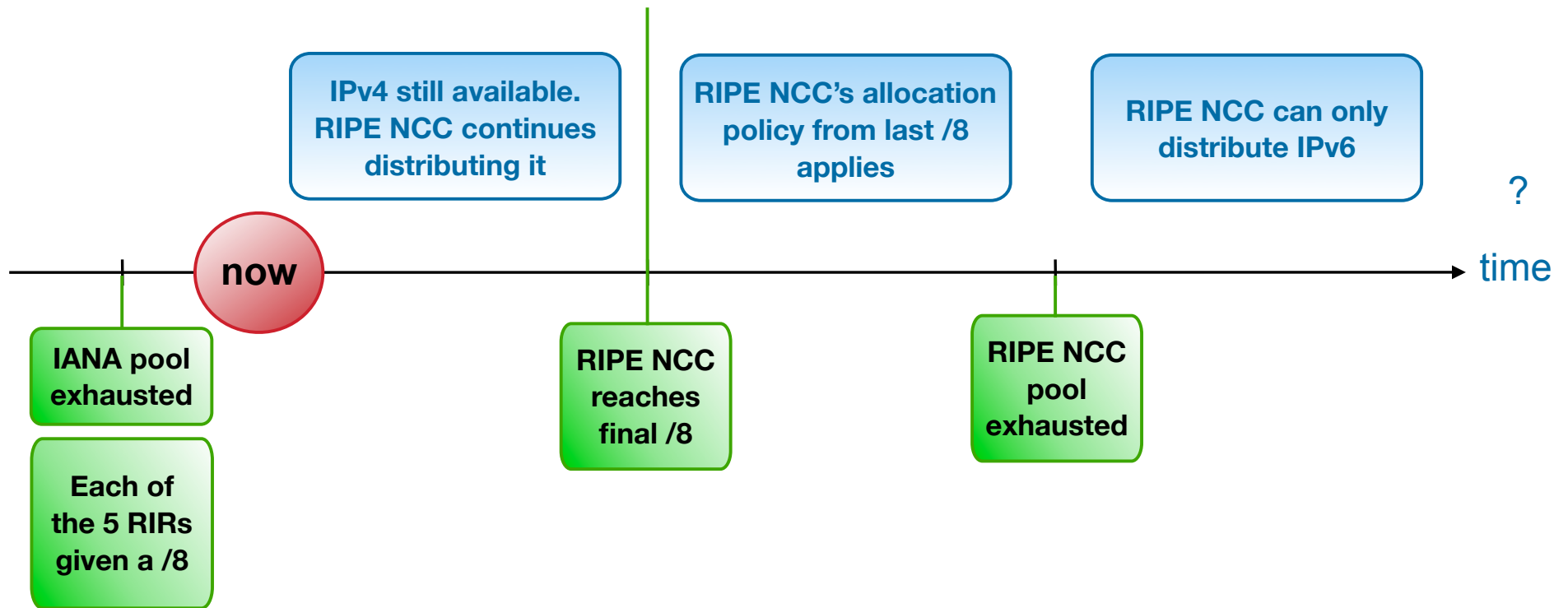


# IPv4 allocation timeline





# IPv4 exhaustion phases

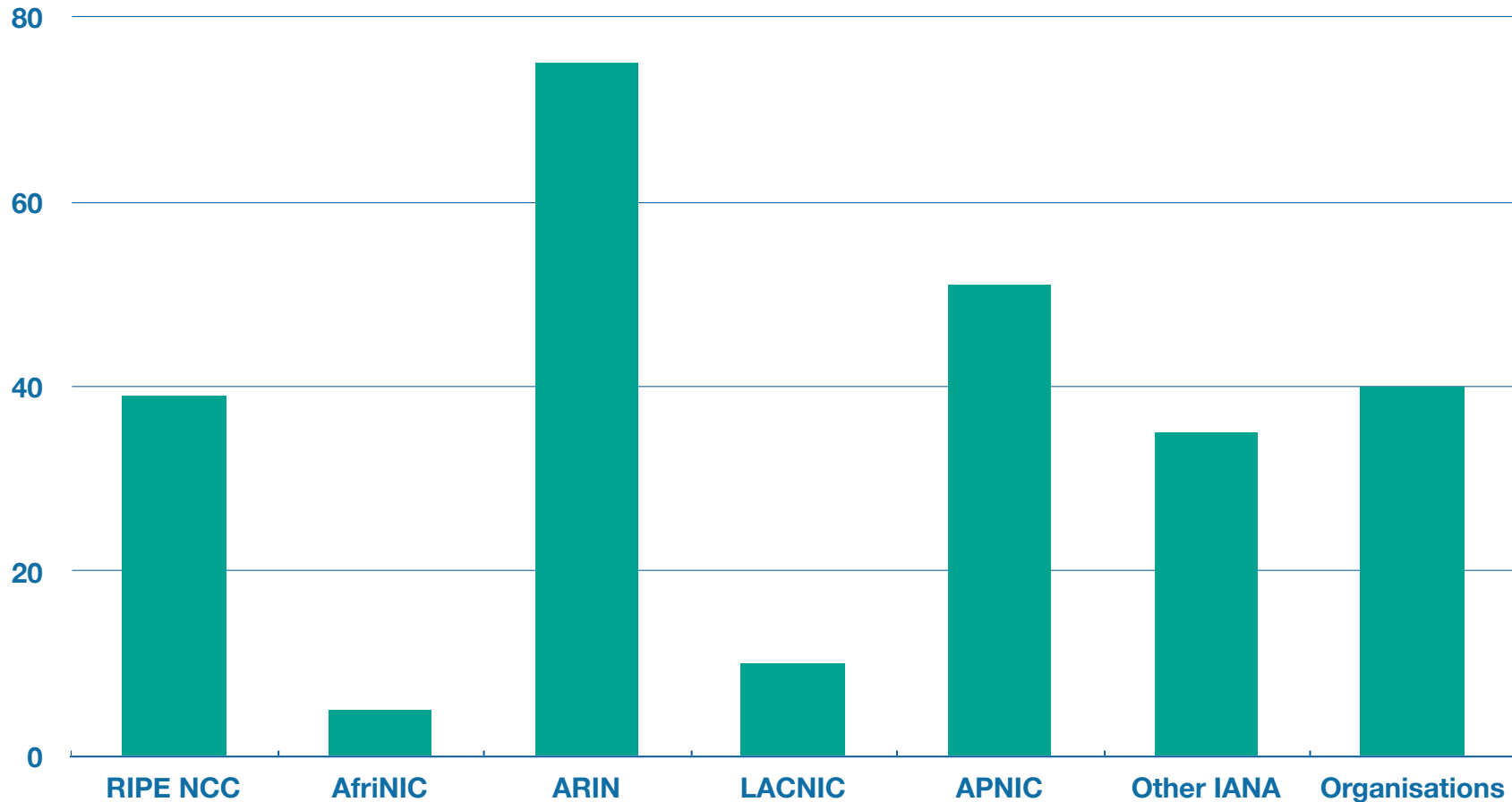


# Last /8 address block the of the RIPE NCC

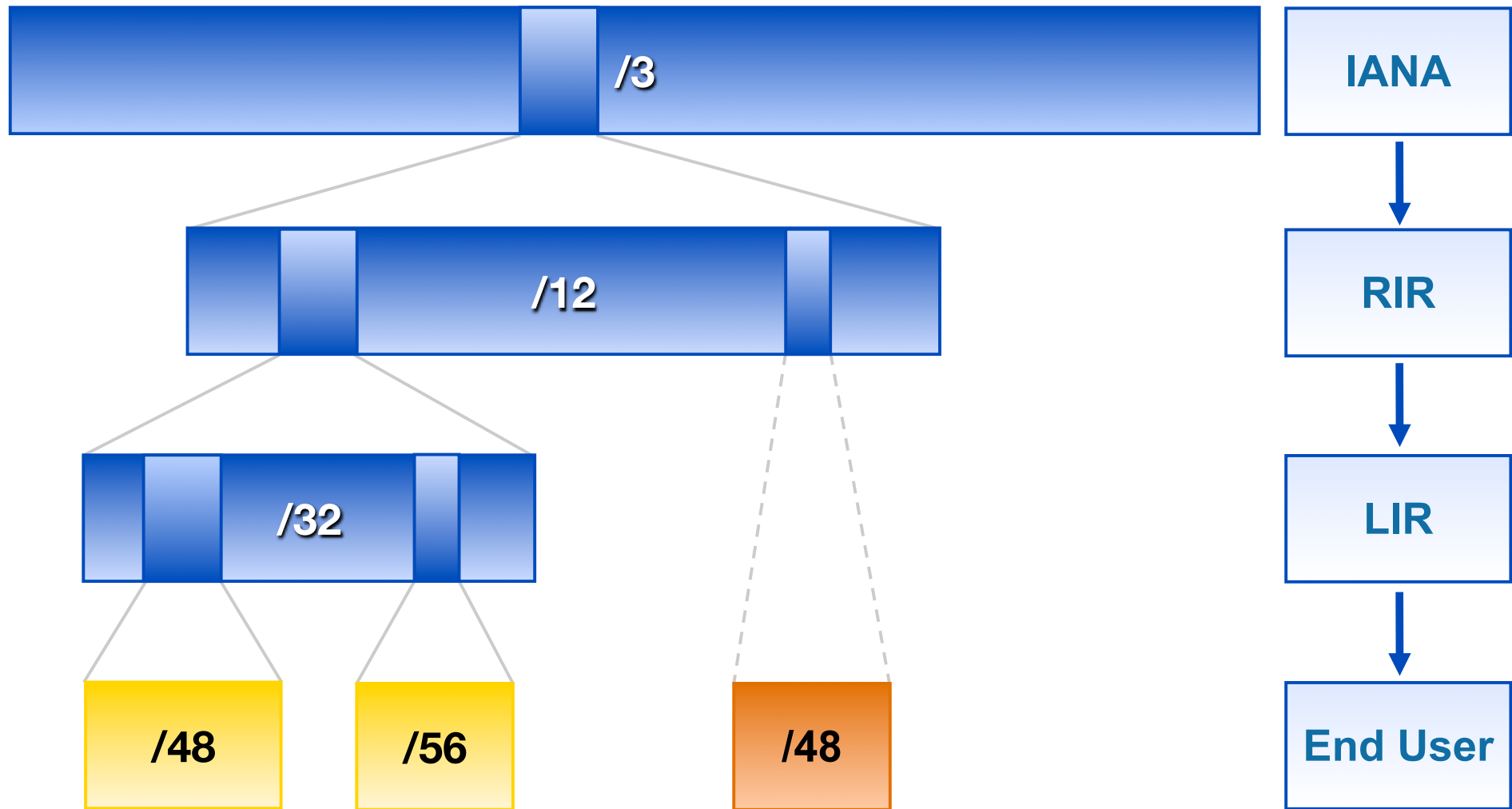
- Last /8 distributed according to RIPE community policy ripe-509
- Ensures IPv4 access for future members
  - 16000+ /22s in a /8
  - members can get **one /22 only** (1000+ addresses)
  - must already hold IPv6
  - must qualify for allocation
- /16 set aside for unforeseen situations
  - if unused, will be distributed

# IPv4 address pool: /8-s used in each region


---




# IPv6 address distribution



 Allocation

 PA Assignment

 PI Assignment

# Deploy production grade IPv6 now !

---

- **Regional Internet Registries will have to start turning down requests for IPv4 addresses in 2011**
- Networks need to continue growing
- **Deploy production grade IPv6 now !**
  - **The time for excuses is over**
  - **The time for experiments is over**

# What does an IPv6 allocation cost?

- /32 = 1 scoring unit
- /31 = 2 scoring units
- points =  $\sum (2010 - 1992) \times \text{units}$  : units = 18x1-...

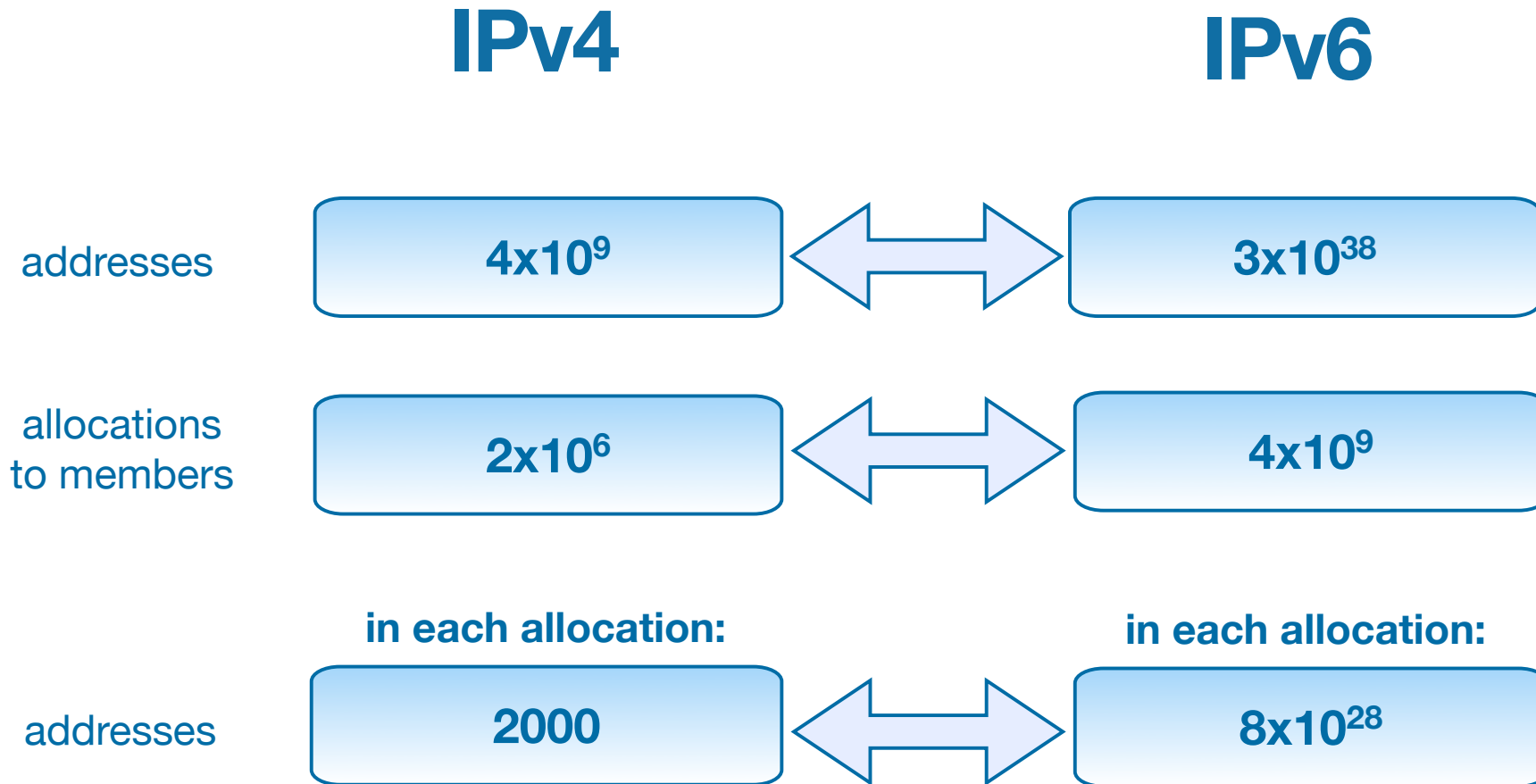


Category	Points	Fee 2010
Extra Small	< 6	€ 0
Small	-	€ 1800
Medium	- 936	€ 2550
Large	- 7116	€ 4100
Extra Large	> 7116	€ 5500



# IPv4 vs IPv6 (rounded off)

---

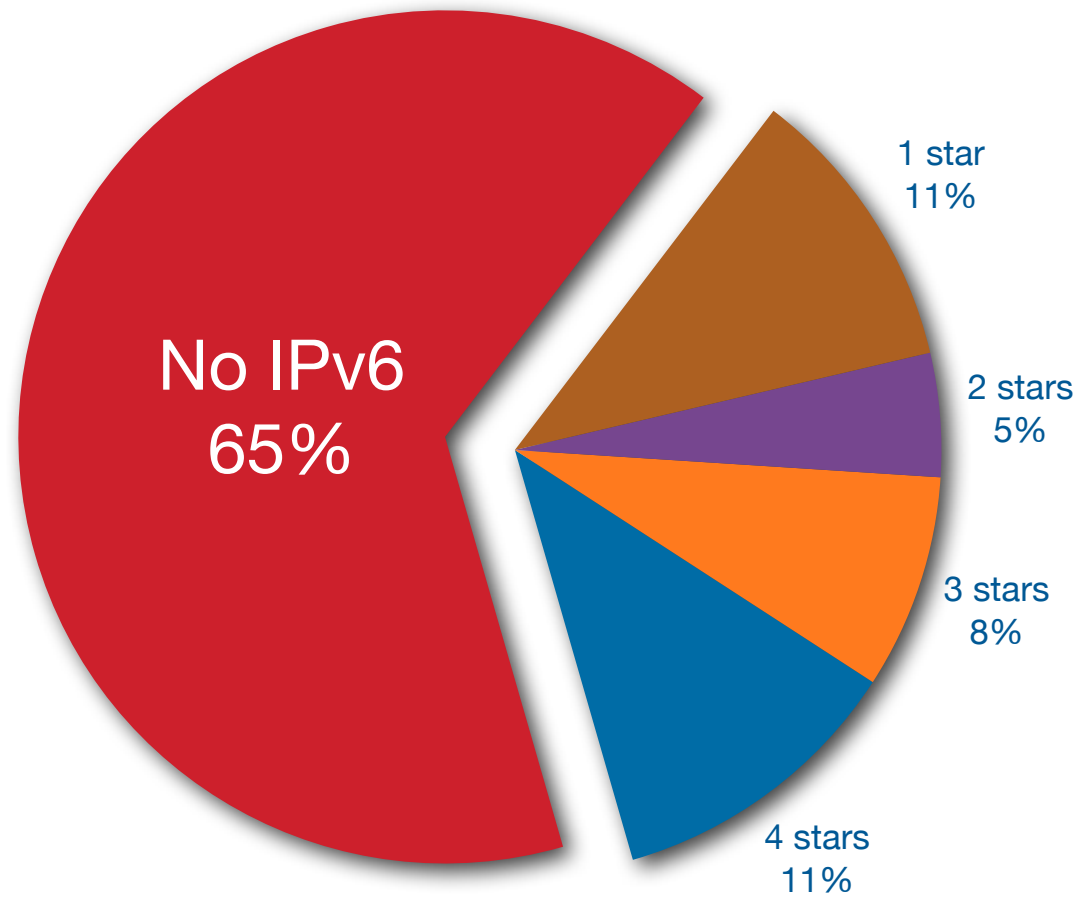




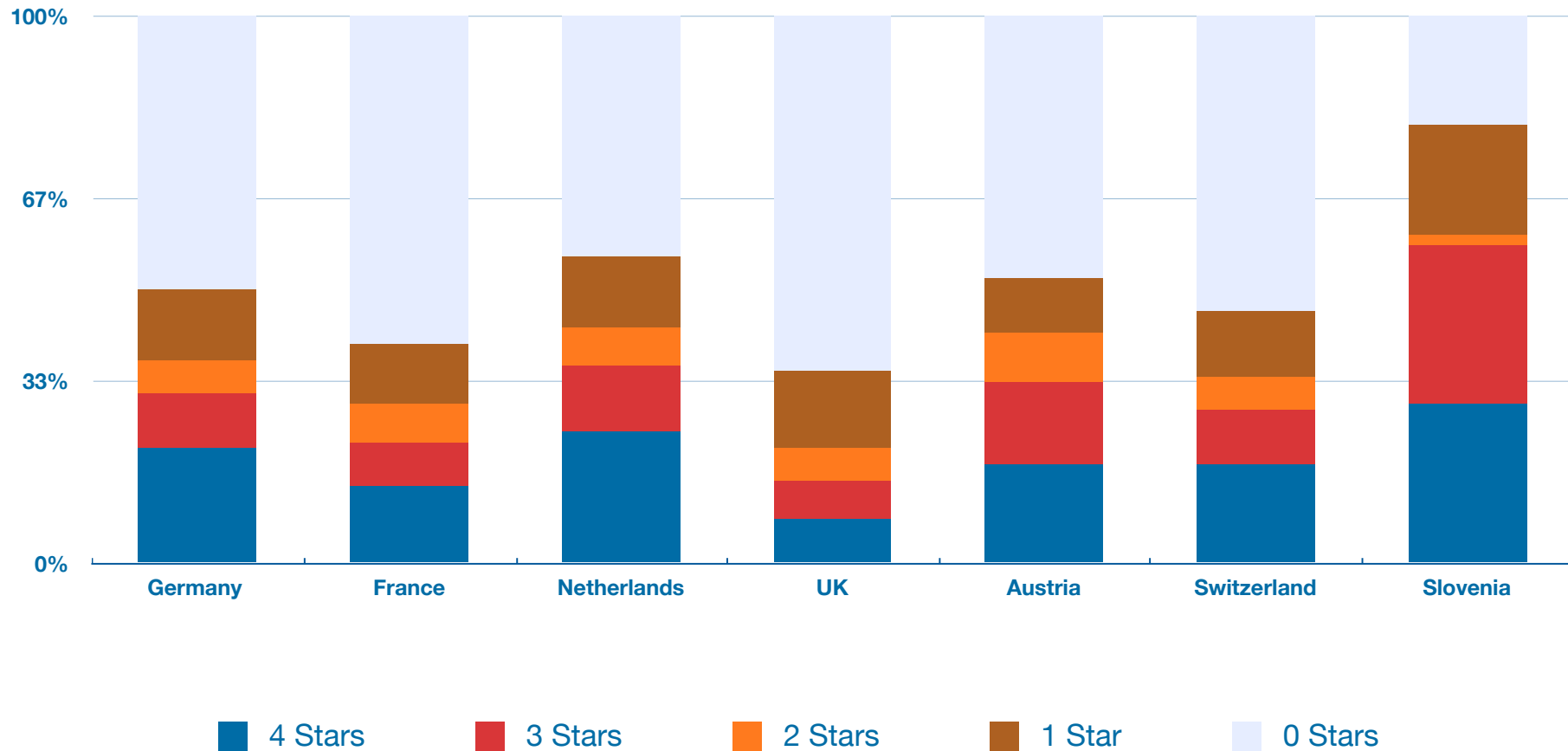
# IPv6 RIPEness – total membership

---

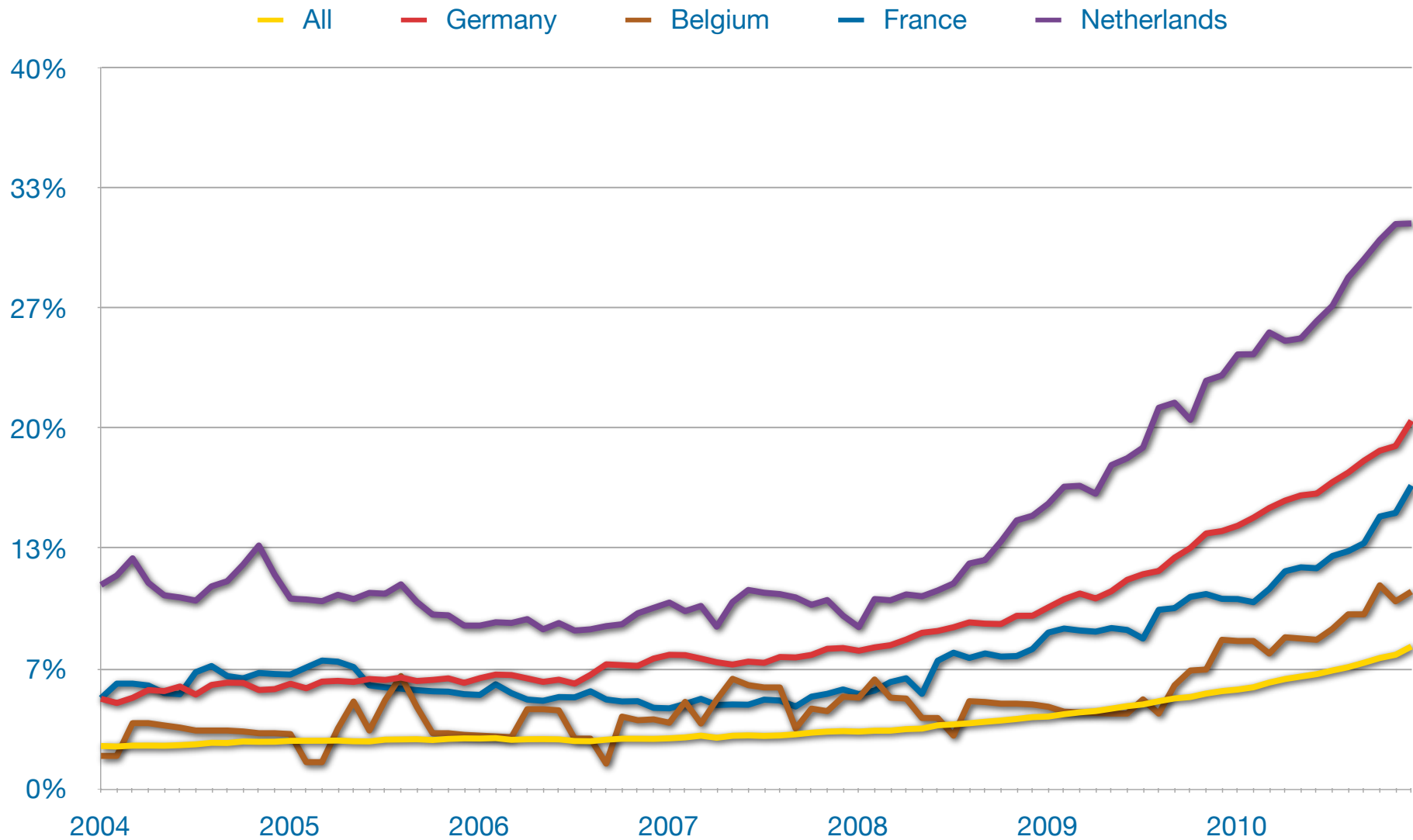
● 1 star    ● 2 stars    ● 3 stars    ● 4 stars    ● No IPv6



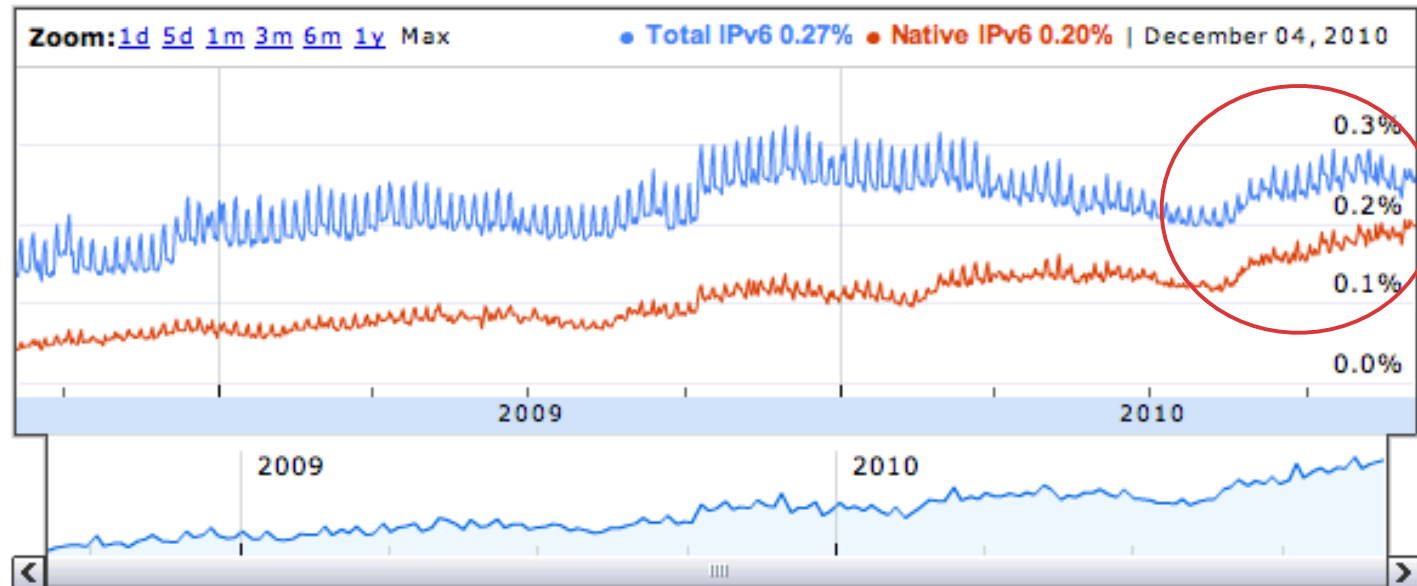
# IPv6 RIPEness – countries



# IPv6 enabled ASes in global routing



# Google's IPv6 Stats



©2010 Google

- Notice the recent acceleration of “native”
- Still too slow

# Some real world examples

---

- **Deploy production grade IPv6 now !**
  - The time for excuses is over
  - The time for experiments is over
  
- **It can be done !**

# Some real world examples

---

- **heise online**

- Major German IT Site
- Operating [www.six.heise.de](http://www.six.heise.de) since 2009
- Switched on IPv6 on main site for 24 hours in September 2010
- Very few problems, decided to keep it switched on!

# Some real world examples

---

- **xs4all**

- Dutch Internet Service Provider (ISP)
- 270,000 customers
- Offering IPv6 as standard to home users since August 2010
- Only 1.5% of customer base opted in by November 2010
- “Customers don’t want to spend much effort”

Marco Hogewoning, XS4ALL

# Some real world examples

---

- **Hetzner**

- Major German Hosting Provider
- Offering IPv6 at no additional cost for servers
- Set-up extremely easy
- IPv6 connectivity production grade



# Some real world examples

## Wikileaks Mirrors

## ad-hoc Volunteers

wikileaks.0cat.com <sup>v4</sup>	wikileaks.net <sup>v4</sup>	wikileaks.jbfrva.im <sup>v4</sup>
wikileaks.delfc.org <sup>v4</sup>	wikileaks.pignouf.fr <sup>v4</sup>	wikileaks.webto.be <sup>v4</sup>
wikileaks.violitas.org <sup>v4</sup>	wikileaks.a-dl.fr	wikileaks.wikileaks.eu
wikileaks.pent.nl	wikileaks.sansinter.net	www.grulik.org
wikileaks.befalas.org	wikileaks.jfb.net	wikileaks.thebubble.org
wikileaks.a-dl.fr	wikileaks.pancake-pirates.org	wikileaks.my-nlap.org
wikileaks.trollab.org	wikileaks.ansibie.fr	wikileaks.tartifettes.com
wikileaks.pitoo.com	wikileaks.sansinter.info	wikileaks.tyrnop.org
wikileaks.pilup.fr	wikileaks.parry.ch	cablegate.techroaddd.fr
wikileaks.trollab.org	wikileaks.ickmychip.com	wikileaks.nf.org
wikileaks.pfilu.org	wikileaks.pilup.fr	wikileaks.schatf.org
wikileaks.azylum.org	wikileaks.levelcap.net	wikileaks.huissoud.ch
wikileaks.k-rtbu.com	wikileaks.killy.me	wikileaks.ideologic.ws
wikileaks.tetelab.org	mimorleaks.org	wikileaks.lobotomie.org
swaeflw.info	wikileaks.gagniard.org	wikileaks.afurguruk.org
wikileaks.freedomofspeech	wikileaks.kowain.net	wikileaks.entrecorantes.com
wikileaks.chalitet.eu	wikileaks.zone84.net	wikileaks.cancarcusa.net
www.3em.tl	wikileaks.open-web.fr	wikileaks.infrinium.org.uk
wikileaks.majinboo.org	wikileaks.adtam.org	wikileaks.rootash.net
wikileaks.noo-world.com	wikileaks.jpworld.net	gouv.delaion.org
wikileaks.khamael.net	wikileaks.durmwind.net	wikileaks.fdn.fr
leaks.kool.linfo	bruxelles-wikileaks.mooo.com	wikileaks.amis.tv
wikileaks.mantrain.me	wikileaks.dat.fr	sinde.malaco.me
wikileaks.hmaika.com	wikileaks.yesaw.net	wikileaks.medapart.fr
wikileaks.bdf.it	wikileaks.krkz.eu <sup>v4</sup>	wikileaks.beneath.fr <sup>v4</sup>
wikileaks.fayafux.me	wikileaks.loveleaks.net	wikileaks.gnand.com
leaks.manurevah.com	wikileaks.wl.kh.ro	wikileaks.worldtravelingartist.com
wikileaks.google.eu	gg.burble.de	wikileaks.dyndns.org
wikileaks.dagarrs.de	wikileaks.wimot.info	wikileaks.dewerdnorgen.be
wikileaks.fiduras.fr	wikileaks.chsdl.de	wikileaks.xsicht.me
wikileaks.creative-guillas.com	wikileaks.martystrong.co.uk	wikileaks.geizhals.org
wikileaks.ketoler.net	wikileaks.af0.net	wikileaks.adhells.com
wikileaks.kay-server.de	wikileaks.rbdspain.es	www.mainleaks.net
www.kabespiegel.nl	wikileaks.wobterrorist.net	wokleleaks.org.uk
wikileaks.edon.ch	wikileaks.nodo50.info	wikileaks.stephaneard.fr
wikileaks.net	wikileaks.sekil.fr	wikileaks.505.ru
wikileaks.w15.ch	wikileaks.querat.me	wikileaks.asaneb.net
wikileaks.dusse.fr	wikileaks.flatworld.eu	wikileaks.molard.fr
honestgovernment.org.uk	wikileaks.simiab.cc	wikileaks.hacktabwalls.org
wikileaks.redcube.nl	wikileaks.electric-castle.net	wikileaks.opperschaap.net
wikileaks.kachel.de	wikileaks.sisbinga.org	wikileaks.mantrain.me
wikileaks.prevalent.de	wikileaks.phoeney.de	wikileaks.under.ch
wikileaks.emi-area.com	wikileaks.urmittlung.com	wikileaks.bsente.com
wikileaks.blumirror.de	wikileaks.zic.fr	wikileaks.stycore.com
wikileaks.phpdata.org	wikileaks.cbsrv.net	wikileaks.ds-bs.de
wikileaks.apathic.net	wikileaks.kabesearch.org <sup>v4</sup>	wikileaks.mafed.de <sup>v4</sup>
wikileaks.swissbite.net <sup>v4</sup>	wikileaks.kofuka.org <sup>v4</sup>	wikileaks.datendeteitel.de <sup>v4</sup>
wikileaks.bytopia.dk <sup>v4</sup>	ichbinauchwikileaks.org <sup>v4</sup>	wikileaks.ak-online.be <sup>v4</sup>

# Deploy production grade IPv6 now !

---

- **Regional Internet Registries will have to start turning down requests for IPv4 addresses in 2011**
- Networks need to continue growing
- **Deploy production grade IPv6 now !**
  - **The time for excuses is over**
  - **The time for experiments is over**

# Join the IPv6 Day on 8 June 2011!

---

- Major organisations offer all content over IPv6 for a day
  - Google, Facebook, Yahoo!, Akamai, Limelight NW, etc
- Test drive
- IPv4 not “switched off”
- Want to participate?
  - <http://isoc.org/wp/worldipv6day/>
  - content providers: dual stack & AAAA records in DNS

Questions?

