

The Internet Addressing Crunch

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Introduction

- What's the problem?
 - Where do IP addresses come from?
- What's going to happen?
- What can be done about it?
- What do I need to do?

IP Address Primer

- Master registry is IANA
 - Hands out blocks of 16M IPv4 addresses to an RIR
 - Called /8s in the trade
- RIR issues addresses to its members (typically ISPs)
- ISPs hand out addresses to their customers
- All done on the basis of need
 - Addresses are not traded or considered “property”

So what's the problem?

- There are 256 /8s of IPv4 address space
 - IANA only has 12 /8s left to give out to RIRs
- IANA usually issues one /8 every month
 - => IANA IPv4 shelves will be empty next year
- Current projected end-date is mid-June 2011
- When there are 5 /8s left, IANA will give one to each of the 5 RIRs

What does this mean?

- It will get progressively harder to get IPv4 addresses
- RIRs will probably run out of IPv4 space about a year after IANA does
- ISPs & enterprises may run out shortly after the RIRs do
- How will **you** grow **your** network then?

Don't Panic!

- Exhaustion of IPv4 will not be a cataclysmic event
- The Internet will continue to work as though nothing had happened:
 - Email, web, audio/video streaming, etc. unaffected
- Adding new stuff on IPv4 will get harder and harder... and harder
- What's the impact for new service roll-outs planned for the years ahead?

The Solution

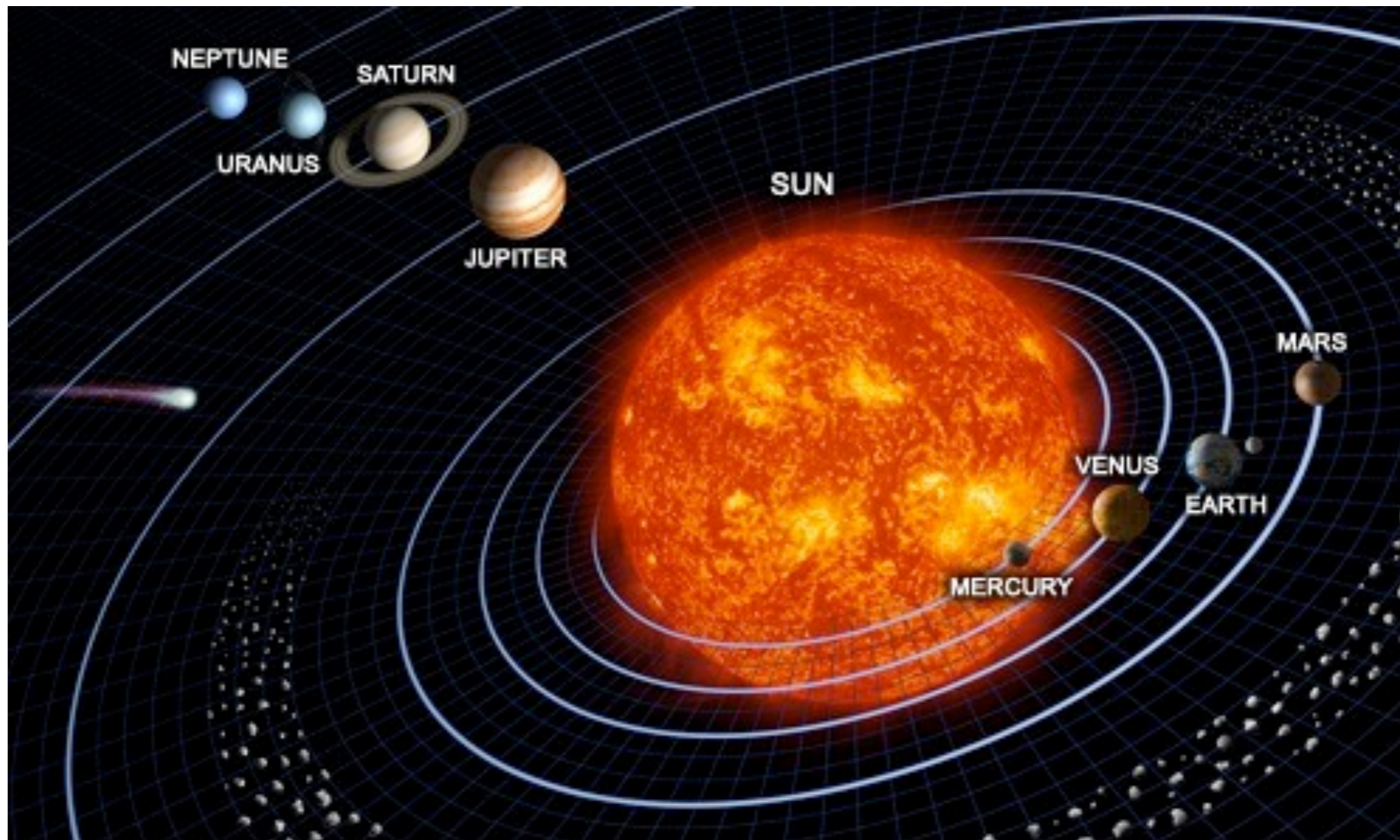
- 4Bn IPv4 addresses are simply not enough for 6Bn+ people
- Adopt IPv6
- “New” protocol with vast address space
 - 340 trillion, trillion, trillion addresses
- How to visualise this?

IPv4 Address Space as Droplets of Water

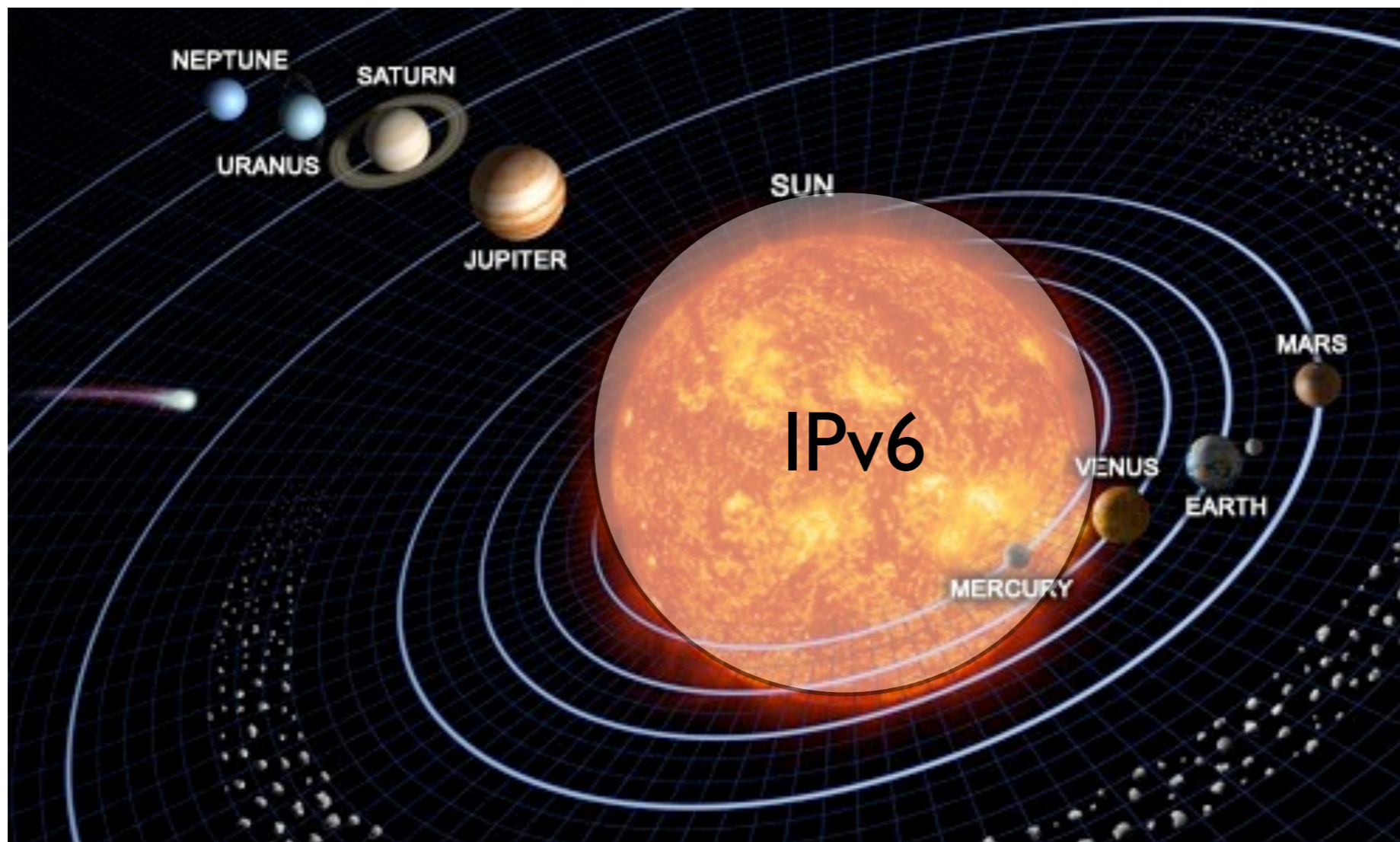
IPv4 Address Space as Droplets of Water



IPv6 Address Space as Droplets of Water



IPv6 Address Space as Droplets of Water



The Not So Good News

- IPv6 and IPv4 are not compatible
 - Can run both on the same physical network
- Most devices speak IPv6 today
 - Dual-stack operating systems
 - IPv6 is usually just not switched on!
- Chicken and egg problem
 - Not much IPv6 demand because of little content
 - Not much content because of low IPv6 uptake

Short-Term Workarounds

- Buy IPv4 from a likely market?
- How much? Can they be used?
- Proxies and Address Translation boxes
 - Don't scale well
 - Expensive to maintain
 - Clunky
 - May cost a lot more in the long run
- Simply postponing the inevitable

Why IPv6?

- Future growth of the Internet will depend on it
 - “Emerging” technologies
 - Smart phones & hand-held devices, mobile computing, intelligent grid/utilities, RFID tags
- Some of your customers and suppliers will **only** have IPv6
 - If you don't have IPv6, they won't be able to contact you and *vice versa*
 - Already starting to happen in Asia

What To Do

- Prepare now!
 - Assess your organisation's IPv6 readiness
 - Develop a migration/adoption plan
 - Align business drivers with likely crunch points
- Get IPv6 into your basic Internet services soon
 - Connectivity, DNS, email, web, etc.
- Join 6UK