ANU
Advanced Communications Deployments: IPV6

Andrew Howard
Manager Advanced Communications Research
Networks and Communications

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Overview

- Bandwidth
- Protocols
- Services

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ANU

- Networks and Communications
- Researching and Delivering world class network facilities and services for the Australian National University

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Bandwidth

- 10Gb IP core carried over a redundant fibre network
  - 10Gb data centre services
  - 1Gb to the desktop standard
  - V6 available throughout the network
- Dedicated optical interconnects between datacentres and specialised users

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Protocols

- IPV4
- IPV6
  - Deploying V6 to applications

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Services

- Reliable high speed data networks
  - Copper and Fibre
- Converged voice and video using H.323 and SIP
  - International SIP peering
- Campus wide Wireless
- Network Security
- Multicast based video reticulation ANUTV
- Research support

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IPV6

- Why ?
- When ?
- How ?

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IPV4 addresses are running out

- Bush, Huston and Li using different models are projecting V4 address exhaustion late 2010
- Who cares ?
- Can't I just use NAT ?

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Can’t we just use NAT ?

- No
  - End to end connectivity is needed
  - For your home network and specialised applications NAT is fine
  - As the R&E community we need to support next generation applications

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IPV6 is coming

- Why ?
  - The internet is not going away
  - Massive Asian population with growing wealth
  - Mobile devices

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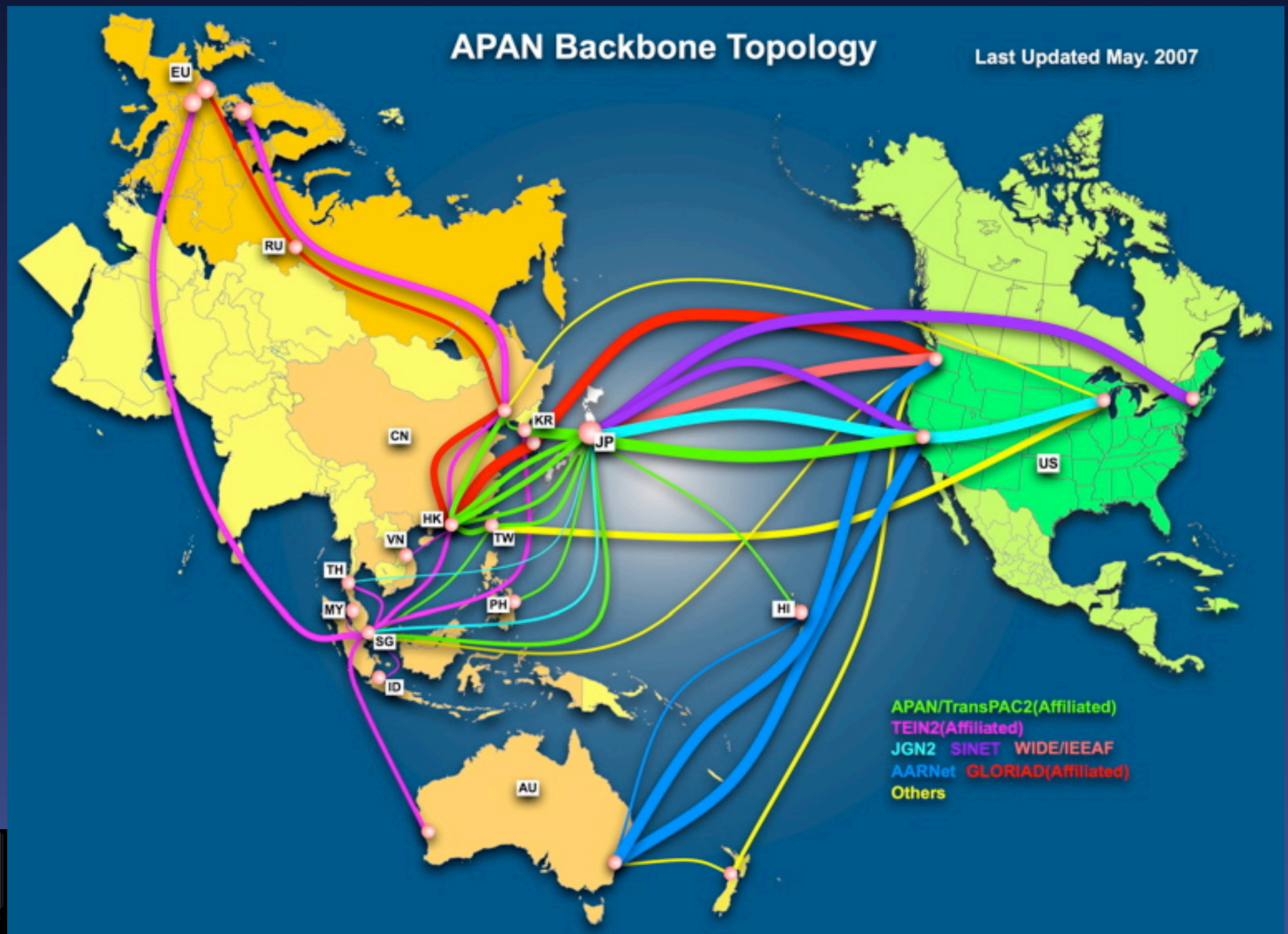
Asia

Research and Education Networks



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When ?

- This is bigger than Y2K so you better start getting ready now
- Dual stack eases the pain
- Add V6 to your purchasing requirements and development roadmaps

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How ?

- Some examples of what we've done at the ANU to implement IPV6

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Initial steps

- Activated V6 routing in network core
- Peering to AARNet
- Setup V6 DNS AAAA forward and reverse records for well known services
  - DNS, www, mail

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Core

- Cisco 6500 series core
  - Just worked
- Static IGP routing
  - Testing dynamic V6 IGP in safe harbour train during December

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IPV6 network stacks

- Native V6 support in Linux, FreeBSD, OSX and Windows Vista
- Activate on WindowsXP via cmd line
  - ipv6 enable
- Browsers now default to the V6 address first

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DNS

- IPV6 addresses are an unfamiliar format and the most common config error
- Our DNS management scripts needed to be updated to add both V4 and V6 addresses for new entities and to handle V6 addresses
- All new devices get both V4 and V6

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Firewalls

- Cisco FWSM blades (virtualised mode)
  - Outgoing V6 permitted
  - Testing V6 state-full inspection
    - No issues identified to date

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V6 Multicast

- Currently using
  - EtherDVB video streaming
  - DVTS
    - Native and using the CanalAvist overlay network
  - UltraGrid HD video

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SIP

- Using V6 for SIP peering activities with APAN
- Transparent use of V6 for peering with V4 based edge service

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Core Services

- DNS
- Apache
  - Enable V6 support
- All Unix based services worked transparently
  - X11, ssh, browser

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Security

- Core servers
- IP tables or TCP wrappers (both support V6)

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Applications

- Largest challenge
  - Should be transparent to the user
  - We expect to maintain V4 legacy support indefinitely
  - Added V6 as a purchasing requirement
- Application development groups need to migrate to V6 without major cost impact
- Working with internal development groups to define strategy and policy

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ANU is using V6 now

- Computer Science
  - cs.anu.edu.au (aka linux.anu.edu.au)
  - IPV6 is a component of the CS course
  - IPV6 Wireless mobility
- Core Services
  - NMS
  - SIP peering
  - Standard and High Definition video conferencing
  - Digital video reticulation

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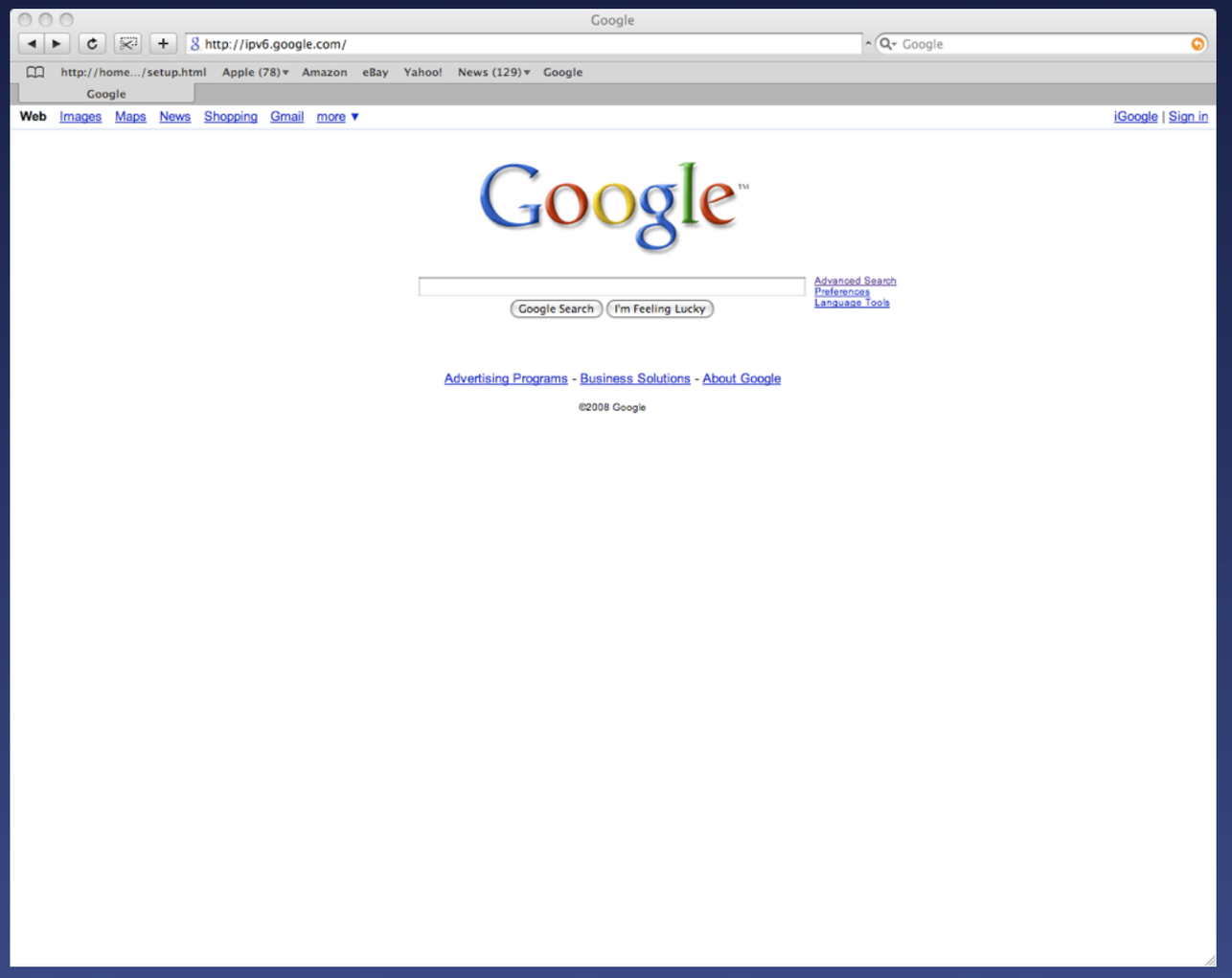
Using V6

- Google
  - ipv6.google.com
- ANU
  - www.anu.edu.au
  - cs.anu.edu.au



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IP-USN

- IPV6 Ubiquitous Sensor Network
- APAN (Asia Pacific Advanced Network) initiative lead by NIA (National Information Society Agency Korea)
- Testing iBit products (router and sensors)
  - ibitworld.com

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IPV6 Video reticulation

- ANUTV dual stack multicast
- ANU is working with a select group of Commonwealth agencies to implement a V6 based video reticulation capability

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Gotcha's

- Addresses
  - size
  - typos
  - DNS is the best solution

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Conclusion

- The time to activate IPV6 is now
- ANU is using IPV6 in production and didn't hit any major problems
- Most core services are already IPV6 capable
- Applications need to be tested against IPV6
- Still lots of interesting work to do
  - Multicast
  - Applications
  - Performance
  - Mobility
  - Security

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Thank you

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