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IPV6 in CSIRO

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CSIRO

About CSIRO

- CSIRO, the Commonwealth Scientific and Industrial Research Organisation, is Australia's national science agency and one of the largest and most diverse research agencies in the world.
- CSIRO has over 50 sites around Australia and the world with inter-site network connections ranging from ADSL to 10GBit Ethernet.

CSIRO's Network

- CSIRO is a part owner of AARNet and uses AARNet for IP and Wavelength carriage between states/territories.
- CSIRO has a geographicly state/territory based network architecture – there is no centre of our network.
- Within states between major sites we have connections that look like Ethernet (fibre/microwave).
- Smaller/remote sites the connections are opportunistic (we use the bets that we can get within budget)
- On site we have we deliver services via 100Mbit or Gbit Ethernet or 802.11g radio.
- Workstation access to the external world is via a firewall
- External world access to CSIRO services is via a firewalled external services network and servers on the network or proxies.
- CSIRO does NOT NAT.

Weasel Words

- Working
  - Switched on by default
  - Eg. Linux 2.6, Vista, MacOS X, BSD, some routers.
- Capable
  - There's a check box and we hope if we tick it IPv6 will work.
- Ready
  - The hardware, in theory, has the grunt to do the job and by the time it's obsolete we (the vendor) hope to have a new product to sell you upon which IPv6 actually works.
- Future
  - We've heard of this IPv6 acronym and would like you to check the box in our row in the evaluation list.

Structure of IPv6 Activities

- Following the AGIMO '**Strategy for the Transition to IPv6 for Australian Government agencies**'
- **3 Stages:**
  - **Preparation**
  - **Transition**
  - **Implementation**
- **Internally this divides into 3 Views**
  - **Universal Services**
  - **Enterprise Applications**
  - **Scientific and control equipment.**

Universal Services

- What are they?
  - Email
    - But it's not just about mail anymore.
    - The calendar is vital for people and objects
    - The address book is how we contact people by other means as well
  - File Storage (moving to repositories)
    - We have a LOT of data
    - We have an increasing obligation to make this data more readily accessible)
  - Printing
    - It's not just about getting paper out.
    - Its about scanning/imaging
    - Some organizations still use Faxes
  - Telephony
    - IPTel changes the cost equation of deployment and management.
    - It's now voice and video and voice messaging

Universal Services - Continued

- 'Internet Access'
  - Web browsing – including web apps
  - File transfer – including torrents
  - Instant messaging
  - Social / Profesional Networks
  - Gmail/ Live
  - Access Grid and similar

Universal Services

- Where are they?
  - Email – currently in transition to Exchange 2007 - so will be capable when transitioned.
  - File Storage
    - UNIX + Linux – the big stores – has been capable for years
    - Windows – varies but headed to IPv6 Compliant
  - Printing – some network attached devices have a long way to go.
  - Telephony - the server OS is capable, the gateways are capable, some newer phones are 'IPv6 ready???' The big video conferencing kit is capable. The most common item does not do IPv6
  - 'Internet Access'
    - The router hardware works (with some caveats).
    - The Workstation software works (with a caveat about Windows, that may not matter.)
    - The firewalls and security devices are the least mature and most problematic.

Administrative Applications

- HR, Finance, Legal etc.
  - Generally used internally only either on an internal network or via VPN.
  - In some cases the product is ‘capable’
  - In a dual stack world this is not urgent.

Scientific and Control Equipment

- These may be the first devices which are IPv6 only
- These will be the last devices which are IPv4 only.
- They are not subject to the normal lifecycle processes which we are used to for desktops, servers and administrative applications.
- They range from a (theoretical) sensor which direct connects using 10G Ethernet to a building management system which uses 10Mbit half duplex.

Network Perspectives
Internal Islands

- These are routed networks containing desktops and laptops that do not cross our border security zone.
- Dual Stack is the foreseeable future both test and after go–live.
- IPv6 is essentially invisible to IPv4 and vice versa
- ‘Router on a Stick’ test solutions have been deployed with no disruption to existing IPv4 services.
- Some things can easily co-exist on production networks
  - Internally routed IPv6 address space at /64 autoprovisioned.
  - Well known addresses for well known services.
  - Stateless DHCP for other services.
- Some things are not suited to the production world
  - There’s no such thing as ‘test’ DNS for a production machine.
  - IPv4 DNS for IPv6 for quite some time.
- Its pretty easy at the desktop/laptop level.

Network Perspectives
External Island

- A network external to our production border security zone – but on the ‘real’ IPv6 internet.
- Looking at firewall rules and some making some basic services available externally as well as test workstations in an ‘internal’ environment.

Small Devices

- Some devices can't afford to run IPv6 (or even IPv4)
  - They don't have enough program memory and/or enough ram to make it happen
  - Most importantly they often don't have enough CPU cycles available either due to speed or energy constraints.
  - If you want to run forever off a small solar cell then you will spend most of your time asleep.
  - There are low power implementations of IPv6 (6lopan) which will even run on an 8 bit microcontroller (an example is the AVR Raven) Even so, this is still, by some standards, an energy hog.
  - For wireless devices in the field energy matters – the number of joules of energy available per day is restricted – there are cost and size considerations which affect this figure.
  - Internet access to these devices is generally via a proxy
  - Direct addressing is via one for one NAT.
  - So NAT has a place in an IPv6 World?

Your Fridge on the Internet (misconceptions)

- You say tomato I say tomato.
- There is frequent reference to IPv6 as the enabler of making 'everything' accessible on the internet.
- What people want to achieve is NOT everything accessible on the internet.
- But… Everything on IPv6 (but not necessarily visible to all) isn't necessarily a bad thing.
- Your fridge is a composite object.
  - A door open sensor
  - A thermometer
  - A temperature set point
  - A light
  - A heat pump
  - Etc
- You want to access an agent which is a fridge controller not the individual objects

The Foreseeable future

- Dual Stacking is the short, medium and long term future.
- At some stage we need to join the islands
- The timing of the transition to dual stack as a production environment is a management decision there are no technical show stoppers.

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Thank you

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