



www.csiro.au

Quietly Deploying IPv6 at the CSIRO


John Gibbins
CSIRO IT Security
IPv6 Summit, 8th December 2009



IPv6 in CSIRO

- What is CSIRO?
- Why are we deploying IPv6?
- Deployment Methodology
- How far have we come?
- What we have learnt

CSIRO. Quietly Deploying IPv6



What is CSIRO?

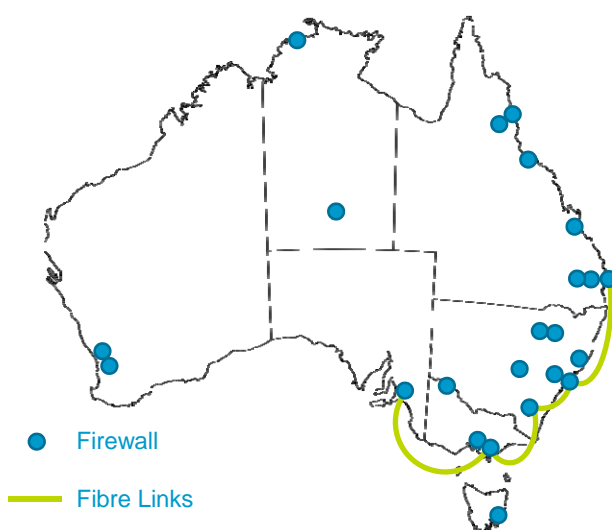
- Commonwealth Scientific and Industrial Research Organisation
- Australia's largest research organisation
- Commonwealth Government agency

CSIRO. Quietly Deploying IPv6



3

CSIRO Network



CSIRO. Quietly Deploying IPv6



4

Why are we deploying IPv6?

- What I've been telling management:
 - Communicate with partners/clients
 - Develop/test software compatible with IPv6
 - Government Transition Strategy

Why are we really deploying IPv6?

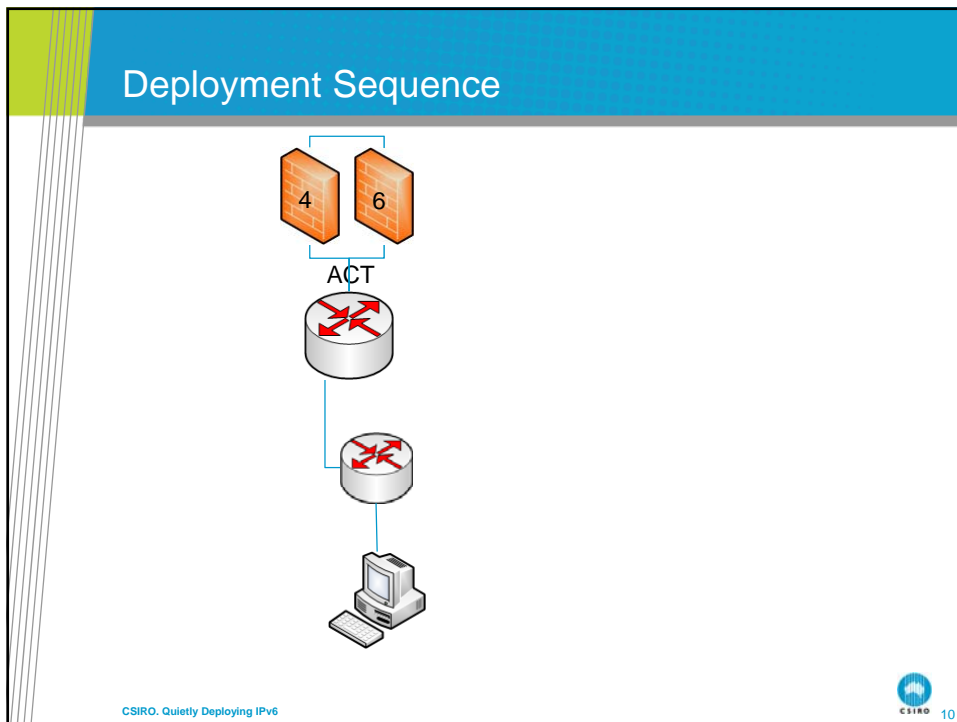
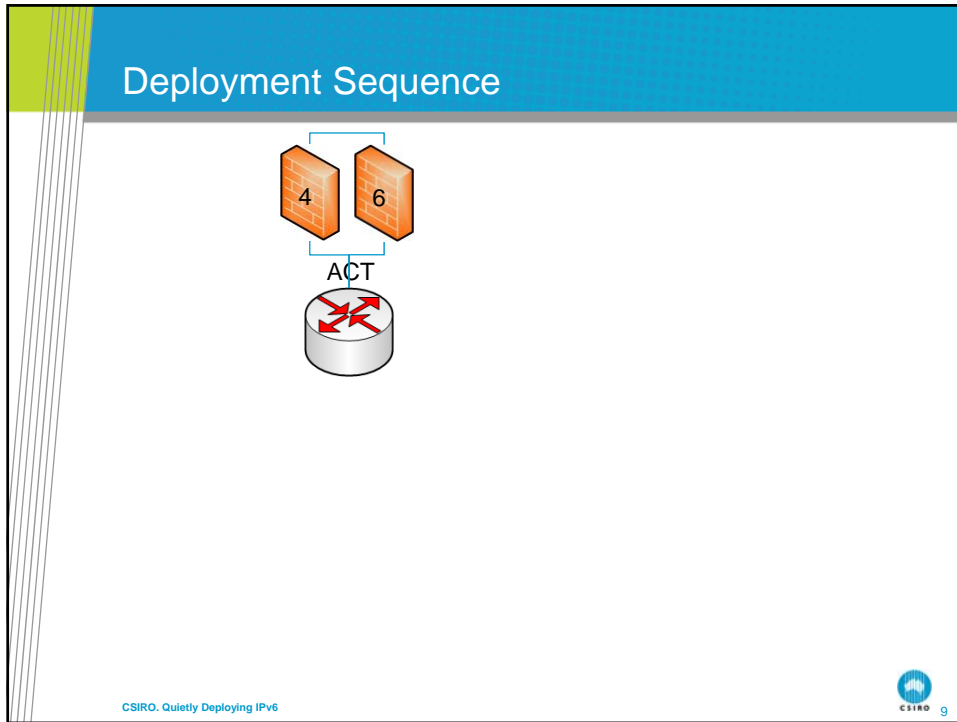
- I'm a nerd and IPv6 looked interesting
- Because we can
- Dangerous not to
- (And those other reasons)

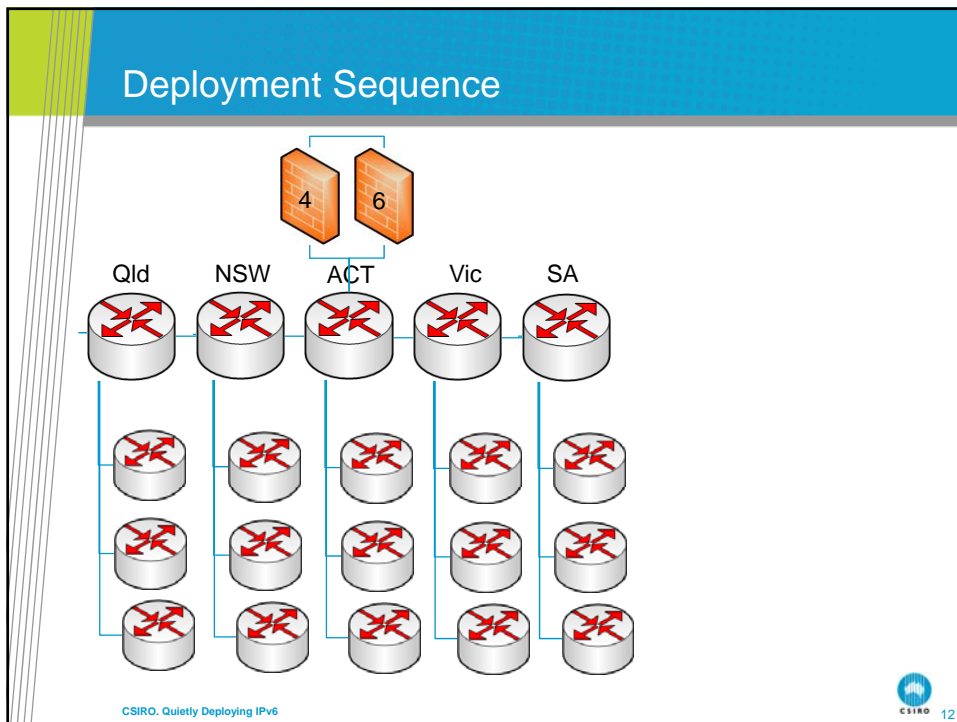
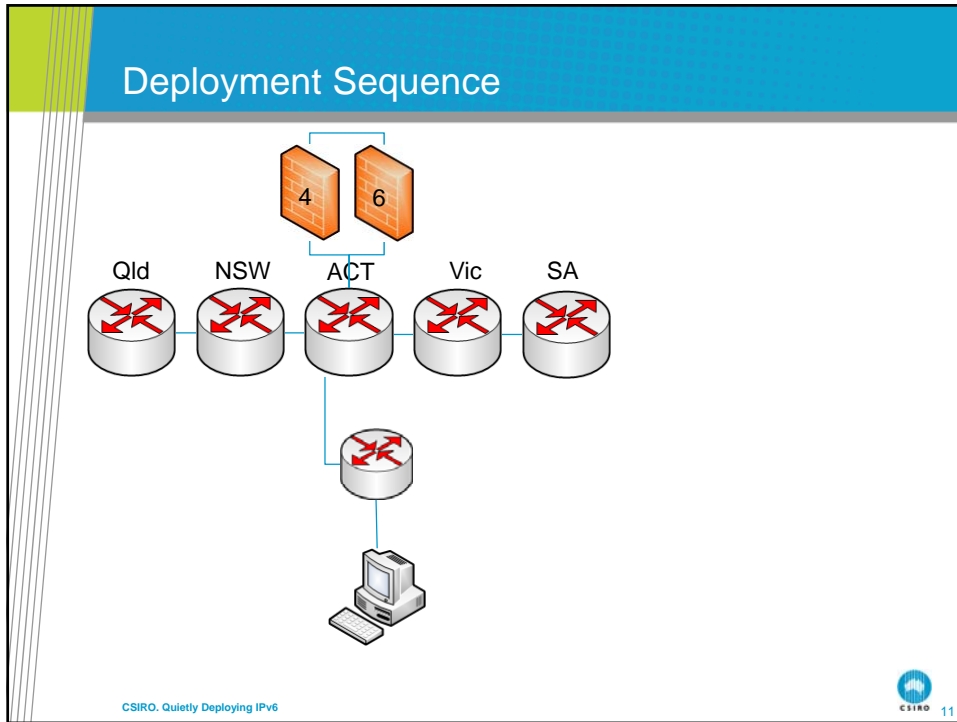
Deployment Methodology

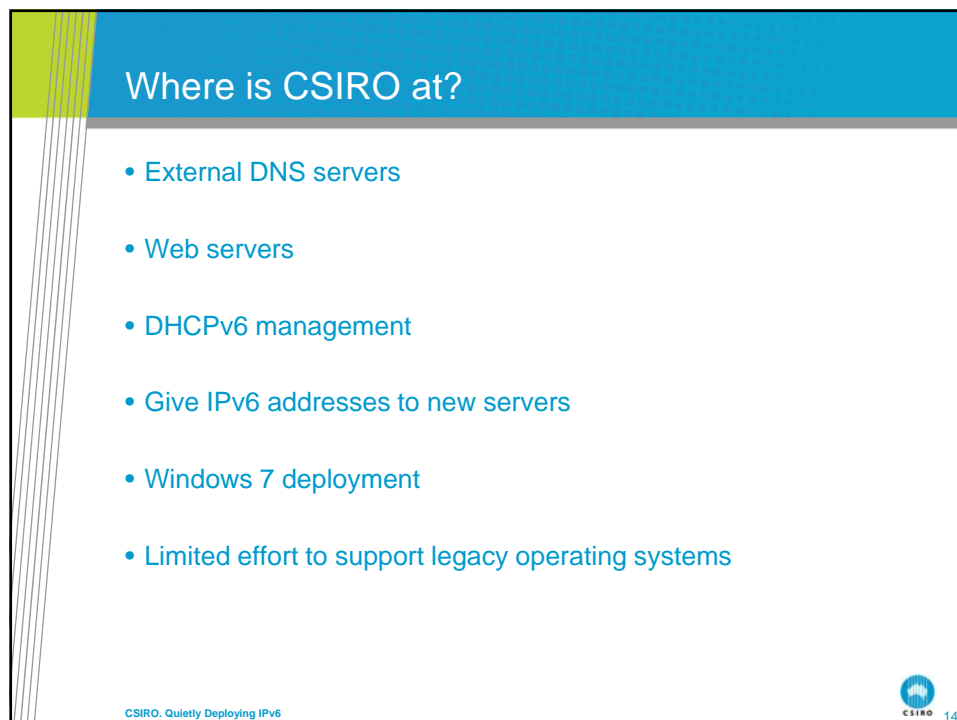
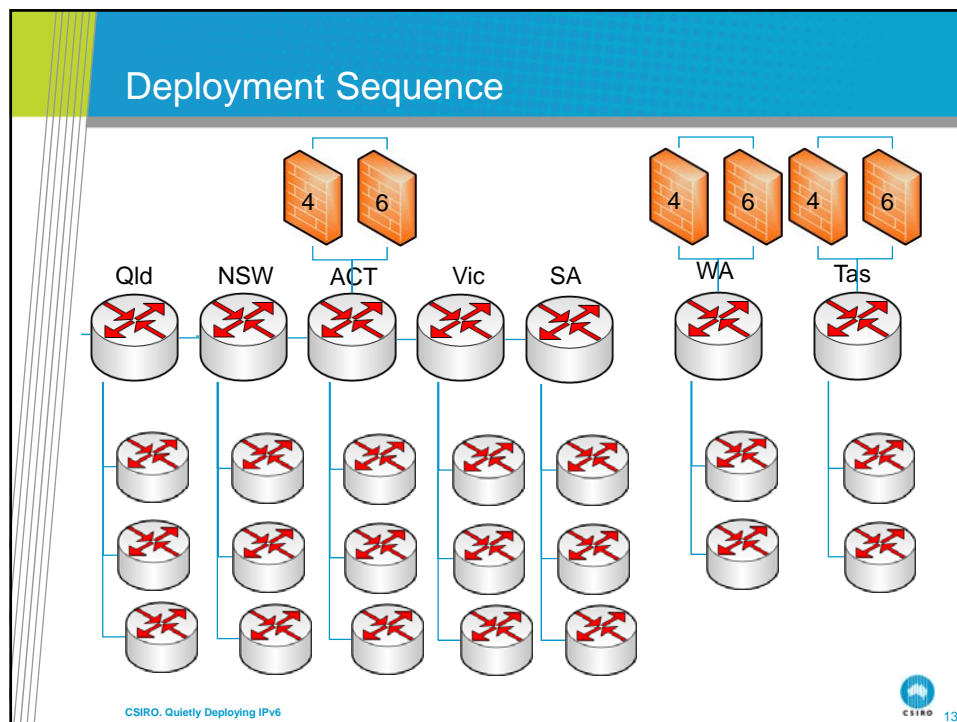
- Test labs of limited use
- Deploy native IPv6 slowly but steadily
- Working from the outside in
- Dual-stack environment
- Ignore mobility

Deployment Sequence - Testing

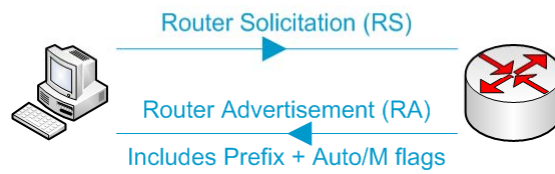
- Obtain address block and carve it up
- Verify existing infrastructure
- Use separate firewall for IPv6
- Connect through to our desktops and test servers







How addresses are obtained



Prefix: Network part of IPv6 address

Auto: StateLess Auto-Configuration (SLAC) Flag

M: Managed Flag

CSIRO's settings

- Turn off Auto flag
- Turn on M flag
- Only provide addresses for specific systems
- Explicitly specify addresses

DHCPv6 vs DHCPv4

- Based on DUID not MAC address
- We use DHCP reservations
- Same reasons for use apply in IPv6 as in IPv4

Address Allocation

- We have a /32 allocation
- Last 64 bits are the Interface ID
- 32 bits to play with in the prefix
- Keep the addresses simple

Prefix Allocation

2001:0db8	0	Site	VLAN	Interface ID
-----------	---	------	------	--------------

- 32 bit registry allocation
- 4 zero bits (reserved)
- 12 bits for the Site (including State)
- 16 bit VLAN number

Interface IDs

- Use simple Interface Ids based on IPv4 address
- Use last two bytes of IPv4 address in decimal
- 152.83.32.254 becomes:
- 2001:0db8:0603:0123:0000:0000:0032:0254
- i.e. 2001:db8:603:123::32:254
 - 2001:0db8 = Registry allocation (documentation)
 - 6 = ACT
 - 03 = Head Office
 - 0123 = VLAN 123
 - 0032:0254 taken from 152.83.32.254

What We Need from Vendors

- **Disclaimer: We are essentially a Cisco shop**
- **ASA firewalls**
 - Do not work if failover unit present
 - Do not support ANY routing protocol
 - Do not support ND/RA options (eg M/O flags, Autoconfig)
 - Do not support DHCPv6 relay
 - Do not support ssh with IPv4 TACACS
 - Do not support routed multicast
- **Routers**
 - 3750Gs don't support MLD/PIM for multicast
 - No IOS images support IPv6-MIB in SNMP

What We Need from Vendors (cont)

- **Load Balancers**
 - Cisco won't have any support for IPv6 until late next year
 - (So we bought some Brocade ServerIrons)
- **E-mail gateways**
 - Cisco Ironport not supporting IPv6 until 2011.
- **Linux utilities (in Enterprise SuSE)**
 - snmpwalk
 - tftp servers
 - Squid
- **Low end ADSL routers**

What we have learnt

- Core functionality works
- Functionality is more of an issue than bugs
- New systems may need replacing to fully support IPv6
- Poor support for firewalls and other specialist devices
- Vendors claim customers not asking for IPv6.

What you need to know

- You can run IPv6 now
- Don't believe that everything new is IPv6 ready
- Identify what doesn't work and pressure vendors now
- Vendors losing business now
- Build expertise before it's too late

CSIRO Information Management and Technology
 John Gibbins
 Team Leader – IT Security Operations

Phone: 02 6124 1419
 Email: John.Gibbins@csiro.au

www.csiro.au

Thank you

Contact Us
 Phone: 1300 363 400 or +61 3 9545 2176
 Email: enquiries@csiro.au Web: www.csiro.au



My punts on the future (bonus slide)

- IPv4 addresses won't run out
 - IANA will run out
 - RIRs will run out or impose strict restrictions on last allocations
 - A market for IPv4 addresses will ensure addresses are available
 - Price will reflect scarcity
 - The cost will be out of reach for many players
- It will become hard to get more IPv4 addresses
 - Initially, ISPs will increase use of NAT
 - They will allocate IPv6 addresses to clients and provide gateways to specific IPv4 services (eg web proxies, mail gateways)
 - These gateways will need to exist for many years

CSIRO. Quietly Deploying IPv6

