

DIAC is Ready for IPv6 Business

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DIAC is Ready for IPv6 Business

- The Department of Immigration and Citizenship (DIAC) and their need for IPv6
- How Unisys Australia enabled IPv6 for DIAC
 - Implementation approach taken
 - Current status
 - Final comments

Need for IPv6

- The Australian Government Information Office (AGIMO) directed all agencies to have IPv6 connectivity by December 2012
- More importantly, consider DIAC's motto "people our business"

Clients – The Numbers

- From DIAC’s “ The Outlook for Net Overseas Migration June 2012” statistic publication

Table 1: Net Overseas Migration – DIAC year ending forecast

'000 of persons	2011 Dec ^(a)	2012 Mar ^(b)	2012 June	2012 Sept	2012 Dec	2013 Mar	2013 June	2014 June	2015 June	2016 June
NOM arrivals	441.2	464.0	470.5	471.7	472.8	474.2	475.2	480.7	485.5	490.4
NOM departures	257.2	269.2	272.0	272.6	273.2	274.0	274.6	277.3	280.0	282.7
Net NOM	184.0	194.8	198.6	199.1	199.6	200.3	200.7	203.5	205.6	207.7

(a) Latest ABS preliminary estimates

(b) DIAC forecast from March 2012 onwards

Source: Australian Bureau of Statistics and Department of Immigration and Citizenship

Clients – Countries of Citizenship

Table 5: NOM—top10 countries of citizenship 2003–04 to 2009–10

'000 of persons	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
China (ex SARs & Taiwan)	11.6	16.5	22.1	37.4	50.0	60.0	23.7
England	19.4	19.5	20.5	28.3	36.5	33.5	28.6
India	14.2	20.6	23.1	29.8	36.1	20.2	21.2
Korea, Republic of (South)	16.0	17.7	21.6	24.5	26.6	23.3	16.5
Malaysia	3.9	5.2	6.6	9.0	11.5	11.8	8.5
New Zealand	4.5	5.1	6.8	7.5	9.9	11.6	5.1
Philippines	5.3	5.3	8.0	9.3	9.5	8.1	3.1
South Africa	5.8	4.6	5.0	6.2	7.4	6.7	5.3
Sri Lanka	2.3	2.7	3.9	5.5	7.5	9.1	6.7
Vietnam	1.5	2.7	3.8	5.2	6.6	6.4	4.7

Source: Australian Bureau of Statistics and Department of Immigration and Citizenship

Clients – Their IPv4/IPv6 area

- 8/10 of the top 10 countries are in APNIC's geographical service area
- APNIC onto its final IPv4 /8 block
- DIAC anticipates an increase of Clients from areas with IPv6 only connectivity
- DIAC wants (and expects) to do business with them!

IPv6 Enablement Strategies

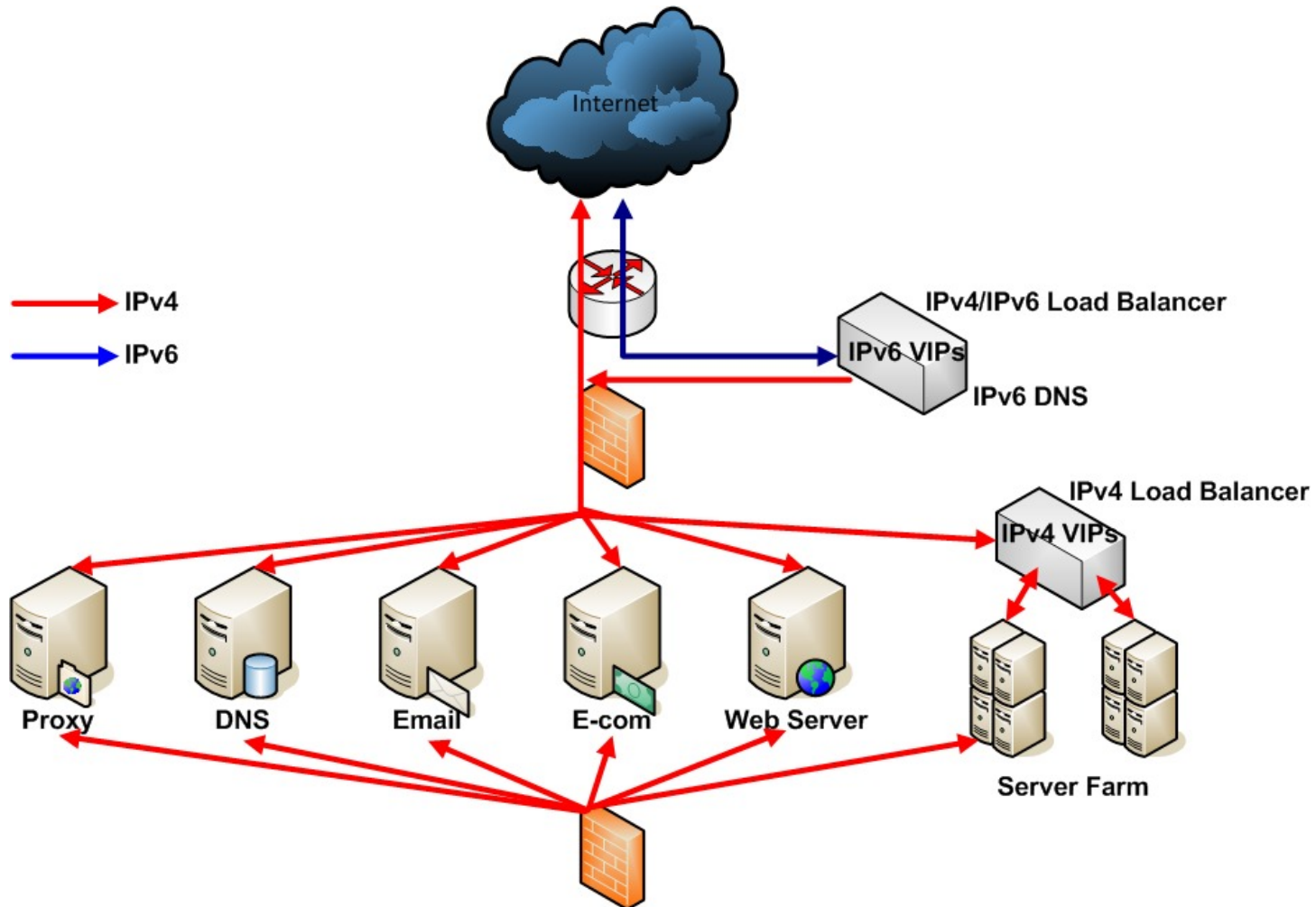
Seems to be two common approaches that organizations are using:

- Place dual-stack IPv4/IPv6 load balancers at the top of your IPv4 gateway
- Dual-stack IPv4/IPv6 your gateway

IPv4/IPv6 load balancers at top of your IPv4 gateway

- Load balancer has IPv6 VIPs for all services
- Proxy IPv6 to your backend IPv4 services

IPv4/IPv6 load balancers at top of your IPv4 gateway



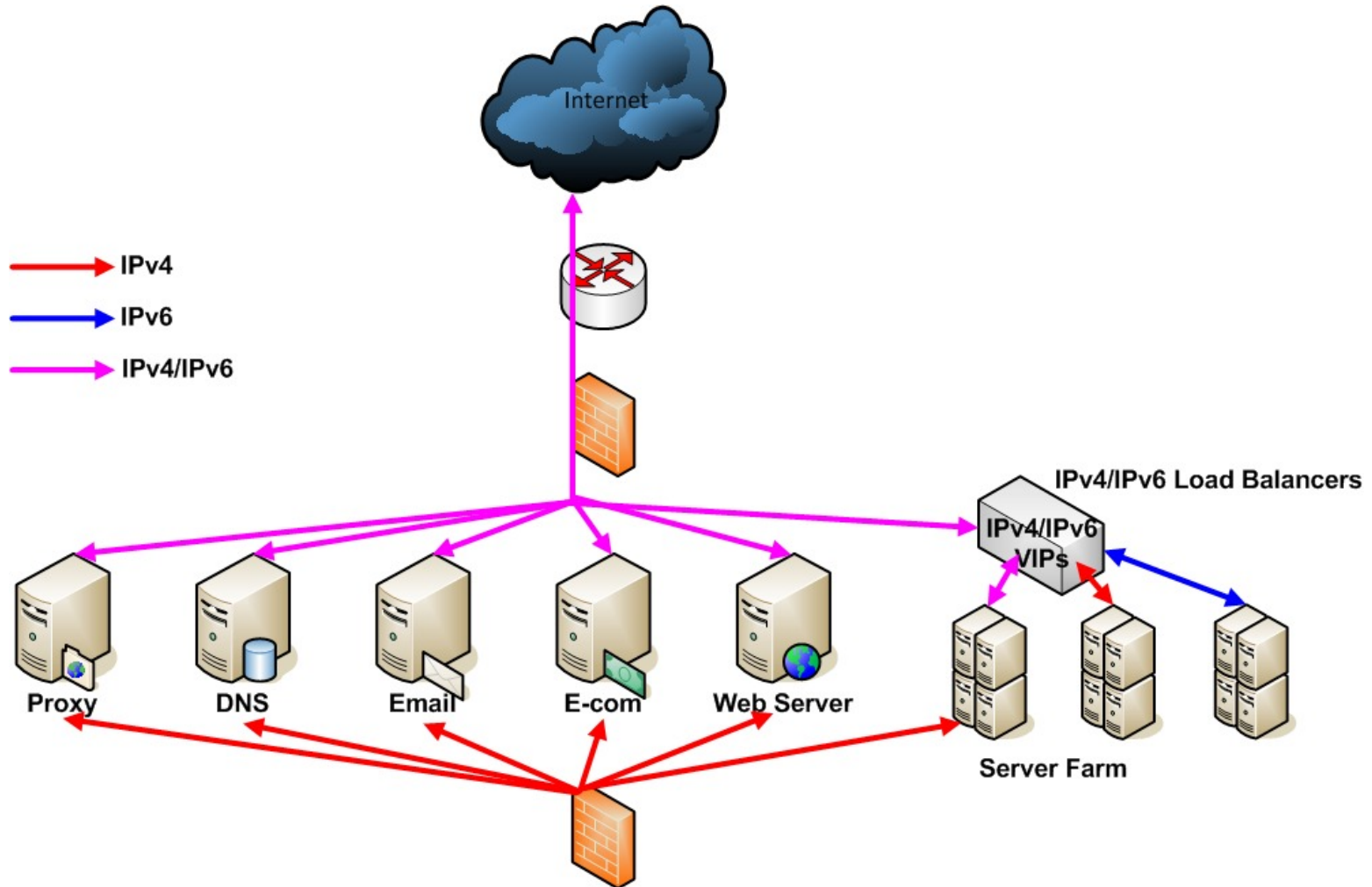
IPv4/IPv6 load balancers at top of your IPv4 gateway

- Advantages
 - Simpler, easy and faster to implement
 - Access to your hosted services / web presence
 - Incoming Email, DNS, etc. available
- Disadvantages
 - One way, no outgoing email, web, DNS

Dual-stack IPv4/IPv6 your gateway

- Gateway infrastructure is dual-stack
 - Email/DNS servers, Web Proxies etc
- Load balancers use either IPv4 or IPv6 backend
- Common services are IPv6 enabled: DNS, E-mail, web proxies
- IPv6 only services

Dual-stack IPv4/IPv6 your gateway



Dual-stack IPv4/IPv6 your gateway

- Advantages
 - Access to your hosted services / web presence
 - Incoming Email, DNS, etc. available
 - Outgoing Email, DNS resolution, web surfing
 - A more “complete” solution
- Disadvantages
 - Requires a little bit more effort

DIAC and Unisys Australia

- DIAC required:
 - A two-way IPv6 solution
 - IPv6 capability by 30 June 2012
- Unisys Australia provides IT services to DIAC and were engaged to provide said IPv6 capability

IPv6 Path

- Identify IPv6 capable equipment
- IPv6 address planning
- Implementation approach
- Validating the capability

Identify IPv6 capable equipment

- Stocktake time. Requires checking all your devices against vendor supported IPv6 versions – OS and hardware
- Beware “IPv6 compliant”. Need to read the fine print on vendor sites
 - <https://www.ipv6ready.org/db/>
- For Unisys, this was a simple process due to a pro-active patch/OS upgrade regime for gateway infrastructure

IPv6 address planning

- The standard IPv6 addressing goals
 - Not stingy or overly excessive
 - Allocate a sufficient subnet range to meet current requirements
 - Allocate a sufficient subnet range that will support future envisaged requirements
 - Allocation of subnet ranges that provide route aggregation

DIAC Is Ready for IPv6 Business: Australian IPv6 Summit 2012

– If X IPv4 subnets $\rightarrow (X \pm (10\% \text{ of } X))$

IPv6 address planning

- Use IPv6 subnet calculators:
 - http://www.gestioip.net/cgi-bin/subnet_calculator.cgi
 - <http://www.subnetonline.com/pages/subnet-calculators/ipv6-subnet-calculator.php>
- Use IPv6 address management tools (IPAM)
 - <http://www.ipv6now.com.au/address>

IPv6 Path – IPv6 address planning

- Needed to consider BGP routing prefixes
 - DIAC has 3 ISPs
- IPv6 /48 prefix is smallest that could be advertised via BGP
- Great resources
 - http://www.getipv6.info/index.php/IPv6_Addressing_Plans
 - http://www.ipbcop.org/wp-content/uploads/2012/02/BCOP-IPv6_Subnetting.pdf
 - <http://www.networkworld.com/community/blog/ipv6-address-design>

Implementation approach

- DIAC needed a dual-stack IPv4/IPv6 core gateway
- Unisys's approach was a top (ISP) to bottom (core), step by step, IPv6 implementation
- Implemented in Secondary Gateway 1st , Primary Gateway 2nd

Implementation approach

- AAAA records have precedence over A records
- Provided reverse mapping for IPv6 addresses – a good net-citizen

Validating the IPv6 Capability

- Validate the basic IPv6 connectivity
 - Internet to DIAC
 - DIAC to Internet
- Validate IPv6 “presence” from external location
 - Web, services, business offerings etc.

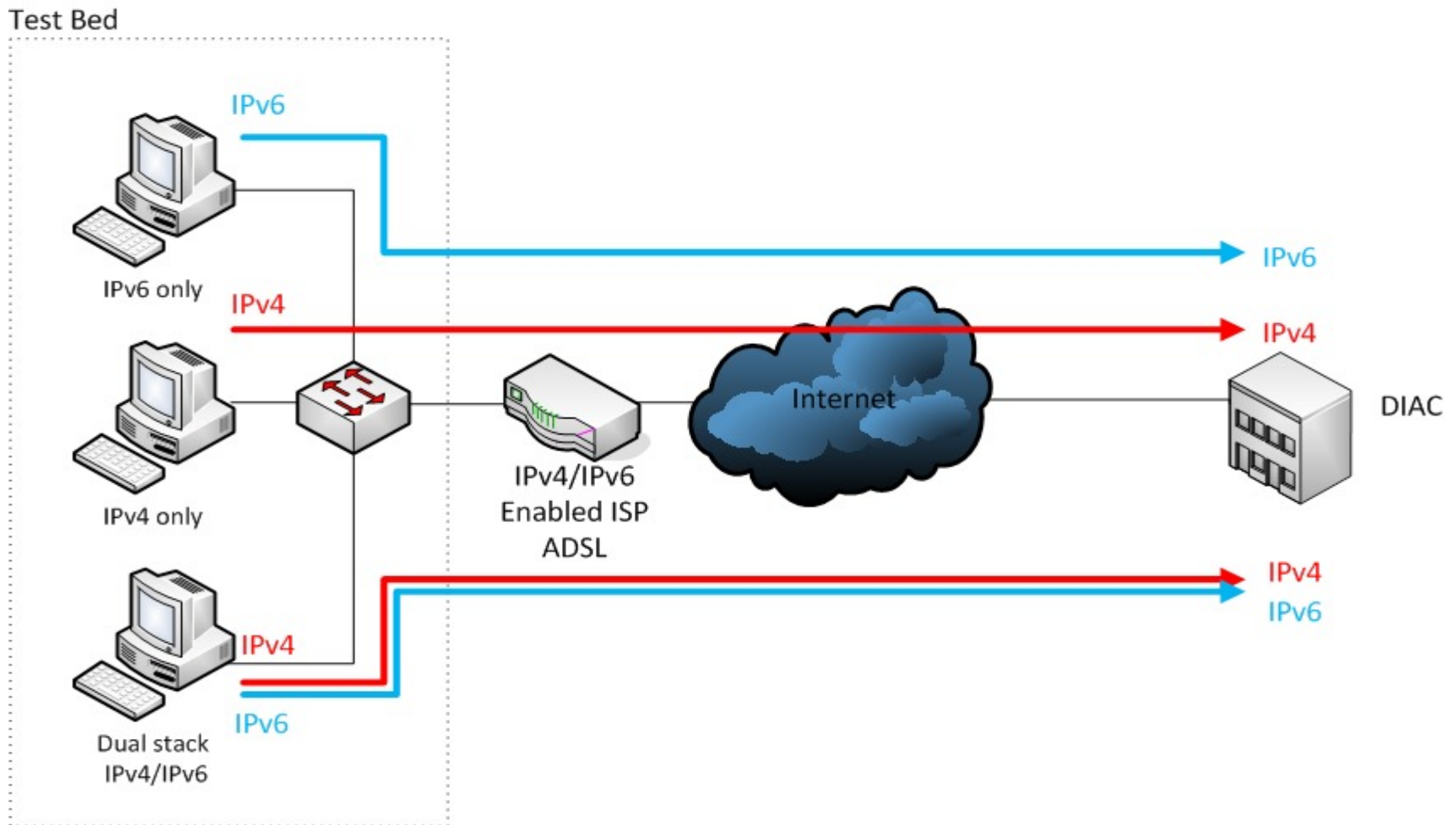
Validate the basic IPv6 connectivity

- Dual-stack sites to test the basics:
 - <http://test-ipv6.com/>
 - <http://ipv6-test.com/>
 - <http://www.traceroute6.net/>
 - <http://www.ipv6proxy.net/>
- **sixxs.org** http proxies
 - IPv4 -> IPv6, append **.ipv4.sixxs.org** to name
 - IPv6 -> IPv4, append **.ipv6.sixxs.org** to name

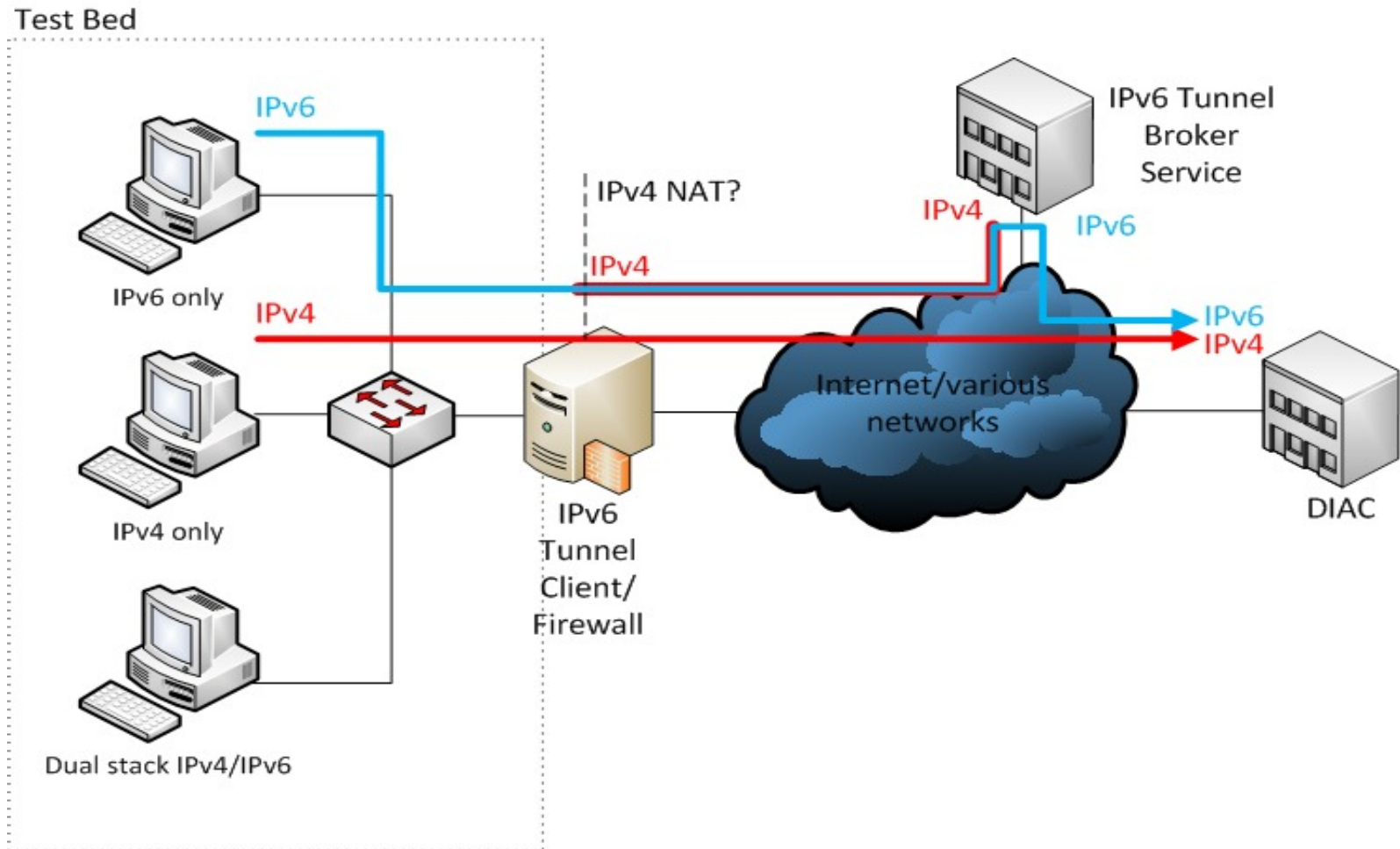
Validate IPv6 “presence” from external location

- DIAC has a separate IPv4 network for ESP (External Service Providers) and staff testing
- Test bed options:
 - Only have IPv4? Use an IPv6 tunnel broker
 - Adsl with IPv4/IPv6 connectivity
- Suggest 3 workstations in test bed
 - IPv6 only, IPv4 only, and dual-stack (OS is your choice)
 - Don't want your application/site testers constantly changing your network stack configuration

Validating - IPv4/IPv6 ADSL



Validating - Only IPv4? Use an IPv6 Tunnel



Validating IPv6 “presence” from external location

- Testing from the 3 different enabled platforms will identify:
 - What’s broken under IPv6 (obviously!)
 - What’s broken under IPv4 (if anything)
- Can you get the same statistical data for IPv6 that you collected, collated, gathered, reported on for IPv4?

IPv6 Status

DIAC:

- Has IPv6 capability in its Primary and Secondary gateways
- Has enabled IPv6 to selected web sites
- Is reviewing its other web sites
- Has the capability for IPv6 email/web browsing (when FedlinkV2 is announced)

Final Comments

- Properly planning your IPv6 addressing requirements makes the job easier
- Equipment > 3 years old, expect IPv6 “issues”
- Some appliances with added IPv6 capability have become version 1.0 products (expect version 1.0 issues!)
- Vendor interoperability – Global and link local addressing
- Implementing IPv6 capability was not difficult or hard

Thankyou!

