

IPv6 Addressing Exercise

ISP Workshops



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Acknowledgements

- ❑ This material originated from the Cisco ISP/IXP Workshop Programme developed by Philip Smith & Barry Greene
- ❑ Use of these materials is encouraged as long as the source is fully acknowledged and this notice remains in place
- ❑ Bug fixes and improvements are welcomed
 - Please email *workshop (at) bgp4all.com*

Philip Smith

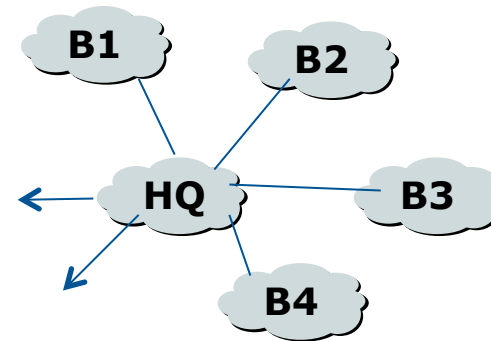
Three Scenarios

- End user organisation (commercial or academic)
- Small Access provider
- Backbone Network Services provider

- Work in groups of two:
 - Hint: Keep It Simple!

Scenario One – Campus Network

- ❑ Organisation has 10 buildings and one headquarter building
 - Network from each building goes to HQ
 - HQ has Internet access and one /48 from their ISP
 - Each building has the following LANs:
 - ❑ Staff fixed
 - ❑ Staff wifi
 - ❑ Guest fixed
 - ❑ Guest wifi
 - ❑ IT Services
 - ❑ Administration/Finance
 - ❑ Network Core
 - Develop an IPv6 Address plan for this Organisation



Scenario One – Campus Network

□ Hints:

- What subnet mask does a LAN get in IPv6?
- Do point-to-point links need to be addressed?
 - And if so, how?
- Organisation has 11 separate offices right now
 - Will the organisation expand?
 - What allowances to make in the plan?
- Remember the assistance of nibble boundaries
- What about addressing to give simple filters to ease infrastructure security?



Scenario One – do the exercise

Scenario Two – Retail ISP

- ❑ ISP provides Internet access to Broadband, Wireless and Small Hosting/content organisations
 - Their PoP is in just one location with the following considerations
 - ❑ ADSL Broadband Users
 - ❑ Wifi Broadband Users
 - ❑ Hosting Services
 - ❑ They also need to allow for ISP Service, Core Network, and office administration infrastructure
 - ❑ They get Internet access from two upstream ISPs
 - Develop an IPv6 Address plan for this Organisation
 - ❑ Do they use a /32 or a /48?
 - ❑ Why?

Scenario Two – Retail ISP

□ Hints:

- Learn from the previous scenario!
- How will the multihoming work?
 - Should the provider go to RIR for address space (/32) or to each upstream provider (/48 from each)?
- How much address space should a residential ADSL or Wifi user get?
 - /56? /60? /64? And why?
 - And how will this address space be delivered?
- What should a hosting customer get?
 - Depends what is being hosted – one server, or just a virtual machine on a shared physical platform?



Scenario Two – do the exercise

Scenario Three – Backbone NSP

- Network Services Providers sells transit to ISPs, Content Providers, and large enterprises
 - They have 10 PoPs in their service region
 - They peer at two Internet Exchange Points
 - They get transit from two Global Tier 1 providers
 - Each PoP has at least two connections elsewhere in the network
 - Their ISP customers and Content Providers may or may not be multihomed
 - Develop an IPv6 Address plan for this Organisation
 - What address space do they need? A /32 or a /48?
 - Why?

Scenario Three – Backbone NSP

□ Hints:

- Learn from the previous two scenarios
- ISPs tend to split address space into two parts
 - Trusted – for core network infrastructure
 - Untrusted – for distribution to customers
- How should the ISP deal with the untrusted part?
 - They are multihoming and peering at IXPs



Scenario Three – do the exercise
