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*

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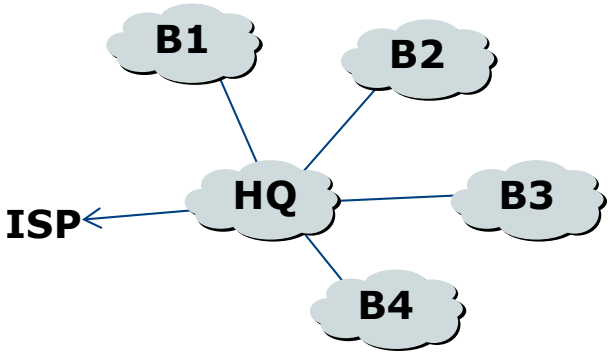
Three Scenarios

- 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
  - Gets /48 from their ISP
  - Network from each building goes to HQ
  - HQ has sole Internet connection
  - Each building has the following LANs:
    - Staff fixed
    - Staff Wi-Fi
    - Guest fixed
    - Guest Wi-Fi
    - Device Management
    - 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
    - Wi-Fi 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 need 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

- The Network Services Provider 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