

# IPv6 Addressing Exercise

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ITU/APNIC/MOIC IPv6  
Workshop  
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Thimphu



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# Acknowledgements

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- ❑ 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

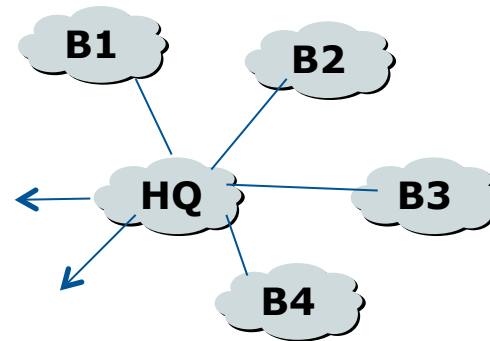
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- End user organisation (commercial or academic)
- Small Access provider
- Backbone Network Services provider
  
- Work in groups of two:
  - Hint: Keep It Simple!

# Scenario One – Campus Network

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- ❑ 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

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## □ 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

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# Scenario Two – Retail ISP

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- ❑ 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

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## □ 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

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# Scenario Three – Backbone NSP

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- 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

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## □ 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

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