

# IPv6 Addressing Exercise

---

ITU/APNIC IPv6 Workshop  
22<sup>nd</sup> – 24<sup>th</sup> October 2018  
Ulaanbaatar



These materials are licensed under the Creative Commons Attribution-NonCommercial 4.0 International license  
(<http://creativecommons.org/licenses/by-nc/4.0/>)

Last updated 5<sup>th</sup> December 2017

# 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

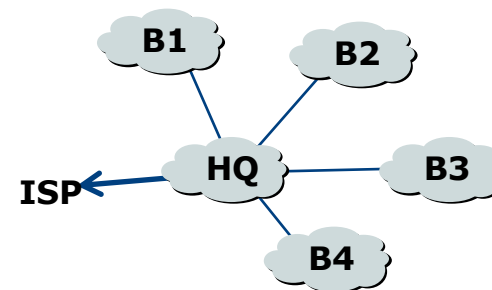
---

- 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
  - 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

---