

UK IPv6 Council– Better IPv6 Operational Outcomes through Network Design

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Design Operate





Real Design/Ops Problems

Supportable Address Plan – Goldilocks syndrome

IP Address Assignments – we have a binary view

Helpdesk and troubleshooting – our hardest problems we leave to others

IPv6 is a network team problem – pass the flaming bag of 000



Example Datacenter IPv4 Address Assignment

- Core Network
 - manual statically assigned interfaces, loopbacks, vrfs
- Boot services
 - DHCP for ZTP (zero touch provisioning)
- Bare metal servers
 - manually static assignments
- Virtual machine servers
 - DHCP via hypervisor management
- Application containers
 - DHCP or manually assignment via container management



Example Campus IPv4 Address Assignment

- Distribution and Access Network
 - manual statically assigned interfaces, loopbacks, vrfs
- TFP Boot services
 - DHCP for VoIP/Video endpoints
- Printers and Multifunction devices
 - manually static assignments
- Corporate (trusted) wired and wireless
 - Centralized DHCP
- Guest (untrusted) wired and wireless
 - Localized DHCP

Assigning Addresses

Network Function	IPv4		IPv6				
Method	Static	DHCP	Static	DHCPv6 Stateful	DHCPv6 Stateless	SLAAC	
DC Servers	Yes (1)	No	Yes (1)	Maybe (1)	No	No	
DC VMs	Maybe (1)	Yes (1)	Maybe (1)	Yes (1)	Maybe (1)	Maybe (1 + RFC6106)	
Corp Trust	No	Yes (1)	No	Yes (1)	No	No	
Guest Wi-Fi	No	Yes (1)	No	Yes (1)	Yes (1)	Yes (1 + RFC6106)	



OS Support

OS	IPv4		IPv6					
Method	Static	DHCP	Static	DHCPv6 Stateful	DHCPv6 Stateless	SLAAC RFC6106		
Linux Server	Yes	Yes	Yes	Yes	Yes	-		
Windows Server	Yes	Yes	Yes	Yes	Yes	-		
Windows Client	-	Yes	-	Yes	Yes	Maybe		
Chromebook	-	Yes	-	Yes	Yes	Yes		
Apple Mac OS	-	Yes	-	Yes	Yes	Yes		
Apple iOS	No	Yes	No	Yes	Yes	Yes		
Android	No	Yes	No	Maybe	Maybe	Yes		
General IoT	No	Yes	No	Maybe	Maybe	Yes		



Customer Use Case

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Simple IPv4 Address Plans (RFC1918)Simple IPv6 Address Assignment (GUA)Assume use of 10.0.0.0/16 (256 /24 networks)Assume use of 2001:db8::/40 (256 /48 networks)• Core Datacenter Network
• /20 per datacenter• Core Datacenter Network
• /48 per datacenter• Top of Rack
• /25 per rack (96 nodes per rack)• Top of Rack
• /64 per rack

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- Campus
 - /20 per campus
- Building
 - /23 per building

- Campus
 - /44 per campus
- Building
 - /48 per building



S/M/L

Network	IPv4			Network	IPv6		
Allocation Size	Small	Medium	Large	Allocation Size	Small	Medium	Large
10.0.0/8	No	Yes	Maybe	2001:db8::/32	No	Yes	Yes
172.16.0.0/12	No	Maybe	No	2001:db8::/36	No	Yes	Maybe
192.168.0.0/16	Yes	No	No	2001:db8::/40	No	Maybe	No
192.0.2.0/24	Yes	No	No	2001:db8::/44	Maybe	No	No



Helpdesk and Networking

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THANK YOU



We Answer the Call