BGP 4 ALL

PFS Internet Development

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The workshop materials are based on the content of the extremely successful Cisco ISP/IXP Workshop programme which ran from 1997 until 2011, built by a cast of dozens of contributors from technical experts inside Cisco to highly experienced network engineers and operators across the Internet community. While the programme is sadly no longer active within Cisco, many industry friends and volunteers still use and develop the materials for use in workshops taking place in the Network Operations Group fora and other gatherings around the world.

If you like the materials, and want to make derivative works, Philip is happy for you to do that. Please acknowledge Philip, Cisco, and the Network Startup Resource Center, without whom this collection of training materials would simply not be available. Rebranding these materials with your logos and claiming they are yours is simply not okay.

Most of the presentations below have been recorded during 2017 and 2019. If you'd like to see the presentations given live, then please look at NSRC's Video Collection for this content (and on many other topics as well).

If you have any suggestions for improvements, or any contributions you'd like to make to the materials, these would be most welcome, with full acknowledgements, of course.

Presentations

Category	Presentation	Notes
Routing	Routing Introduction	How routing works
	OSPF Introduction	25 slide primer on OSPF
	OSPF for ISPs	A lot more detail about OSPF
	IS-IS Introduction	25 slide primer on IS-IS
	IS-IS for ISPs	A lot more detail about IS-IS
	Comparing IS-IS with OSPF	Valuable comparison between the two protocols
	Migration from OSPF to IS-IS	The simple steps to move from one to the other

Category	Presentation	Notes
BGP	BGP Introduction	Introductory slideset
	Scaling BGP	How to scale BGP for today's networks
	32bit AS Numbers	What they are and how to deploy
	BGP Attributes	Describing all the BGP attributes
	BGP Policy	How to use attributes to implement policy
	BGP Best Current Practices	Industry best current practices
	Transitioning to BGP	How to move from static routed network to using BGP
	Multihoming: Introduction	The whys and wherefores of multihoming
	Multihoming: Inbound TE	Inbound Traffic Engineering Examples
	Multihoming: Outbound TE	Outbound Traffic Engineering
	Multihoming: Deployment	Deploying Multihoming for End-Sites
	BGP Communities	More advanced BGP policy and traffic engineering
	BGP Case Studies	Some multihoming case studies
	BGP Deployment Troubleshooting	BGP Deployment Troubleshooting
	BGP Connectivity Troubleshooting	BGP Connectivity Troubleshooting
Design	Internet Introduction	Introductory slideset
	Internet Evolution	The Internet from the 90s until today
	The Value of Peering	Why peering is fundamentally important for the Internet
	IXP Design	The why and how of design and building an IXP
	LINX History	The history of LINX from 1994 to 1997: my experience
	ISP Network Design	The key components for designing a service provider backbone network
	Transit and Peering Network Design	The key components for planning upstream transit and peering connectivity
	Peering Deployment	How to go about Peering (Private & at IXPs) in detail
	ISP Systems Design	
	Choosing Routers	How to choose a router

Category	Presentation	Notes
IPv6	IPv6 Introduction	Why we need to deploy IPv6
	The IPv6 Protocol	All about the protocol and IPv6 standards
	IPv6 Address Planning	How to do IPv6 addressing in a network
	IPv6 Address Planning Exercise	Putting presentation into practice
	IPv6 Routing	Introduction to IPv6 specific features in the common routing protocols
	Introduction to OSPFv3	OSPF for IPv6
	ISIS for IPv6	IPv6 support in IS-IS
	BGP for IPv6	IPv6 support in BGP
	IPv6 Transition Planning	A review of relevant transition mechanisms for today's Internet
	Securing IPv6 Transition Mechanisms	And how to secure these mechanisms
	IPv6 Deployment Study	The simple steps to deploying IPv6 on a network operator's backbone - technical version
	IPv6 Deployment Planning	The simple steps to deploying IPv6 on a network operator's backbone - high level version
	IPv6 Security	And introduction to security for IPv6
	IPv6 Device Hardening	Device hardening, with a focus on IPv6
	IPv6 Routing Security	Implementing routing security, specifically related to IPv6
Security	Remotely Triggered Blackhole Filtering	Describing how RTBH filtering works
	BGP Origin Validation	RPKI and securing BGP announcements
	Unicast Reverse Path Forwarding	Implementing uRPF for BCP38

Labs

Category	Lab Modules	Notes
IPv4	Workshop Setup	
	Introducing IS-IS or Introducing OSPF	
	Introducing iBGP	
	OSPF Areas	
	BGP Route Reflector	
	Cisco IOS Essentials	
	Policy Routing	
	IS-IS, iBGP & eBGP or OSPF, iBGP & eBGP	
	IS-IS, iBGP & eBGP from scratch	For IXP Workshop
	BGP Route Filtering	
	BGP Policy	
	BGP Best Practices	
	Simple IXP	
	Advanced IS-IS & iBGP or Advanced OSPF & iBGP	
	Multi-AS (IS-IS) & Advanced IXP or Multi-AS (OSPF) & Advanced IXP	
	Address Plan for single AS lab	
	Address Plan for 4 AS lab	

Category	Lab Modules	Notes
IPv6	Workshop Setup	
	Introducing IS-IS or Introducing OSPFv3	
	Introducing iBGP	
	OSPF Areas	
	BGP Route Reflectors	
	Migrating from OSPF to IS-IS	
	Migrating Dual Stack OSPF to IS-IS	
	IS-IS, iBGP & eBGP or OSPFv3, iBGP & eBGP	
	IS-IS, iBGP & eBGP from scratch	for IXP Workshop
	BGP Route Filtering	
	BGP Policy	
	IPv6 Access	
	Simple IXP	
	Advanced IS-IS & iBGP or Advanced OSPFv3 & iBGP	
	Multi-AS (IS-IS) & Advanced IXP or Multi-AS (OSPF) & Advanced IXP	
	Address Plan for single AS Labs	
	Address Plan for 4 AS Labs	

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