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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 While the programme is sadly no longer active within Cisco, many industry friends and volunteers still use and develop the materials for use in workshops taking place in the Network Operations Group fora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 |
|---|---|---|
| | 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 | |
| IPv6 | 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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