Definitive IP routing for engineers Training

Duration: **5 Day**

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An intensive hands on IP routing course leading to LINX Accredited Internet Technician stage 2 focusing on routing in an IP environment. The course concentrates on OSPF and IS-IS but also covers STP and VLANS. Hands on sessions are used to reinforce the theory rather than teach specific manufacturer equipment. route interior routing protocols networking.

Prerequisites

There are no formal prerequisite courses, just a good knowledge of how IP works.

A good suggested course would be TCP/IP foundation for engineers

What You Will Learn

By the end of the course delegates will be able to:

- Calculate subnet numbers in seconds.
- Configure and troubleshoot static routes.
- Explain how OSPF works.
- Build resilient networks with VRRP and OSPF.
- Implement and troubleshoot OSPF, IS-IS and VLANS.
- Evaluate and choose appropriate routing protocols for particular scenarios.

Training Outline

Basic routing
Review of LAIT I routing, reading routing tables.
Hands on: Setting up a routed network.

Static routes
Why use static routes? Default routes.
Hands on: Configuring static routes.

First hop redundancy
Default gateways, VRRP/HSRP/GLBP. Load sharing, critical IP addresses.
Hands on: VRRP.

Basic OSPF
What is OSPF? Process IDs, passive interfaces.
Hands on: Simple OSPF.

Subnetting
Bit boundary subnetting, calculating network numbers.
Exercise: Subnetting.

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OSPF overview
Metrics, convergence, DV vs. Link state, IGPs, classless, OSPF features, load sharing, OSPF authentication.
Hands on: OSPF features.

OSPF within an area
How OSPF works, LSAs, LSDB, router IDs, hellos, configuring hellos, exchange protocol.
Hands on: Investigating OSPF structures.

OSPF areas
Scalability, why areas? Area IDs, area 0, ABRs, ABR resilience, areas & LSDBs & LSAs, virtual links.
Hands on: Multi area OSPF.

Redistribution
Multiple routing protocols, common scenarios, routing distance, External LSAs, E1 and E2. Type 4 LSAs. OSPF and default routes.
Hands on: Configuring static route redistribution.

Route aggregation
Route summarisation. How to aggregate, CIDR, ASBR summarisation.
Hands on: OSPF address summarisation.

OSPF packet formats
OSPF packets, protocol stack, packet flows, OSPF headers, neighbours, neighbour states, DRs, adjacencies, BDRs, DR election.
Hands on: Analysing OSPF packets, troubleshooting. OSPF

OSPF stub areas
LSA types, area types, area architecture, stub areas, default routes, benefits & disadvantages of stub areas, TSSAs, NSSAs, Type 7 LSAs.
Hands on: Stub and TSSA configuration.

IS-IS
End systems, Intermediate systems, how IS-IS works, IS-IS router ID, Level 1, Level 2, IS-IS hierarchy.
Hands on: Configuring IS-IS, troubleshooting IS-IS.

The Internet
Autonomous systems, Peering, transit, looking glasses.
Hands on: Internet routing tables.

Basic BGP
IGPs, EGPs, What's BGP? BGP RIB, in/out process, tables peers, adding routes.
Hands on: Simple configuration and troubleshooting.

Routing IPv6
Multi protocol routing, IPv6 addressing, IPv6 routing tables, IPv6 static routes, OSPFv3, IS-IS and IPv6.
Hands on: Routing IPv6.

STP and L2 routing

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STP, RSTP, L2 IS-IS, Multi system link aggregation.
Hands on: RSTP.

MPLSCore MPLS, MPLS and the 7 layer model, MPLS protocol, MPLS standard, MPLS runs on routers, MPLS history, Why MPLS?, LSRs, PE and P router roles, FEC, swapping labels, MPLS packet format.
Hands on: Enabling MPLS. Testing and troubleshooting of MPLS.

Appendix
EIGRP: How EIGRP works, DUAL.