# Definitive IP routing for engineers Training

Duration: **5 Day**

BILGINC
IT Academy
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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.

**MPLS**Core 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.