

State-of-the-Art IP Routing Routing Protocols-Compact

The collective term routing entails protocols with the most diverse approaches to find optimum data routes through a complex network. The protocols and algorithms, however, will only direct the data traffic optimally if the design has been planned and developed carefully. The required knowledge is to be imparted in the course at hand.

Course Contents

- Concepts, Application Fields, and Limits of Routing Protocols
- RIPv1 and RIPv2
- Enhanced IGRP (EIGRP)
- OSPF and Areas
- Designated Router and Area Border Router
- Hello and LSAs
- Graphs and Dijkstra Algorithm
- IS-IS
- Level-1 and Level-2 Router
- BGP-4, External and Internal
- Attributes, Communities, and Policies
- IP Routing and MPLS

The technical context and background are explained, deepened, and verified in a test network.

In this course from the ExperTeach Networking series, each participant will receive the comprehensive ExperTeach course documentation.

Target Group

The course imparts the know-how required by networkers who want to become familiar with the topic of routing and for employees who need an overview of the routing environment to service customers and products.

Knowledge Prerequisites

The students should be familiar with the basic networking technologies and terms to attain a maximum learning effect. Sound TCP/IP know-how is required.

Course Objectives

The course provides a comprehensive and practice-related overview of the status quo of routing concepts and protocols. This knowledge will enable the students to competently assess the various solution approaches to structure and optimize networks.



Reservation and Registration

We will be glad to make a free and non-binding course reservation for you for the duration of two weeks. On www.experteach-training.com under *Registration*, you can conveniently make course reservations, registrations, and hotel reservations. Alternatively, call us under +49 6074 4868-0.

For closed groups of participants, we can modify the course contents according to your requirements. Do not hesitate to contact us!



5 days €2,495 exclusive of V.A.T.

Course date (mm/dd/yy)/Location

02/27-03/02/12	Frankfurt	12/03-12/07/12	Frankfurt
06/11-06/15/12	Frankfurt	02/25-03/01/13	Frankfurt
09/03-09/07/12	Frankfurt		

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<p>1 Routing Concepts</p> <p>1.1 Data Transport</p> <p>1.1.1 Routing Decision</p> <p>1.1.2 A Routing Table</p> <p>1.1.3 Properties of IP Routing</p> <p>1.2 Routing Protocols</p> <p>1.2.1 Classification of Routing Protocols</p> <p>1.2.2 Static or Dynamic Routing</p> <p>1.2.3 CIDR—Classless Inter-Domain Routing</p> <p>1.2.4 Redistribution: Importing Routes</p> <p>2 RIP—The Classic</p> <p>2.1 RIP: The Basics</p> <p>2.1.1 Hop Count as Metric</p> <p>2.1.2 Convergence Problems</p> <p>2.2 RIP-1 and RIP-2</p> <p>2.2.1 The Role of the Next Hop Field</p> <p>2.2.2 Authentication</p> <p>2.3 Packet Formats</p> <p>2.3.1 RIP Version 2</p> <p>2.3.2 Encapsulation of the RIP Updates</p> <p>3 Enhanced Interior Gateway Routing Protocol</p> <p>3.1 Cisco’s Enhanced IGRP</p> <p>3.1.1 The Theory</p> <p>3.1.2 EIGRP—The Functional Components</p> <p>3.1.3 Topology Setup</p> <p>3.2 The Central Function: Diffusing Computation</p> <p>3.2.1 An Example: The Initial Situation</p> <p>3.2.2 EIGRP Stub</p> <p>4 OSPF—The Recommended IGP</p> <p>4.1 The Link State Algorithm</p> <p>4.1.1 Topology Database</p> <p>4.1.2 Scalability and Hierarchy</p> <p>4.1.3 Hello Procedure</p> <p>4.2 OSPF: Theoretical Basics</p> <p>4.2.1 Representation of the Topology</p> <p>4.2.2 Adjacencies on Point-to-Point Connections</p> <p>4.2.3 Adjacencies in the LAN</p> <p>4.2.4 The Hello Procedure in Detail</p> <p>4.2.5 Database Synchronization in Detail</p> <p>4.2.6 Special Care: NBMA</p> <p>4.2.7 Database Update</p> <p>4.2.8 Case Study: 1-Area Scenario</p> <p>4.3 The Area Philosophy</p> <p>4.3.1 Router Types</p> <p>4.3.2 Intra- and Inter-Area Routing</p> <p>4.3.3 The Example: One Step Beyond</p> <p>4.3.4 Virtual Links</p> <p>4.4 Import of External Information</p>	<p>4.4.1 Type-1 External Routes</p> <p>4.4.2 Type-2 External Routes</p> <p>4.4.3 AS External Links</p> <p>4.4.4 Summary Links ASBR</p> <p>4.5 Optimizations</p> <p>4.5.1 Stub Areas</p> <p>4.5.2 Not-so-Stubby Area (NSSA)</p> <p>4.5.3 On-Demand Circuits</p> <p>5 IS-IS</p> <p>5.1 IS-IS—The World of OSI</p> <p>5.1.1 The OSI Model</p> <p>5.1.2 OSI Addresses</p> <p>5.2 Basics of IS-IS</p> <p>5.2.1 Creation of the Topology Information</p> <p>5.2.2 Topology Setup</p> <p>5.2.3 OSI Routing with IS-IS</p> <p>5.2.4 IS Routing with IS-IS</p> <p>5.2.5 Import of External Information</p> <p>5.2.6 L2 Design</p> <p>5.3 IS-IS: Formalia and Details</p> <p>5.3.1 The IS-IS Packet Formats</p> <p>5.3.2 The Hello Process</p> <p>5.3.3 Database Synchronization</p> <p>6 BGP-4—The World of the Internet</p> <p>6.1 BGP-4: The Basics</p> <p>6.1.1 Autonomous Systems</p> <p>6.1.2 Specifications</p> <p>6.1.3 Internal and External BGP</p> <p>6.1.4 BGP Adjacencies at the Example of Cisco</p> <p>6.1.5 What Is a BGP Route?</p> <p>6.1.6 The BGP Routing Process</p> <p>6.1.7 (IGP/IBGP) Synchronization</p> <p>6.1.8 EBGP/IBGP Internetworking</p> <p>6.2 The BGP-4 Attributes and their Meaning</p> <p>6.2.1 The ORIGIN Attribute</p> <p>6.2.2 The AS_PATH Attribute</p> <p>6.2.3 The NEXT_HOP Attribute</p> <p>6.2.4 The MULTI_EXIT_DISC Attribute</p> <p>6.2.5 The LOCAL_PREF Attribute</p> <p>6.2.6 The COMMUNITY Attribute</p> <p>6.2.7 Route Selection</p> <p>6.3 Optimization of BGP in Large Networks</p> <p>6.3.1 Route Aggregation</p> <p>6.3.2 BGP Peer Groups</p> <p>6.3.3 The Full Mesh Concept</p> <p>6.3.4 The Route Reflector Concept</p> <p>6.3.5 The Confederation Concept</p> <p>6.3.6 A Just Punishment: Route Flap Damping</p> <p>6.4 Connection Scenarios</p> <p>6.4.1 Example #1: ISP with Confederation</p>	<p>6.4.2 Load Sharing</p> <p>6.4.3 The Question of Address Space</p> <p>6.5 Topology of the Internet</p> <p>6.5.1 NAPs and Internet Exchanges</p> <p>6.5.2 Route Server</p> <p>6.5.3 Providing and Peering</p> <p>7 MPLS</p> <p>7.1 From Routing to Switching</p> <p>7.1.1 Routing Table and Best Match</p> <p>7.1.2 Switching Table</p> <p>7.2 Multiprotocol Label Switching</p> <p>7.2.1 Elements of the MPLS Network</p> <p>7.2.2 Shim Header</p> <p>7.2.3 The Switching Table</p> <p>7.3 Label Distribution</p> <p>7.4 MPLS and BGP Routing</p> <p>7.5 MPLS vs. IP over ATM</p> <p>7.6 Virtual Private Networks</p> <p>7.7 IntServ with MPLS</p> <p>7.8 DiffServ with MPLS</p> <p>7.9 Prospects for MPLS</p> <p>A Hands-On Exercises at the Test Network</p> <p>A.1 The Test Network</p> <p>A.2 RIP</p> <p>A.3 OSPF</p> <p>A.4 IS-IS</p> <p>A.5 BGP -4</p> <p>A.6 MPLS</p>
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