

Ethernet, Routing & Switching

Technology Fundamentals

The connection of terminals to local area networks (LANs) and their internetworking constitute the basis of modern data communications. Long-established and sophisticated LAN concepts, such as Ethernet, and the protocols of the TCP/IP family are continuously being improved in order to implement state-of-the-art applications, like Voice over IP. Intelligent internetworking components, like multi-layer switches, moreover offer a wide range of configuration options for the network and new features, such as quality of service. Persons who wish to master this environment require a profound know-how. After the course, the participants will be able to perform standard tasks in the fields of generic cabling systems, professional commissioning of Ethernet components, and implementation of VLANs and IP networks independently and to find solutions on their own.

Course Contents

- Generic Cabling Systems
- Ethernet Access Procedures (Half- and Full-Duplex)
- High-Speed Variants up to 10 Gigabit Ethernet
- Bridging and Switching
- Typical Setup of Switched LANs, Switch Blocks
- Spanning Tree and Its Variants
- VLANs and Trunking According to IEEE 802.1Q
- Port Security and IEEE 802.1X
- IP-Addressing, Subnetworks, Auxiliary Protocols
- Routing and the Routing Protocols RIP, OSPF, IS-IS, and BGP-4
- Routing via Wide Area Networks
- Network Management and SNMP
- Network Configuration with Microsoft Windows and Linux
- Hands-On Exercises in the Test Network

In this course of the ExperTeach Networking series, each student will receive the comprehensive ExperTeach course documentation.

Target Group

The course addresses employees with a focus on technology who have to acquire a profound theoretical and practice-related knowledge of Ethernet technology and internetworking with TCP/IP. Moreover, they will learn how to configure modern LAN and WAN structures.

Knowledge Prerequisites

Participants only require a basic networking and IT know-how, as it can be acquired in the Networking Technologies course.



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

02/13-02/17/12	Frankfurt	09/10-09/14/12	Düsseldorf
03/12-03/16/12	Düsseldorf	10/15-10/19/12	Berlin
03/26-03/30/12	Berlin	10/15-10/19/12	Hamburg
03/26-03/30/12	Hamburg	10/22-10/26/12	München
04/16-04/20/12	München	10/22-10/26/12	Stuttgart
04/16-04/20/12	Stuttgart	11/12-11/16/12	Zürich
04/16-04/20/12	Wien	11/12-11/16/12	Frankfurt
05/21-05/25/12	Zürich	12/03-12/07/12	Düsseldorf
05/21-05/25/12	Frankfurt	01/07-01/11/13	Hamburg
06/11-06/15/12	Düsseldorf	01/07-01/11/13	Berlin
07/02-07/06/12	Berlin	01/21-01/25/13	München
07/02-07/06/12	Hamburg	01/21-01/25/13	Wien
07/30-08/03/12	Wien	02/11-02/15/13	Frankfurt
07/30-08/03/12	München	03/04-03/08/13	Düsseldorf
08/20-08/24/12	Frankfurt		

Up-to-date information: www.experteach-training.com LRSW



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<p>1 Motivation and Assessment of the Situation</p> <p>1.1 State-of-the-Art in Telecommunications</p> <p>1.2 Standardization Committees—Who Standardizes What?</p> <p>1.3 The Right Format: The World of Protocols</p> <p>1.3.1 Open Communication: The OSI Model</p> <p>1.3.2 TCP/IP—The Number 1</p> <p>1.3.3 Under Scrutiny: The Tasks of Layers 1, 2, and 3</p> <p>1.4 Multimedia—New Demands on Local Area Networks</p> <p>1.5 Internetworking Devices—An Overview</p> <p>2 Generic Cabling Systems</p> <p>2.1 Cables and Plugs: The Basis of a LAN</p> <p>2.1.1 Symmetrical Data Cables: Twisted Pair</p> <p>2.1.2 Optical Fiber</p> <p>2.2 Classes, Categories, and Standards</p> <p>2.2.1 Measuring Parameters for TP Cables</p> <p>2.2.2 Attenuation and Dispersion with Optical Fiber</p> <p>2.2.3 Classes and Categories</p> <p>2.3 Generic Cabling Systems</p> <p>2.3.1 With or without Screen?</p> <p>2.3.2 Fiber-to-the-Desktop: A Sensible Solution?</p> <p>2.3.3 Insufficient Documentation and the Consequences</p> <p>3 Ethernet—Variants and Alternatives</p> <p>3.1 The Principle</p> <p>3.1.1 CSMA/CD in an Overview</p> <p>3.1.2 CSMA/CD in Detail</p> <p>3.1.3 Ethernet Variants</p> <p>3.1.4 Ethernet Switching</p> <p>3.1.5 Full Duplex Ethernet</p> <p>3.2 Fast Ethernet</p> <p>3.2.1 Technical Implementation</p> <p>3.2.2 The Auto-Negotiation Procedure</p> <p>3.2.3 Fast Ethernet Variants</p> <p>3.3 Gigabit Ethernet—Standard Technology in the Backbone</p> <p>3.4 10 Gbps Ethernet—The Next Generation</p> <p>3.5 ARP</p> <p>3.6 Wireless LAN</p> <p>4 Bridging—Functions, Standards, Components</p> <p>4.1 Transparent Bridging</p> <p>4.2 The Spanning Tree Algorithm</p> <p>4.2.1 Spanning Tree Protocol</p> <p>4.2.2 Rapid Spanning Tree</p> <p>4.3 Switching</p> <p>4.3.1 The Switch Block</p>	<p>4.3.2 Switching Systems</p> <p>4.3.3 Switching Concepts</p> <p>4.3.4 Security and Quality of Service in Dedicated LANs</p> <p>4.3.5 Switching in an Ethernet Environment</p> <p>4.3.6 Areas of Application and Limits</p> <p>4.4 Virtual LANs</p> <p>4.4.1 VLAN Trunk Protocols</p> <p>4.4.2 VLANs According to IEEE 802.1Q</p> <p>4.4.3 Port Security</p> <p>4.4.4 Layer-2 Security with IEEE 802.1X</p> <p>5 The Protocol Stacks</p> <p>5.1 Layers 2 to 4—The Principle</p> <p>5.2 TCP/IP—The Number 1</p> <p>5.3 IP in Detail</p> <p>5.3.1 Subnetmask</p> <p>5.3.2 History: Classful Networks</p> <p>5.3.3 Auxiliary Protocols</p> <p>5.3.4 Unambiguity of the IP Addresses</p> <p>5.3.5 Private Addresses with NAT and PAT</p> <p>5.3.6 DHCP for Automated IP Configuration</p> <p>5.3.7 DNS—Working with Names</p> <p>5.3.8 The Future: IPv6</p> <p>6 Routing—Functions, Standards, Components</p> <p>6.1 Routing—Coupling on Layer 3</p> <p>6.1.1 Routable Protocols</p> <p>6.1.2 The Routing Table</p> <p>6.1.3 The Routing Decision</p> <p>6.1.4 Inter-VLAN Routing</p> <p>6.1.5 Static versus Dynamic Routing</p> <p>6.2 Routing Protocols</p> <p>6.2.1 RIP</p> <p>6.2.2 Link State Algorithms</p> <p>6.2.3 OSPF</p> <p>6.2.4 IS-IS</p> <p>6.2.5 BGP-4</p> <p>6.3 The Structure of the Internet</p> <p>6.3.1 Peerings and Providings</p> <p>6.3.2 Exchanges</p> <p>6.4 Connection to the WAN</p> <p>6.4.1 Frame Relay—Optimized for LAN Connections</p> <p>6.4.2 Asynchronous Transfer Mode—ATM</p> <p>6.4.3 PPP—Point-to-Point Protocol</p> <p>6.4.4 ISDN—Internetworking on Demand</p> <p>6.4.5 New Concepts—Layer-3 Switching & Co</p> <p>6.4.6 Components of an MPLS Network</p> <p>6.5 Virtual Private Network—VPNs</p> <p>6.5.1 VPNs via Frame Relay, ATM, or X.25</p> <p>6.5.2 IP-VPN or Layer-3 VPNs</p>	<p>6.5.3 VPN—Security</p> <p>6.5.4 MPLS VPNs</p> <p>7 Network Management</p> <p>7.1 Motivation</p> <p>7.2 Network Management Concept</p> <p>7.3 Simple Network Management Protocol--SNMP</p> <p>7.3.1 The Working Mode of SNMP</p> <p>7.3.2 An Example: Inquiry of a Routing Table</p> <p>7.3.3 SNMPv2—The Motivation</p> <p>7.3.4 NMS—The Graphical User Interface</p> <p>7.4 Remote Monitoring—RMON</p> <p>7.5 Current Developments and Trends</p> <p>8 Operating Systems for Networks</p> <p>8.1 Operating Systems for Networks</p> <p>8.2 The Microsoft Systems</p> <p>8.2.1 Identification</p> <p>8.2.2 Services</p> <p>8.2.3 Protocols: TCP/IP</p> <p>8.2.4 The Network Map</p> <p>8.2.5 Connections</p> <p>8.2.6 Server Services under Windows</p> <p>8.2.7 User Profiles, System Directives</p> <p>8.3 Networks under LINUX</p>
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