

# TCP/IP

## Protocols, Addressing, Routing

In the IT world, the TCP/IP protocol stack plays a predominant role. Even applications such as telephony, which formerly had nothing to do with IP, are increasingly being migrated to IP. No networker can do without knowing this protocol.

### Course Contents

- TCP/IP Protocol Family
- Encapsulation of IP
- Public and Private IP Addresses
- IP Networks and Subnetmask
- Address Resolution (ARP)
- NAT and PAT
- Domain Name Service (DNS)
- Routing and Routing Protocols (RIP, OSPF, IS-IS, and BGP-4)
- ICMP for Troubleshooting
- TCP: Ports, Flow Control, and Acknowledgement
- UDP and its Particularities
- Standardized Applications: HTTP, Telnet, SSH, DHCP, FTP...
- Voice over IP
- MPLS
- Hands-On Exercises at the Test Network

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

### Target Group

This course constitutes the networkers' ABC and therefore addresses everyone dealing with communications networks.

### Knowledge Prerequisites

Basic network know-how is the prerequisite for a successful participation in this course.

### Course Objectives

The know-how imparted in theory and practice enables the participants to actively plan, set up, operate, and administrate IP-based 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](http://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!



**3 days** €1,395 exclusive of V.A.T.

#### Course date (mm/dd/yy)/Location

01/30-02/01/12	Frankfurt	09/17-09/19/12	Hamburg
01/30-02/01/12	Frankfurt	09/17-09/19/12	Berlin
02/22-02/24/12	Düsseldorf	10/08-10/10/12	München
03/12-03/14/12	Hamburg	10/08-10/10/12	Stuttgart
03/12-03/14/12	Berlin	10/08-10/10/12	Wien
04/02-04/04/12	Stuttgart	10/29-10/31/12	Frankfurt
04/02-04/04/12	Wien	10/29-10/31/12	Zürich
04/02-04/04/12	München	11/19-11/21/12	Düsseldorf
05/02-05/04/12	Frankfurt	12/10-12/12/12	Berlin
05/02-05/04/12	Zürich	12/10-12/12/12	Hamburg
05/14-05/16/12	Düsseldorf	01/07-01/09/13	Wien
06/11-06/13/12	Hamburg	01/07-01/09/13	München
06/11-06/13/12	Berlin	01/28-01/30/13	Frankfurt
07/09-07/11/12	Wien	02/18-02/20/13	Düsseldorf
07/09-07/11/12	München	03/11-03/13/13	Berlin
08/06-08/08/12	Frankfurt	03/11-03/13/13	Hamburg
08/27-08/29/12	Düsseldorf		

Up-to-date information: [www.experteach-training.com](http://www.experteach-training.com)

INIP



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- 1 An Overview of the TCP/IP World**
  - 1.1 The Basic Concept
  - 1.2 Typical Scenarios with IP
    - 1.2.1 IP in the LAN
    - 1.2.2 IP in the Internet
    - 1.2.3 IP in the Enterprise Network
  - 1.3 The Protocol Family
  - 1.4 Layer 2
  - 1.5 The Standards
- 2 The Internet Protocol in Detail**
  - 2.1 The Header—Format and Functions
    - 2.1.1 Version and Length Field
    - 2.1.2 Type of Service
    - 2.1.3 Fragmentation
    - 2.1.4 Time to Live
    - 2.1.5 Options of the IP Header
  - 2.2 IP Addresses and IP Networks
    - 2.2.1 IP Networks
    - 2.2.2 Subnet Mask
    - 2.2.3 Broadcast Addresses
    - 2.2.4 Multicast Addresses
    - 2.2.5 Practical Application of Subnetworks
    - 2.2.6 Route Aggregation and CIDR
    - 2.2.7 History: Classful Networks
    - 2.2.8 Unambiguousness of the IP Addresses
    - 2.2.9 Private Addresses with NAT and PAT
  - 2.3 Auxiliary Protocols
    - 2.3.1 ARP—The Address Resolution
    - 2.3.2 ICMP—Troubleshooting and Diagnosis
- 3 Hands-On Exercises in an IP Network**
  - 3.1 The Test Network
  - 3.2 Configuration of the End Devices
  - 3.3 Erroneous IP Address
  - 3.4 The Address Conflict
  - 3.5 Erroneous Netmask
- 4 IP Routing—The Path through the Network**
  - 4.1 Data Transport
  - 4.2 Routing Protocols
    - 4.2.1 Static or Dynamic Routing
    - 4.2.2 RIP
    - 4.2.3 OSPF and IS-IS
    - 4.2.4 BGP-4
  - 4.3 MPLS
- 5 Applications of the TCP/IP World**
  - 5.1 The Transport Protocols
    - 5.1.1 UDP—Connectionless and Unacknowledged
    - 5.1.2 TCP—Connection-Oriented and Acknowledged
  - 5.2 Standard Applications of the TCP/IP World

- 5.2.1 DHCP for Automated IP Configuration
- 5.2.2 DNS—Working with Names
- 5.2.3 Remote Access via Telnet or SSH
- 5.2.4 SNMP for Network Monitoring
- 5.2.5 File Transfer with FTP
- 5.2.6 E-Mail—Electronic Mail
- 5.2.7 HTTP—World Wide Web
- 5.3 Voice over IP (VoIP)

- 6 IPv6—The Next Generation**
  - 6.1 The New Header Format
  - 6.2 The New Addressing Concept
  - 6.3 New Functions of IPv6?
  - 6.4 Interworking with IPv4

- A Useful Commands**
  - A.1 ARP
  - A.2 IPCONFIG
  - A.3 PING
  - A.4 ROUTE
  - A.5 TRACERT
  - A.6 PATHPING
  - A.7 NETSTAT



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