

Course ID

**MOIP**

Course Duration

**2 days**

Course Title

**Mobile IP: An Intensive Tutorial**

**Related Courses**

- Multimedia Applications: IMS, SIP, and VoIP (2 day(s), MULTIMEDIA)
- IMS: The Technology, Applications, and Challenges (2 days, IMS)
- VoIP: Protocols, Design, and Implementation (2-3 days, VOIP)
- MPLS: Integrated Routing with End-to-End QoS for the Next Generation Networks (2-3 days, MPLS)
- Wireless Network Structure, Operation, and Technologies (3 day(s), WIRELESSNET)
- Wireless Technologies: A Comparative Study (2-4 day(s), COMPARISON)
- GSM: Network Architecture, Operation, and Design (5 day(s), GSM-I)
- GPRS: Network Architecture, Operation, and Design (3 day(s), GPRS)
- EDGE: Network Architecture, Operation, and Design (2 day(s), EDGE)
- iDEN™: Network Architecture, Operation, and Design (4 day(s), IDEN)
- cdmaOne/IS95: Network Architecture, Operation, and Design (2 day(s), IS95)
- 1xRTT: Network Architecture, Operation, and Design (2 day(s), 1XRTT)
- UMTS-FDD: Network Architecture, Operation, and Design (3 day(s), UMTS-FDD)
- UMTS-TDD: Network Architecture, Operation, and Design (2 day(s), UMTS-TDD)

**Aimed At**

Network and RF engineers, planners and designers, business strategists and services planners, marketers, supply chain managers, and others responsible for helping usher in the new applications and services that Mobile IP will make possible. The standard presentation of this course assumes technical background, though you need not be an engineer to be able to take this course.

**Group Size**

5-25

**Prerequisites**

At least one year experience in the field of communications engineering, fixed or wireless telephony, data networking, information technology, or other technical field.

**Course In a Nutshell**

As mobile wireless operators seek to enhance their services offerings with the new 3G-oriented, IMS enabled applications, the volume and importance of IP traffic on the mobile networks continues to grow as well. The savings afforded by Voice over the Internet protocol (VoIP) provide another impetus for the coming transition from the traditional circuit-switched, voice centric environments to networks that treat all applications as data.

Given the growing importance of IP in the mobile wireless domain, engineers, business strategists and planners, services designers, marketers and others can use a good strong tutorial on Mobile IP. This course was designed to fulfill that need. It provides comprehensive coverage of the whole range of Mobile IP topics from the basic principles to Mobile IPv4, transition to and differences with respect to Mobile IPv6, ICMPv6, HIPv6, MIPv6 over MPLS, synchronicity and security issues, and the impact of the Internet Multimedia Subsystem (IMS) on the mobile domain.

### **Customize It!**

*We customize our courses to client requirements at minimal to no additional expense. This course is also offered in distinct versions suited to audiences such as:*

- System designers and planners
- Network or RF engineers
- Business strategists, services designers, and marketers
- Supply chain and procurement managers
- Equipment or application developers

### **Course Outline**

- Basics of Mobile Communications
  - Mobility overview
  - Operation of a 2G network
  - Operation of a 2.5G network
  - Operation of a 3G network
  - Routing areas
  - Measuring throughput
  - Contention and contention mitigation
  - Impacts on the mobility environment to quality of experience/quality of service
- Basic Principles of Mobile IP
  - Role of the SGSN/GGSN
  - Role of the PDSN
  - Role of the home agent (HA), the foreign agent (FA), the AAA and security
  - Home link, foreign link
  - Care of address
  - Corresponding agent
  - Routing area updates
  - Mobility call flows
  - IP address bindings
- Mobile Internet Protocol version 6 (Mobile IPv6)
  - Overview of IPv6
  - IPv6 address space
  - IPv6 headers and extension headers

- Security issues
- IPv6 subnetting
- Network discovery process
- Mobility header
- Bidirectional tunneling
- Mobility in IPv6
- MIPv6 Route optimization
- Binding refresh request
- Home Test Init (HoIT)
- Care of Test Init (CoIT)
- Home Test (HoT)
- Care of Test (CoT)
- Binding Update
- Binding acknowledgement
- Internet Control Message Protocol version 6 (ICMPv6)
  - HA discovery request
  - HA discovery reply
  - Mobile prefix solicitation
  - Mobile prefix advertisement
  - Modified router advertisement message
  - Modified prefix information
  - New advertisement interval option
  - New home agent information option
  - Correspondent Registration
    - Direct registration
    - Indirect registration
    - Return routability procedure
- Security Mechanisms and Considerations
  - Mobile IP trust model
  - SA/HA reference
  - SA/FA reference
  - AAA/Radius
  - IPSec
  - IKE model
- Host Identity Protocol version 6 (HIPv6)
  - Problem definition and scope of HIPv6; decoupling the network and transport layers of a mobile network
  - HIP overview and functional elements/changes
  - HIP mobility and DNS impacts
  - HIP multihoming
  - HIP security
  - HIP Implementation proposals in standards
- Mobile IP over MPLS
  - MPLS overview
  - Using MPLS to enhance the MIP experience

- CE routers
- PE routers
- Label switched paths
- VRF concepts
- Route discovery protocols
- The MPLS domain
- Internet Multimedia Subsystem (IMS)
  - Overview of IMS
  - IP gateway
  - AAA/HSS and SLF
  - Security/PKI
  - P-CSCF, I-CSCF, S-CSCF
  - Application layer
  - BGCF
  - MGCF
  - PDF/PEF
- Exercises: IMS/Mobile IP Call Flows
  - Mobile to mobile VoIP call
  - Mobile to landline VoIP to PSTN interworking
  - Video streaming
  - Audio streaming
  - 3G IMS MIP session sending SMS to 2G legacy SMS on same network, and on different networks
  - Roaming case studies
- Wrap Up: Course Recap, Q/A, and Evaluations

## **How You Will Learn**

- You will learn in interactive lecture/workshop format from an experienced engineer and instructor.
- Along with lecture, we use exercises, case studies, and activities to add depth and practice to the course content.
- Whether your background is mobility or IP, we will build on what you already know to make it easier to learn what's new.
- If your background is less technical, we will use examples and analogies to simplify the complex subject matter and drive home the essential points.
- You will receive a participant handbook to which you can add notes in real-time to turn it into a valuable back-to-the-job resource.

*Revised*

*April 4, 2007*