Course ID
GPRS
Course Duration
3 days

Course Title
GPRS: Network Architecture, Operation, and Design

Related Courses

- EDGE: Network Architecture, Operation, and Design (EDGE, 2 days)
- UMTS-FDD: Network Architecture, Operation, and Design (UMTSFDD, 3 days)
- UMTS-TDD: Network Architecture, Operation, and Design (UMTSTDD, 2 days)
- HSDPA: Network Architecture, Operation, and Design (HSDPA, 2 days)
- Traffic Engineering Models for 3G Network Design (TRAFFIC3G, 2 days)

Aimed At

Engineers experienced in GSM who wish to learn more about GPRS. The standard presentation of this course assumes a bachelor of science in Electrical Engineering, Mathematics, Physics, or a related subject along with an appropriate background in communications.

Group Size

5-25

Prerequisites

- GSM: Network Architecture, Operation, and Design (GSM-I, 5 days)
- Working knowledge of wireless network structure and operation, RF propagation and fading issues, and link budget analysis
- Working knowledge of packet switching and associated networking problems and solution approaches
- At least two years experience in the design and optimization of a wireless network using any major technology

Course in a Nutshell

GPRS is the first technology to introduce packet switching to the world of mobile communications in a meaningful, large scale context. As such, it adds two major, equally important, elements, namely, packet switching over the air interface and enhancements to the core to support packet switching on a GSM network.

Implementing packet switching over a highly unreliable and time varying channel, such as is typical in today's wireless communications, is not an easy task. In this course, you will learn how GPRS tackles this problem and achieves a reasonable performance. You will also learn the new interfaces that were necessary in the fixed portion of the network to support an end-to-end packet switched service. We will not be shy about highlighting the shortcomings of GPRS, some of which are quite serious. We will go on to learn which of these shortcomings can be mitigated (along with how that's done) and which are unsolvable within the framework of GPRS.

Customize It!

Customize this course to your specific needs at little-to-no additional cost. We offer distinct versions tailored for:

- Network design and optimization engineers
- Equipment or application designers
- Less technical audiences such as managers, executives, business planners, sales and marketing specialists, and operations and support personnel.

You can also combine this 3-day GPRS course with its sequel, the 2-day EDGE course, for an integrated five-day presentation. Ask us about the 'combo discount'.

Course Outline

- Motivation, Background, and GPRS Services
  - General perceptions of GPRS: True and false!
  - Review of existing GSM network architecture and data services: Or Motivation for GPRS
  - GPRS traffic models
  - GPRS-offered data services

- GPRS Network Architecture
  - GPRS mobile station modes and classes
  - Packet Control Unit (PCU) and Channel Codec Unit (CCU)
  - Serving GPRS Support Node (SGSN)
  - Gateway GPRS Support Node (GGSN)
  - Border Gateway (BG)
  - Protocol stacks between the various GPRS network elements

- GPRS Air Interface Protocol Structures
  - Mobility management and routing areas vis-à-vis location areas
  - Mobile station states: Idle, Ready, Standby and associated transition and triggering mechanisms and parameters
  - GPRS vis-à-vis GSM RF layer
  - GPRS Medium Access Control (MAC) Sublayer
  - GPRS Radio Link Control (RLC) Sublayer
  - GPRS Logical Link Control (LLC) Layer

- GPRS Structures on the TDMA Air Interface
  - New set of logical channels defined by GPRS
  - The GPRS-Introduced 52-frame multiframe
  - Mapping of GPRS logical channels to the physical channel(s)
  - MAC operation and resource allocation schemes in GPRS
  - RLC block structures and associated issues
  - Retransmission strategies used in GPRS and protocol stalling issues

- Course Recap and Conclusion
  - Strengths and weaknesses of GPRS
  - Motivation for Enhanced GPRS (EGPRS), or EDGE

How You Will Learn

- You will learn in interactive lecture format from an instructor who's among the most knowledgeable and dynamic in the industry.
- Along with lecture, we use exercises, puzzles, case studies, and interesting group activities to enrich the instruction and drive home the essential points.
- If you already know something about the technology, we will build on that. We'll compare and contrast what's familiar with what's new, making new ideas easier to learn as well as more relevant.
- If your background is less technical, we will use meaningful and ingenious examples and analogies to simplify the complex subject matter.
- The Participant Handbook will provide you with a structure to which you can add the information and insight provided in real-time, turning it into a valuable reference resource you can take back to your job.

Revised *June 4, 2006*