

Fundamentals of 2.5G and 3G Wireless

Duration: 1 day

Prerequisites: Understanding of basic wireless principles

Objectives:

At the conclusion of the workshop the student will be able to:

- Understand technologies supporting next generation wireless systems
- Identify the wireless data technology evolution path for GSM and ANSI networks
- Understand the system, function, and operation of 2.5G and 3G networks
- Understand the differences between GSM and CDMA based technologies
- Identify the issues involved in migrating from 2G to 2.5G and beyond
- Identify the applications and related network requirements for next generation wireless data services
- Understand the challenges and opportunities involved in deploying and operating wireless data networks

Course Outline:

1. Introduction to wireless data technologies
 - 1.1. Circuit versus packet switching
 - 1.2. 1G wireless data
 - 1.2.1. CDPD
 - 1.3. 2G wireless data
 - 1.3.1. Circuit switched data
 - 1.3.2. WAP
 - 1.3.3. SMS
 - 1.3.4. USSD
 - 1.4. Introduction to 2.5G
 - 1.4.1. Improvements with 2.5G
 - 1.4.1.1. "Always on"
 - 1.4.1.2. Greater bandwidth available to users
 - 1.4.1.3. Faster connections
 - 1.4.1.4. More efficient use of spectrum
 - 1.4.2. Application example: WAP
 - 1.4.3. GSM path
 - 1.4.3.1. HSCSD
 - 1.4.3.2. GSM-to-GPRS-to-EDGE-to-W-CDMA
 - 1.4.4. ANSI path
 - 1.4.4.1. cdmaOne-to-CMDA2000
2. GSM

- 2.1. GPRS
 - 2.1.1. Introduction
 - 2.1.2. Why is it faster than GSM?
 - 2.1.3. Calculating GPRS data speeds
 - 2.1.4. Evolving from GSM to GPRS
 - 2.1.5. GPRS Core Network (CN)
 - 2.1.5.1. Network architecture and configuration
 - 2.1.5.2. Network element functions and capabilities
 - 2.1.6. Mobility management in GPRS
 - 2.1.6.1. Network management
 - 2.1.6.1.1. Attachment
 - 2.1.6.1.2. PDP contexts
 - 2.1.6.1.3. GPRS tunneling protocol
 - 2.1.6.2. Mobile stations management
 - 2.1.6.2.1. Ready state
 - 2.1.6.2.2. Standby state
 - 2.1.6.2.3. Idle state
 - 2.1.7. GPRS mobile station capabilities
 - 2.1.7.1. Class A, B, and C terminals
 - 2.1.7.2. Time slot classes
- 2.2. EDGE
 - 2.2.1. Radio Access Network (RAN) improvements
 - 2.2.2. Core network remains the same
 - 2.2.3. EDGE evolution
- 2.3. W-CDMA
 - 2.3.1. Changes to RAN
 - 2.3.2. New core network elements
 - 2.3.3. W-CDMA vs. CDMA2000
- 3. CDMA
 - 3.1. Introduction to CDMA2000
 - 3.1.1. RAN network
 - 3.1.2. Core network
 - 3.1.2.1. Network architecture and configuration
 - 3.1.2.2. Network element functions and capabilities
 - 3.2. 1xRTT
 - 3.3. 1xEV-DO
 - 3.4. 1xEV-DV
 - 3.5. 3xRTT
- 4. Other 3G standards
 - 4.1. FOMA
 - 4.2. TD-SCDMA
- 5. Evolution of wireless data
 - 5.1. Evolution from 2.5G to 3G
 - 5.2. 3G standardization
 - 5.3. 3G compatibility
 - 5.4. What about 4G and WLAN's?
- 6. Technical and business challenges and opportunities
 - 6.1. Actual vs. theoretical data speeds
 - 6.2. Charging and billing for 2.5G and 3G services
 - 6.3. Quality of service, performance, and network optimization
 - 6.4. Integration of presence and location technologies

- 6.5. 2.5G and 3G applications
 - 6.5.1. MMS
 - 6.5.2. MIM
- 7. Deployment and operations update
 - 7.1. Status of 2.5G and 3G deployments
 - 7.1.1. Challenges of migrating from 2G to 2.5G
 - 7.1.2. Case evaluation of mobile network operators
 - 7.2. Applications offered – successes and failures
 - 7.2.1. Applications delivered
 - 7.2.2. Service plans offered
 - 7.2.3. Customer uptake, usage and network impacts