Nadar Saraswathi College of Engineering & Technology

NSCET E-LEARNING PRESENTATION

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

III YEAR / VI SEMESTER

EC8004– WIRELESS NETWORK

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UNIT III

3G OVERVIEW

INTRODUCTION

- 3G is the fourth generation of wireless mobile telecommunications technology.
- It is the upgrade for 2.5G and 2.5G GPRS networks, for faster data transfer speed.
- This is based on a set of standards used for mobile devices and mobile telecommunications use services and networks that comply with the International Mobile Telecommunications-2000 (IMT-2000) specifications by the International Telecommunication Union
- 3G finds application in wireless voice telephony, mobile Internet access, fixed wireless Internet access, video calls and mobile TV.

Advantages of 3G

- New radio spectrum to relieve overcrowding in existing systems.
- More bandwidth, security, and reliability.
- Interoperability between service providers.
- Fixed and variable data rates.
- Asymmetric data rates.
- Backward compatibility of devices with existing networks.
- Always-online devices. 3G will use IP connectivity, IP is packet based (not circuit based).
- Rich multimedia services.

Wireless Generation

S.No	Wireless Generation	Systems	General services
1	1G	AMPS,NMT	Voice
2	2G	GSM,TDMA CDMA	Primarily voice with SMS
3	2.5G	CDMA GPRS / EDGE	Primarily voice with packet data services being introduced
4	3G	CDMA 2000 ULTRA TDD TD.SDMA	Packet data and voice services designed for high speed multimedia data and voice

IMT – 2000 Services

IMT 2000 is commonly known as 3G

- High quality
- Global standard
- World wide common frequency
- World wide roaming capacity
- Improved spectrum efficiency
- High speed packet data rates

Overview of UMTS

- UMTS – Universal Mobile Telecommunication Services

UMTS Services

- Conversational
- Interactive
- Streaming
- Background

Channel Structure

- It has an Access layer and Non Access layer
- Access Layer – related to Layer 1,2,3
- Non Access Layer – Communicate between User Equipment and Core Network

RRC	Layer3- Radio Resource Control
RLC	Layer 2 - Radio Link Layer
MAC	Layer 2 - Medium Access Control
PHY	Layer1 – Physical Layer

UMTS Terrestrial Radio Access Network (UTRAN)

Two logical elements,

- RNC - Radio Network Controller
- Node B
- RNC - responsible for the use and allocation of all radio resource of RNC and also handles the user voice and packet data traffic
- Node B - responsible for radio transmission and reception in one or more cells from the user equipment

Logical Interfaces of UTRAN

- Layers and planes are logically independent of each other
- Protocol model
  - Radio Network Layer (RNL)
  - Transport Network Layer (TNL)
- Planes
  - User Plane
  - Control Plane
  - Transport Plane

UMTS Core Network (UCN)

- UCN consists of Circuit Switched(CS) and Packet Switched (PS)
- CS – providing voice and data service

  Includes MSC , GMSC
- PS – providing Packet based services

  Includes SGSN, GGSN, DNS, firewalls

3GPP (3rd Generation Partnership Project)

- GSM and related 2G /2.5G standards including GPRS and EDGE
- UMTS and related 3G standards including HSPA
- LTE and related 4G standards
- 5G Standard

CDMA 2000

- Code Division Multiple Access – 3G standard developed by the International Telecommunication Union (ITU)
- This Protocols uses CDMA access to send voice and data and signals between mobile phones and cell sites
- Speed – 114 Kbps to 2Mbps

THANKS!