Comp347: Computer Networks (Revision 7)

Assignment 3

1.

GSM stands for global system for mobile communication and is the most popular digital mobile network of the 3 kinds of telecommunication networks, the others being TDMA, GSM and CDMA. It works by digitizing and compressing data that gets sent through a channel along with 2 other streams of user data.(techtarget,2022)

The role that Mobile Switching Center(MSC) anchor plays in GSM networks is being a part of the core network and accounts for call establishment, tear down and handoff, user authorization and determining whether a device is allowed to connect to the network. A providers network has several MSCs amongst those are gateway mscs(GMSC) or home MSC which connect a providers cellular network to the public telephone network.Visitor location registers are paired with the MSC that coordinates a call both ways from a visited network.

2.

Long Term Evolution (LTE) Radio access Network is one type of 4G network. It is considered quite efficient with the ability to utilize multiple input antennas and has a maximum data rate for an LTE user at 100 Mbps downstream and 50 upstream, while using 20 MHz of wireless spectrum.

The main characteristics of LTE radio access networks are orthogonal frequency division multiplexing, and node allocation

OFDM uses a combo of frequency division multiplexing and time division on a downstream channel. These frequencies interfere very little with each other as they are sent on different frequency channels, and are still effective when channels are tightly spaced together.

Nodes are allocated allocated to one or more 0.5 millisecond time slots in one or possibly more channel frequencies, which increases efficiency greatly. Re-allocation is also performed as often as every millisecond. The allocation of nodes is decided upon by the operator.

3.

Carrier sense multiple access and collision detection can be expressed as (CSMA/CD) which is in part carrier sensing or turn based network communication in the form of sensing the channels message before responding, whereas collision detection is to detect when another message is being sent while the receiving node is trying to receive something from another sending node.

An adapter receives a network layer datagram, then prepares a link layer frame and then puts the frame adapter buffer. If the channel is idle and the adapter senses this, it transmits a frame, while if it were busy it would wait for it waits until there is no signal sensed and begins transmission of the frame. While transmitting, the presence of signal energy is monitored by the adapter using the broadcast channel coming from other adapters. If the entire frame is transmitted and the adapter doesn't detect a signal from another adapter, the adapter finishes its job with the frame, however if a signal is detected while transmitting, transmission will be aborted. After the frame is aborted, the adapter waits a randomized amount of time and loops back sensing if the channel is idle again to begin transmitting the frame once more. \_\_\_\_\_

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Ross, J.F.K.K. W. (2013). Computer Networking: A Top-Down Approach (6th ed.). Pearson Learning Solutions. https://online.vitalsource.com/books/9781269392488

What is GSM (Global System for Mobile communication)?. (2022). Retrieved 10th November 2022, from https://www.techtarget.com/searchmobilecomputing/definition/GSM