LTE NETWORK ARCHITECTURE TUTORIAL pdf

1: The LTE Network Architecture - A Comprehensive Tutorial (white paper)

The high-level network architecture of LTE is comprised of following three main components: A USIM stores user-specific data very similar to 3G SIM card. This keeps information about the user's phone number, home network identity and security keys etc. The architecture of evolved UMTS Terrestrial.

This new architecture has been developed to provide a considerably higher level of performance that is in line with the requirements of LTE. As a result it is anticipated that operators will commence introducing hardware conforming to the new System Architecture Evolution standards so that the anticipated data levels can be handled when 3G LTE is introduced. Therefore when LTE Advanced is introduced, the network will be able to handle the further data increases with little change. As a result it is anticipated that it will be wide adopted by the cellular operators. With 3G LTE offering data download rates of Mbps, and the focus of the system being on mobile broadband, it will be necessary for the network to be able to handle much greater levels of data. To achieve this it is necessary to adopt a system architecture that lends itself to much grater levels of data transfer. When 3G was first developed, voice was still carried as circuit switched data. Since then there has been a relentless move to IP data. With increased levels of interaction being required and much faster responses, the new SAE concepts have been evolved to ensure that the levels of latency have been reduced to around 10 ms. This will ensure that applications using 3G LTE will be sufficiently responsive. A key element for any operator is to reduce costs. In addition to this a high level of automatic configuration is introduced and this reduces the set-up and commissioning time. Despite this, the SAE network brings in some major changes, and allows far more efficient and effect transfer of data. This connects to the eNodeBs as shown in the diagram below. As part of this it also handles the security key management. Accordingly the MME is the point at which lawful interception of signalling may be made. Its main purpose is to manage the user plane mobility and it also acts as the main border between the Radio Access Network, RAN and the core network. Also when UEs move across areas served by different eNodeBs, the SGW serves as a mobility anchor ensuring that the data path is maintained. For applications that require dynamic policy or charging control, a network element entitled the Applications Function, AF is used. The Node Bs were connected in a star formation to the Radio Network Controllers RNCs which carried out the majority of the management of the radio resource. To provide the required functionality within LTE SAE, the basic system architecture sees the removal of a layer of management. The RNC is removed and the radio resource management is devolved to the base-stations. The new style base-stations are called eNodeBs or eNBs. The eNBs are connected directly to the core network gateway via a newly defined "S1 interface". This provides a much greater level of direct interconnectivity. It also enables many calls to be routed very directly as a large number of calls and connections are to other mobiles in the same or adjacent cells. The new structure allows many calls to be routed far more directly and with only minimum interaction with the core network. In addition to the new Layer 1 and Layer 2 functionality, eNBs handle several other functions. This includes the radio resource control including admission control, load balancing and radio mobility control including handover decisions for the mobile or user equipment UE. The additional levels of flexibility and functionality given to the new eNBs mean that they are more complex than the UMTS and previous generations of base-station. The new System Architecture Evolution, SAE for LTE provides a new approach for the core network, enabling far higher levels of data to be transported to enable it to support the much higher data rates that will be possible with LTE. In addition to this, other features that enable the CAPEX and OPEX to be reduced when compared to existing systems, thereby enabling higher levels of efficiency to be achieved.

2: LTE Roaming Architecture in LTE - LTE Roaming Architecture in LTE () | Wisdom Jobs

comprehensive, overview of the 3GPP Release 8 LTE network architecture and interfaces, showing how it can be deployed in an optimized and efficient manner. Engineers involved.

It meets the requirements of industry for high data download speeds as well as reduced latency - a factor important for many applications from VoIP to gaming and interactive use of data. It also provides significant improvements in the use of the available spectrum. They enable LTE to be able to operate more efficiently with respect to the use of spectrum, and also to provide the much higher data rates that are being required. OFDM technology was used for the signal format for LTE because it enabled high data bandwidths to be transmitted efficiently while still providing a high degree of resilience to reflections and interference. As data was carried on a large number of carriers, if some were missing as a result of interference from reflections, etc, the system was still able to cope. The access schemes differed between the uplink and downlink: SC-FDMA was used in view of the fact that its peak to average power ratio is smaller than for OFDMA - the lower peak to average power ratio enabling better levels of final RF power amplifier to be achieved - this was and is an important factor for mobile handset battery life. One of the main problems that previous telecommunications systems has encountered was that of multiple signals arising from the many reflections that are encountered. By using MIMO, these additional signal paths could be used to advantage and were able to be used to increase the throughput. When using MIMO, it is necessary to use multiple antennas to enable the different paths to be distinguished. Accordingly schemes using 2 x 2, 4 x 2, or 4 x 4 antenna matrices could be used. While it is relatively easy to add further antennas to a base station, the same was not true of mobile handsets, where the dimensions of the user equipment limited the number of antennas which should be placed at least a half wavelength apart. With the very high data rate and low latency requirements for 3G LTE, it was necessary to evolve the system architecture to enable the improved performance to be achieved. One change was that a number of the functions previously handled by the core network were transferred out to the periphery. Essentially this provided a much "flatter" form of network architecture. In this way latency times could be reduced and data routed more directly to its destination. As part of the upgrade an Evolved Packet Core, EPC was developed to ensure that the packet data was routed as efficiently as possible. Originally it had been anticipated that operators would supply the data capability and voice would be via OTT applications. As operators would lose out significant revenues as voice, at the time, constituted a major element of the revenue. To help operators overcome this, a limited implementation of IMS was developed and this considerably reduced the capital expenditure required by operators. Both first and second generation technologies were focussed on voice and 3G then moved towards mobile data.

LTE NETWORK ARCHITECTURE TUTORIAL pdf

3: IMS VoLTE Architecture - Voice Over LTE Tutorial

This video tutorial talks about LTE architecture in detail to give holistic view of LTE architecture. Main functionalities of each network node are discussed in detail along with examples.

The EPC has three main functional elements. MME is the single most control point in the EPC and responsible for most of the control plane functions. S-GW is also responsible for handling handovers. It also provides interfaces towards internet and IMS. UE may be a smartphone, tablet or other communication devices. ISIM contains the following: IMPI is a global identity allocated by the home network. IMPU acts like a telephone number. This long secret key is used for user authentication and SIP registration. SIP-UA provides basic telephony functionality. It can act in two different roles: It also checks how to account for the traffic. Operators use this information for billing purpose. IMS core has the following important nodes. It has three different functional elements. These may or may not be separate physical entities. S-CSCF has knowledge about the user and what applications are available to the user. It acts as a decision point. It handles name and address resolution. HSS is also responsible for authentication and authorization. You can find more details in RFC Also, it may serve as a breakout to a circuit-switched network.

LTE NETWORK ARCHITECTURE TUTORIAL pdf

4: Telecom Tutorial by Vikas Shokeen | Simplifying Technology & 3GPP Specs

This tutorial on LTE covers following in addition to LTE air interface and LTE system architecture: LTE Air interface The Air interface between LTE network and UE supports high data rate owing to OFDM and Multiple antenna techniques employed.

LTE is mainly designed for high speed data applications both in the uplink and downlink. LTE network offers about Mbps data rate in the downlink and about 75 Mbps in the uplink. LTE is completely IP based network. The basic architecture contains the following network elements. It provides higher data rates, lower latency and is optimized for packet data. Before the data is actually transmitted the control plane has to be established. Other functionalities include scheduling and transmission of paging messages, broadcast messages, and bearer level rate enforcements also done by eNB. The MME is a control entity. It is responsible for all the control plane operations. MME is also responsible for bearer management functions including establishment of dedicated bearers for all signaling traffic flow. SGW acts as a local mobility entity for inter eNB handovers. It also acts a mobility anchor for inter 3GPP mobility. SGW is responsible for packet routing and forwarding, buffering the downlink packets. PGW is responsible for all the IP packet based operations such as deep packet inspection, UE IP address allocation, Transport level packet marking in uplink and downlink, accounting etc. It is also responsible for UL and DL rate enforcement. The HSS is a central database that contains user-related and subscription-related information. The functions of the HSS include functionalities such as mobility management, call and session establishment support, user authentication and access authorization. It also holds information about the PDNs to which the user can connect. In addition the HSS holds dynamic information such as the identity of the MME to which the user is currently attached or registered. The HSS may also integrate the authentication center AUC , which generates the vectors for authentication and security keys.

LTE NETWORK ARCHITECTURE TUTORIAL pdf

5: LTE Tutorial: What is LTE?

What is LTE Network Architecture? The high-level network architecture of LTE is comprised of below three main components: The User Equipment (UE).

The high-level network architecture of LTE is comprised of below three main components: The User Equipment UE. The evolved packet core will be communicating with the packet data networks in the outside world internet which private corporate networks or the IP multimedia subsystem. Uu, S1 and SGi are the denotions if different parts which are used to differentiate interfaces as shown below: It is actually a Mobile Equipment ME , which are comprised of the below vital modules: MT handles all the communication functions. TE terminates the data streams. Each eNB is a base station that controls the mobiles in one or more cells. The base station that communicates with a mobile is called as its serving eNB. LTE Mobile communicates with just single base station and also one cell at a time and there are below mentioned two main functions which are assisted by eNB: The eBN will act as an interface which sends and receives radio transmissions to all the mobiles with the use of the analogue and digital signal processing functions of the LTE air interface. It also controls the low-level operation of all its mobiles, by sending them signalling messages such as handover commands. Every single eBN will be connecting with EPC by means of the S1 interface and it can also be interconnected to the nearby base stations by the X2 interface. It is mainly used for signalling messages and packet forwarding during handover. A home eNB HeNB is a base station that has been bought by a customer in order to provide femtocell coverage within the range of home. Below is a brief description of each of the components shown in the above architecture: The HSS for Home Subscriber Server is a database which carries all the user-related and subscriber-related information. It provides support functions in mobility management and access authorization. Each packet data network is identified by an access point name APN. This has two slightly different implementations, namely S5 if the two devices are in the same network, and S8 if they are in different networks.

6: LTE Tutorial: E-UTRAN Architecture

Audience. This tutorial has been designed for audiences with a need to understand the LTE technology basics in very simple terms. This tutorial will give you enough understanding on LTE technology from where you can take yourself at higher level of expertise.

7: LTE Architecture | LTE system architecture basics | tutorials

Long Term Evolution (LTE) is the latest buzzword on everyone's lips, but are you as conversant with the LTE architecture as you would like to be, or â€" more importantly â€" need to be?

8: VoLTE Tutorial - Voice Over LTE

This document provides a brief overview of the LTE network architecture as the first technical document of "LTE" area. First, the LTE network reference model is defined and its basic Evolved Packet System (EPS) entities and the functions of each entity are described.

9: VoLTE IMS Architecture - IMS Core CSCF , TAS , MRF , BGw , SIP-UA , Dedicated Bearer

E-UTRAN Architecture. In order to meet the requirements for LTE networks, the evolved UTRAN (E-UTRAN) architecture has been improved dramatically from the 3G/G radio access network (UTRAN).

LTE NETWORK ARCHITECTURE TUTORIAL pdf

Searching for water in the universe The Documentary history of the state of New-York The top seven issues between moms and daughters Unforgettable desserts Aperture 1.5 Beyond the Basics Middle East bibliography Administration of wills, trusts, and estates Voodoo death Gregor Robinson Stan Lee presents Spider-Man Carnage Appealing to the court of public opinion Poetry from Daisys Garden Angolas Political Economy 1975-1985 Conditionally human by Walter M. Miller, Jr. Different worlds James Van Pelt The history of the First national bank of Chicago Disneys Hercules 3-D Mask Book Millers Preferable accounting principles SmartStart Your Massachusetts Business (SmartStart Series (Smartstart Series) Punishment of a vixen Iron man manual daniel wallace Justice in Jeopardy A Fight With Giants Managerial Accounting Study Guide and Lotus 123 Templates to Accompany Managerial Accounting. Good morning, my love Men and women of deep piety Tony Evans on You and Your Childs Future Fairy Tale Family Upsc mains paper 2017 Reindeer nomads meet the market The intellectual instinct: skepticism and the quest for truth The system of minerology of James Dwight Dana, 1837-1868 Prince of Lankhmar (Advanced Dungeon and Dragons Module LNA3) Financial institutions Colors of Russia (Colors of the World) Mosaics of human life. Andy shaw creating a bug mind Why Moms Are Weird Social philosophy and health service systems, public policy, legislation, and advocacy Larry Nosse and De Mcse 2012 interview questions and answers Franciscan missionaries in Hispanic California, 1769-1848