Chapter 6 : Presentation

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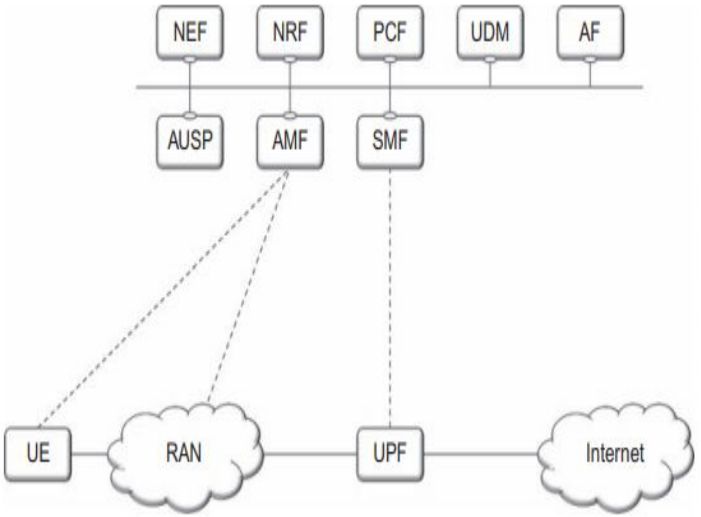
Radio-Interface Architecture

The RAN is responsible for all radio-related functionality of the overall network including, for example, scheduling, radio-resource handling, retransmission protocols, coding, and various multi-antenna schemes.

The 5G core network is responsible for functions not related to the radio access but needed for providing a complete network. This includes, for example, authentication, charging functionality, and setup of end-to-end connections.

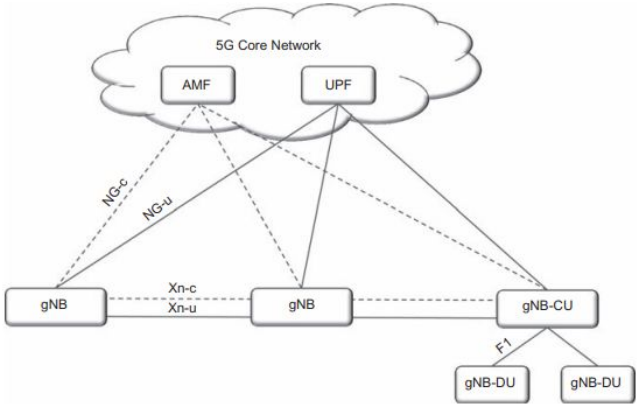


Radio-Interface Network

The radio-access network can have two types of nodes connected to the 5G core network:

- A gNB, serving NR devices using the NR user-plane and control-plane protocols; or
- An ng-eNB, serving LTE devices using the LTE user-plane and control-plane protocols.

A radio-access network consisting of both ng-eNBs for LTE radio access and gNBs for NR radio access is known as an NG-RAN. Furthermore, it will be assumed that the RAN is connected to the 5G core and hence 5G terminology, such as gNB, will be used.



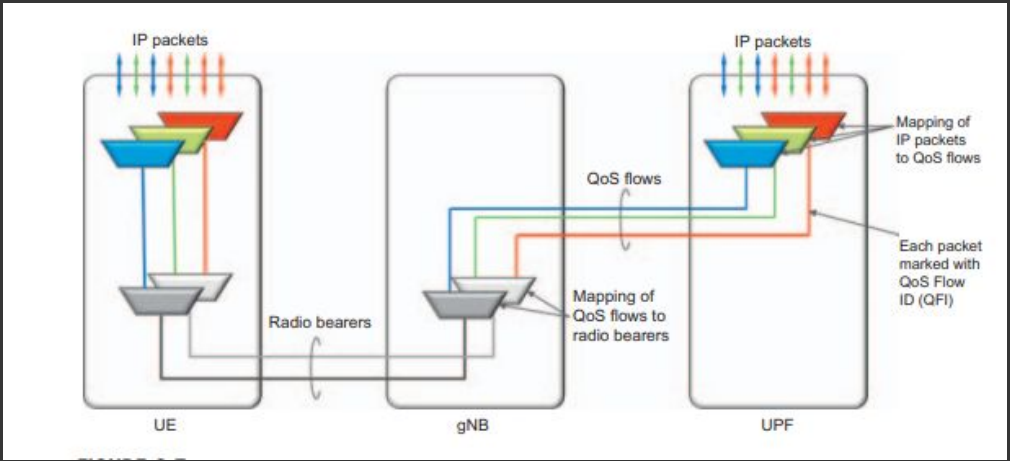
QUALITY-OF-SERVICE HANDLING

The key principles of LTE are kept

Read

Handling of different quality-of-service (QoS) requirements is possible already in **LTE**, and **NR** builds upon and enhances this framework.

QoS handling! - realization of network slicing

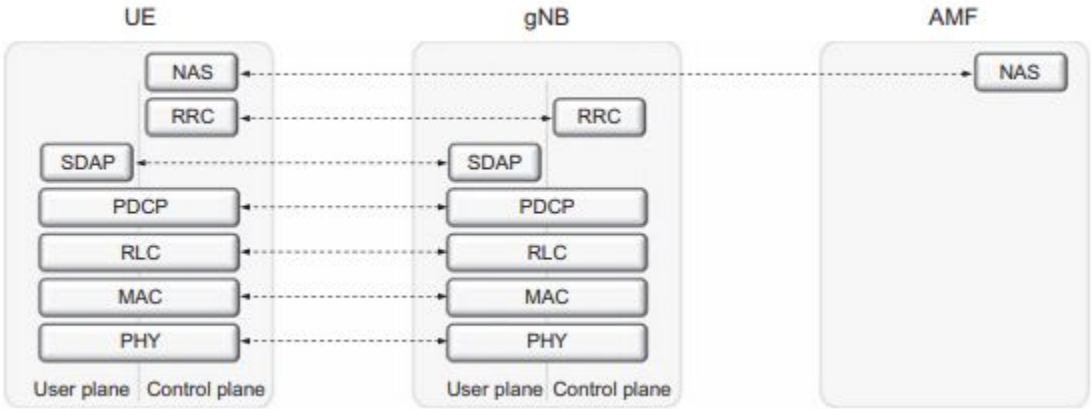


Read

There are two ways of controlling the mapping from quality-of-service flows to data radio bearers in the uplink: **reflective mapping** and **explicit configuration**

RADIO PROTOCOL ARCHITECTURE

The picture illustrates the RAN architecture



USER-PLANE PROTOCOLS

- **Service Data Application Protocol (SDAP)**
  responsible for mapping QoS bearers to radio bearers according to their quality-of-service requirements
- **Packet Data Convergence Protocol (PDCP)**
  performs IP header compression, ciphering, and integrity protection

- **Radio-Link Control (RLC)**
  responsible for segmentation and retransmission handling
- **Medium-Access Control (MAC)**
  handles multiplexing of logical channels, hybrid-ARQ retransmissions, and scheduling and scheduling-related functions
- **Physical Layer (PHY)**
  handles coding/decoding, modulation/demodulation, multi-antenna mapping, and other typical physical-layer functions

CONTROL-PLANE PROTOCOLS -

The control-plane protocols are, among other things, responsible for connection setup, mobility, and security.

CONTROL-PLANE PROTOCOLS

RRC STATE MACHINE

The Radio Resource Control (RRC) control-plane functionality operates between the RRC located in the gNB. RRC is responsible for handling the RANrelated control-plane procedures

IDLE-STATE AND INACTIVE-STATE MOBILITY

The purpose of the mobility mechanism in idle and inactive states is to ensure that a device is reachable by the network

CONNECTED-STATE MOBILITY

The aim of connected-state mobility is to ensure that the connectivity is retained without any interruption or noticeable degradation as device moves within network.

Thank You

- Hemanth