

MOBILE COMPUTING

ASSIGNMENT-II

Name: Bree Vishal R

Branch & Sec: IIIrd Yr 5th Sem CSE 'C' section

Roll no: 143

Reg no: 180501143

Subject: Mobile Computing - IT18502

Assignment: Assignment - II CAT - II

1. 5G Networks and Beyond:

5G refers to 5th generation Technology.

It is the 5th generation technology for cellular standard that started deploying worldwide in 2019 and is considered as a successor of 4G Networks.

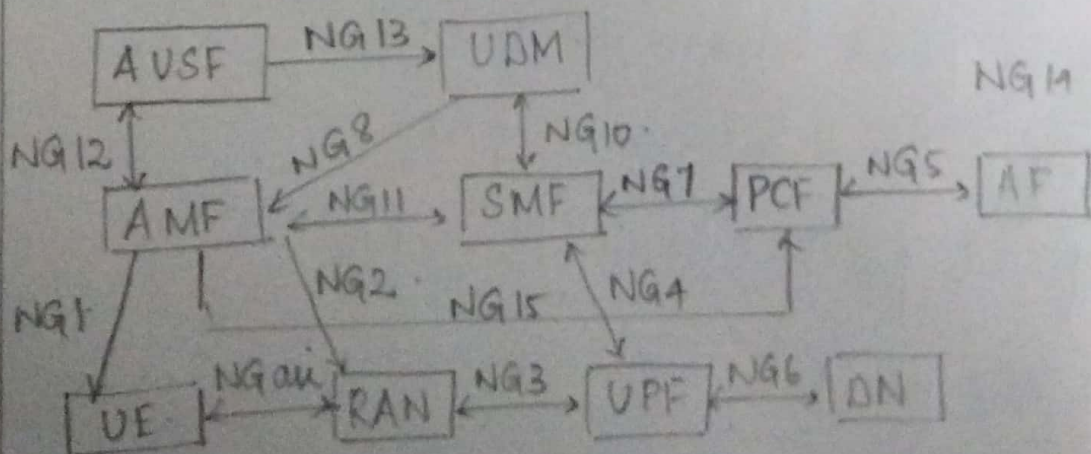
The future of 5G lies in the hands of

- * Gaming
- * Self driving.
- * IOT
- * Surgery
- * Speed.

5G system is defined as 3GPP system consisting of 5G (AN), 5G Core network and UE.

The 5G system provides data connectivity and services.

5G Network Architecture:



NG9 - Between UPF's

NG4 - Between ANF's

Functional Blocks in 5G Architecture are:

- * AUSF - Authentication server function
- * UDM - Unified Data Management
- * AMF - Core Access and Mobility Management function
- * SMF - Session Management function
- * PCF - Policy Control function
- * AF - Application function
- * UE - User Equipment
- * RAN - (Radio) Access Network
- * UPF - User plane function
- * DN - Data Network

Interfaces in 5G Network are

- NG1: Reference point between UE and AMF
- NG2: Reference point between RAN & AMF
- NG3: Reference point RAN and UPF
- NG4: Reference point between SMF and UPF
- NG5: Reference point between PCF & AF
- NG6: Reference point between UPF and DN
- NG7: Reference point between SMF & PCF

NG7: Reference point between VPCF & hPCF

NG8: Reference point between Unified Data Management and AMF

NG9: Reference point between 2 UPF's

NG10: Reference point between UDM & SMF

NG11: Reference point between Access & Mobility Management Function & SMF

NG12: Reference point between AMF & AUSF

NG13: Reference point between UDM & AUSF

NG14: Reference point between 2 AMF's

NG15: Reference point between PCF & AMF

NG16: Reference point between two SMF's

eNB and gNB

~~eNodeB~~ eNodeB (eNB)

~~the~~ LTE access Network from 3GPP Rel 8 upto Rel 15

For an eNB to connect to a 5G Network it would have to be 3GPP release 15 or above

An eNB only supports legacy E-UTRAN interface and does not support next generation interface

Next Generation Node B (gNB)

5G Access Networks from 3GPP Rel 15 onwards

Node providing NR user plane and control plane protocol termination towards the UE and connected via the NG interface to the 5GC.

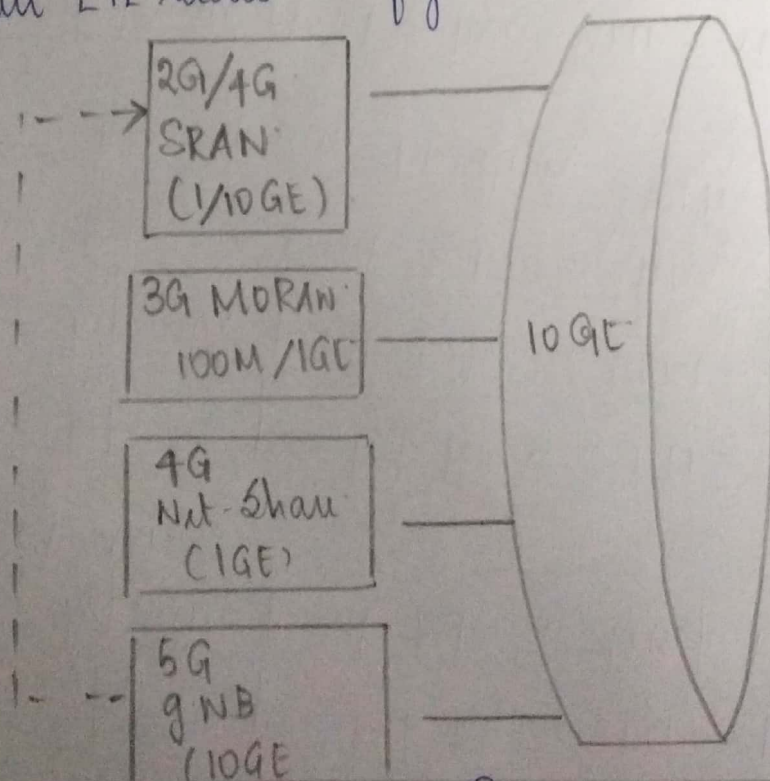
gNB does not support legacy E-UTRAN interface.

Adding 5G to an existing multi-RAT macro-site

Current multi-RAT macro cell sites typically have backhaul of 1Gbps.

Capacity is shared between RAT's and in many cases between network sharing partners (MNO's).

Less than 1Gbps backhaul is being deployed to support certain LTE radio configurations



5G deployment to macro cells is very likely to be less than 6GHz spectrum bands

Massive MIMO is a key concept for 5G - 32/64/128 + antennas

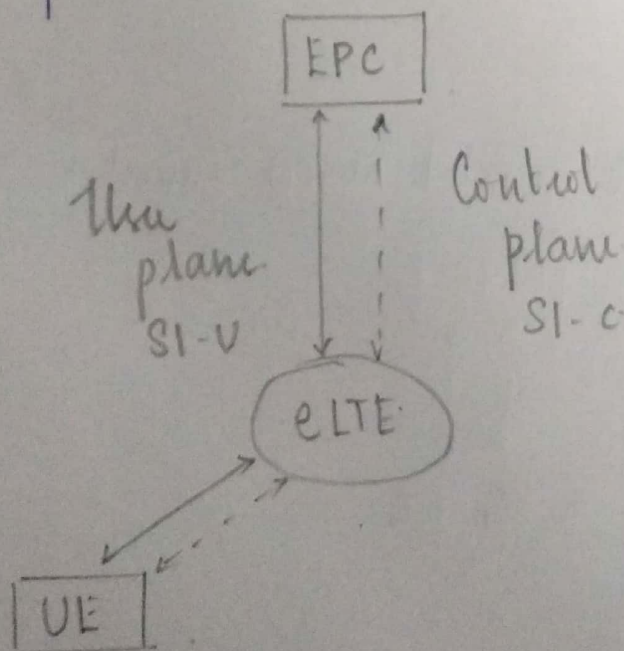
5G NR channel bandwidth to be larger than current LTE channel

Most spectrum will be unpaired so phase / time synchronization is needed for TDD operation

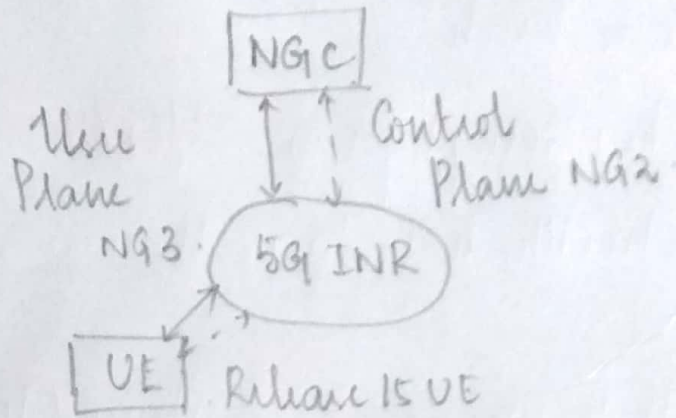
Backhaul or NGFI will need a minimum of 10GE local connectivity with scalable end to end capacity.

5G Architecture Options:

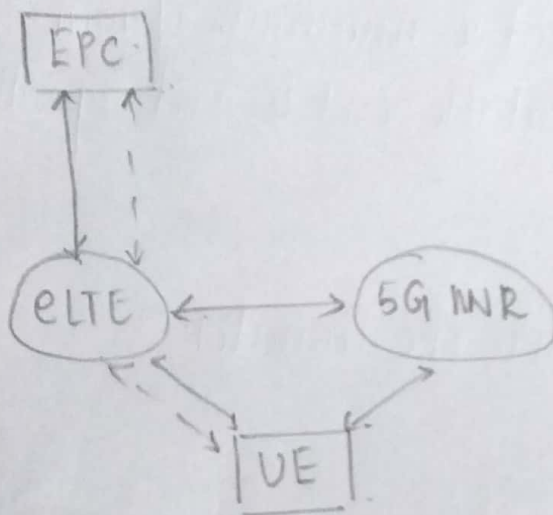
Legacy option 1: Standalone LTE EPC Connected.



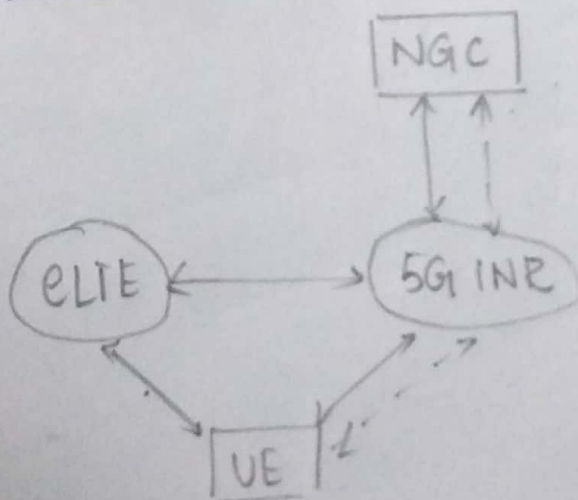
2. Standalone NR, NGCN Connected



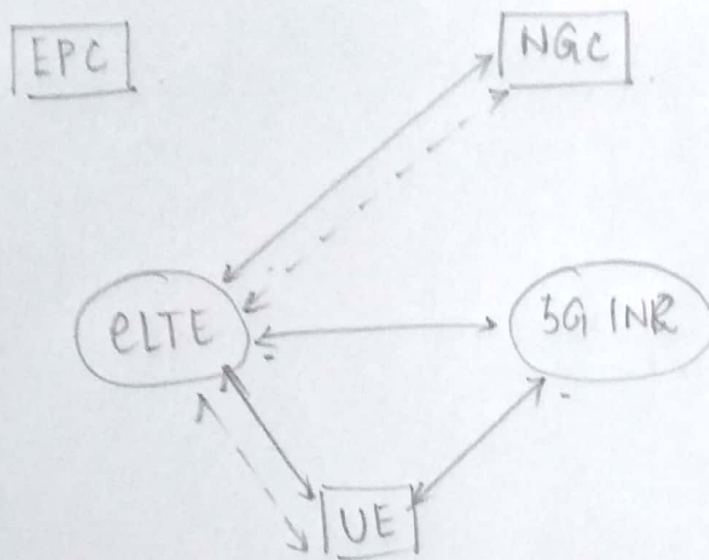
3. Non standalone /LTE Assisted EPC Connected



4. Non standalone /NR assisted NGCN Connected



Non standalone / LTE assisted NGCN Connected.



Use of 5G:

- * Enhanced Mobile BroadBand
- * Mission Critical Communication
- * Massive IOT