ASSIGNMENT-02-DAY-01

1. **What is 5G NSA network Architecture**.

5G NSA (Non-Standalone) network architecture is an early implementation of 5G technology that leverages existing 4G LTE infrastructure to provide 5G services. It is designed to allow a faster rollout of 5G services without the need for a complete overhaul of the existing network infrastructure.

Key Components of 5G NSA Architecture

- **LTE eNodeB (eNB)**: The existing 4G LTE base stations that handle the control plane signaling and some of the data traffic
- **5G gNodeB (gNB)**: The new 5G base stations that primarily handle the user plane data traffic, providing higher data rates and lower latency
- **Evolved Packet Core (EPC)**: The existing 4G core network that manages data and voice connections, mobility management, and session management
- **NR (New Radio)**: The new radio access technology introduced in 5G for higher throughput and efficiency

How 5G NSA Works:

- **Dual Connectivity**: In the 5G NSA architecture, the user equipment (UE), such as smartphones, connects simultaneously to both the LTE eNodeB and the 5G gNodeB. This is known as dual connectivity, where the LTE eNodeB provides control signaling and the 5G gNodeB handles the data plane for higher speeds and lower latency.
- **LTE Anchor**: The LTE network serves as the anchor, providing coverage and handling most of the control plane traffic. This allows for seamless mobility and continuity of services as users move between areas with varying levels of 5G coverage.
- **Enhanced Mobile Broadband (eMBB)**: One of the primary use cases for 5G NSA is enhanced mobile broadband, which benefits from the increased data rates and capacity offered by the 5G gNodeB while maintaining the reliability and wide coverage of the LTE network.

Benefits of 5G NSA:

- **Rapid Deployment**: By leveraging existing 4G infrastructure, network operators can roll out 5G services more quickly and cost-effectively
- **Seamless Integration**: Ensures backward compatibility and a smooth transition for users from 4G to 5G.

- **Improved Performance**: Provides enhanced data rates and reduced latency, improving user experience for applications such as streaming, gaming, and more

Limitations of 5G NSA:

- **Reliance on 4G**: Since 5G NSA depends on the 4G network for control signaling, it cannot fully utilize the potential of 5G standalone (SA) networks, which are designed to operate independently with a new 5G core network
- **Limited Latency Improvement**: The latency improvements are not as significant as in 5G SA, where both control and user planes are managed by the 5G core network

5G NSA is a transitional architecture that allows for the quick deployment of 5G services by building on existing 4G infrastructure. It provides improved data rates and user experience while maintaining the reliability and wide coverage of the 4G network.