**Assignment**

1. What is 5G NSA Network Architecture?

Ans: 5G NSA (Non-Standalone) network architecture is an initial deployment approach where 5G networks are built upon existing 4G LTE infrastructure. Here's a brief explanation of the components and how it operates:

1. **LTE (E-UTRAN) Infrastructure**: The 5G NSA architecture utilizes the LTE (Long Term Evolution) radio access network (RAN) as the anchor network. This means existing LTE base stations (eNodeBs) and core network (EPC - Evolved Packet Core) are used to support both 4G and initial 5G services.
2. **NR (New Radio)**: 5G NR is introduced as an extension to the LTE network. NR operates in two frequency ranges: sub-6 GHz and mmWave (millimeter wave). NR provides higher data rates, lower latency, and better spectral efficiency compared to LTE.
3. **Dual Connectivity**: Dual Connectivity is a key feature of 5G NSA architecture. It allows devices to simultaneously connect to both LTE and 5G NR networks. This enables seamless mobility and improved performance, as data can be transmitted over both networks concurrently.
4. **Control Plane and User Plane Separation (CUPS)**: In 5G NSA, CUPS architecture is implemented to separate the control plane (where signaling and network management occur) and the user plane (where data traffic flows). This separation improves scalability and flexibility in managing network resources.
5. **Core Network Evolution**: While the LTE EPC continues to handle core functions for 5G NSA deployments, enhancements are made to support new 5G services and functionalities. Eventually, 5G Standalone (SA) architecture will replace the dependence on LTE core networks with a new 5G core (5GC) network.
6. **Deployment and Transition**: 5G NSA allows operators to quickly deploy 5G services leveraging existing LTE infrastructure, reducing time-to-market and initial investment costs. It serves as an interim solution before full-fledged 5G SA networks become widely deployed.

5G Architecture

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| 5G User Device |-------| 5G Base Station |

| | NR | |

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| | Xn | |

| 5G Base Station |-------| 5G Base Station |

| (gNB) |-------| (gNB) |

+-------------------+ +-------------------+

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| | NGAP | |

| Centralized |-------| Centralized |

| Unit (CU) | | Unit (CU) |

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| | F1 | |

| Distributed Unit |-------| Distributed Unit |

| (DU) | | (DU) |

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| 5G Core Network |

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| Internet | | Other Networks |

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