In order to support a very diverse range of services envisioned for 5G with very different performance requirements, the next generation core (5GC) is designed with a service-oriented architecture through the adoption of the new 3GPP defined service-based architecture (SBA). In this architecture, a set of 5GC components, or in this case called Network Functions (NFs) provide services to others authorized NFs to access their services. For the interaction between network functions, one of these acts as a Service Consumer and the other as a Service Producer. On top of that, the Control Plane (CP) functions are separated from the User Plane (UP) in order to make them scaling independently. This allows the operators to use these components for dimensioning, deploying, and adapting the network to their needs easily.

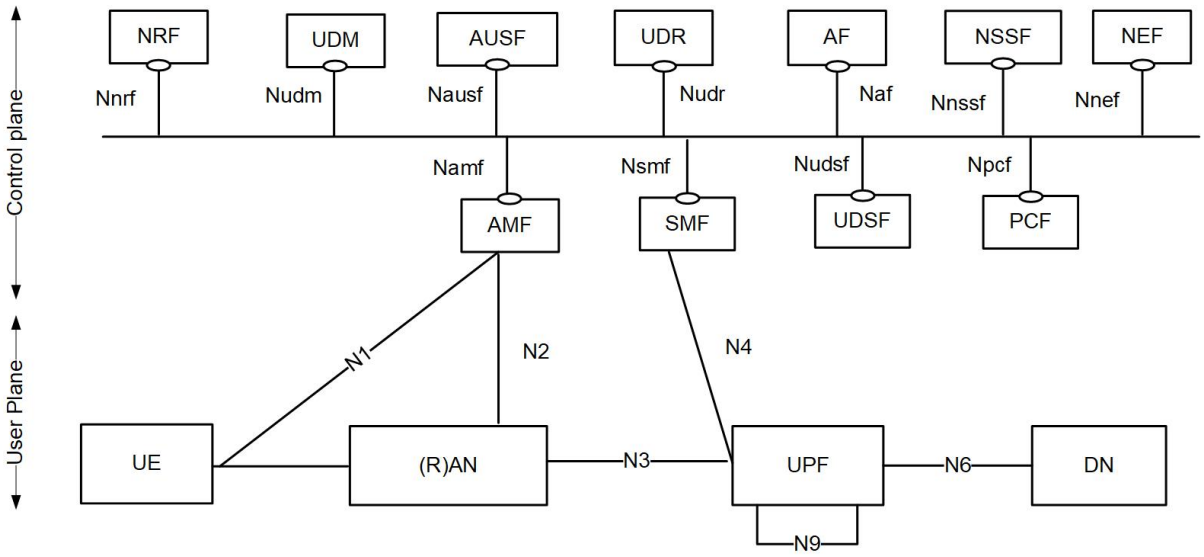

Figure 1. 5G System Architecture

Figure 1 depicts the non-roaming reference architecture for 5GC (add ref TS23.501). At the bottom, the UP components are sketched. The communication between (R)AN and UP Function (UPF) will be done directly and from there, to the Data Network (DN). The CP components include:

I) Authentication Server Function (AUSF) to support the authentication for 3GPP access and untrusted non-3GPP access;
II) Access and Mobility Management Function (AMF) which is responsible for managing access control and mobility;
III) Network Exposure Function (NEF) that provides a mechanism to expose services and features of the 5G NFs to external entities;
IV) NF Repository Function (NRF) to provide NF service registration and discovery;
V) Network Slice Selection Function (NSSF) to assist in the selection of suitable network slice instances for users;
VI) Policy Control Function (PCF) responsible for handling policies and rules in 5G system for network slicing, roaming and mobility management;
VII) Session Management Function (SMF) to set up and manages sessions according to network policy; and
VIII) Unified Data Management (UDM) that generates the Authentication and Key Agreement (AKA) credentials and stores subscriber data + profiles.

Using the reference point representation, the 5GC architecture is illustrated in the below figure.

Figure 3. OAI 5G CN Project Roadmap

[1] 3GPP TS 23.501, Technical Specification Group Services and System Aspects; System Architecture for the 5G System, Stage 2, Release 16, Mar. 2019.

[2] 3GPP TS 29.500, Technical Specification Group Core Network and Terminals; 5G System, Technical Realization of Service Based Architecture, Stage 3, Release 16, Mars. 2019.

[3] 3GPP TS 23.502, Technical Specification Group Services and System Aspects; V16.0.0 (2019-03), Procedures for the 5G System; Stage 2, Release 16, Mar. 2019.

[4] 3GPP TS 24.501, Technical Specification Group Core Network and Terminals; Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3, Release 16, Mar. 2019

[5] 3GPP TS 38.413, Technical Specification Group Radio Access Network; NG-RAN; NG Application Protocol (NGAP), Release 16, Dec 2019.

[6] OAI 5G CN Project website: https://openairinterface.org/oai-5g-core-network-project/

[7] OpenAirInterface 5G Core Network Deployment using Helm Charts, https://gitlab.eurecom.fr/oai/cn5g/oai-cn5g-fed/-/blob/master/docs/DEPLOY_SA5G_HC.md

[8] OpenSource MANO, OSM: https://osm.etsi.org/