**GSM:**

The **Global System for Mobile Communications** (**GSM**) is a standard developed by the [European Telecommunications Standards Institute](https://en.wikipedia.org/wiki/European_Telecommunications_Standards_Institute) (ETSI) to describe the protocols for second-generation ([2G](https://en.wikipedia.org/wiki/2G)) digital [cellular networks](https://en.wikipedia.org/wiki/Cellular_network) used by mobile devices such as mobile phones and tablets.

2G networks developed as a replacement for first generation ([1G](https://en.wikipedia.org/wiki/1G)) analog cellular networks. The GSM standard originally described a digital, circuit-switched network optimized for [full duplex](https://en.wikipedia.org/wiki/Duplex_(telecommunications)#Full_duplex) voice [telephony](https://en.wikipedia.org/wiki/Telephony). This expanded over time to include data communications, first by [circuit-switched transport](https://en.wikipedia.org/wiki/Circuit_Switched_Data), then by [packet](https://en.wikipedia.org/wiki/Network_packet) data transport via [General Packet Radio Service](https://en.wikipedia.org/wiki/General_Packet_Radio_Service) (GPRS), and [Enhanced Data Rates for GSM Evolution](https://en.wikipedia.org/wiki/Enhanced_Data_Rates_for_GSM_Evolution) (EDGE).

Subsequently, the [3GPP](https://en.wikipedia.org/wiki/3GPP) developed third-generation ([3G](https://en.wikipedia.org/wiki/3G)) [UMTS](https://en.wikipedia.org/wiki/UMTS) standards, followed by fourth-generation ([4G](https://en.wikipedia.org/wiki/4G)) [LTE Advanced](https://en.wikipedia.org/wiki/LTE_Advanced) standards, which do not form part of the ETSI GSM standard.

**Circuit switching**:

**Circuit switching** is a method of implementing a [telecommunications network](https://en.wikipedia.org/wiki/Telecommunications_network) in which two [network nodes](https://en.wikipedia.org/wiki/Network_nodes) establish a dedicated [communications channel](https://en.wikipedia.org/wiki/Communications_channel) ([circuit](https://en.wikipedia.org/wiki/Telecommunication_circuit)) through the network before the nodes may communicate. The circuit guarantees the full bandwidth of the channel and remains connected for the duration of the [communication session](https://en.wikipedia.org/wiki/Communication_session). The circuit functions as if the nodes were physically connected as with an electrical circuit.

The defining example of a circuit-switched network is the early analog [telephone network](https://en.wikipedia.org/wiki/Telephone_network). When a [call](https://en.wikipedia.org/wiki/Telephone_call) is made from one telephone to another, switches within the [telephone exchanges](https://en.wikipedia.org/wiki/Telephone_exchange) create a continuous wire circuit between the two telephones, for as long as the call lasts.

**Duplex**:

A **duplex** [communication system](https://en.wikipedia.org/wiki/Communication_system) is a [point-to-point](https://en.wikipedia.org/wiki/Point-to-point_(telecommunications)) system composed of two or more connected parties or devices that can communicate with one another in both directions. Duplex systems are employed in many communications networks, either to allow for simultaneous communication in both directions between two connected parties or to provide a reverse path for the monitoring and remote adjustment of equipment in the field. There are two types of duplex communication systems: full-duplex (FDX) and half-duplex (HDX).

In a **full-duplex** system, both parties can communicate with each other simultaneously. An example of a full-duplex device is a [telephone](https://en.wikipedia.org/wiki/Telephone); the parties at both ends of a call can speak and be heard by the other party simultaneously. The earphone reproduces the speech of the remote party as the microphone transmits the speech of the local party, because there is a two-way communication channel between them, or more strictly speaking, because there are two communication channels between them.

In a **half-duplex** system, both parties can communicate with each other, but not simultaneously; the communication is one direction at a time. An example of a half-duplex device is a [walkie-talkie](https://en.wikipedia.org/wiki/Walkie-talkie) two-way radio that has a "[push-to-talk](https://en.wikipedia.org/wiki/Push-to-talk)" button; when the local user wants to speak to the remote person they push this button, which turns on the transmitter but turns off the receiver, so they cannot hear the remote person. To listen to the other person, they release the button, which turns on the receiver but turns off the transmitter.

**Network Packet**:

A **network packet** is a formatted unit of data carried by a [packet-switched network](https://en.wikipedia.org/wiki/Packet-switched_network). A packet consists of control information and user data,[[1]](https://en.wikipedia.org/wiki/Network_packet" \l "cite_note-1) which is also known as the [payload](https://en.wikipedia.org/wiki/Payload_(computing)).

**GPRS:**

**General Packet Radio Service** (**GPRS**) is a [packet oriented](https://en.wikipedia.org/wiki/Packet_oriented) [mobile data](https://en.wikipedia.org/wiki/Mobile_data) standard on the [2G](https://en.wikipedia.org/wiki/2G) and [3G](https://en.wikipedia.org/wiki/3G) [cellular communication](https://en.wikipedia.org/wiki/Cellular_communication) network's [global system for mobile communications](https://en.wikipedia.org/wiki/Global_System_for_Mobile_Communications) (GSM). GPRS was established by [European Telecommunications Standards Institute](https://en.wikipedia.org/wiki/European_Telecommunications_Standards_Institute) (ETSI) in response to the earlier [CDPD](https://en.wikipedia.org/wiki/CDPD) and [i-mode](https://en.wikipedia.org/wiki/I-mode" \o "I-mode) packet-switched cellular technologies. It is now maintained by the [3rd Generation Partnership Project](https://en.wikipedia.org/wiki/3rd_Generation_Partnership_Project) (3GPP).

**EDGE:**

**Enhanced Data rates for GSM Evolution** (**EDGE**) (also known as **Enhanced** [**GPRS**](https://en.wikipedia.org/wiki/General_Packet_Radio_Service) (**EGPRS**), [**IMT**](https://en.wikipedia.org/wiki/IMT-2000) **Single Carrier** (**IMT-SC**), or **Enhanced Data rates for Global Evolution**) is a digital [mobile phone](https://en.wikipedia.org/wiki/Mobile_phone) technology that allows improved data transmission rates as a [backward-compatible](https://en.wikipedia.org/wiki/Backward-compatible) extension of [GSM](https://en.wikipedia.org/wiki/GSM). EDGE is considered a pre-3G radio technology and is part of [ITU](https://en.wikipedia.org/wiki/ITU)'s [3G](https://en.wikipedia.org/wiki/3G) definition. EDGE was deployed on GSM networks beginning in 2003 – initially by [Cingular](https://en.wikipedia.org/wiki/Cingular) (now [AT&T](https://en.wikipedia.org/wiki/AT%26T)) in the United States.

**3GPP:**

The **3rd Generation Partnership Project** (**3GPP**) is a [standards organization](https://en.wikipedia.org/wiki/Standards_organization) which develops protocols for [mobile telephony](https://en.wikipedia.org/wiki/Mobile_telephony). Its best known work is the development and maintenance of

* [GSM](https://en.wikipedia.org/wiki/GSM) and related [2G](https://en.wikipedia.org/wiki/2G) and [2.5G](https://en.wikipedia.org/wiki/2.5G) standards, including [GPRS](https://en.wikipedia.org/wiki/General_Packet_Radio_Service) and [EDGE](https://en.wikipedia.org/wiki/Enhanced_Data_Rates_for_GSM_Evolution)
* [UMTS](https://en.wikipedia.org/wiki/Universal_Mobile_Telecommunications_System) and related [3G](https://en.wikipedia.org/wiki/3G) standards, including [HSPA](https://en.wikipedia.org/wiki/High_Speed_Packet_Access)
* [LTE](https://en.wikipedia.org/wiki/LTE_(telecommunication)) and related [4G](https://en.wikipedia.org/wiki/4G) standards, including [LTE Advanced](https://en.wikipedia.org/wiki/LTE_Advanced) and [LTE Advanced Pro](https://en.wikipedia.org/wiki/LTE_Advanced_Pro)
* [5G NR](https://en.wikipedia.org/wiki/5G_NR) and related [5G](https://en.wikipedia.org/wiki/5G) standards
* An evolved [IP Multimedia Subsystem](https://en.wikipedia.org/wiki/IP_Multimedia_Subsystem) (IMS) developed in an access independent manner

**LTE Advanced**:

**LTE Advanced** is a mobile communication standard and a major enhancement of the [Long Term Evolution](https://en.wikipedia.org/wiki/LTE_(telecommunication)) (LTE) standard. It was formally submitted as a candidate [4G](https://en.wikipedia.org/wiki/4G) to [ITU-T](https://en.wikipedia.org/wiki/ITU-T) in late 2009 as meeting the requirements of the [IMT-Advanced](https://en.wikipedia.org/wiki/IMT-Advanced) standard, and was standardized by the 3rd Generation Partnership Project ([3GPP](https://en.wikipedia.org/wiki/3GPP)) in March 2011 as 3GPP Release 10.

**LTE:**

In [telecommunication](https://en.wikipedia.org/wiki/Telecommunication), **Long-Term Evolution** (**LTE**) is a [standard](https://en.wikipedia.org/wiki/Technical_standard) for [wireless broadband](https://en.wikipedia.org/wiki/Wireless_broadband)

Communication for [mobile devices](https://en.wikipedia.org/wiki/Mobile_device) and data terminals, based on The [GSM](https://en.wikipedia.org/wiki/GSM)/[EDGE](https://en.wikipedia.org/wiki/Enhanced_Data_Rates_for_GSM_Evolution) and [UMTS](https://en.wikipedia.org/wiki/UMTS)/[HSPA](https://en.wikipedia.org/wiki/High_Speed_Packet_Access) technologies. It increases the capacity and speed using a different radio interface together with core network improvements. The standard is developed by the [3GPP](https://en.wikipedia.org/wiki/3GPP) (3rd Generation Partnership Project) and is specified in its Release 8 document series, with minor enhancements described in Release 9.

**IMS:**

The **IP Multimedia Subsystem** or **IP Multimedia Core Network Subsystem** (**IMS**) is an [architectural framework](https://en.wikipedia.org/wiki/Architectural_Framework) for delivering IP [multimedia](https://en.wikipedia.org/wiki/Multimedia) services. Historically, mobile phones have provided voice call services over a [circuit-switched](https://en.wikipedia.org/wiki/Circuit_switching)-style network, rather than strictly over an IP [packet-switched](https://en.wikipedia.org/wiki/Packet_switching) network. Alternative methods of delivering voice ([VoIP](https://en.wikipedia.org/wiki/VoIP)) or other multimedia services have become available on smartphones, but they have not become standardized across the industry. IMS is an architectural framework to provide such standardization.

IMS was originally designed by the wireless [standards](https://en.wikipedia.org/wiki/Standardization) body [3rd Generation Partnership Project](https://en.wikipedia.org/wiki/3rd_Generation_Partnership_Project) (3GPP), as a part of the vision for evolving mobile networks beyond [GSM](https://en.wikipedia.org/wiki/GSM).

**VoIP:**

**Voice over Internet Protocol** (**VoIP**), also called **IP telephony**, is a method and group of technologies for the delivery of [voice communications](https://en.wikipedia.org/wiki/Speech) and [multimedia](https://en.wikipedia.org/wiki/Multimedia) sessions over [Internet Protocol](https://en.wikipedia.org/wiki/Internet_Protocol) (IP) networks, such as the [Internet](https://en.wikipedia.org/wiki/Internet). The terms **Internet telephony**, **broadband telephony**, and **broadband phone service** specifically refer to the provisioning of communications services (voice, [fax](https://en.wikipedia.org/wiki/Fax), [SMS](https://en.wikipedia.org/wiki/Short_Message_Service), voice-messaging) over the public Internet, rather than via the public switched telephone network (PSTN), also known as [plain old telephone service](https://en.wikipedia.org/wiki/Plain_old_telephone_service) (POTS).

**LTE:**

The LTE network is also called as Evolved Packet System (EPS).

EPS is divided into two parts:

* E-UTRAN (radio access network)
* EPC (core network)

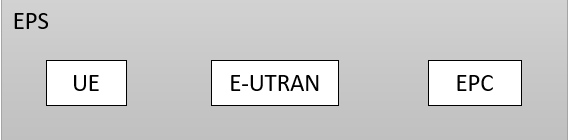
Entities in EPC

* MME
* S-GW
* P-GW
* HSS
* PCRF

EPS is an end-to-end (E2E) all IP network.

An E2E all IP network means that all traffic flows – from a UE all the way to a PDN which connects to a service entity – are transferred based on IP protocol within EPS.

A PDN is an internal or external IP domain of the operator that a UE wants to communicate with, and provides the UE with services such as the Internet or IP Multimedia Subsystem (IMS).



<https://www.3gpp.org/technologies/keywords-acronyms/100-the-evolved-packet-core>

<https://www.youtube.com/watch?v=ZlQkHQbHQ_E&list=PL-XjHn7CHrmQvc10CTljTE7Vb4SvuT6tY&index=3>

**5G**

<https://www.ericsson.com/en/blog/2019/2/your-quick-guide-to-network-functions-in-5g-core>

<https://www.nokia.com/networks/portfolio/5g-core/#defining-a-new-5g-core>

<https://medium.com/5g-nr/5g-service-based-architecture-sba-47900b0ded0a>

3GPP TS 23.501 [3] defines the 5G System Architecture as a Service Based Architecture, i.e. a system architecture in which the system functionality is achieved by a set of NFs providing services to other authorized NFs to access their services.

Control Plane (CP) Network Functions in the 5G System architecture shall be based on the service based architecture.

A NF service is one type of capability exposed by a NF (NF Service Producer) to other authorized NF (NF Service Consumer) through a service based interface. A NF service may support one or more NF service operation(s).

### Conventions for Names in Data Structures

The following syntax conventions apply when defining the names for attributes in the 5GC SBI service API data structures, carried in the payload body of http requests and responses.

a) Names of attributes shall be represented using lowerCamel.

Example 1:

attributeName

b) Names of arrays (i.e. those with cardinality 1..N or 0..N) shall be plural rather than singular.

Example 2:

users

c) Each value of an enumeration type shall be represented using UPPER\_WITH\_UNDERSCORE.

Example 3:

BLACK\_LISTED

d) The names of data types shall be represented using UpperCamel.

Example 4:

ResourceHandle