3GPP TSG|SA WG2 Meeting #169 S2-2504686r02

19 - 23 May, 2025, Fukuoka, Japan (revision of xx-yyxxxx)

**Source: ZTE (Moderator)**

**Title: New Study on Architecture for 6G System**

**Document for: Approval**

**Agenda Item: 30.7**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on Architecture for 6G System

{Free text. It has to be the same as in the "Title:" section above. Studies have to start by "Study on"}

Acronym: FS\_6G\_ARCH

Unique identifier: TBC

Potential target Release: Rel-20

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes | X | x | x | x |  |
| No |  |  |  |  |  |
| Don't know |  |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
| x | Study  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| FS\_6G\_REQ | SA WG1 | 1050110 | Study on 6G Use Cases and Service Requirements; Stage 1 |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 1060079 | Study on 6G Scenarios and Requirements | The architecture related requirements from RAN may need to be taken into account. |
|  | RAN WG studies (TBD) |  |

# 3 Justification

The 5G network architecture marked a significant leap forward compared to previous generations, with its adoption of a Service-Based Architecture (SBA) enabling a cloud-native deployment. These innovations enhanced flexibility and scalability, enabling more dynamic and adaptable network orchestration. While 5G is continuously introducing remarkable advancements, there remain gaps that need to be addressed, e.g. further CAPEX/OPEX reduction, further improvement of overall 3GPP system performance, etc. 6G brings a good opportunity to address these gaps, by means of e.g. simplifying the overall system, integrating new technologies, etc

3GPP SA1 has started the FS\_6G\_REQ study item to identify use cases and service/operational requirements for 6G system. TSG RAN has also initiated the FS\_6G\_RAN\_Scen\_Req study item to develop requirements for 6G Radio and expects to see initial input from and interaction with SA2.

The 6G architecture is to be grounded in established design principles, aligns with the IMT-2030 vision, and responds directly to the 6G requirements outlined in 3GPP TR 22.870 and TR 38.914. Therefore, this study will address critical challenges identified in 5G deployments and study the architecture aspects to support both connectivity service and beyond connectivity services in 6G era in a more efficient, sustainable, and innovative ways.

# 4 Objective

This study aims to define a system architecture for 6G mobile networks for improvement of existing services and support of new services, to meet the 6G system requirements as defined by 3GPP SA1 and TSG RAN. The 6G system architecture shall support new 6G RAT and non 3GPP access network.

The study shall follow the principles endorsed in SP-250340 at TSG#107(Mar2025) to create a lean and streamlined standards for 6G, e.g., by dimensioning an appropriate set of functionalities, minimizing the adoption of multiple options for the same functionality, avoiding excessive configurations, etc.

The study shall investigate the requirements, assumptions and high level principles for 6G architecture, taking into account the work of other work tasks. This includes at least the following aspects:

1. Cloud native aspects

2. Sustainability and Energy Efficiency aspects

3. Robustness and Resiliency aspects

4. Architecture simplification aspects

NOTE n: The need to have separated key issue for each aspect will be determined during the study.

The study includes the following work tasks:

**WT#1**: Consolidate the overall standalone 6G architecture to support 6G access network based on the progress of the following work areas and other work tasks:

1. Study whether and how to avoid duplication of functionality in RAN and CN, while maintaining the RAN and CN functionality split.

2. Study support for control signalling for 6G for connectivity and beyond connectivity services, including at least the following:

a. Whether and how to enable the introduction of a new non-access stratum functionality without impacting other non-access stratum functionalities.

b. Whether and how to identify a minimal set of non-access stratum functionalities that does not get impacted by additional non-access stratum functionalities.

c. Whether and how to support a common framework for operator services beyond connectivity services.

3. Study whether and how to enhance the SBA framework (e.g. enhancement on NRF/SCP, use SBI over other interfaces, etc.)

4. Study whether and how to simplify the support for the network slicing in 6G. Rel-15 slicing with potential simplification is the starting point.

5. Study whether and how to enhance the support of the network sharing in 6G, e.g. Multi-Operator Core Network, Indirect Network Sharing, and potential new mechanism.

6. Study whether and how to enhance the existing user plane architecture, while keeping a flexible, and efficient UP handling

7. Study whether and how to enhance/modify the existing QoS/Policy framework, including at least the following:

a. Support of new services (e.g. immersive communication, AI service, etc.) and improved support of existing services

b. Content awareness, elastic efficient and agilely adaptive QoS framework

8. Study whether and how to support a common solution for different non 3GPP access (e.g., Wi-Fi, wireline) and support multi-access data connections.

9. Study how to support essential services (e.g. voice, Messaging, location services, Emergency services, etc.).

10. Study whether and how to enhance the network exposure framework

The conclusion for each work area should:

a. Identify functionalities, NFs etc. that use 5GC NFs as basis and any enhancements.

b. Identify functionalities, NFs etc. that need further study and that may be redesigned

c. Identify new functionalities, e.g. NFs to be added for supporting new features

**WT#2**: Study migration and interworking of 6GS with 5GS and whether and how to support interworking with EPS.

NOTE  n: Interworking with 2G/3G are not considered in this study, but scenarios where the UE in 6G may reselect to 2G/3G and return to 6G will be analysed.

NOTE n: The detailed migration study scope will be coordinated and aligned with RAN

The study also includes the following work tasks to support services beyond connectivity.

**WT#3:** Study the support of AI in 6GS, including at least the following:

1. E2E AI based framework (i.e. AI for Network, Network for AI)

2. Whether and how to introduce the support of AI Agents.

NOTE n: Coordination with SA1 is required.

**WT#4:** Study the common framework for Integrated Sensing and Communication (ISAC) over 3GPP access, considering the sensing modes to be supported and other sources of sensing data.

NOTE n: WT#4 needs to be revisted based on the scoping of SA2 R20 FS\_Sensing\_ARC by TSG SA#108(Jun).

**WT#5:** Study common data framework for all aspects related to efficient and scalable data handling including data collection, distribution, storage data access and data exposure, with consideration of access control/user consent and privacy where relevant. The example of data may include data of AI and Sensing. This WT can also study the any potential enhancement on user consent framework.

NOTE n: Enhancements of user consent and privacy will require coordination with SA3

NOTE n: Data handling for OAM and Charging will require coordination with SA5.

**WT#6:** Study aspects on computing in 6GS, including at least the following:

1. Whether and how to support coordination between UE and core network for compute offloading service.

2. Whether and how to enhance the exposure framework to offer computing service to authorized (third-party) applications.

NOTE n: Application layer mechanism and exposure framework may require coordination with SA6.

NOTE n: Coordination with SA1 is required

NOTE n: No impact on the RAN.

**WT#7:** Study enhancements on IMS architecture, including at least the following:

1. Whether and how to simplify the IMS architecture, including network elements convergence and signaling optimization.

2. Whether and how to enhance the support for existing services, immersive service and Intelligent RTC services communication

NOTE n: Whether WT#7 is part of this study will be determined at TSG SA#108(Jun).

**WT#8:** Study how to support 6G RAT for NTN use cases and TN-NTN service continuity, based on RAN decision for 6G NTN. Existing enablers for NR NTN/ IoT NTN will be the baseline.

**WT#9:** Study how to support cellular IoT enablers in 6G, based on RAN decision for 6G IoT. Existing enablers for cellular IoT in 4G/ 5G will be the baseline. Ambient IoT is not in the scope of the work.

NOTE n: The detailed scope for WT#8 and WT#9 will be coordinated and aligned with RAN

The conclusions of this study will form the basis for the normative work and/or for any further study.

During the study, the progress and results of 3GPP TR 22.870(SA1 study) and TR 38.914(RAN study) shall be taken into account.

NOTE n: The final objectives and the TU for each work task will be determined at SA#110 (Dec 2025), or SA#111(Mar 2026)

# 5 Expected Output and Time scale

***{If this WID covers both stage 2 and stage 3, clearly indicate the different completion dates.}***

|  |
| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
|  |  |  |  |  |  |
| TR | 23.xxx | Study on Architecture for 6G System | TSG#xx(TBD) | TSG#xx(TBD) | {<FamilyName>, <GivenName>, <Company>, <email address>. See Note 2} |

NOTE n: The timeline for the study will be decided at SA#110 (Dec 2025)

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| {e.g. "22.281"} | {Possible values: - either free text (e.g. “CS aspects to be removed") - or “Specification to be withdrawn”} | {e.g. "TSG#89"} | {Free text, e.g. "This TS covers Stage 2" or "This TS covers Stage 3" or "This TS covers both stages 2 and 3"} |
|  |  |  |  |

# 6 Work item Rapporteur(s)

# 7 Work item leadership

SA2

# 8 Aspects that involve other WGs

Potential RAN impact to be covered by RAN WGs.

Potential security impact to be covered by SA3.

Potential multimedia and codecs aspects to be covered by SA4.

Potential charging and OAM impact to be covered by SA5.

Potential specific exposure related aspects to be covered by SA6

# 9 Supporting Individual Members

{At least 4 supporting Individual Members are needed. There is an expectation that these companies will provide resources to progress the work. Note that having 4 supporting companies is a necessary but not sufficient condition: the usual TSG approval process by consensus is needed for the WID approval}

|  |
| --- |
| Supporting IM name |
|  |
|  |
|  |
|  |
|  |
|  |