

3GPP Introduction and 6G Progress Report from TSG SA

Puneet Jain
TSG SA Chair

3GPP – How the project Works

3GPP works based on

- Participation in face-to-face meetings
- Pro-activity & Contributions – you need written proposals to get attention
- Consensus Driven – “no sustained objections”

Work organization

- Study Items (SI), Work Items (WI)
- Releases with fixed time-lines, which are partially overlapping
- [Work Plan](#) (good overview)

3 stages, often overlapping

- Stage 1: Requirements
- Stage 2: Architecture
- Stage 3: Protocols

Companies not individuals participate

- From all over the world
- All major telecommunication companies – operators, vendors, service providers
- Ministries, Regulators, and government agencies actively engaged
- More and more vertical industry representatives bring their work directly to 3GPP

Amazing Track Record

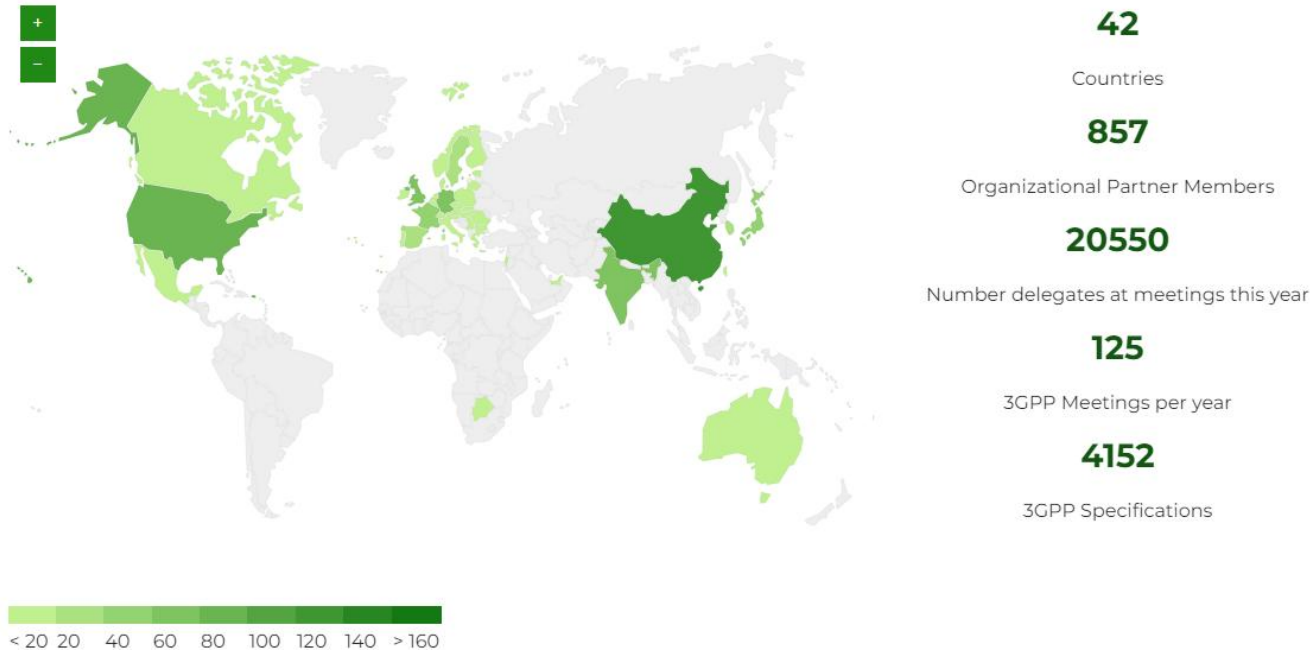
- 3GPP started in 1998, since then all major standard projects have been deployed
- Seamless migration from “old” to “new” mobile generations

A new Release every 15 to 24 months

- Allows for reasonably fast standardization & deployment of new technologies
- Strong commitment to time-lines guarantees reliable planning

3GPP Membership

3GPP Global Membership



The 3GPP Organizational Partners – from Asia, Europe and North America – determine the general policy and strategy of 3GPP.

857 organizations have joined 3GPP via one of these seven OPs.

ARIB

atis

CCSA

ETSI

tsdsi
India's Telecom SDO

TTA

TTC
Telecommunication
Technology
Committee

<https://www.3gpp.org/about-us/partners>

3GPP standards eco-system

3GPP Organizational Partners (OPs)

796 members



- The 3GPP **Organizational Partners (OP)** - 7 Standards Organizations - from China, Europe, India, Japan, Korea and the United States.
- Participation in 3GPP by companies and organizations becoming Members of one of these 7 OPs.
- Inputs on market requirements may come in to the Project via 3GPP **Market Representation Partners (MRP)**.
- There is a lot of additional **external liaison** activity...SDOs, Industry bodies, projects...

3GPP Market Representation Partners (MRPs)



Next Generation Projects

5G Projects



...

Certification Bodies

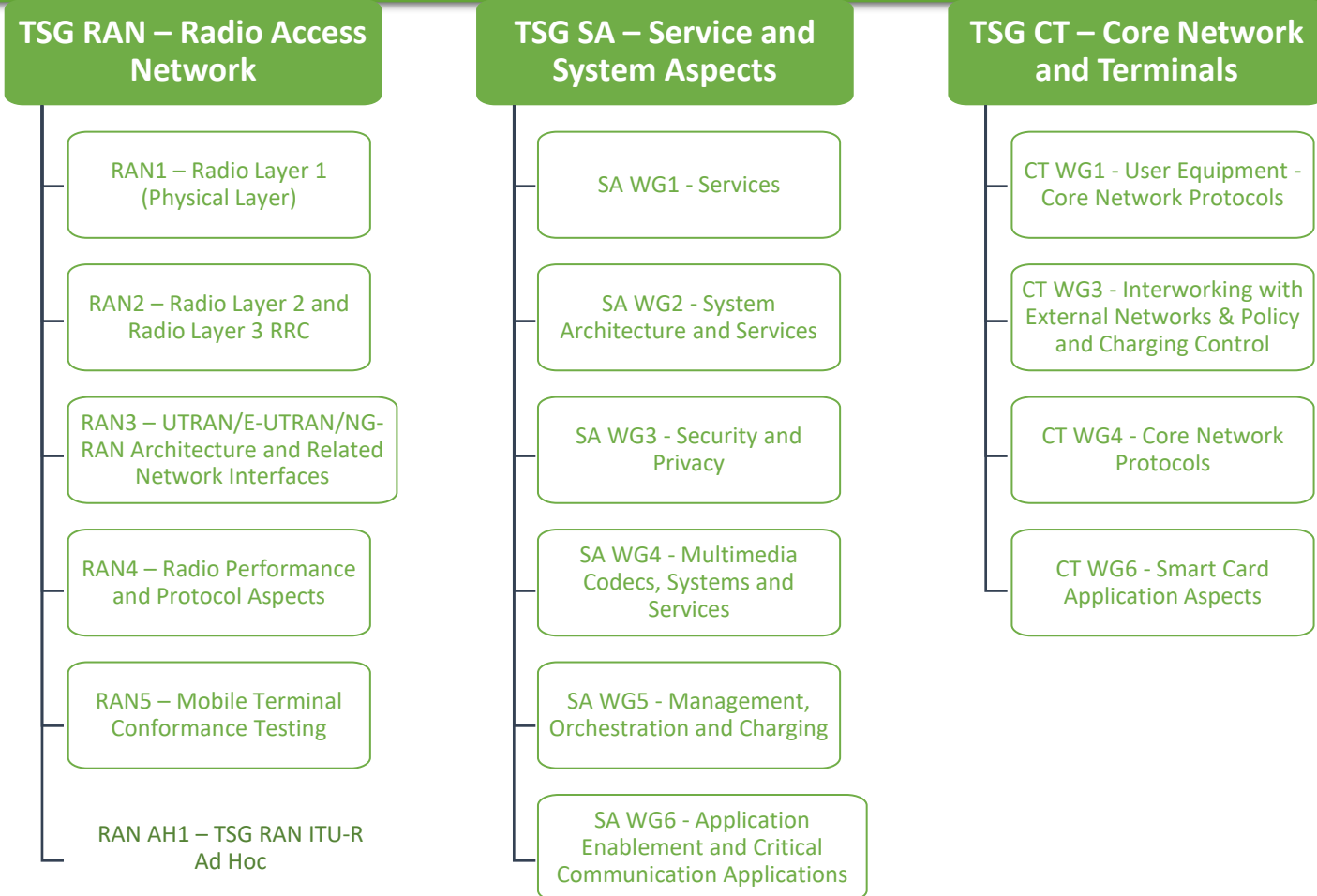


Official Liaisons on specification work:

450 MHz Alliance, AISG, Bluetooth, Broadband Forum (BBF), CableLabs, International Special Committee on Radio Interference (CISPR), CTIA, Digital Video Broadcasting (DVB) Project, Ecma, International, Expert Group for Emergency Access (EGEA), Eurescom, COST 273, European Radiocommunications Committee (ERC), Fixed Mobile Convergence Alliance (FMCA), GCF, Global TD-LTE Initiative (GTD), GPS Industry Council, GSM Association, HomeRF Forum, IDB Forum, IEEE, Internet Engineering Task Force (IETF), IrDA, International Multimedia Telecommunications Consortium (IMTC), Internet Streaming Media Alliance, ISO-ITU expert group, ISO MPEG / JPEG, ITU-T SG2, JAIN tm (Javatm APIs for Integrated Networks), The Java Community Process (JCP), Liberty Alliance Project, Metro Ethernet Forum (MEF), NENA, NGMN (Next Generation Mobile Networks), oneM2M, OMA (Open Mobile Alliance), Open Networking Foundation (ONF), Open IPTV Forum, Object Management Group (OMG), PCS Type Certification Review Board (PTCRB), Portable Computer and Communications Association (PCCA), Presence and Availability Management (PAM) Forum, RSA Laboratories, SDR Forum, Sun Micro Systems Inc., Steerco, SyncML Initiative, Trusted Computing Group (TCG), TeleManagement Forum (TMF), TCCA, TIA /TR45, TIA/TR47, ITU, TV-anytime Forum, Voice eXtensible Markup Language (VXML) Forum, Wi-Fi Alliance, Wireless Broadband Alliance (WBA), WLAN Smart Card Consortium, Wireless World Research Forum (WWRF), World Wide Web Consortium (W3C)

(Source: extract from <https://www.3gpp.org/about-3gpp/15-bodies-with-which-3gpp-has>)

3GPP groups



The Technical Specification Groups (TSGs)

- Three TSGs handle the overall planning and coordination within/between TSGs
- They meet in parallel every quarter, with multi-TSG sessions for coordination of cross-TSG topics
- Approve the work from the WGs

The Working Groups (WGs)

- Each TSG “monitors” a set of WGs
- Sixteen WGs (left) do the technical work
- Submit it to their parent TSG for official approval

Project Coordination Group (PCG)

- Highest decision making body in 3GPP, it meets formally every six months to carry out the final adoption of 3GPP Technical Specification Group work items, to ratify election results and the resources committed to 3GPP (Not shown).

Work Schedule driven by technical meetings

- New work is initiated by member companies as Work Items, via Tdocs at meetings
- Work Items are prioritised and allocated time for discussion during meetings
- 3GPP member companies may contribute to any work item, on equal terms
- 3GPP seeks consensus on all technical matters (but has mechanisms if consensus cannot be reached)
- The Release deadline is respected. Unfinished work is deferred to a later release

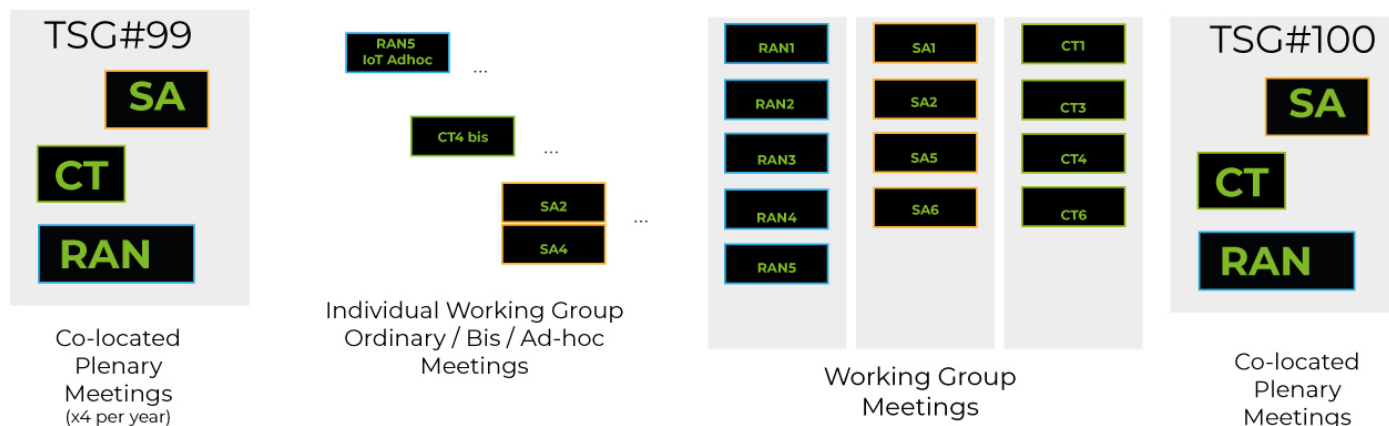
3GPP Meeting Cycle (Q2 example)

March

April

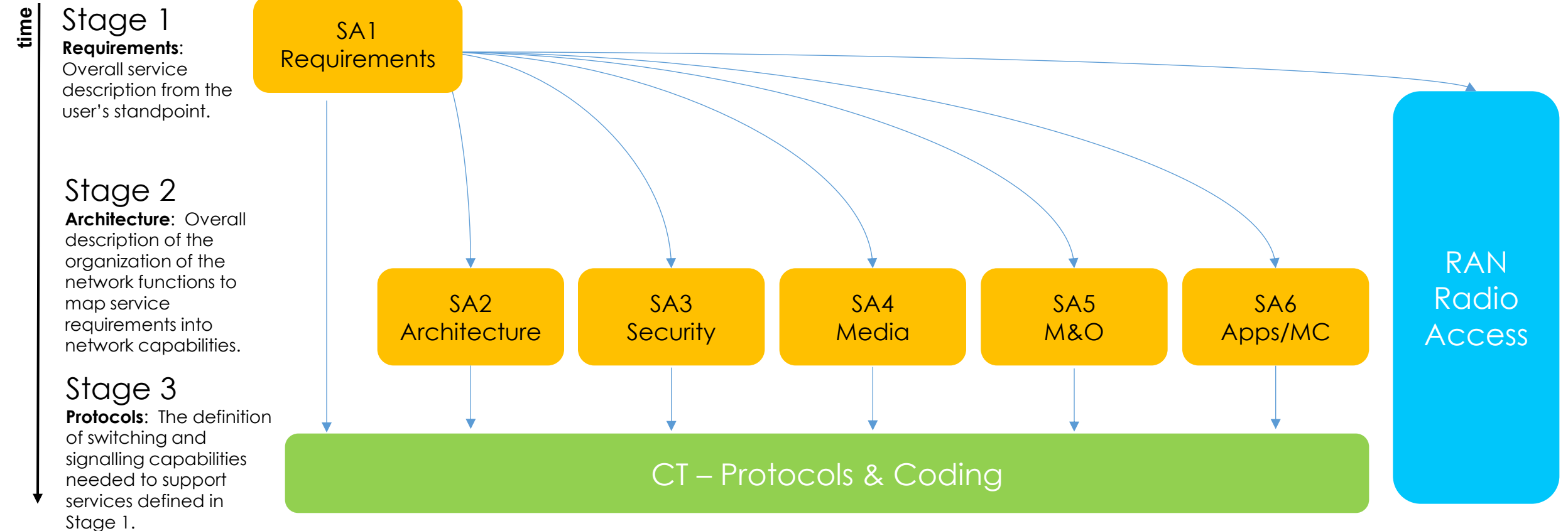
May

June



These examples are to demonstrate the principle and are not based on actual meeting dates.

Three stage approach to Features, through Releases



Overall 3GPP 6G Workplan



2024



Stage-1 workshop on IMT2030 use cases

Rotterdam, Netherland, May 8 – 10, 2024



To bring 3GPP closer to the ongoing initiatives of various global/regional research organizations and MRPs related to the 6G use cases

Workshop Summary: [SWS-240025](#)

Workshop Presentations: [Link](#)



TSGs#107

First 3GPP TSG-wide 6G Workshop

Incheon, S. Korea, March 10 – 11, 2025



To discuss vision & priorities for next generation RAN, system architecture, CN and protocols.

Workshop Summary: [6GWS-250243](#)

Workshop Presentations: [Link](#)



3GPP & O-RAN ALLIANCE Joint Workshop on 6G Coordination

Sophia Antipolis, France, April 24 – 15, 2025



To share high-level information and establish high-level understanding of work split between 3GPP and O-RAN.

Workshop Summary: [3ORW-250035](#)

Workshop Presentations: [Link](#)



Studies for 6G

from Release 20

SA/RAN 6G studies are well underway, targeting completion by Mar 2027 – June 2027



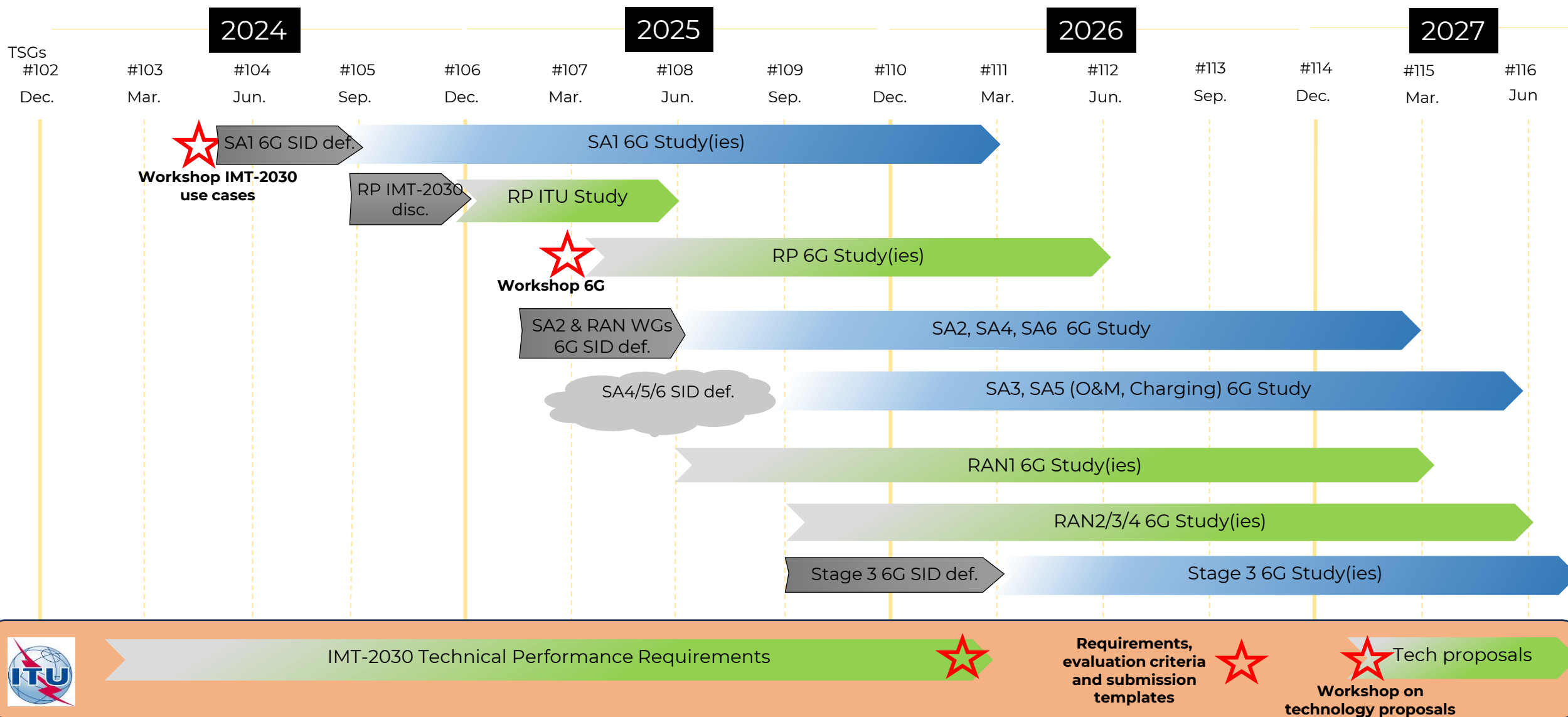
Normative work for 6G

from Release 21

Rel-21 timeline will be finalized in June 2026

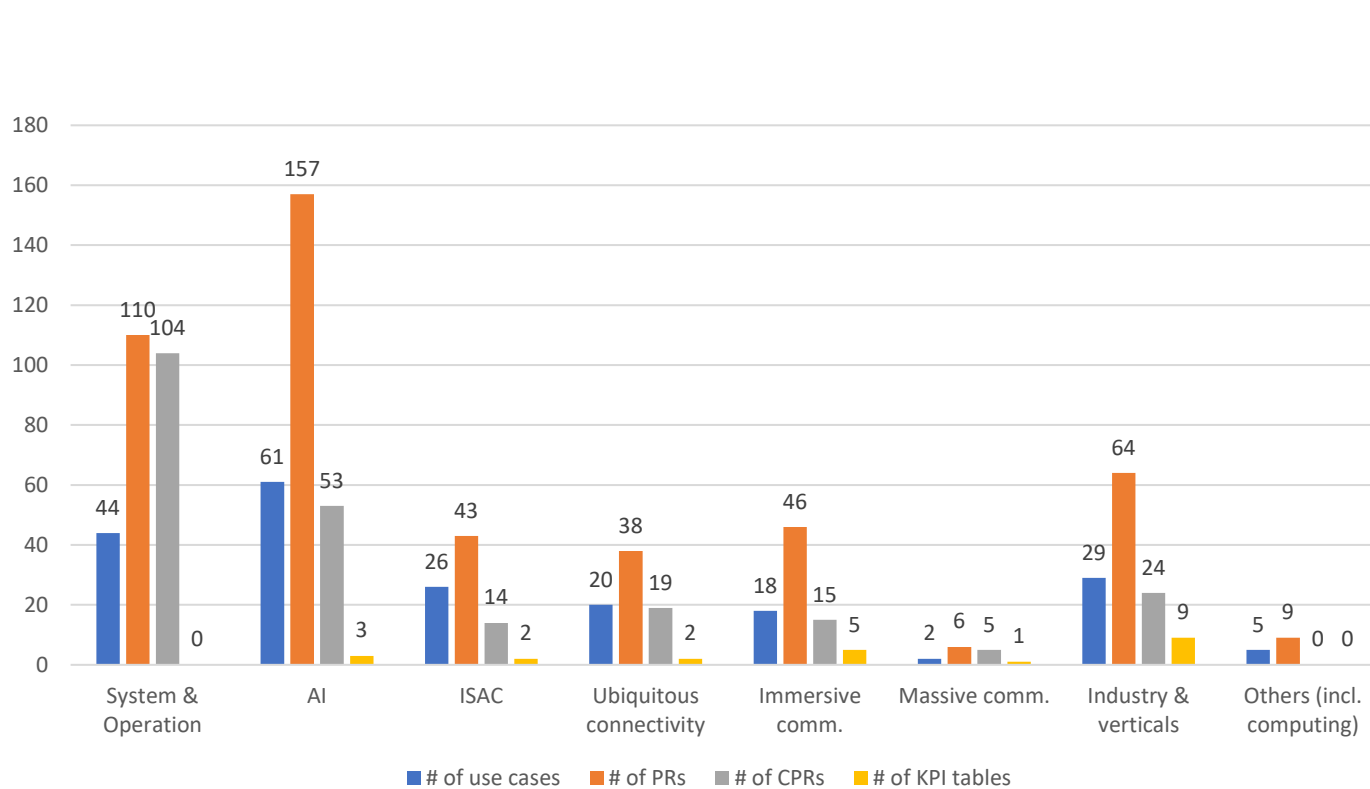
2030

Release 20: 6G Study Item (SI) timeline

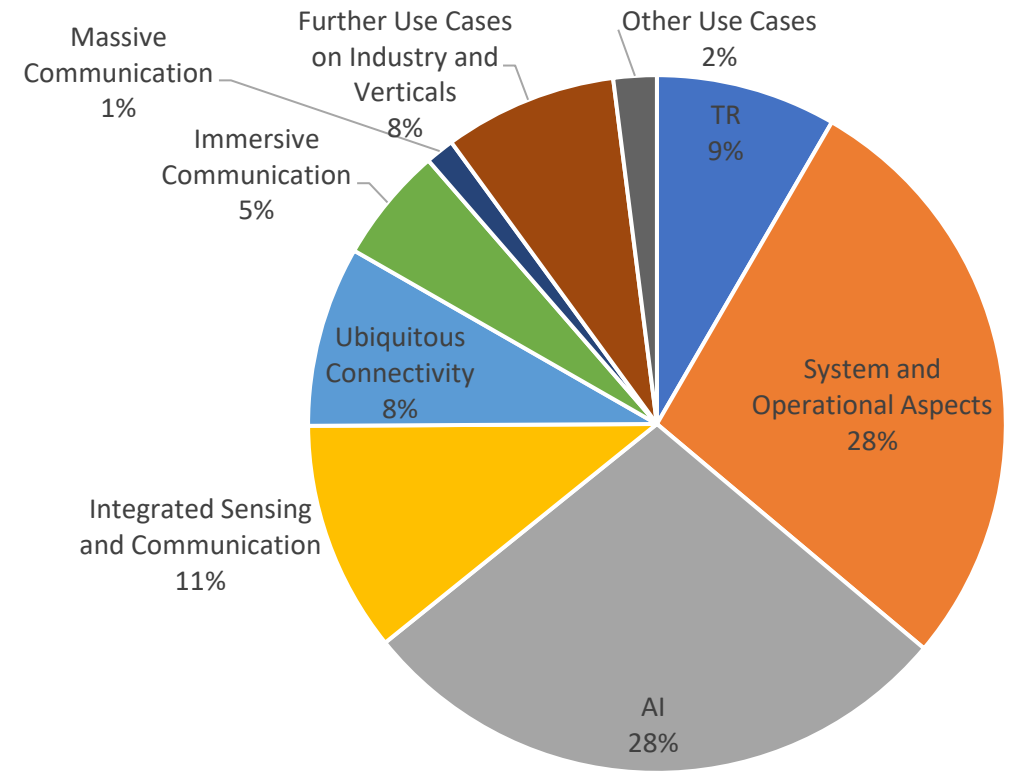


3GPP SA1 6G study (FS_6G_REQ) is complete, TR 22.870 was approved at TSG#111 (Mar 2026)

AI and system and operation aspects are the most heated topics.



Number of use cases and potential requirements per clause



Contribution of SA1#111

- **Twenty-four specific Key Issues have been identified** for investigation, ranging from core network enhancements like QoS and policy, to new capabilities such as AI integration, integrated sensing, and computing support.
- The study uses the **5G Service Based Architecture as a baseline** and assumes the 6G system will natively support both terrestrial and non-terrestrial networks.
- **Various solution variants are currently being documented and evaluated**, including detailed drafts for handling voice services, emergency fallback, location services, and AI agent coordination.
- Work is ongoing to reach interim agreements on these solutions, though **many topics remains FFS** and require coordination with other groups like the RAN working groups.
- SA2 6G architecture study (FS_6G_ARC | TR 23.801-01) is expected to be complete by Mar 2027.

6G Key Issues

Key Issue #	Key Issue Title
#1 	Study the support for control signalling for 6G System
#2 	SBA framework
#3 	Support of Network Slicing in the 6G system
#4 	User Plane Architecture
#5 	QoS Framework for 6G
#6 	Policy and charging control framework
#7 	Network Exposure
#8 	Network Sharing in the 6G system
#9 	Localized Service Access
#10 	FWA / Fixed Wireless Access
#11 	Support of non-3GPP access
#12 	Voice Services for 6G
#13 	Emergency Voice Services for 6G
#14 	Location Services for 6G
#15 	Messaging Services for 6G
#16 	Other Essential/ Regulatory Services for 6G
#17 	Migration and Networking
#16 	Other Essential/ Regulatory Services for 6G
#17 	Migration and Networking
#18 	AI for 6G architecture
#19 	6G Network for AI
#20 	Integrated Sensing and Communication
#21 	6G data framework in SA2
#22 	6G Computing Support
#23 	6G Support of 6G NTN
#24 	Analyse 5GS IoT features and solutions

- The study is **structured around seven primary security areas**: Security Architecture, RAN (Radio Access Network) Security, UE to Core Network Security, Core Network/Interconnect/Roaming Security, Subscription Authentication and Authorization, Network Exposure Security, and Data Collection for Security Monitoring.
- Begun **detailing specific key issues**. Current investigations include defining 6G security domains and trust anchors, structuring the 6G key hierarchy, and handling security contexts during mobility within 6G and between 5G and 6G networks.
- Actively developing a preliminary 6G attacker model** to identify capabilities and threat locations based on the high-level 6G architecture.
- Detailed **risk analyses are being conducted on specific network layers**, such as evaluating potential vulnerabilities **MAC CEs** to determine if they pose novel risks compared to standard attacks like RF jamming.



- The SA4 study on Media Aspects for the 6G System (TR 26.870) **examines media-related opportunities and gaps for 6G**, building on SA1 service requirements and SA2 architectural developments, to ensure media considerations are properly reflected in the 6G system design.
- The study is **structured around agreed work topics** covering media delivery architecture, emerging 6G media technologies, media aspects related to SA2 topics, support for ubiquitous access, and trusted and private media communication.
- The work is **closely coordinated with SA1, SA2, RAN, and SA3**, taking into account progress on AI, sensing, computing, data handling, and QoS, and assessing potential impacts on SA4-related media aspects.
- Initial versions of TR 26.870 establish the scope, assumptions, and work-topic structure; the **study is progressing towards identifying gaps and opportunities** and recommending potential follow-up studies or normative work, aligned with the overall 6G timeline.

Key Work Topics



Media Delivery Architecture

Efficient Streaming & Content Delivery



6G Media Technologies

2D, 3D & Immersive Media



Media Aspects related to SA2 Topics

Core Network & Service Aspects



Ubiquitous Media Access

Seamless Connectivity



Trusted Media Communication

Secure & Private Media

- TR 32.801-01 studies the **evolution of the 3GPP management system towards 6G**, targeting highly autonomous, intelligent, and interoperable management and orchestration, while ensuring continuity with existing 5G management architectures.
- Initial **6G management architecture principles have been defined**, covering service-based management, cloud-native design, multi-vendor interoperability, and support for cross-domain and multi-administrative-domain operation.
- A broad set of **6G management scenarios** has been identified and consolidated, **forming the basis for key feature areas** including Data Management Framework, AI & Autonomous Agents, Network Digital Twin, Intent-Driven Management, Cloud aspects of O&M, and Energy Efficiency.
- The study remains non-normative, with ongoing **consolidation of scenarios, key issues, and solution directions**, intended to inform future SA5 normative work and identify gaps and enhancements needed for 6G management.

Key 6G Management Features



Data Management Framework

Data Handling & Integration



AI & Autonomous Agents

AI-Driven Management



Energy Efficiency

Energy Saving Solutions



Cloud Aspects of O&M

Cloud-Based Operations



Network Digital Twin

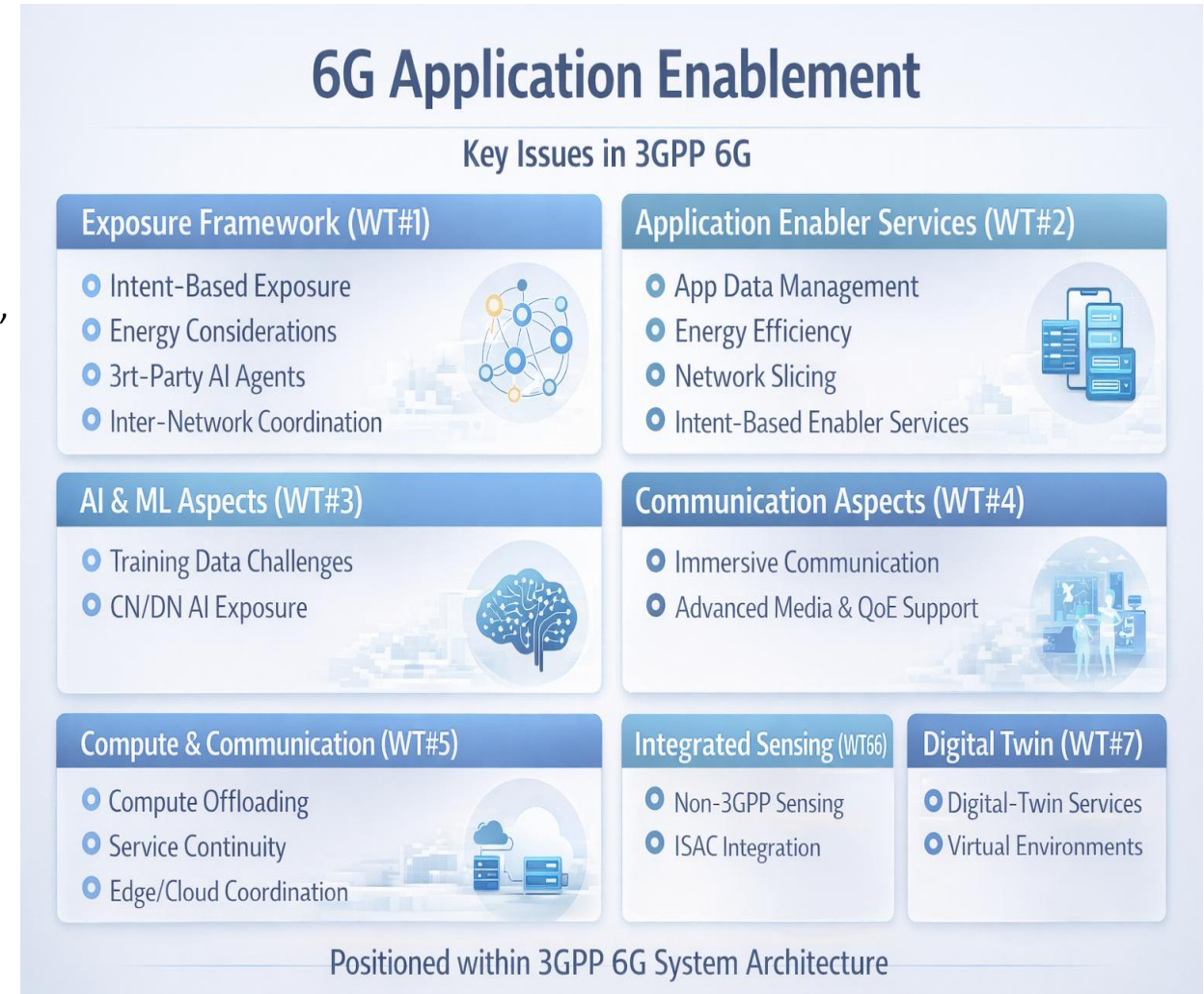
Virtual Network Replica



Intent Driven Management

Policy & Intent Automation

- TR 23.801-02 documents the **SA6 study on 6G application enablement**, addressing how exposure frameworks and application-layer enablers support integration of 3GPP 6G capabilities with applications and verticals.
- The study has **identified and structured key issue areas across seven technical domains** (exposure, enablers, AI/ML, communication, compute, sensing, digital twins), with an additional common aspect on representation within the 3GPP 6G system architecture.
- SA1-driven and **vertical-oriented use cases have been analysed** to clarify applicability of application enablement services and to identify gaps beyond existing 5G mechanisms, particularly for AI-native, sensing-assisted, compute-enabled, and digital-twin services.
- The study has reached a consolidated key-issue and use-case baseline (v0.2.0), intended to guide further cross-WG alignment and to inform potential normative work on 6G application enablement and exposure in subsequent releases.



3GPP 6G Studies progress snapshot

UID	Name	Acronym	Rel	WG	Target	Prog.	WID	Impacted_TSs_and_TRs
1110085	6G Service Requirements	6G-REQ	Rel-21	S1	March 27	0%	SP-260323	22.270 (new); 22.228; 22.137; 22.101; 22.156; 22.173
1050110	Study on 6G Use Cases and Service Requirements	FS_6G_REQ	Rel-20	S1	March 26	100%	SP-241391	22.870
1060079	Study on 6G Scenarios and Requirements	FS_6G_RAN_Scen_Req	Rel-20	RP	June 26	90%	RP-251395	38.914
1080057	Study on Architecture for 6G System	FS_6G_ARC	Rel-20	S2	March 27	30%	SP-251633	23.801-01
1080072	Study on 6G Radio	FS_6G_Radio	Rel-20	R1	June 27	19%	RP-260282	RANP: 38.960; RAN1: 38.760-1; RAN2: 38.760-2; RAN-3: 38.760-3; RAN-4: 38.760-4
1100019	Study on 6G Application Enablement	FS_6G_APP	Rel-20	S6	June 27	10%	SP-251688	23.801-02
1090044	Study on Security for the 6G System	FS_6G_SEC	Rel-20	S3	June 27	10%	SP-251233	33.801-01
1100010	Study on Media Aspects for 6G System	FS_6G_MED	Rel-20	S4	March 27	9%	SP-251652	26.870
1090013	Study on Charging Aspects of 6G System	FS_6G_CH	Rel-20	S5	June 27	25%	SP-251708	32.801-02
1100014	Study on 6G Management and Orchestration	FS_6G_OAM	Rel-20	S5	June 27	5%	SP-251653	32.801-01
1100011	Study on Lawful Interception for 6G	FS_6G_LI	Rel-20	S3LI	Dec. 27	0%	SP-251651	33.801-06
1110045	Study on MC architecture evolution and 6G capabilities for MC service	FS_MCX_MC	Rel-20	S6	June 27	0%	SP-260342	23.801-03
1090028	Study on supporting AEAD algorithms	FS_AEAD	Rel-20	S3	Sep. 26	40%	SP-251247	33.771
1080045	Study on Transitioning to Post Quantum Cryptography in 3GPP	FS_CryptoPQC	Rel-20	S3	June 26	70%	SP-250858	33.703
1110004	Study on Control Plane Protocols in Core Network of the 6G System	FS_6G_CPCN_CT	Rel-20	C4	Sep. 27	0%	CP-260165	29.840
1110005	Study on Protocol aspects for User Plane in Core Network of 6G System	FS_6G_UPCN_CT	Rel-20	C4	Sep. 27	0%	CP-260166	29.841
1110006	Study on Resilience and Reliability in Core Network of the 6G System	FS_6G_ResRel_CT	Rel-20	C4	Sep. 27	0%	CP-260167	29.842
1110088	Study on NAS protocol for 6G System	FS_6G_NAS_CT	Rel-20	C1	Sep. 27	0%	CP-260171	24.860

Latest version of 3GPP work plan (post TSG#111) is available here: [3GPP Work Plan](#)

Latest Draft of TR/Ts is available here: <https://www.3gpp.org/ftp/Specs/latest-drafts>



6G Normative work

IMT-2030 submission and normative work for 6G in 3GPP are expected to start from Release 21

- Release 21 is expected to produce the 1st set of 3GPP 6G technical specifications, and will be the release for IMT-2030 submission before 2030
- Release 21 is expected to be delivered with a single drop (i.e., a single code freeze)



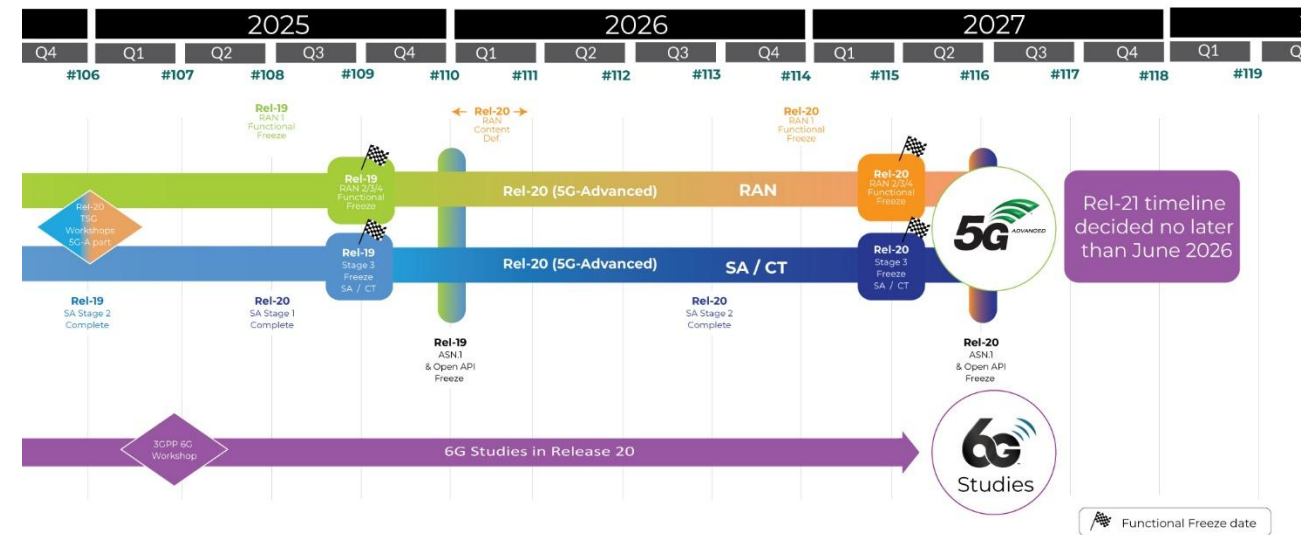
Release 21 timeline

Rel-21 (5G-Adv and 6G)

- 5G-A/6G Package Approval: Mar 2027
- Stage-1 freeze : Mar 2027
- Stage-2 freeze : June 2028 (100%)
 - Stage-2 80% completion checkpoint: Mar 2028
- Stage-3 freeze : Dec 2028
- ASN.1/OpenAPI freeze: Mar 2029

Concluding thoughts

- 3GPP is industry driven - Standardization of interfaces enables an interoperable, multi-vendor approach to deployment.
- 3GPP is contribution driven and require active participation by 3GPP individual members. 3GPP also allow Observer/Guest participation, but they cannot take part in decision making.
- The 3GPP processes are necessarily complex, but we will adapt to bring new sectors into the work.
- Rel-20 adopts a dual-track approach, advancing 5G-Advanced normative work while launching 6G studies under Rel-20_6G.
- The SA1 6G service requirements study is 100% complete. Other SA WG are making good progress on 6G studies on Architecture, Security, O&M, Charging, Media, and Application Enablement aspects.
- Release 21 will mark the start of normative 6G work and IMT-2030 submission preparation with ASN.1/OpenAPI freezes targeted for March 2029.



Thank You!



Puneet Jain
3GPP TSG SA Chair
puneet.jain@intel.com
www.3gpp.org