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India's Telecom SDO

Telecommunications
Standards Development
Society, India

Years of developing ICT Standards

3GPP & ITU-R
Induction Program on TSDSI
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3GPP

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3GPP and its Scope

- 3GPP, 3rd Generation Partnership Project is an industry collaboration that develops and manages the standards for the mobile communications systems.
- Global standards organization for mobile communication
- 800+ Companies from all over the world actively participating
- A new Release every 15 to 24 months
- A new Generation every 10 years – 3G/UMTS, 4G/LTE, 5G
- Standards for all sectors of mobile communication – VoLTE, NB-IoT
- 19 Working Groups & TSGs
- Contribution driven
- Consensus based

Scope:
3GPP, 3rd Generation Partnership Project manages a variety of standards, and essentially it looks after the standards that have come out of GSM and UMTS. These include:

- GSM and related 2G / 2.5G standards including GPRS and EDGE.
- UMTS and related 3G standards including HSPA
- LTE and related 4G standards
- 5G and beyond standards

3GPP organisational partners (1/2)

- 3GPP has a set of organisational partners. These are essentially regional standards institutions.
- Organizational Partnership is open to any Standards Organization, irrespective of its geographical location, which has:

- A national, regional or other officially recognized status and the capability and authority to define,
- publish and set standards within the 3GPP scope, in that nation or region
- An Intellectual Property Rights (IPR) Policy which is compatible with those of the Organizational Partners
- Committed itself to all or part of the 3GPP scope
- Signed the Partnership Project Agreement
- Standards Organizations may apply to become an Organizational Partner by writing to any ofthe existing Organizational Partners.

- These organisational partners determine the general policy and strategy of 3GPP as well as undertaking a number of other specific tasks.

3GPP organisational partners (2/2)

There are currently 7 Organizational Partners of 3GPP

3GPP ORGANIZATIONAL PARTNERS		
ORGANIZATION	**ORIGINATING REGION**	Country
ARIB	Association of Radio Industries and Businesses	Japan
ATIS	Alliance for Telecommunications Industry Solutions	USA
CCSA	China Communications Standards Association	China
ETSI	European Telecommunications Standards Institute	Europe
TSDI	Telecommunications Standards Development Society India	India
TTA	Telecommunications Technology Association	Korea
TTC	Telecommunication Technology Committee	Japan

Individual Members, Observers and Guests (1/2)

Individual Members

- It is essential to take individual membership of 3GPP to take part in Standard development of 3GPP.
- All entities registered as members of an Organizational Partner and eligible for participation in the technical work of that Organizational Partner, can become Individual Members of 3GPP if they are committed to support 3GPP and:

- To contribute technically or otherwise to one or more of the Technical Specification Groups within the 3GPP scope

- To use the 3GPP results to the extent feasible

- An Individual Member has the right to participate in the work of 3GPP by attending meetings of the technical Specification Groups and subtending groups.

Individual Members, Observers and Guests (2/2)

Observers and Guests

- The status of Observer may be granted by the Organizational Partners to an entity which has the qualifications to become a future Partner
- An Observer may send a single representative to an Organizational Partners or PCG meeting. An Observer may also have representatives at TSG meetings. Observers shall not take part in decision making or hold any leadership positions
- Additional participation rights of an Observer shall be decided by the Organizational Partners on a case-by-case basis
- The status of **Guest** may be granted for a limited period, by the Organizational Partners to an entity which has the qualifications to become a future Individual Member. The limited period shall be decided by the Organizational Partners on a case-by-case basis

Market Representation Partners (MRPs)

MRP is an entity which has the ability to offer market advice to 3GPP and to bring into 3GPP a consensus view of market requirements (e.g., services, features and functionality) falling within the 3GPP scope:

- Does not have the capability and authority to define, publish and set standards within the 3GPP scope, nationally or regionally
- Has committed itself to all or part of the 3GPP scope;
- Has signed the Partnership Project Agreement.

Currently, there are over 20 MRPs associated with 3GPP

3GPP Eco-System

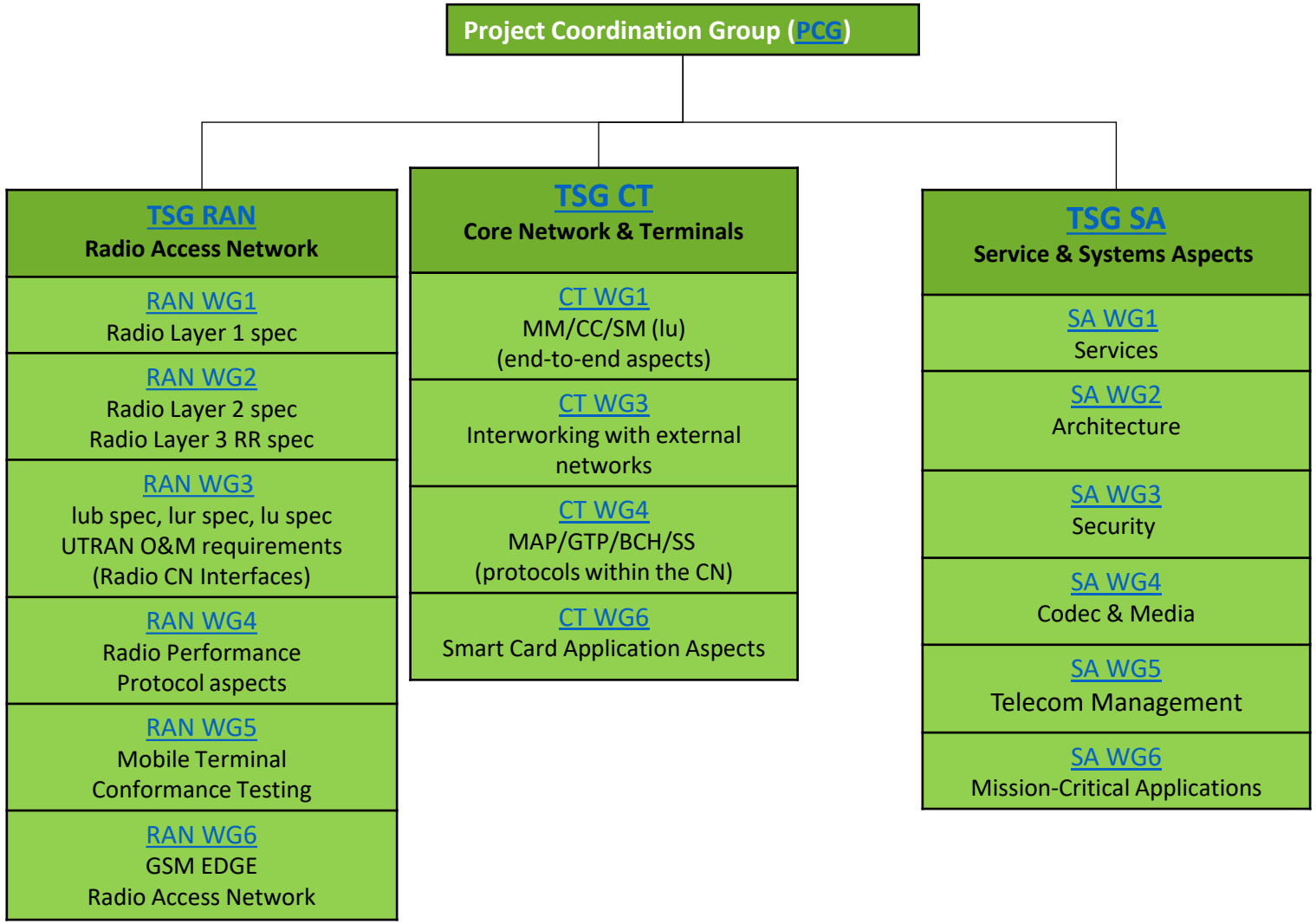
The 3GPP Organizational Partners (OP) are the seven Standards Developing Organizations (SDOs) - from China, Europe, India, Japan, Korea and the United States.

Participation in 3GPP is made possible by companies and organizations becoming Individual Members (IM) of one of the OPs.

Specific inputs, in the form of market requirements may also come in to the Project via any of the twenty Market Representation Partners (MRP) in 3GPP. These organizations have all signed up to the 3GPP Project scope and objectives.

Lots of external cooperation with other standards bodies and a broad variety of other groups, by way of formal Liaisons.

3GPP Organization Structure



- 3GPP – The 3rd Generation Partnership Project (“the project”)
- PCG – Coordination of 3GPP by the Organizational Partners (OPs)
- Technical Specification Groups (TSGs) covering different aspects of 3GPP system & process
- TSGs are organized into Working Groups (WGs)
- TSGs meet 4 times a year in the so-called “Plenary meetings” (co-located)
- WGs meet once or more per plenary cycle (mostly not co-located)
- Each TSG and each WG elects its own leadership (2year terms / 2 terms)
- **Technical work is mostly done in WGs**
- **Overall planning and coordination in TSGs**
- **Individual Members (IMs) participate in TSG and WG (TSDSI-19 IMs)**

Project Co-ordination Group

- PCG – Coordination of 3GPP by the Organizational Partners (OPs)
- The Project Co-ordination Group (PCG) meets about twice a year
- Discussion takes place electronically between meetings
- Final Adoption of TSG work items
- Highest Decision-making body
- Determines overall time frame and manages work progress in TSG
- Handles appeal from individual members on procedural or technical matters referred to them

Technical Specification Groups

- The Technical Specification Groups meet in series/parallel (TSGs CN, RAN, CT in parallel followed by TSG SA). They meet four times per year: in March, June, September and December
- The TSGs have the authority to approve their own specifications
- TSG SA undertakes a co-ordination role across all TSGs
- WGs meet 1 or 2 times between TSG meetings
- WGs have varying participation which may exceed 350 for some WGs and handle up to 1300 technical documents in a meeting
- Preparation of detailed time frame and management of detailed work progress
- Proposal and approval of work items within the agreed scope and terms of reference of the TSG
- Handling of appeals from individual members on technical matters

TSG RAN

- The RAN or Radio Access Network specifications groups are known as TSG RAN. This is split into six working groups: RAN WG1 to RAN WG6. Often these are shortened to just RAN1 to RAN6.
- The TSG RAN is responsible for the definition of the functions, requirements and interfaces associated with the radio access network, i.e. UTRA / E-UTRA in both FDD and TDD modes.
- TSG RAN encompasses both user equipment and base station functionality addressing areas including radio performance, physical layer, layer 2 and layer 3 RR specification in UTRAN/E-UTRAN; specification of the access network interfaces (Iu, Iub, Iur, S1 and X2); definition of the O&M requirements in UTRAN/E-UTRAN.
- TSG RAN also addresses the conformance testing of both the UE and the Base Stations to ensure complete interoperability regardless of the manufacturer / designer of the equipment.

TSG SA

- The Service and System Aspects Working Group is known as TSG SA.TSG SA is responsible for the overall architecture and service capabilities of systems and, as such, has a responsibility for cross TSG co-ordination.
- There are six working groups known as SA WG1 to SA WG6. Again these are often referred to as just SA1 to SA6.
- Each working group is responsible for a different area of the services and systems: SA1 - Services; SA2 - Architecture; SA3 - Security; SA4 - Codec; SA5 - Telecom management; and SA6 - Mission critical applications.

TSG CT

- The TSG CT is the working group that addresses the Core Network and Terminals.
- In this role it is responsible for specifying terminal interfaces (logical and physical), terminal capabilities (such as execution environments) and the Core network part of 3GPP systems.

3GPP at a Glance

26+
Years driving 2G, 3G, 4G and 5G standards

2000+
Man-years in cumulative meeting time

>2K
Active technical specifications

800+
Individual member companies

100,000s
Member-driven technical contributions

16
Specialized technical working groups

3GPP Process (1/3)

How It Works…?

3GPP works based on

- Participation in face-to-face meetings
- Pro-activity & Contributions – you need written proposals to get attention
- Consenus

Work organization

- Study Items, Work Items
- Releases with fixed time-lines, which are partially overlapping

3 stages, often overlapping

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

Around 700 Companies actively participate in the 3GPP work

- From all over the world
- All major telecommunication companies – operators, network/device/chipset vendors
- More and more vertical industry representatives bring their work directly to 3GPP

Amazing Track Record

- 3GPP started 1998, since then all major standards projects were deployed
- E.g. 3G/UMTS, 4G/LTE, VoLTE/IMS, NB-IoT, 5G
- Seamless migration from “old” to “new” technology generations

A new Release every 15 to 24 months

- Allows for resonably fast standardization & deployment of new ideas
- Strong commitment to time-lines guarantees reliable planning and time-to-market
- New technologies get easily introduced (IP, IoT, AI ...)

3GPP Process (2/3)

Some 3GPP Terms explained…

- **Feature:**
  New or substantially enhanced functionality which represents added value to the existing system
  Complex features may be broken down into building blocks
  Study Items (SI) and Work Items (WI) are created

- **SI**:
  Feasibility study to analyze the market and potential technical difficulties of a given service or approach.
  The results may be made available in a TR (technical report).

- **WI**:
  The actual specification development for a new feature and/or a building block. Produces TS (technical specification).
  WI may cover more than one specification within TSG and more than one TSG

- **Releases:**
  Specifications grouped together

3GPP Process (3/3)

Some 3GPP Terms explained…

CR (Change Request):

- Once a TS or TR has become sufficiently stable and has been approved by the TSG, a version x.0.0 is produced and put under change control
- A CR may be raised by any individual and brought to the attention of the responsible Working Group
- The TSG Secretary shall collate all CRs approved by the WGs of that TSG and shall bring them to the TSG for approval
- Following approval at TSG level, the changes are incorporated, and new version of the specification shall then be made available

"Freezing" of specifications:

- A TSG may decide that a specification is sufficiently stable that it may be considered "frozen“
- After "freezing", a Release can have no further additional functions added. However, detailed protocol specifications (stage 3) may not yet be complete. A "frozen" Technical Specification is one which can have no further new or modified functionality Change Requests
- Only CRs for essential corrections of errors shall be considered

Benefits of becoming member of 3GPP (1/2)

- 3GPP is a technology collaboration platform where organizations from all over the world with experts in various aspects of international mobile telecommunications participate.
- The working groups of 3GPP deal with a large variety of technology topics which have synergy with various related technological development undertaken by the R&D and manufacturing organizations in India.
- Participation in 3GPP allows opportunity to get exposure to most advanced mobile communication technologies and the entire ecosystem around that.

Benefits of becoming member of 3GPP (2/2)

- This provides opportunity to make contributions in the development of advance technologies and incorporation of IPRs in the international standards. Thus, Indian requirements can also become part of International standards.
- As an example, NAVIC system of ISRO became part of the 3GPP standards due to the contributions made by TSDSI members of 3GPP.The handset manufacturers will introduce NAVIC facility in the headsets as we have the GPS facility today.
- Since, most of the large organizations in the area of equipment manufacturers, chip manufacturers, power amplifier manufacturers, R & D organizations, telecom service providers are part of 3GPP, it provides opportunity to explore one to one or one to many collaborations not only for development of standards but also for commercial purposes.

Intellectual Property Rights (IPR) Policy

- Individual Members shall be bound by the IPR Policy of their respective Organizational Partner
- Individual Members should declare at the earliest opportunity, any IPRs which they believe to be essential, or potentially essential, to any work ongoing within 3GPP. Declarations should be made by Individual Members to their respective Organizational Partners
- Organizational Partners should encourage their respective members to grant licenses on fair, reasonable terms and conditions and on a non-discriminatory basis

Contribution in 3GPP meetings (1/5)

EOL account

- Opening of EOL account is a pre-requisite for participation in the 3GPP TSG or working groups

Opening of EOL Account on 3GPP website after becoming 3GPP IM

Selection and Registration for the meeting you are interested in attending from the meeting calendar using your EOL Account credentials.

Same EOL account can be used for accessing the non-public meeting documents.

Refer to the attached document for 3GPP EOL account creation process

Process for
:ing 3GPP EOL Acc

Contribution in 3GPP meetings (2/5)

- Important to be familiar with the working procedures of 3GPP
- Important to be aware of the ongoing work in general but very carefully in WG/WGs of interest
- Important to note that:
    - Topics of work in WGs are frozen as a part of the Release content at TSG level
    - Proposals for normative work and study work against the topics can be approved at the time of release freeze or later and will also be limited by available time and priority of work
- Choose the topic of your interest, collaborate with supporters of proposal and submit in template. For a new proposal minimum 4 supporters are required

Contribution in 3GPP meetings (3/5)

- Check the Calendar of meetings of the Working Groups of your interest

  https://www.3gpp.org/3gpp-calendar/3gpp-calendar
- Choose the topic of your interest, collaborate with supporters of proposal and submit in template
- Subscribe to the email list of that working group to receive emails for meeting documents etc.
- The process for subscription to various mailing list is available at https://www.3gpp.org/specifications-groups/e-mail-lists

Contribution in 3GPP meetings (4/5)

Templates

- 3GPP Work Item Description Template

WID Template

- 3GPP Temporary Document Template

TDoc Template

Contribution in 3GPP meetings (5/5)

Log in to 3GPP portal https://portal.3gpp.org/#/

Go to the meeting you have registered and click on the 3 dots in the end.

Click on "contribute to meeting"

Fill in the details asked for and obtain the generated TDoc number.

Add the TDoc number to your contribution.

Important Links

- About 3GPP https://www.3gpp.org/about-3gpp/about-3gpp
- 3GPP User (3GU) Portal http://portal.3gpp.org
- 3GPP FAQ https://www.3gpp.org/about-3gpp/3gpp-faqs
- 3GPP News http://www.3gpp.org/news-events
- 3GPP TSG SA – Home http://www.3gpp.org/specifications-groups/sa-plenary/sa-plenary/home
- 3GPP Working Procedures http://www.3gpp.org/ftp/Information/Working_Procedures/3GPP_WP.pdf
- Liaison Statements https://www.3gpp.org/specifications-groups/liaison-statements
- Current List of Work Items : https://www.3gpp.org/DynaReport/GanttChart-Level-2.htm

ITU

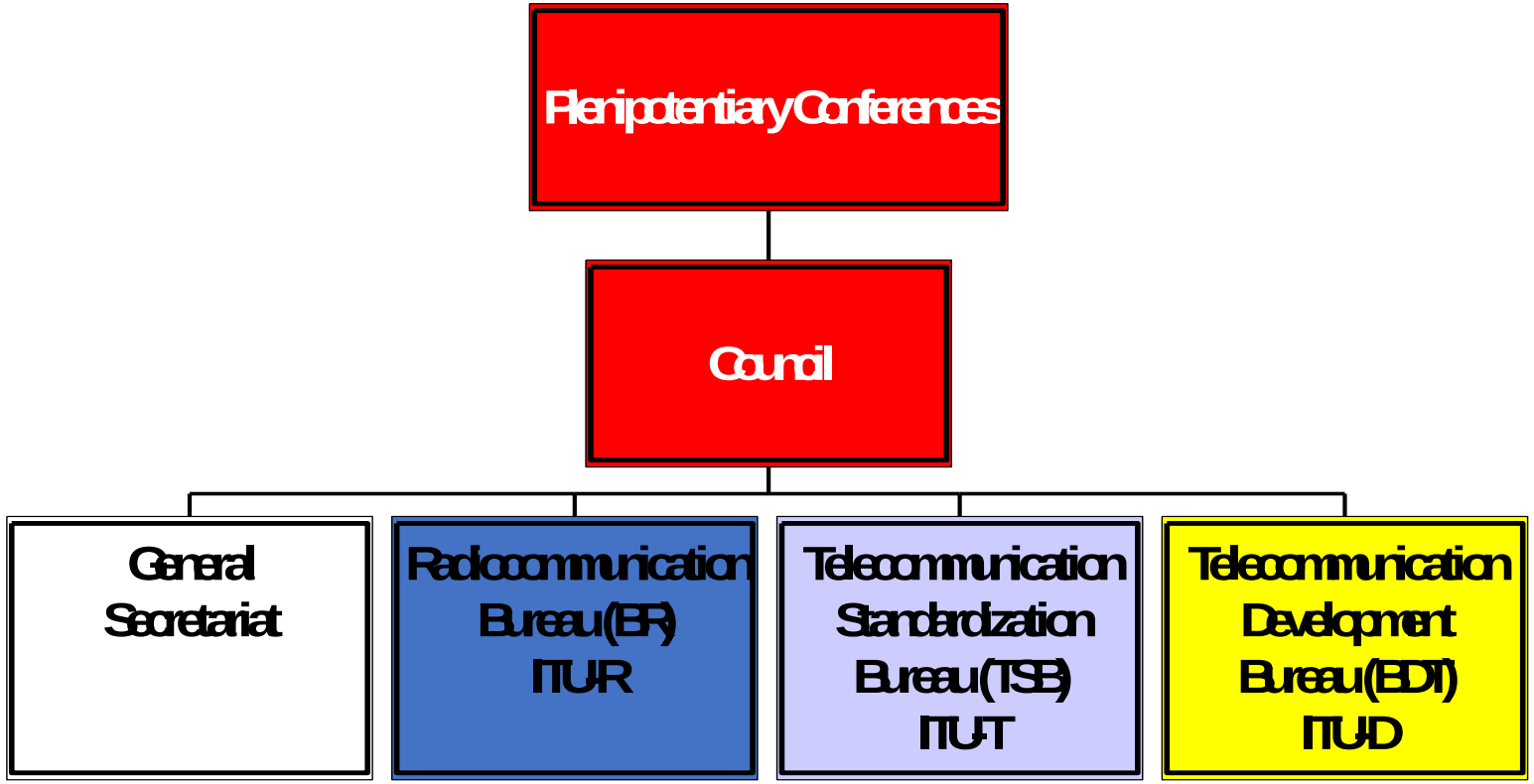
International Telecommunication Union: Introduction (1/2)

- Created in 1865 as International Telegraph Union, based in Geneva, 193 Member States, around 800 private-sector entities and academic institutions, 12 Regional offices
- **ITU is the United Nations specialized agency for information and communication technologies – ICTs since 1947: ITU Convention**
- 3 ITU Sector:
  - ITU-R - Radiocommunications -> *global radio spectrum management and radiocommunication standardization,* World Radio Conference (**WRC)-**Radio Regulations
  - ITU-T - Standardization –> *standardization of non-radio networks, service aspects,* World Telecom Standardization Assembly (**WTSA)**
  - ITU-D – Development –> *assistance in the extension of ICTs to all the world's inhabitants, narrowing the digital divide,* World Telecom Development Conference (**WTDC)**
  - *4year standards development Cycle*

International Telecommunication Union: Introduction (2/2)

Main purposes: to promote the use of telecommunications worldwide and the extension of the benefits of the new technologies to all world's inhabitants.

Organisational Structure



ITU - Types of Membership

- **Member States** – All the three sectors of ITU and voting rights
- **Sector Members** – Sector-R and/or Sector-T and/or Sector-D. Have the right to participate in all activities in ITU, including chairing groups, take part in consensus-based decisions, and make contributions to all meetings.
- **Associate Members** – Participate in only one Study Group from one sector, and cannot take part in the decision-making process.
- **Academia Members** – Access to all the learning resources of all the three sectors. No voting rights/ cannot take part in the decision-making process.
- **Exempted Entities** – Members with a limited scope of access to ITU activities.

ITU-D Study Groups

The broad objectives of the ITU-D are:

- Promote the extension of the benefits of ICTs to all the world's inhabitants
- Assist countries in facilitating the mobilization of technical, human and financial resources needed for their implementation, as well as in promoting access to ICTs.
- Participate in actions that contribute towards narrowing the digital divide.
- Develop and manage programs that facilitate information flow geared to the needs of developing countries.
- ITU-D has two Study Groups:
- **Study Group-1"Enabling environment for the development of telecommunications/ICTs"**
- **Study Group-2 "ICT services and applications for the promotion of sustainable development".**

ITU-T Study Groups

- SG2 – Operational Aspects
- SG3 - Economic and policy issues
- SG5 - Environment and circular economy
- SG9 - Broadband cable and TV
- SG11 - Protocols and test specifications
- SG12 - Performance, QoS and QoE
- SG13 - Future networks, with focus on IMT-2020, cloud computing and trusted network infrastructure
- SG15 - Transport, access and home
- SG16 - Multimedia
- SG17 - Security
- SG20 - IoT, smart cities & communities

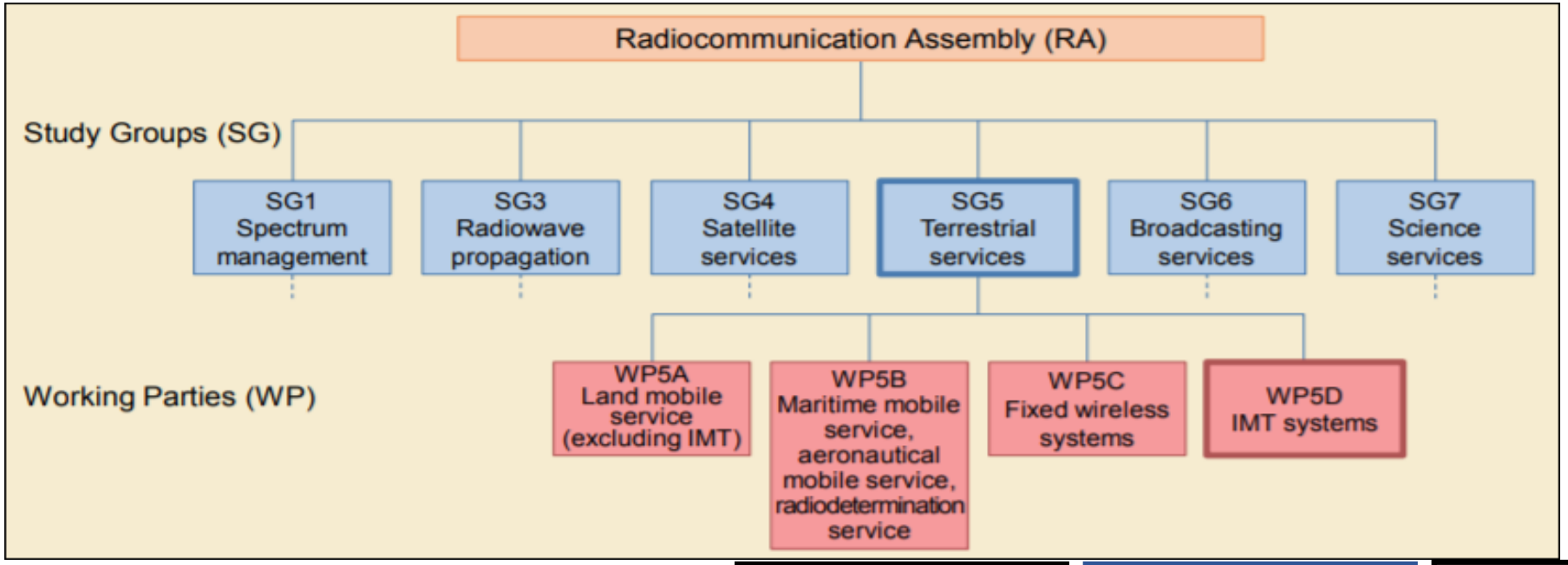
ITU-R Study Groups (1/2)

- **Study Group 1 (SG 1) Spectrum management**
- Spectrum management principles and techniques, general principles of sharing, spectrum monitoring, long-term strategies for spectrum utilization, economic approaches to national spectrum management, automated techniques.
- Three Working Parties (WPs) carry out studies on Questions assigned to Study Group (SG) 1
- **Study Group 3 (SG 3) Radio wave propagation**
- Propagation of radio waves in ionized and non-ionized media and the characteristics of radio noise, for the purpose of improving radiocommunication systems.
- Four Working Parties (WPs) carry out studies on the Questions assigned to Study Group (SG) 3:
- **Study Group 4 (SG 4) Satellite services**
- Systems and networks for the fixed-satellite service, mobile-satellite service, broadcasting satellite service and radiodetermination-satellite service.
- Three Working Parties (WPs) carry out studies on Questions assigned to Study Group (SG) 4:

ITU-R Study Groups (2/2)

- **Study Group 5 (SG 5) Terrestrial services**
- Systems and networks for fixed, mobile, radiodetermination, amateur and amateur-satellite services.
- Four Working Parties (WPs) carry out the studies on Questions assigned to Study Group (SG)
- **Study Group 6 (SG 6) Broadcasting service**
- Radiocommunication broadcasting, including vision, sound, multimedia and data services principally intended for delivery to the general public.
- Three Working Parties (WPs) carry out studies on Questions assigned to Study Group (SG) 6.
- **Study Group 7 (SG 7) Science services**
- “Science services” refer to the standard frequency and time signal, space research (SRS), space operation, Earth exploration-satellite (EESS), meteorological-satellite (MetSat), meteorological aids (MetAids) and radio astronomy (RAS) services.
- Four Working Parties (WPs) carry out studies on Questions assigned to Study Group (SG) 7

ITU-R Study Group Structure



GENERAL ASPECTS | TECHNOLOGY ASPECTS | SPECTRUM ASPECTS

WP 5D is responsible for the overall radio system aspects of the terrestrial component of International Mobile Telecommunications (IMT) systems, comprising the current IMT-2000, IMT-Advanced and IMT-2020.

Thank You