



International Network Generations Roadmap

-2021 Edition-

Standardization Building Blocks



An IEEE 5G and Beyond Technology Roadmap
futurenetworks.ieee.org/roadmap

Wi-Fi® and Wi-Fi Alliance® are registered trademarks of Wi-Fi Alliance.

The IEEE emblem is a trademark owned by the IEEE.

"IEEE", the IEEE logo, and other IEEE logos and titles (IEEE 802.11™, IEEE P1785™, IEEE P287™, IEEE P1770™, IEEE P149™, IEEE 1720™, etc.) are registered trademarks or service marks of The Institute of Electrical and Electronics Engineers, Incorporated. All other products, company names, or other marks appearing on these sites are the trademarks of their respective owners. Nothing contained in these sites should be construed as granting, by implication, estoppel, or otherwise, any license or right to use any trademark displayed on these sites without prior written permission of IEEE or other trademark owners.

Copyright © 2021

This edition of the INGR is dedicated to the memory of Earl McCune Jr., who left us tragically and too soon on 27 May 2020. Earl was a microwave/RF guru, brilliant technologist, major industry/IEEE contributor, global visionary, keen skeptic, and all around fantastic human being. He was a major contributor to the INGR's early work on energy efficiency, millimeter-wave, and hardware. He worked for a technologically advanced yet more energy efficient world, and the contents of the INGR are a tribute to that vision. Rest in peace, Earl!



Table of Contents

1.	Introduction	1
2.	Working Group Vision	1
2.1.	Scope of Working Group Effort.....	1
2.2.	Linkages and Stakeholders.....	1
3.	Today's Landscape	2
3.1.	Major System Integrator Organizations	2
3.2.	Core Technology Organizations.....	4
3.2.1.	IEEE - Core Technologies Standards Development Organization	4
3.2.2.	Internet Engineering Task Force (IETF).....	5
3.2.3.	Other Core Technology SDOs/Fora.....	5
3.3.	Industry Alliances	6
3.4.	Open Source Organizations.....	9
3.5.	A Matrix of Topics Addressed in Various SDOs/Fora.....	10
4.	Future State (2030)	13
4.1.	Major System Integrator SDOs	13
4.2.	Core Technology SDOs	14
4.2.1.	IEEE Core Technologies Standards	14
4.2.2.	Internet Research Task Force (IRTF)	17
4.2.3.	Other Core Technology SDOs/Fora.....	17
4.3.	Industry Alliances	17
5.	Needs, Challenges, and Enablers and Potential Solutions	18
5.1.	Summary	18
5.2.	Cooperation between SDOs and Open Source Communities	18
5.3.	Cooperation among SDOs/Fora	20
5.3.1.	IEEE Relationships/Interactions with Other Groups	20
5.3.2.	5G Related Harmonization Efforts	22
5.3.3.	Harmonization of Autonomic Management & Control (AMC).....	23
5.3.4.	ITU-T SG13 Harmonization	24
5.3.5.	TM Forum Interaction with Other SDOs/Fora.....	25
5.4.	Standardization of Emerging Technologies	25
5.4.1.	Bringing Emerging Technologies to Standardization, IEEE Case Study	25
5.4.2.	Standardization Building Blocks Roadmap Timeline Chart	28
6.	Conclusions and Recommendations	28
7.	Contributors	29
8.	References	30
9.	Acronyms/abbreviations	31
10.	Appendix	33

Abstract

This chapter, produced by the Standardization Building Blocks (SBB) Roadmap Working Group, describes a wide range of global standards, consortia, and alliance activities enabling and defining future networks use cases, architectures, technical interface specifications, compliance, and test requirements, and regulatory environment over a ten-year time horizon.

The primary objective of the SBB Roadmap is to illustrate the “master timeline” for the standardization of wireless communications technologies. With the advent of every new generation of wireless networks, the capabilities of technologies expand, and economic conditions change resulting in an increasingly broader standardization scope. Accordingly, the scope of the SBB includes:

- depicting the value chain of the global system integrator Standards Developing Organizations (SDOs),
- illustrating the effort of relevant alliances and consortia that drive standardization, and open source activities.

The target audience for this road map are end-users, content producers using networks for content distribution, network service providers, equipment manufacturers, infrastructure vendors, component suppliers, and test and measurement service and equipment providers.

This roadmap recommends that the core technology stakeholders take a proactive approach to harmonize standardization with their vision for long-term technology evolution.

Keywords:

Emerging Technologies, Fifth Generation (5G), Industry consortia, Future Networks Initiative, Institute of Electrical and Electronics Engineers (IEEE), IEEE Standards Association (IEEE-SA), Internet Engineering Task Force (IETF), Industrial Internet Consortium, Internet Research Task Force (IRTF), International Organization for Standardization (ISO), International Telecommunication Union (ITU), Multiple In-Multiple Out (MIMO), Millimeter-Wave (mmWave), New Radio (NR), Open RAN, Open Source Organizations, Reference Architecture, Standards Developing Organizations (SDOs), European Telecommunications Standards Institute (ETSI), Autonomic/Autonomous Networking Standards.

This file is a free sample of this chapter.
The full chapter is available exclusively to signed-in
participants of the [IEEE Future Networks Community](#).