

Wi-Fi Technology Fundamentals



WI-FI TECHNOLOGY
FUNDAMENTALS COURSE

Module-1

Introduction and History of WiFi

Session-1c

WLAN Standards/Amendments and Alphabet Soup

Last Session Recap.....



Module-1

Introduction and History of WiFi

Session-1b

WiFi Network Topologies

- ✓ WiFi Topologies
- ✓ WiFi Deployment Use Cases
- ✓ WiFi Technology Challenges
- ✓ WiFi Network Management/Business Challenges

How to Stay Connected?

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- ✓ Access course notes, slides, video recordings

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Today's Session...



Module-1

Introduction and History of WiFi

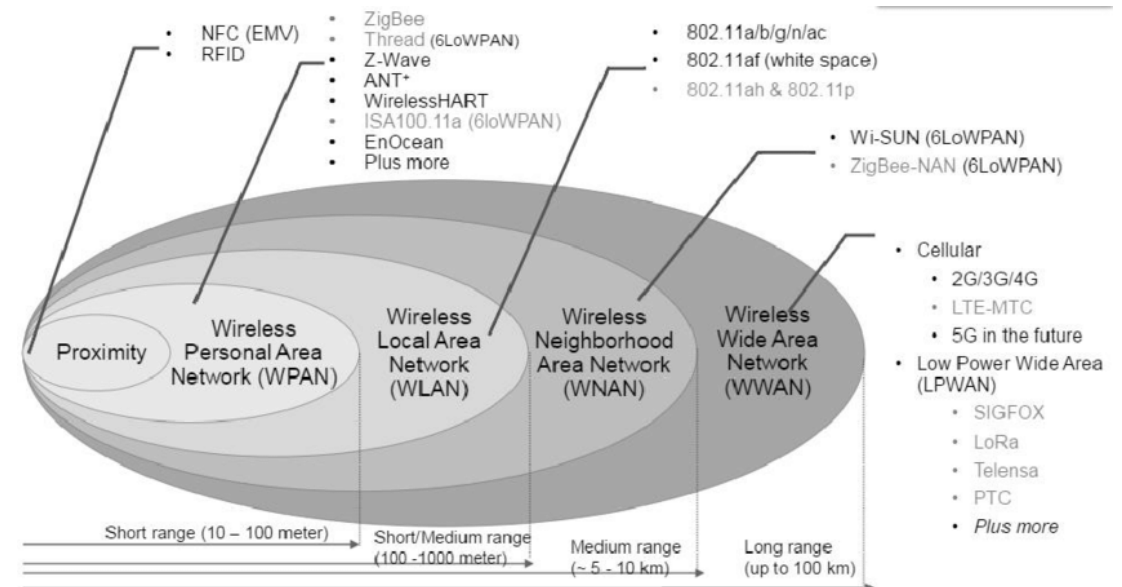
Session-1c

WLAN Standards/Amendments and
Alphabet Soup

IEEE 802 Standards

Name	Description	Status
IEEE 802.1	Higher Layer LAN Protocols Working Group	Active
IEEE 802.2	LLC	Disbanded
IEEE 802.3	Ethernet	Active ^[3]
IEEE 802.4	Token bus	Disbanded
IEEE 802.5	Token Ring MAC layer	Disbanded
IEEE 802.6	MANs (DQDB)	Disbanded
IEEE 802.7	Broadband LAN using Coaxial Cable	Disbanded
IEEE 802.8	Fiber Optic TAG	Disbanded
IEEE 802.9	Integrated Services LAN (ISLAN or isoEthernet)	Disbanded
IEEE 802.10	Interoperable LAN Security	Disbanded
IEEE 802.11	Wireless LAN (WLAN) & Mesh (Wi-Fi certification)	Active
IEEE 802.12	100BaseVG	Disbanded
IEEE 802.13	Unused ^[4]	Reserved for Fast Ethernet development ^[5]
IEEE 802.14	Cable modems	Disbanded
IEEE 802.15	Wireless PAN	Active
IEEE 802.15.1	Bluetooth certification	Disbanded
IEEE 802.15.2	IEEE 802.15 and IEEE 802.11 coexistence	Hibernating ^[6]
IEEE 802.15.3	High-Rate wireless PAN (e.g., UWB, etc.)	?
IEEE 802.15.4	Low-Rate wireless PAN (e.g., Zigbee, WirelessHART, MiWi, etc.)	Active
IEEE 802.15.5	Mesh networking for WPAN	?
IEEE 802.15.6	Body area network	Active
IEEE 802.15.7	Visible light communications	?

IEEE 802.16	Broadband Wireless Access (WiMAX certification)	Hibernating
IEEE 802.16.1	Local Multipoint Distribution Service	Hibernating
IEEE 802.16.2	Coexistence wireless access	Hibernating
IEEE 802.17	Resilient packet ring	Disbanded
IEEE 802.18	Radio Regulatory TAG	Active
IEEE 802.19	Wireless Coexistence Working Group	?
IEEE 802.20	Mobile Broadband Wireless Access	Disbanded
IEEE 802.21	Media Independent Handoff	Hibernating
IEEE 802.22	Wireless Regional Area Network	Hibernating
IEEE 802.23	Emergency Services Working Group	Disbanded
IEEE 802.24	Vertical Applications TAG	?



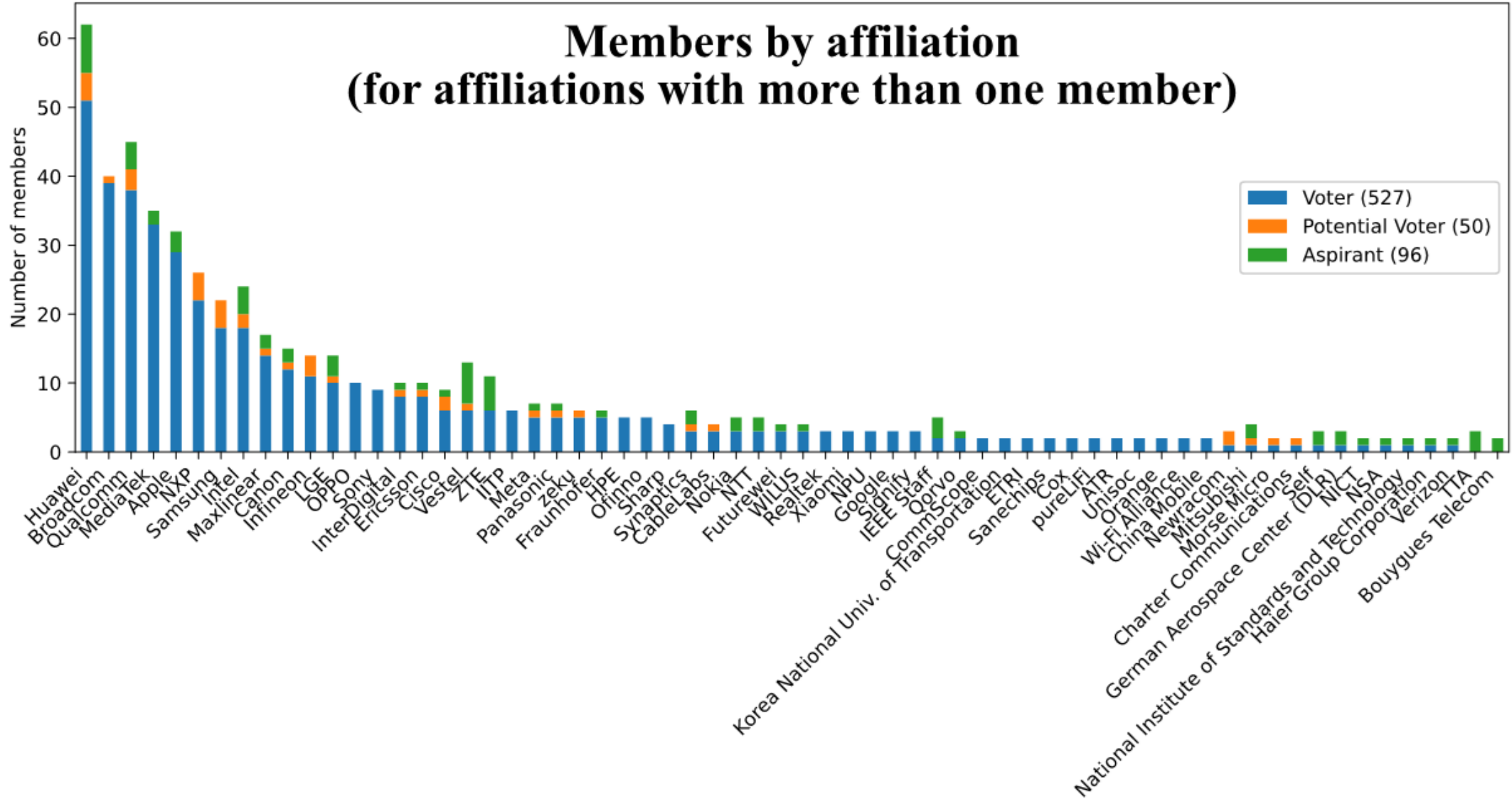
IEEE Standards Process



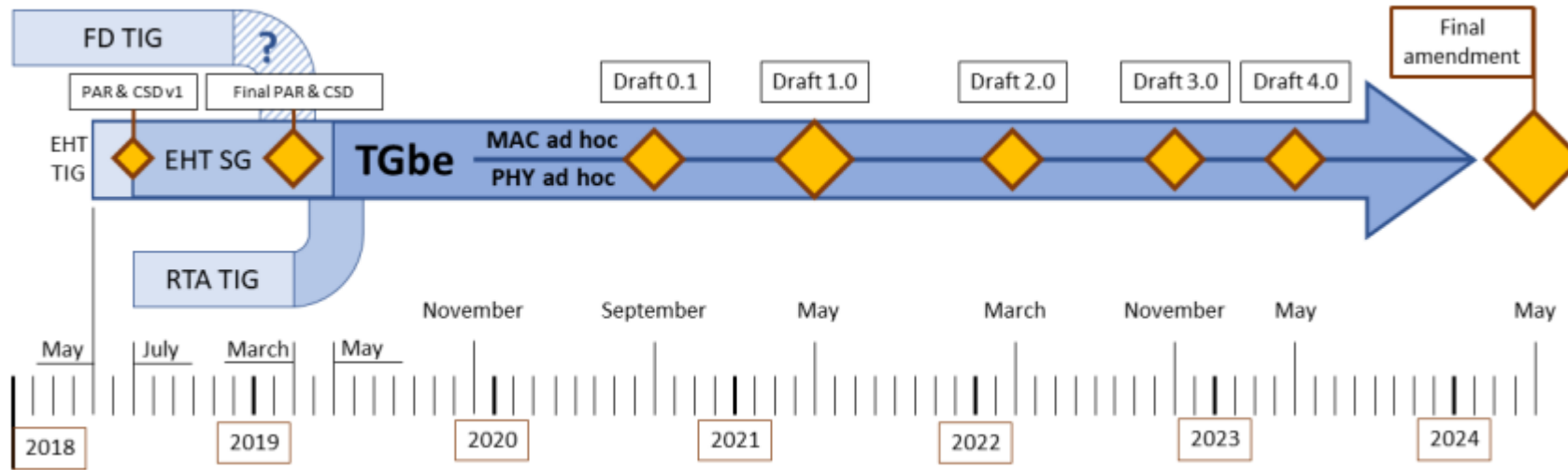
Types of 802.11 Standards Activities

Activity	Tag	Description
IEEE 802.11 Working Group	WG	<p>The Working Group is comprised of all of the Standing Committees, Task Groups, Study Groups, and Ad-Hoc Groups.</p> <p>Membership is at the WG level. All WG members may participate in any of these sub-groups.</p>
Task Group	TG	<p>The committee(s) that are tasked by the WG as the author(s) of the Standard or subsequent Amendments via an approved PAR</p>
Study Group	SG	<p>A committee responsible for researching a possible future amendment. The output of the SG is usually a project authorization request (PAR).</p> <p>Study groups are authorized by the IEEE 802 executive committee (EC) and are expected to have a relatively short lifetime (~6 months).</p> <p>The SG terminates when it has submitted a PAR, or failed to gain approval for a PAR, or when the IEEE 802 EC declines to approve an SG extension.</p>
Topic Interest Group	TIG	<p>A committee that gathers together interested members to work together on a specific topic. Typically this might be used before a study group to determine technical feasibility and initial requirements before deciding to request a study group. The TIG is formed by WG motion and dissolved by the WG chair. It typically lasts 6 months.</p>
Standing Committee	SC	<p>A committee with a determined role/task, that does not modify the IEEE 802.11 standard. These committees are created by the 802.11 chair and are relatively long-lived.</p>
Ad-hoc Committee	AHC	<p>A committee with a determined role/task, that does not modify the IEEE 802.11 standard. These committees are created by the 802.11 chair and are relatively short-lived.</p>

Member Companies



Proposed Timeline for 802.11be standard



- **PAR approved** Mar 2019
- **First TG meeting** May 2019
- **D0.1** Sept 2020
- **D1.0 Letter Ballot** May 2021
- **D2.0 LB** Mar 2022
- **D3.0 LB** Nov 2022
- **Initial Sponsor Ballot (D4.0)** May 2023
- **Final 802.11 WG approval** Mar 2024
- **802 EC approval** Mar 2024
- **RevCom and SASB approval** May 2024

GET 802® STANDARDS

[802: Overview & Architecture](#)

[802.1: Bridging & Management](#)

[802.2: Logical Link Control](#)

[802.3: Ethernet](#)

[802.11: Wireless LANs](#)

[802.15: Wireless PANs](#)

[802.16: Broadband Wireless
MANs](#)


[802.17: Resilient Packet Rings](#)

[802.20: Mobile Broadband
Wireless Access](#)


[802.21: Media Independent
Handover Services](#)


[802.22: Wireless Regional Area
Networks](#)


IEEE 802.11™: WIRELESS LOCAL AREA NETWORKS (LANs)

[IEEE 802.11-2007](#)  IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

- An [interpretation](#) is available.

[IEEE 802.11k™-2008](#)  IEEE Standard for information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment 1: Radio Resource Measurement of Wireless LANs

[IEEE 802.11n™-2009](#)  IEEE Standard for information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment 5: Enhancements for Higher Throughput

[IEEE 802.11p™-2010](#)  IEEE Standard for information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements Part 11: Wireless LAN

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802.11 Standards Document

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**IEEE Standard for
Information technology—
Telecommunications and information
exchange between systems—
Local and metropolitan area networks—
Specific requirements**

**Part 11: Wireless LAN Medium Access Control (MAC)
and Physical Layer (PHY) Specifications**

IEEE Computer Society

Sponsored by the
LAN/MAN Standards Committee

IEEE
3 Park Avenue
New York, NY 10016-5997, USA
12 June 2007

IEEE Std 802.11™-2007
(Revision of
IEEE Std 802.11-1999)

802.11™

802.11 Alphabet Soup

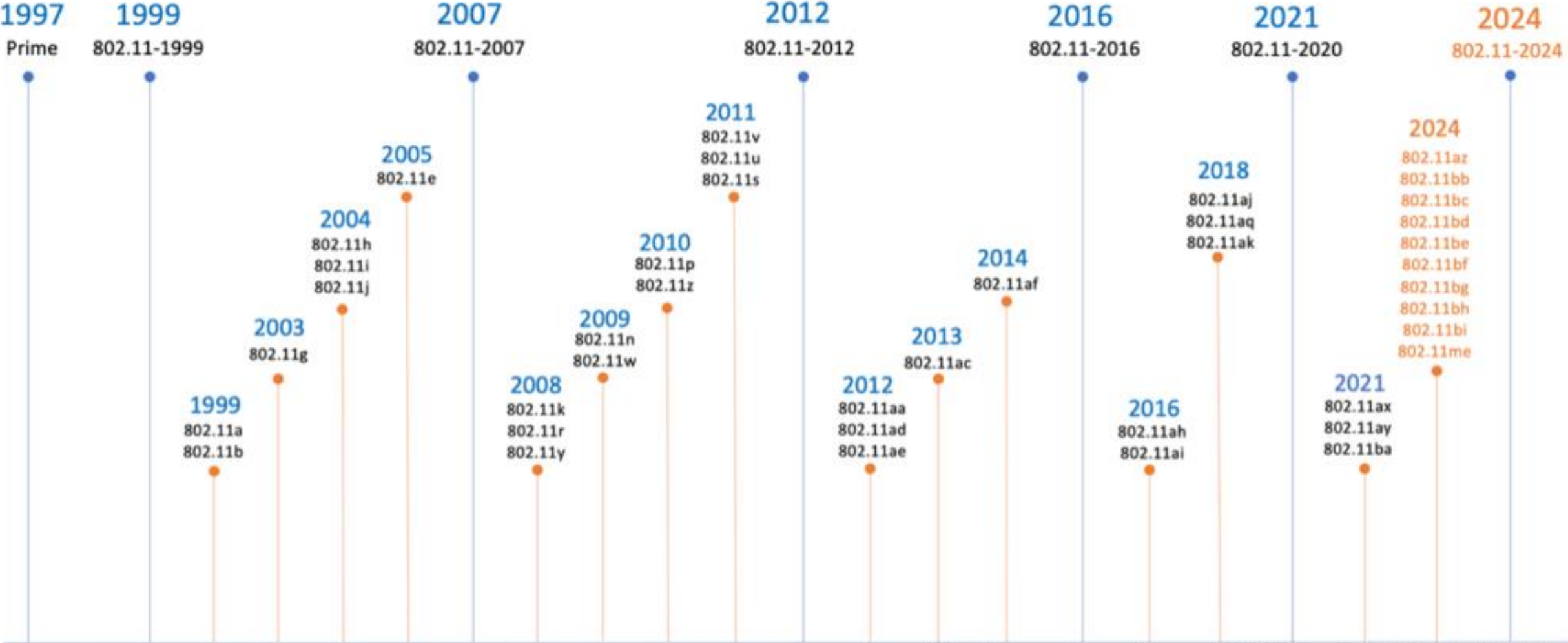
- IEEE 802.11-1997: The WLAN standard was originally 1 Mbit/s and 2 Mbit/s, 2.4 GHz RF and infrared (IR) standard (1997)
- IEEE 802.11a: 54 Mbit/s, 5 GHz standard (1999, shipping products in 2001)
- IEEE 802.11b: 5.5 Mbit/s and 11 Mbit/s, 2.4 GHz standard (1999)
- IEEE 802.11c: Bridge operation procedures; included in the IEEE 802.1D standard (2001)
- IEEE 802.11d: International (country-to-country) roaming extensions (2001)
- IEEE 802.11e: Enhancements: QoS, including packet bursting (2005)
- IEEE 802.11F: Inter-Access Point Protocol (2003) Withdrawn February 2006
- IEEE 802.11g: 54 Mbit/s, 2.4 GHz standard (backwards compatible with b) (2003)
- IEEE 802.11h: Spectrum Managed 802.11a (5 GHz) for European compatibility (2004)
- IEEE 802.11i: Enhanced security (2004)
- IEEE 802.11j: Extensions for Japan (4.9-5.0 GHz) (2004)
- IEEE 802.11-2007: A new release of the standard that includes amendments a, b, d, e, g, h, i, and j. (July 2007)
- IEEE 802.11k: Radio resource measurement enhancements (2008)
- IEEE 802.11n: Higher Throughput WLAN at 2.4 and 5 GHz; 20 and 40 MHz channels; introduces MIMO to Wi-Fi (September 2009)
- IEEE 802.11p: WAVE—Wireless Access for the Vehicular Environment (such as ambulances and passenger cars) (July 2010)
- IEEE 802.11r: Fast BSS transition (FT) (2008)
- IEEE 802.11s: Mesh Networking, Extended Service Set (ESS) (July 2011)
- IEEE 802.11T: Wireless Performance Prediction (WPP)—test methods and metrics Recommendation cancelled
- IEEE 802.11u: Improvements related to HotSpots and 3rd-party authorization of clients, e.g., cellular network offload (February 2011)
- IEEE 802.11v: Wireless network management (February 2011)
- IEEE 802.11w: Protected Management Frames (September 2009)
- IEEE 802.11y: 3650–3700 MHz Operation in the U.S. (2008)
- IEEE 802.11z: Extensions to Direct Link Setup (DLS) (September 2010)

802.11 Alphabet Soup. Contd

- IEEE 802.11-2012: A new release of the standard that includes amendments k, n, p, r, s, u, v, w, y, and z (March 2012)
- IEEE 802.11aa: Robust streaming of Audio Video Transport Streams (June 2012) - see Stream Reservation Protocol
- IEEE 802.11ac: Very High Throughput WLAN at 5 GHz[e]; wider channels (80 and 160 MHz); Multi-user MIMO (down-link only)[102] (December 2013)
- IEEE 802.11ad: Very High Throughput 60 GHz (December 2012) – see also WiGig
- IEEE 802.11ae: Prioritization of Management Frames (March 2012)
- IEEE 802.11af: TV Whitespace (February 2014)
- IEEE 802.11-2016: A new release of the standard that includes amendments aa, ac, ad, ae, and af (December 2016)
- IEEE 802.11ah: Sub-1 GHz license exempt operation (e.g., sensor network, smart metering) (December 2016)
- IEEE 802.11ai: Fast Initial Link Setup (December 2016)
- IEEE 802.11aj: China Millimeter Wave (February 2018)
- IEEE 802.11ak: Transit Links within Bridged Networks (June 2018)
- IEEE 802.11aq: Pre-association Discovery (July 2018)
- IEEE 802.11-2020: A new release of the standard that includes amendments ah, ai, aj, ak, and aq (December 2020)
- IEEE 802.11ax: High Efficiency WLAN at 2.4, 5 and 6 GHz;[f] introduces OFDMA to Wi-Fi[75] (February 2021)
- IEEE 802.11ay: Enhancements for Ultra High Throughput in and around the 60 GHz Band (March 2021)
- IEEE 802.11az: Next Generation Positioning (March 2023)
- IEEE 802.11ba: Wake Up Radio (March 2021)
- IEEE 802.11bd: Enhancements for Next Generation V2X (see also IEEE 802.11p) (March 2023)

- In process
- IEEE 802.11bc: Enhanced Broadcast Service (Dec 2023)
- IEEE 802.11be: Extremely High Throughput (see also IEEE 802.11ax) (May 2024)
- IEEE 802.11bf: WLAN Sensing
- IEEE 802.11bh: Randomized and Changing MAC Addresses
- IEEE 802.11bi: Enhanced Data Privacy
- IEEE 802.11bk: 320 MHz Positioning
- IEEE 802.11me: 802.11 Accumulated Maintenance Changes

802.11 Standards Timeline

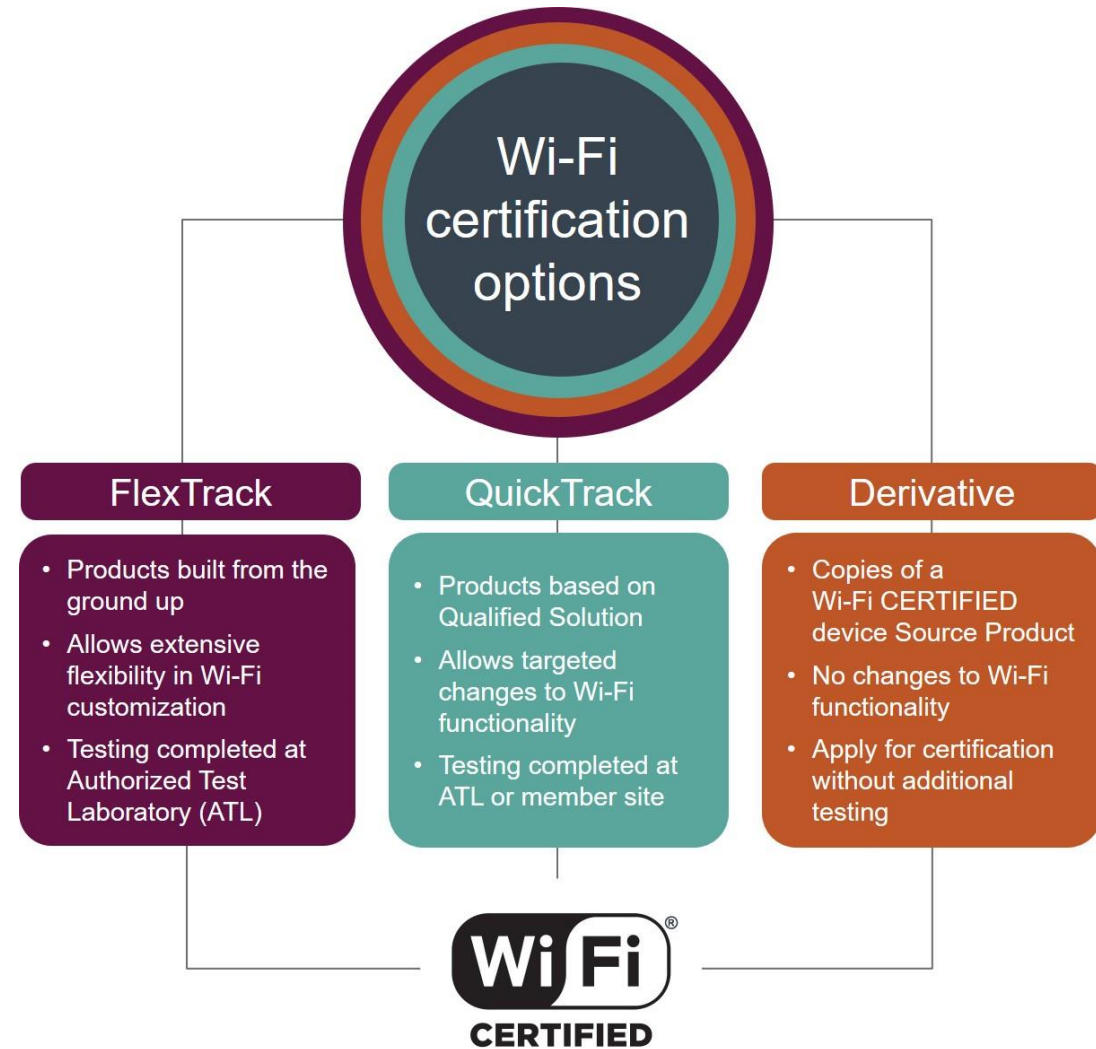


Source: https://grouper.ieee.org/groups/802/11/Reports/802.11_Timelines.htm

WiFi Alliance

Wi-Fi Alliance® is the worldwide network of companies that brings you Wi-Fi®, one of the world's most valued communications technologies. Our vision is to connect everyone and everything, everywhere.

Wi-Fi Alliance drives global Wi-Fi adoption and evolution through thought leadership, spectrum advocacy, and industry-wide collaboration. Our work includes the development of innovative technologies, requirements, and test programs that help ensure Wi-Fi provides users the interoperability, security, and reliability they have come to expect.



WiFi Alliance Certification Programs



Connectivity

Only Wi-Fi CERTIFIED products are backward-compatible with earlier Wi-Fi versions operating in the same frequency band.

- **Wi-Fi CERTIFIED 6[®]**: Based on the IEEE 802.11ax standard, Wi-Fi CERTIFIED 6 is the newest generation of Wi-Fi technology operating in 2.4, 5, and 6 GHz. Wi-Fi CERTIFIED 6 provides greater capacity, multi-gigabit data rates, better power efficiency, and high performance even in densely populated environments. Wi-Fi 6E introduces the advancements of Wi-Fi 6 into the 6 GHz spectrum.
- **Wi-Fi CERTIFIED ac**: Associated with the fifth Wi-Fi generation, Wi-Fi CERTIFIED ac operates in 5 GHz and is capable of gigabit data rates. Key features include enhanced ability in processing a variety of data from multiple sources.
- **Wi-Fi CERTIFIED HaLow™**: Operating in spectrum below 1 GHz, Wi-Fi CERTIFIED HaLow brings long range, low power Wi-Fi to devices and applications with constrained power requirements and need for long range connectivity
- **Wi-Fi CERTIFIED n**: Operating in both 2.4 and 5 GHz, Wi-Fi CERTIFIED n is considered the fourth generation of Wi-Fi and is used today in many Internet of Things (IoT) devices, including wearables and smart televisions.
- **Wi-Fi CERTIFIED WiGig™**: Utilizes the 60 GHz frequency band to enable extremely high performance, multi-gigabit connectivity and low latency for a range of applications, including wireless docking, augmented reality/virtual reality (AR/VR), high-definition multimedia streaming, gaming, and networking.
- **Wi-Fi Direct[®]**: Allows Wi-Fi client devices to connect directly to one another without use of an access point. Enables applications such as printing, content sharing, and wireless display. Wi-Fi Direct certifies products which implement technology defined in the Wi-Fi Direct Specification.

Security

- **Wi-Fi CERTIFIED WPA3™**: Most advanced security capabilities for personal and enterprise Wi-Fi networks; simplifies Wi-Fi security configuration and enhances network security protections.
- **Wi-Fi Enhanced Open™**: Brings data protection to users in open networks without the need for user intervention
- **Protected Management Frames**: Protected Management Frames extends security protections to unicast and multicast management action frames, maintaining the resiliency of mission-critical networks

Access

- **Passpoint[®]**: Enables seamless, secure network access. Passpoint helps Wi-Fi devices discover, select, and securely connect to Wi-Fi access points and networks easily. Once a device contains a network's credentials, it can seamlessly connect to the network on subsequent visits without further user action. The technology behind Passpoint is foundational to **Wi-Fi CERTIFIED Vantage™** which brings better user experiences in managed Wi-Fi networks as well as for OpenRoaming, Wireless Broadband alliance's federated service.
- **Wi-Fi Easy Connect™**: Simplifies device provisioning and configuration while maintaining network security, making onboarding smart home and IoT devices easier than ever
- **Wi-Fi Protected Setup™**: Facilitates easy set-up of security features using a Personal Identification Number (PIN) or other defined methods within the Wi-Fi device. Wi-Fi Protected Setup certifies products which implement technology defined in the Wi-Fi Protected Setup Specification.

WiFi Alliance Certification Programs



Applications and Services

- **Miracast[®]**: Provides seamless display of high-definition (HD) and 4K Ultra High-Definition (Ultra HD) content between devices, regardless of brand, without cables or a network connection. Miracast certifies products which implement technology defined in the Miracast Specification. Enhancements released in 2017 include 4K Ultra HD support, and extended battery life in mobile devices.
- **Voice-Enterprise**: Supports a good experience with voice applications over Wi-Fi, enabling fast transitions between access points and providing management
- **Wi-Fi Aware[™]**: Provides enhanced peer-to-peer communications, enabling devices within Wi-Fi[®] range to detect one another and exchange information and services without the need for network infrastructure. Wi-Fi Aware improves on existing peer-to-peer connectivity offerings by delivering here-and-now contextual awareness that empowers users to both find and utilize services that match their interests while on the go. Wi-Fi Aware works well indoors as well as in dynamic and dense environments, without requiring a cellular, infrastructure, or GPS connection.
- **Wi-Fi Location[™]**: Delivers accurate indoor location through Wi-Fi networks, allowing location applications and services to operate indoors

RF Coexistence

- **CWG-RF**: Developed with CTIA[®], this is a test program developed for converged devices with both Wi-Fi and cellular technology. The testing provides detailed information about the performance of the Wi-Fi radio in a converged handset, as well as how the cellular and Wi-Fi radios interact with one another. Although this test program is not an element of Wi-Fi certification, completion of the testing is mandatory for Wi-Fi enabled handsets

Additional Capabilities

- **Power saving features**: Enhances capabilities of Wi-Fi CERTIFIED ac and Wi-Fi CERTIFIED n by enabling longer battery life for devices through longer sleep periods and more efficient use of network exchanges
- **Wi-Fi Home Design[™]**: Delivers whole home Wi-Fi coverage through professionally designed and installed Wi-Fi networks in homes and multi-dwelling residences such as condominiums, townhomes, and apartment complexes

Optimization

- **TDLS (Tunneled Direct Link Setup)**: Allows network-connected devices to create a secure, direct link to transfer data more efficiently
- **Wi-Fi Agile Multiband[™]**: Enables client devices and access points (APs) to exchange information so the Wi-Fi network can guide devices to the best bands, channels, and APs to maximize system efficiency and provide the best user experience.
- **Wi-Fi Data Elements[™]**: Establishes a standardized set of key performance indicators for ensuring the health of Wi-Fi networks, enabling service providers to deliver better Wi-Fi service, potentially reduce customer support calls, and increase customer satisfaction; also provides a necessary foundation for Wi-Fi EasyMesh networks.
- **Wi-Fi EasyMesh[™]**: Brings a standards-based approach to residential and small office Wi-Fi networks that utilize multiple access points. Wi-Fi EasyMesh delivers scalable, smart Wi-Fi networks that are easy to set up and manage. Supports advanced technologies of Wi-Fi 6 and Wi-Fi 6E networks.
- **Wi-Fi Optimized Connectivity[™]**: Optimizes roaming and network selection in managed network environments through improved scanning, link quality metric assessment, faster initial authentication, and more efficient transmissions
- **Wi-Fi QoS Management[™]**: Enables devices, applications, and network managers to prioritize traffic flows, providing consistent, end-to-end Quality of Service treatment, and quality experiences with real-time applications
- **Wi-Fi Vantage[™]**: Provides an ongoing evolution of advanced features to elevate the user experience in managed Wi-Fi networks
- **WMM[®] (Wi-Fi Multimedia[™])**: Support for multimedia content over Wi-Fi networks enabling Wi-Fi networks to prioritize traffic generated by different applications using Quality of Service (QoS) mechanisms. WMM certifies products which implement technology defined in the WMM Technical Specification.
- **WMM-Admission Control**: Enhanced bandwidth management tools to optimize the delivery of voice and other traffic in Wi-Fi networks. WMM-Admission Control certifies products which implement technology defined in the WMM Technical Specification.
- **WMM-Power Save**: Power savings for multimedia content over Wi-Fi networks - helps conserve battery life while using voice and multimedia applications by managing the time the device spends in sleep mode



Wireless Broadband Alliance



WBA WORK GROUPS & PROJECTS

 5G Work Group	 IoT Work Group	 NextGen Work Group	 Roaming Work Group	 OpenRoaming™ Work Group	 Testing & Interoperability Work Group
5G & Wi-Fi Convergence for Private 5G Networks	IOT & Smart Home	Passenger Experience & Roaming Evolution	Billing and Charging Evolution (BCE)	Federated Onboarding Service for OpenRoaming	Access Network Metrics
	Wi-Fi 6/6E for Industrial IoT	Operator Managed Wi-Fi Network Architecture	Signaling Location Information in RADIUS	WBA OpenRoaming for Private LTE / 5G	E2E Wi-Fi Quality of Service
	Wi-Fi HaLow Technology & Trials	Wi-Fi 7	Decentralized OpenRoaming Networks	WBA OpenRoaming for IoT	RADIUS Accounting Assurance
					Venue Requirements for User Engagement

CONNECT WIRELESS ECOSYSTEM

Enable collaboration among service providers, technology companies and enterprises

ENABLE SECURE & SEAMLESS WIRELESS EXPERIENCE

Accelerate Next Generation Wi-Fi Networks

CREATING INTEROPERABILITY BETWEEN TECHNOLOGIES

Convergence and Coexistence of Wi-Fi and Cellular Networks

MAXIMISE COMMERCIAL & BUSINESS OPPORTUNITIES

Drive activities & programs to address business and technical issues and opportunities

BRIDGE THE DIGITAL DIVIDE

Advocate connectivity as a human right to help connecting the unconnected



EXPLORE OUR LARGE LIBRARY OF WIRELESS LAN VIDEOS, INTERVIEWS, ARTICLES, RESOURCES, AND MORE.

Navigating Wireshark
Keith Parsons
#WLPC Phoenix 2023

WLAN PROS MASTER PROFILE FOR WIRESHARK

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**TOP WI-FI TROUBLESHOOTING TOOLS:
OPTIMIZING YOUR WIRELESS NETWORK**

TOP WI-FI TROUBLESHOOTING TOOLS:
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Samuel Clements
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Analysis of the Future
Peter Mackenzie
#WLPC Phoenix 2023

ANALYSIS OF THE FUTURE | PETER MACKENZIE | WLPC PHOENIX 2023

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**Wi-Fi 6E Update:
Standard Power & AFC**
Peter Thornycroft
#WLPC Phoenix 2023

WI-FI 6E UPDATE: STANDARD POWER & AFC | PETER THORNYCROFT | WLPC PHOENIX 2023

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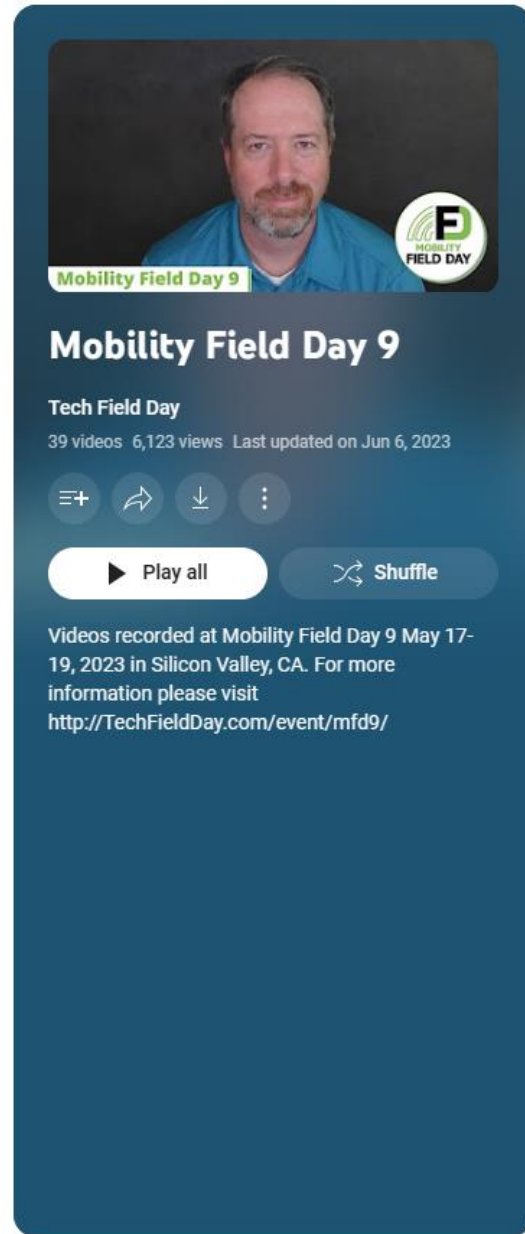
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Raising the Next Generation of Wireless Engineers
Landon Foster
#WLPC Phoenix 2023

RAISING THE NEXT GENERATION OF WIRELESS ENGINEERS | LANDON FOSTER | WLPC PHOENIX 2023

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Understanding the Similarities of Wi-Fi & Cellular
Ian Tearle
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UNDERSTANDING THE SIMILARITIES OF WI-FI & CELLULAR | IAN TEARLE | WLPC PHOENIX 2023

Mobility Field Day




Mobility Field Day 9

Tech Field Day

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1  **Making Mobility Magic at Mobility Field Day 9**
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2  **We Gave Away Too Much To Get Wi-Fi 6E**
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8  **Juniper Mist Premium Analytics**
Tech Field Day • 385 views • 4 months ago

OpenWiFi

TELECOM INFRA PROJECT



Community Driven Development



Fully Disaggregated Open Tech Stack



Commercial Grade Automated Testing



OpenWiFi Product Compliance



Globally Secure Zero Touch Provisioning



Cloud SDK

Whitebox Hardware

Diverse Services

OpenWiFi

Community Developed Tech Stack



Proprietary Product

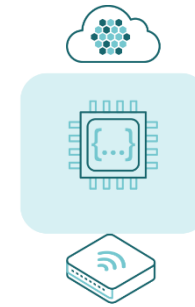
- Large in-house engineering team (Embedded controller, RF, cloud, HW, security, QA automation, etc...)
- Direct access to silicon vendor
- Robust security practices
- Robust QA infrastructure
- "Gated - Opaque" feature development

Equivalent Engineering Grade

TIP OpenWiFi Community



TIP Member Commercial Products



Open Sourced

- All code and APIs are open sourced
- Common code base, build/fix once for everyone
- Providers, vendors & hobbyists can easily engage
- Pooled community engineering team (Enables member companies to focus on core business with innovative smaller R&D team)
- Community participation by multiple silicon vendors
- PKI infrastructure, security practice in system development
- Robust community QA (building to 10,000+ auto test cases)
- Community 'tooled up' for agile feature development

Desh Ka Kona Kona Judega Bhai



WI-FI TECHNOLOGY
DIGITALS COURSE

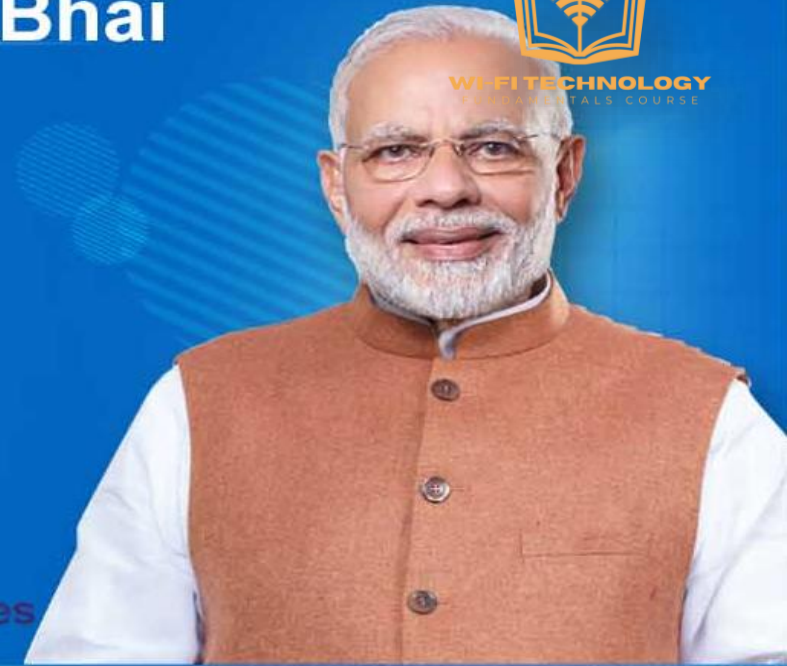


Broadband at your fingertips

PM WANI

Prime Minister's Wi-Fi Access Network Interface

Low cost mass connectivity for Pan-India
Public Wi-Fi connecting farthest remote villages



Broadband at your fingertips

PM WANI

Prime Minister's Wi-Fi Access Network Interface

Individuals in residential area can serve as a **Public Data Office (PDO)** and provide Wi-Fi service. This will create many employment opportunities for people across the country.



WiFi NOW



WI-FI NOW Special Event

All-Wireless Enterprise



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EPISODE 320

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WPA3-Enterprise Part 2

Wi-Fi Alliance defines three modes of operations for WPA3-Enterprise: WPA3-Enterprise only WPA3-Enterprise transition mode WPA3-Enterprise...

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EPISODE 319

PODCAST // WI-FI 6

Multi-Function Radio with Arista Networks (Sponsored)

This episode is sponsored by Arista Networks We're taking a dive into how a multi-function radio can help network engineers with many tasks...

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WPA3-Personal Part 1

In this episode, we're diving into WPA3-Personal and understanding what is different between previous Wi-Fi security, such as WPA2. WPA3...

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Is ChatGPT useful to a Wi-Fi Engineer

Is ChatGPT useful to a Wi-Fi Engineer AI is really starting to make its mark on the world. ChatGPT has already provided us a many ways to...

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EPISODE 313

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Feeling Inspired After WLPC

Informing others on WLPC WLPC is the Wi-Fi conference to attend. Clear To Send attended the conference in Phoenix in February 2023. It...

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EPISODE 312

PODCAST

Outsourcing Survey Work

Finding the right resource for survey work can be challenging due to the amount of Wi-Fi experts available. In this episode, we talk about...

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EPISODE 317

PODCAST // WI-FI 6

Wireless Playoffs

Kelly Burroughs, our special guest from iBwave, joins the podcast to discuss the shifting landscape in Enterprise from a 'one and done...

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How OWE Works

Opportunistic Wireless Encryption (OWE) is a way to secure open Wi-Fi networks. Encryption keys are created between a device and an access...

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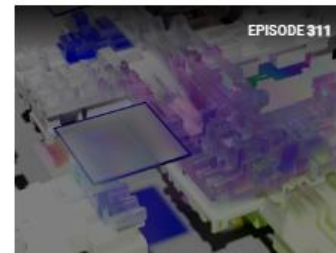
EPISODE 315

PODCAST

5 Wi-Fi Books You Need to Read

If you want to become a better Wi-Fi engineer, then look no further to these 5 Wi-Fi books. We recommend having these books on your shelf...

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PODCAST

5 Reasons To Get Your CWNA

The CWNA is our most recommended certification and first path to becoming a Wi-Fi specialist or expert. You'll gain an immense amount of Wi...

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EPISODE 310

PODCAST

Ultra Wide Band In the Field

channel plans for UWB channels

Resources

Ivo Štastný

LinkedIn:



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Wireless with Ekahau (Sponsored)

Ekahau AI Pro brings many features and benefits for any Wi-Fi engineer. That's why we're being joined by Matt Sterling and Mac Deryng of...

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CWNP Certifications



CWS® - Certified Wireless Specialist is an *entry-level* certification for those in sales, marketing and entry-level positions related to Wi-Fi. CWS teaches the language of Wi-Fi and is an excellent introduction to enterprise Wi-Fi. The CWS certification is valid for 3 years.



CWT® - Certified Wireless Technician is an *entry-level* certification for teaching technicians to install and configure Wi-Fi at the basic level. CWT provides the skills needed to install and configure an AP to specifications and configure a client device to connect to and use the WLAN. CWT is valid for 3 years.



CWNA® - Certified Wireless Network Administrator is an *administrator level* career certification for networkers who are in the field and need to thoroughly understand RF behavior, site surveying, installation, and basic enterprise Wi-Fi security. CWNA is where you learn how RF and IP come together as a Wi-Fi network. The CWNA certification is valid for 3 years.



CWSP® - Certified Wireless Security Professional is a *professional level* certification for network engineers who seek to establish their expertise in enterprise Wi-Fi security. Contrary to popular belief, enterprise Wi-Fi can be secure, if the IT pros installing and configuring it understand how to secure the wireless network. You must have a current CWNA credential to take the CWSP exam. The CWSP certification is valid for 3 years.



CWDP® - Certified Wireless Design Professional is a *professional level* career certification for networkers who are already CWNA certified and have a thorough understanding of RF technologies and applications of 802.11 networks. The CWDP curriculum prepares WLAN professionals to properly design wireless LANs for different applications to perform optimally in different environments. You must have a current CWNA credential to take the CWDP exam. The CWDP certification is valid for 3 years.



CWAP® - Certified Wireless Analysis Professional is a *professional level* career certification for networkers who are already CWNA certified and have a thorough understanding of RF technologies and applications of 802.11 networks. The CWAP curriculum prepares WLAN professionals to analyze, troubleshoot, and optimize any wireless LAN. You must have a current CWNA credential to take the CWAP exam. The CWAP certification is valid for 3 years. The CWAP exam is available at all Pearson VUE Testing Centers worldwide.

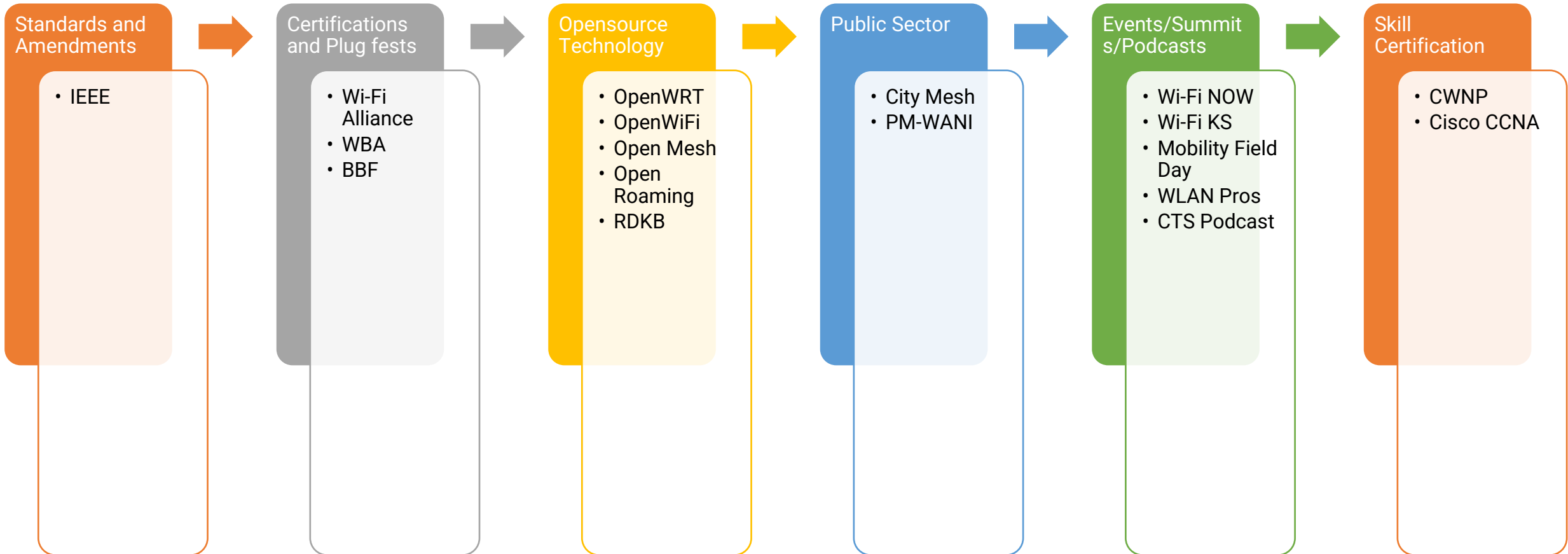


CWNE® - Certified Wireless Network Expert is an *expert level* Wi-Fi certification for the most elite Wi-Fi professionals. Do you have what it takes to be recognized as an expert in enterprise Wi-Fi? If so, start here.



CWNT® - Certified Wireless Network Instructor Leverage your Wi-Fi and networking expertise and IT instruction experience to teach official authorized CWNP classes. CWNP Learning Centers must employ or contract a CWNT to teach any authorized **CWNP training class**.

In Summary



References

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Example IEEE Standards Document

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BBF TR-398 Test Plan

<https://www.broadband-forum.org/pdfs/tr-398-2-0-1.pdf>

Mobility Field Day Channel

<https://www.youtube.com/playlist?list=PLinuRwpnsHaevVzG1JziV7bPEfkENZwQZ>

PM WANI

<https://pmwani.gov.in/wani>

OpenWiFi: An industry movement for accelerating Wi-Fi infrastructure innovation

<https://telecominfraproject.com/openwifi/>



QUIZ!

TIME

Quiz 1b Results



VINAYAK HEBBAR

Number of participants - 257

Score distribution - quiz 1b

