The Next Leap in Wireless: Inside the Evolution from Wi-Fi 7 to 8

Abstract:
The arrival of Wi-Fi 7 in early 2024, based on IEEE 802.11be, marks a paradigm shift in wireless networking—moving from single-link connections toward collaborative multi-link operation, enabling greater capacity and lower latency. With multi-link operation, Wi-Fi 7 can achieve a maximum throughput of 30 Gbps.

While this peak throughput supports most existing applications, it falls short of meeting the strict reliability demands of emerging use cases such as the metaverse, augmented and virtual reality, robotics, and industrial automation. These challenges are driving the development of the next generation—Wi-Fi 8.

To address these needs, the IEEE 802.11 Task Group bn has been established to define Ultra High Reliability (UHR) PHY and MAC layers. Their goal is to improve WLAN reliability, reduce latency, enhance manageability, and increase throughput across varying signal-to-noise ratios (SNRs).

In this talk, we will identify and describe the key PHY and MAC elements that will shape Wi-Fi 8, which will operate in the 2.4 GHz, 5 GHz, and 6 GHz bands. We will also discuss the enabling mechanisms under design and present performance results where appropriate.

Bio:

Dr. Cheng Chen is a Senior Staff Wireless Standards Engineer at Intel Corporation. He leads Intel's standardization efforts on Wi-Fi sensing (802.11bf) and integrated millimeter wave (802.11bq) within the IEEE 802.11 Working Group, as well as Intel's Wi-Fi certification programs within the Wi-Fi Alliance. He currently serves as Editor for the IEEE 802.11bq Task Group, Technical Editor for the Wi-Fi 7 Technical Task Group, and Vice Chair of the Wi-Fi Sensing Task Group in the Wi-Fi Alliance. He previously served as Technical Editor for the Wi-Fi 6 Technical Task Group (July 2021–June 2022).

Dr. Chen is a Senior Member of the IEEE and an IEEE ComSoc Distinguished Lecturer for the 2025–2026 term. He is an active contributor and voting member of multiple IEEE 802.11 standards, including 802.11ay (Next-generation 60 GHz Wi-Fi), 802.11be (Extremely High Throughput), 802.11bf (WLAN Sensing), 802.11bn (Ultra High Reliability), and 802.11bq (Integrated Millimeter Wave). He also contributes to several Wi-Fi Alliance certification programs, including Wi-Fi 6, Wi-Fi 6E, Wi-Fi 7, and Wi-Fi sensing.

In recognition of his outstanding contributions across standards forums, Dr. Chen has received multiple awards, including the IEEE Standards Association Award for Outstanding Contributions to IEEE 802.11ay and the Wi-Fi Alliance Leadership Recognition Award for the Wi-Fi 6 launch.

Dr. Chen earned his B.E. degree in Electronics and Information Engineering from Huazhong University of Science and Technology, Wuhan, China, in 2011, and his M.S. and Ph.D. degrees in Electrical Engineering from Northwestern University, Evanston, IL, in 2013 and 2016, respectively.