EION ByTES

WiFi Generations - From WiFi 4 to WiFi 7

WiFi Generations

The WiFi Alliance introduced a new generational naming system. The new naming system identifies WiFi generations by a numerical sequence which corresponds to major advancements in WiFi. The new Wi-Fi generation names provide manufacturers, operators, and end-users with a far easier way of naming the different types of Wi-Fi.

	WiFi 4	WiFi 5	WiFi 6	WiFi 6E	WiFi 7
Launch Date	2007	2013	2019	2021	2024
IEEE Standard	802.11n	802.11ac	802.11ax	802.11ax	802.11be
Max Data Rates	1.2 Gbps	3.5 Gbps	9.6 Gbps	9.6 Gbps	46 Gbps
Bands	2.4 GHz and 5 GHz	5 GHz	2.4GHz and 5 GHz	6 GHz	1-7.25 GHz (Including2.4GH,5 GHz, 6 GHz Bands)
Security	WPA2	WPA2	WPA3	WPA3	WPA3
Security	20 , 40 MHz	20, 40, 80MHz, 80+80 ,160 MHz	20, 40, 80MHz, 80+80 ,160 MHz	20, 40, 80MHz, 80+80 ,160 MHz	Up to 320 MHz
Security	64 QAM OFDM	256 QAM OFDM	1024 QAM OFDMA	1024 QAM OFDMA	4096 QAM OFDMA (with extensions)
MIMO	4x4 MIMO	4x4 MIMO, DL MU-MIMO	8x8 MU-MIMO	8x8 MU-MIMO	16x16 MU-MIMO

OFDM vs OFDMA

OFDMA stands for orthogonal frequency division multiplexing access. It is an extension of OFDM. The difference is that OFDMA is multi-user where OFDM is a single-user. It has a 3x higher throughput than single-user OFDM for short packets of data or multiple endpoints.

MIMO vs MU-MIMO

The main difference between MIMO or we can call it SU-MIMO (Single User MIMO) and MU-MIMO is that SU-MIMO allows only a pair of wireless devices to simultaneously send or receive multiple data streams. MU-MIMO uses beamforming to direct signals toward the intended wireless device(s) instead of randomly in all directions.

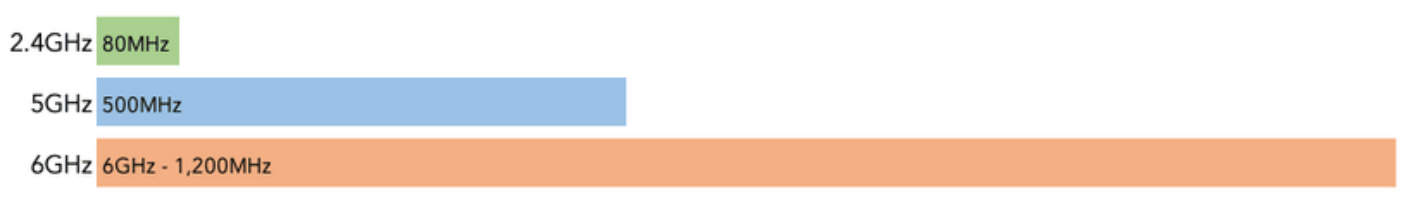
256 QAM vs 1024 QAM

With 1024 QAM modulation, there are more bits per symbol — 10 bits per symbol versus 8 bits in 256 QAM. More bits equals more data, and the payload delivery of data is more efficient — like having a bigger truck.

WPA2 vs WPA3

WPA2 utilized the Advanced Encryption Standard (AES) to provide better security along with new handshake protocols. WPA2 has been under attack, too, including the WPA2 KRACK attack. WPA3 uses the Simultaneous Authentication of Equals (SAE) to replace WPA2's Pre-Shared Key (PSK) exchange protocol.

WiFi Spectrum: 2.4 GHz vs 5 GHz vs 6 GHz



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