

# Wi-Fi standard 802.11ax and their impact on Education

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**Introduction-** “A new technology comes along, and it promises to be the new big things.” One technology that does promise to live up to the hype is **802.11ax, the next standard for wireless LANs.**



Figure 1 Wi-Fi 6 working efficiently in crowded area.

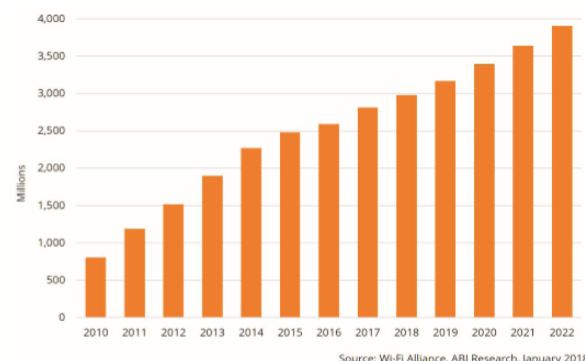
Before, 802.11ax we use Wi-Fi standard

802.11ac. Before We go any further, it's good to tell about the **Wi-Fi Alliance has issued new names for 802.11ac and 802.11ax** that are intended to make it simpler for the average person to understand which specification is being talked about. The alliance calls **802.11ac Wi-Fi 5** and calls **802.11ax Wi-Fi 6.**

Wi-Fi 6 Certified 6<sup>TM</sup>, the industry certification program based on the IEEE 802.11ax standard enables next generation Wi-Fi connectivity providing the capacity, coverage and performance required by users-even in environments with many connected devices such as stadium and other public venues.

Wi-Fi 6 will have an immediate impact on the performance of Network in crowded places such as stadium or railway station, the standard is expected to be adopted

faster than previous Wi-Fi iterations and it will eventually be a necessity for home



Source: Wi-Fi Alliance, ABI Research, January 2018

Figure 3 source: Wi-Fi alliance, ABI research, report January 2018

**users as 100Mbps to 1Gbps broadband connections become more available, and as the roll-out of IOT leads to everything being online.**

Wi-Fi 6 also supported for Up and Downlink “Orthogonal Frequency Division Multiple Access”

(OFDMA), a modulation scheme

that is equated to a **multiuser version** of OFDM, which will reduce latency boost capacity and improve

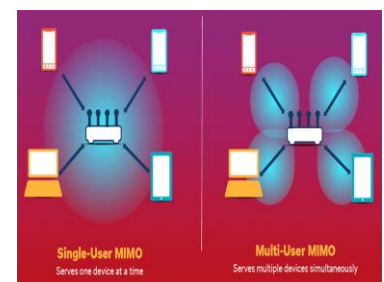


Figure 4 : Comparison between Single-user MIMO and Multi-user MIMO



Figure 2 Internet Devices increase in home.

efficiency by allowing as many as **30 users at once to share a channel**, Where Wi-Fi 5 support Single-User at a time. Wi-Fi is by now the established way to access the Internet, whether at home or at work, from PCs or cell phones. **In 2018, 19 years after the first meeting of the Wi-Fi Alliance, Wi-Fi will carry more than 50% of all Internet traffic.**

### Key Benefit of Wi-Fi 6

1. Higher Data Rates
2. Increased Capacity
3. Performance in environment with many connected devices
4. Improved power efficiency

**Solved problem by Wi-Fi 802.11ax-** The problem with Wi-Fi isn't always the speed of the system. 802.11ac wave 2 gets us to over the Gigabit barrier, which should be plenty of bandwidth for most people.

The bigger problem with Wi-Fi is congestion and how current Wi-Fi handles lots of people trying to do wireless things and overcrowding the network. The 802.11ax standard solves these problems and taking some best practices from LTE.

Its main focus is to enhance the efficiency of how access point handles devices simultaneously. It's no longer about comparing Wi-Fi speeds. Its more about

the capacity of the network to provide the optimal throughput for all clients.

Figure 6: Comparison between 802.11a/g,802.11n,802.11ac-1,802.11ac-2 and 802.11ax

Wifi6 transfer data transfer rate is 1.1Gbps over the 2.4 GHz bands and 4.8Gbps over the 5GHz band. It increases the speed 4x to 10x time of our Wi-Fi.

### Dynamic Fragmentation

Where Wi-Fi 5 has static fragmentation, which require all the fragments of a data packets to be the same size excepts the last fragment. But Wi-Fi 6 supports the dynamic Fragmentation which, allows these packets to be of varying size for better use of network resources.

### Comparison between 802.11n, 802.11ac and 802.11ax

802.11n (2008):	802.11ac (2012):	802.11ax (2018):
<ul style="list-style-type: none"> <li>• 2.4 and 5 GHz supported</li> <li>• Wider channels (40 MHz)</li> <li>• Better modulation (64-QAM)</li> <li>• Additional streams (up to 4)</li> <li>• Beam forming (explicit and implicit)</li> <li>• Backwards compatibility with 11a/b/g</li> </ul>	<ul style="list-style-type: none"> <li>• 5 GHz only</li> <li>• Even wider channels (80, 160 MHz)</li> <li>• Better modulation (256-QAM)</li> <li>• Additional streams (up to 8)</li> <li>• Beam forming (explicit)</li> <li>• MU-MIMO</li> <li>• Backwards compatibility with 11a/b/g/n</li> </ul>	<ul style="list-style-type: none"> <li>• 2.4 GHz and 5 GHz supported</li> <li>• OFDMA uplink and downlink</li> <li>• Extends and generalizes OFDM</li> <li>• Introduces the concept of Resource Units (RUs)</li> <li>• Massive parallelism</li> <li>• Better modulation (1024-QAM)</li> <li>• Uplink MU MIMO</li> <li>• Spatial re-use (BSS color)</li> <li>• Backwards compatibility with 11a/b/g/n/ac</li> </ul>

Figure 5: comparison between 802.11n, 802.11ac and 802.11ax

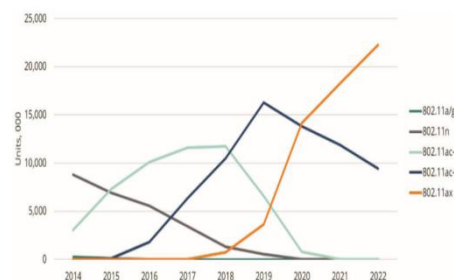




Figure 2 Student attend online Lecture in the classroom.

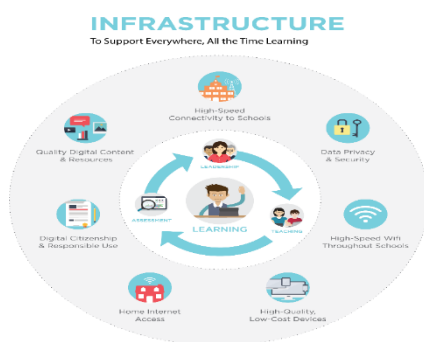


Figure 7 Wi-Fi 6 impact on Education

**Impact on the Education -** Wi-Fi 6 has immense potential to improve the quality of education, which is one

of the pillars of sustainable development. Through Wi-Fi 6 internet speed may improve and the area of network are increase so, study anywhere is easy for us.

Wifi-6 also beneficial for faculties they download E-material for study and updated according the modern era. They also spread their knowledge to that place where the physical infrastructure of the colleges is not existed.

66 % adult learners prefer online education indicating the growth in demand online courses.

Using Wi-Fi 6 at school or colleges, students can easily share documents, edit presentation in real time, store project files in the cloud, and improve their teamwork skills. Wi-Fi in education even allow students to collaborate with peers from other schools. Employers value teamwork, and students who leverage technology to develop this skill will have more

opportunities to succeed in the professional world.

From extracurricular activities to study abroad programs to exploring hobbies on their own, devices such as tablets and smartphones can connect students to a wealth of text, audio and video content found in text books.

For sending an email to conducting a video interview to competing in an online math competition, internet for schools allows students to meet people from around the world. Peers from other schools, business leaders, industry and others offer valuable networking and learning opportunities.

**Conclusion –** After all the discussion about Wi-Fi 6, I come to the point that Wi-Fi 6 is a major step towards the changing technology. It helps us to develop a new way for sharing the Information with high speed and good performance. It proves very helpful in the field of education by providing the high-speed Internet access to us. It surely helps the students as well teachers for guide the new generation people so that they create the new world where the technology is available for everyone.

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