802.11ax, also known as Wi-Fi 6, is the latest Wi-Fi standard ratified by the IEEE in 2021. It represents a significant evolution in wireless networking technology, introducing several improvements over its predecessors, including 802.11ac (Wi-Fi 5). Here are some key features of 802.11ax:

- **Increased Data Rates**: 802.11ax supports higher data rates compared to previous standards, with maximum theoretical speeds exceeding 10 Gbps. This is achieved through various enhancements, including wider channel bandwidths (up to 160 MHz), advanced modulation techniques (1024-QAM), and multi-user MIMO (MU-MIMO) with uplink and downlink support.
- **Orthogonal Frequency Division Multiple Access (OFDMA)**: One of the key features of 802.11ax is the introduction of OFDMA, which enables more efficient spectrum utilization by dividing channels into smaller sub-channels, allowing multiple devices to transmit simultaneously within the same channel. This improves overall network efficiency and reduces latency, especially in high-density environments.
- **Improved MU-MIMO**: 802.11ax enhances MU-MIMO capabilities introduced in previous standards, allowing for more simultaneous connections and better performance, even in scenarios with a large number of connected devices. It supports MU-MIMO operation in both uplink and downlink directions, further improving network efficiency.
- **Target Wake Time (TWT)**: 802.11ax introduces TWT, which allows devices to schedule when they wake up and communicate with the AP, reducing power consumption and improving battery life, especially for battery-powered IoT devices and smartphones.
- **Better Performance in Dense Environments**: With its improved efficiency and capacity management features, 802.11ax performs better in high-density environments with a large number of connected devices, such as stadiums, airports, and urban areas.
- **Backward Compatibility**: Like previous Wi-Fi standards, 802.11ax is backward compatible with older devices using 802.11a/b/g/n/ac standards. However, to take advantage of the new features and higher data rates of 802.11ax, compatible devices and infrastructure are required.

- **Enhanced Security**: 802.11ax includes enhancements to wireless security protocols, such as WPA3, providing better protection against security threats and vulnerabilities.
- **Widespread Adoption**: 802.11ax has seen rapid adoption in both consumer and enterprise environments, driven by the growing demand for high-speed wireless connectivity and the proliferation of IoT devices. It is expected to become the dominant Wi-Fi standard for new installations and upgrades in the coming years.

Overall, 802.11ax represents a significant step forward in Wi-Fi technology, offering faster speeds, improved efficiency, and better performance, making it well-suited for a wide range of applications and use cases in today's connected world