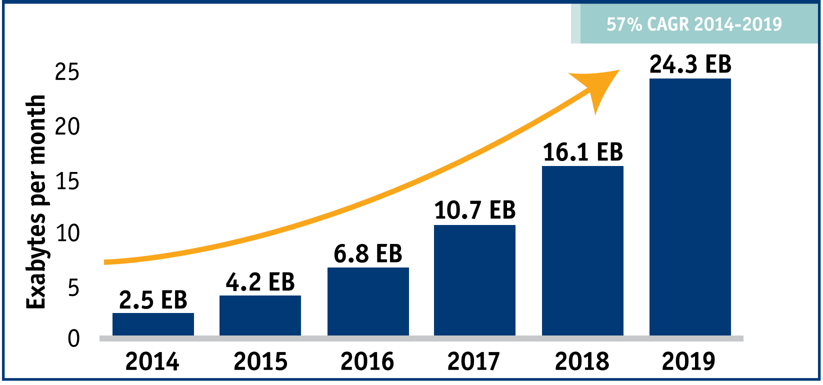
Evolution of Wireless Devices

Advancement in wireless technology is being driven not only by the sheer number of wireless IP devices being used, but also by the amount of content being generated and transmitted by each device **(Figure 1)**. Today, anyone with a mobile smart device can take pictures or record high-definition video content and transmit bandwidth-intensive files to any number of contacts.

FIGURE 1: CONTENT TRANSMITTED BY MOBILE DEVICES



Source: Cisco VNI Mobile, 2015

This growing demand is why the IEEE has developed the wireless standard called 802.11ac. This technology will roll out in phases, or waves. The first wave of products – both devices and wireless access points (WAPs) – began in 2013. As subsequent waves roll out, significantly more bandwidth is made available. By wave 4, WAPs will have the ability to transmit up to 6.9Gbps back to the IDF **(Figure 2)**. This means that if the theoretical maximum throughput is achieved by the WAP, seven Category 6 cables would be required to move that much IP traffic. This is why the TIA TSB-162-A recommends using Category 6A for each WAP.

In the midst of all this, the next generation of wireless is also being developed. This new technology – IEEE 802.3ax – will pick up where 802.11ac drops off. The goal of IEEE 802.3ax is to provide bandwidth of at least 4X what 802.11ac can deliver, with an estimated 30Gbps delivered back to the IDF. Additionally, as bandwidth goes up, the reach of each WAP goes down. Therefore, as 802.11ac technology advances to waves 3 and 4 and 802.11ax starts to become commercially available around 2020, more WAPs will be required for the same square footage.

FIGURE 2: 802.11AC WIRELESS TRANSMISSION RATES

Feature	802.11ac	
Access Points Peak Data Rates	Antennas	Rates
	1x1 2x2 4x4 8x8	866Mbs (Wave 1 2013) 1.7Gbs (Wave 2 2015) 3.4Gbs (Wave 3 est. 2016) 6.9Gbs (Wave 4 est. 2018)
RF Band	5 GHz	
Channel Width	20, 40, 80 MHz 160 (80+80 Opt.)	
MIMO	Multiple Users	

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