EION ByTES

Four Technologies That Will Affect Your Enterprise Network

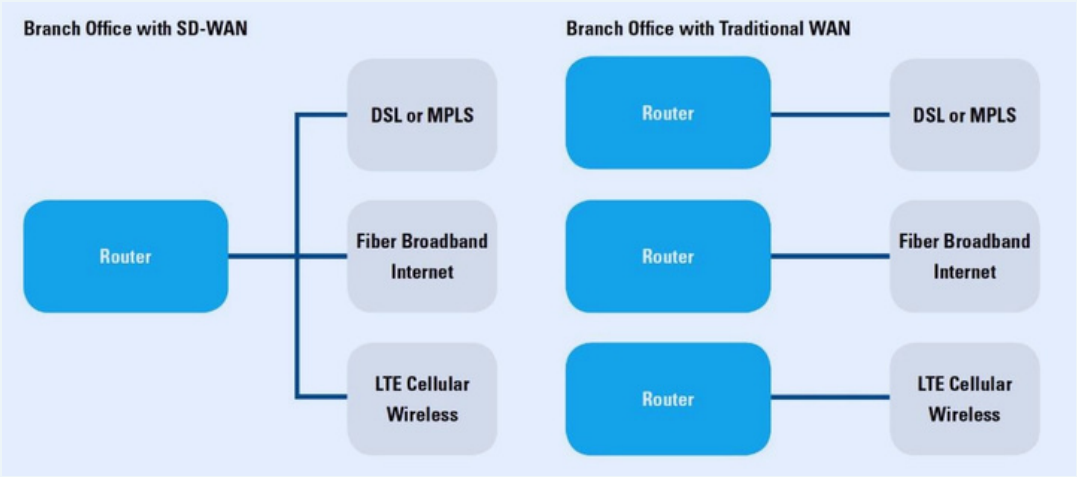
INTRODUCTION

Business IP traffic is projected to have a combined annual growth rate of 21 percent between 2016 and 2021 to 45,452 Petabytes of data per month–about 4 Gigabytes per month for the average business user, according to the Cisco Visual Networking Index: Forecast and Methodology, 2016-20211.

There are a number of technologies you should consider when planning any upgrades to your enterprise network. This article summarizes these technologies and their impact on the physical premise network.

1. SD-WAN: Software Defined - WAN

Software-defined networking (SDN) is the concept of decoupling networking hardware from its control mechanism. Software-Defined Wide Area Network (SD-WAN) is a software overlay that allows dynamic path selection for load sharing across various WAN connections. It supports multiple connection types, including Multiprotocol Label Switching (MPLS), Internet and Long-Term Evolution (LTE) or 5G. It provides a simple interface to manage your WAN, including zero-touch provisioning at branch locations. It supports Virtual Private Networks (VPN) and Network Functions Virtualization (NFV) such as software optimization controllers, load balancers, firewalls, intrusion detection and web gateways.



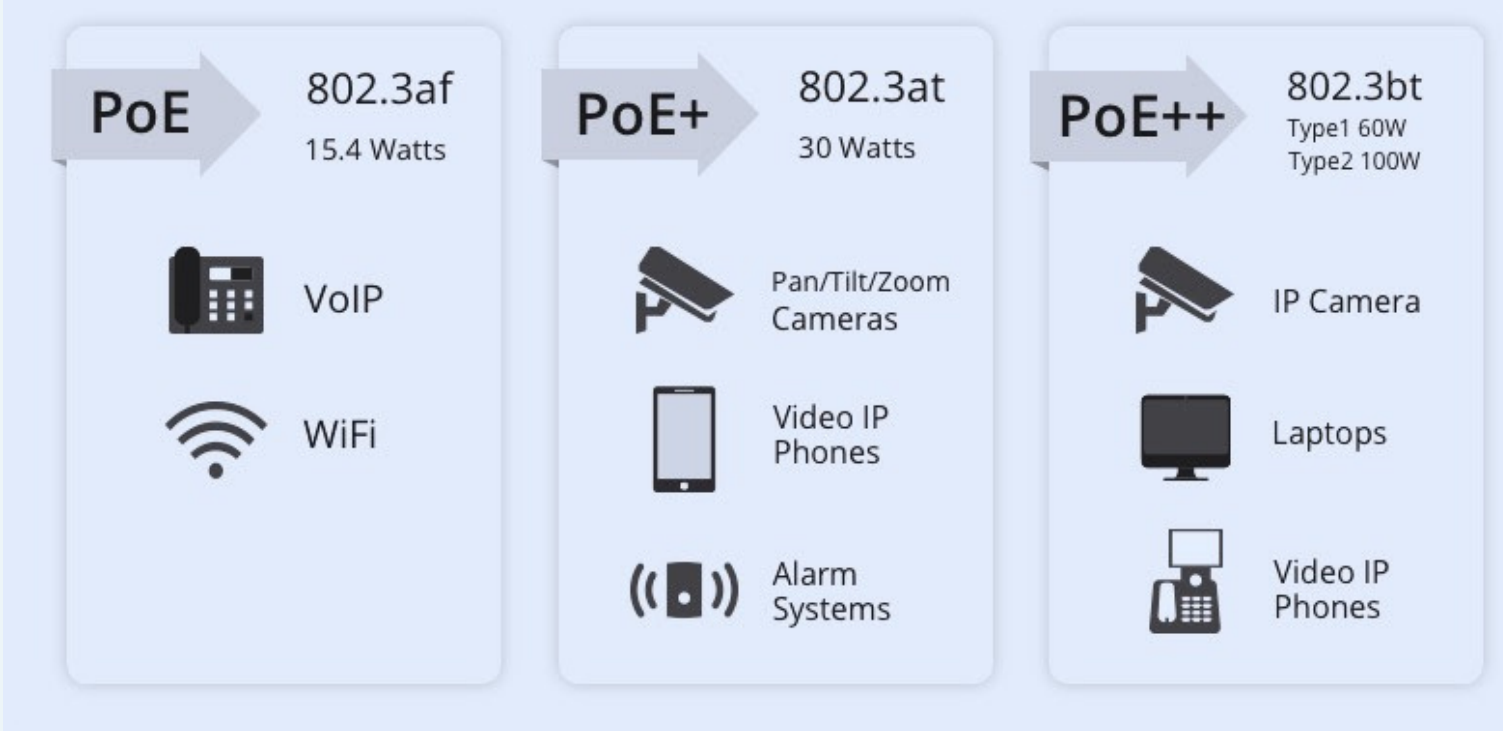
SD-WAN reduces the costs of traditional WAN by virtualizing network services and consolidating customer premise equipment into a single hardware appliance that can manage multiple connections

The impact on the physical network is a reduction of the amount of physical hardware used to create and connect the WAN, as shown in the Figure above. The structured cabling for the site does not change. The switch should support SDN to optimize WAN-LAN conditions and to prepare for intent-based networking. If upgrading switches, consider a cloud-managed switch and an integrated wireless LAN controller function. In some instances, a single appliance provides switching, wireless LAN and broadband connection.

2. PoE++ - Enhanced Power over Ethernet - 802.3bt

Power over Ethernet (PoE) was introduced in 2003. The basic concept is to deliver power over the network connection to end devices, eliminating the need for a separate power connection. Currently deployed PoE delivers up to 25.5 Watts of power to equipment. PoE powers Voice over Internet Protocol (VoIP) desk phones, wireless access points (WAPs) and basic security cameras.

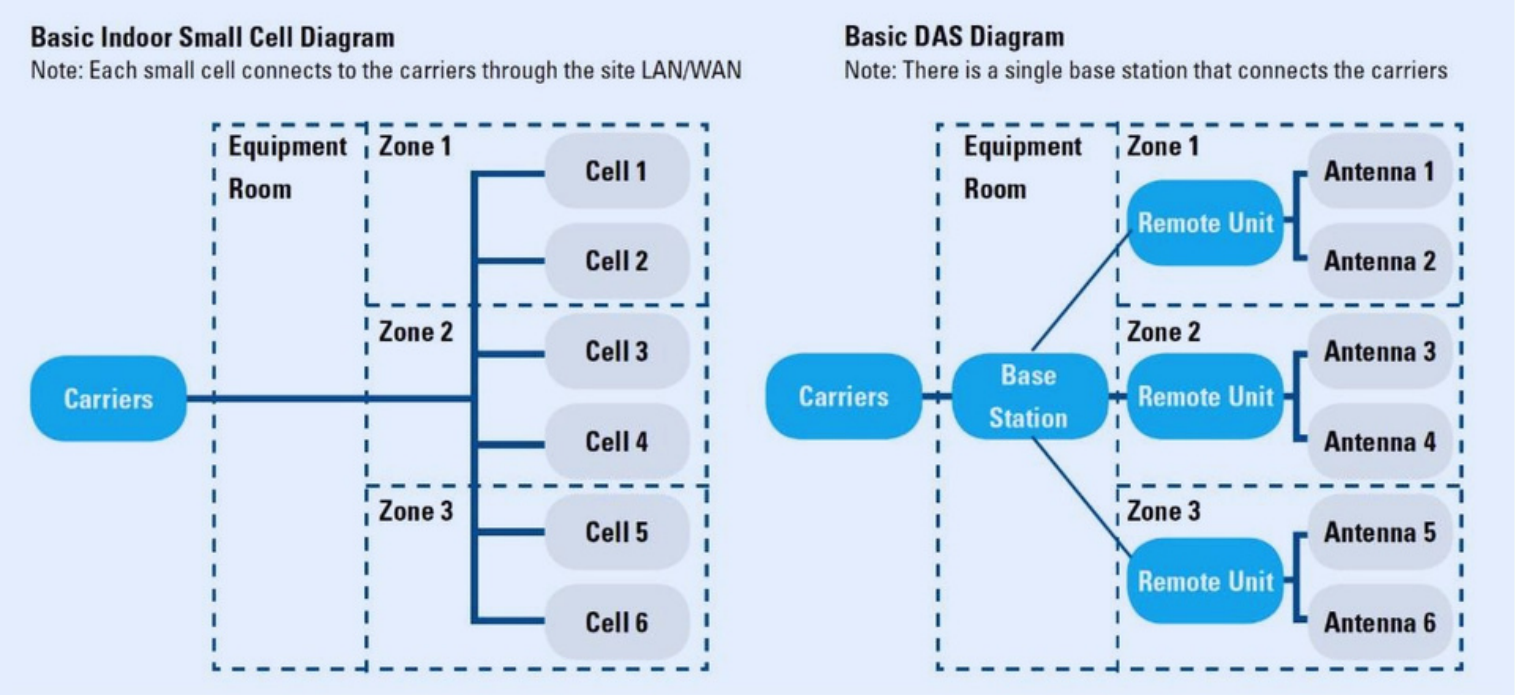
The enhanced PoE draft amendment, IEEE 802.3bt-20184, proposes two additional types, or power ranges, for 60 Watts and up to 100 Watts per connection, thus extending the possibilities to power other end devices such as high bandwidth WAPs, pan-tilt-zoom security cameras, access control systems and IoT sensors.



PoE vs PoE+ vs PoE++

3. 5G Indoor Small Cells or DAS

The next generation of cellular wireless, 5G, is delivering mobile broadband access download speeds between 500 Megabits per second (Mbps) to 1 Gigabit per second (Gbps) with 10 milliseconds (ms) latency.



Small Cells uses the existing LAN and Backhauls through the WAN connection. DAS is a separate overlay with a single base station with multiple connections

Small Cells and DAS deployments are similar. The main difference is that small cells are individual mini-base stations, but DAS shares a single base station signal across a network of antennas. Small cells can attach to the existing network and use the building's broadband connection for backhaul. DAS is a separate network overlay with independent backhaul connections, as shown in the Figure above. Small cells are better suited for small- and medium-size environments or user groups. DAS supports very large venues and user groups.

4. WiFi 6 - 802.11ax

Wireless Local Area Networking (WLAN) throughput, or data transfer rate, has increased significantly in the past decade and continues to increase with the new IEEE 802.11ax (WiFi 6) amendment to the IEEE 802.11 standard. IEEE 802.11ax is the standard that defines high-efficiency wireless local area networks (WLANs) for dense environments. IEEE 802.11ax introduces a number of technical improvements over the previous IEEE802.11ac amendment that allows wireless access points (WAPs) to support even more devices and provide even faster connections in anticipation of 4K/8K UHD video streaming, augmented and virtual reality (AR/VR) and rapid proliferation of connected devices as part of the Internet of Things (IoT).

	802.11ac	802.11ax
BANDS	5 GHz	**2.4 GHz** and 5 GHz
CHANNEL BANDWIDTH	20 MHz, 40 MHz, 80 MHz, 80+80 MHz & 160 MHz	20 MHz, 40 MHz, 80 MHz, 80+80 MHz & 160 MHz
FFT SIZES	64, 128, 256, 512	256, 512, 1024, 2048
SUBCARRIER SPACING	312.5 kHz	**78.125 kHz**
OFDM SYMBOL DURATION	3.2 us + 0.8/0.4 us CP	**12.8 us + 0.8/1.6/3.2 us CP**
HIGHEST MODULATION	256-QAM	**1024-QAM**
DATA RATES	433 Mbps (80 MHz, 1 SS) 6933 Mbps (160 MHz, 8 SS)	600.4 Mbps (80 MHz, 1 SS) 9607.8 Mbps (160 MHz, 8 SS)

Key parameters of 802.11ax compared against 802.11ac

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