

11ax Technology and Portfolio Introduction

Eye Networks Shared Insight 2019



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Agenda

Wireless
Challenge

Technology
Trend

11ax
Key Features

Product
Roadmap

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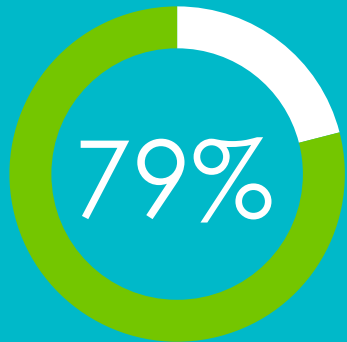
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Your Networking Ally

Wireless Challenge





79% of the Internet's traffic is expected to run through Wi-Fi and mobile by **2022**

Source: 2018 Cisco VNI report

The number of Internet-connected devices in the home is expected to reach **50** per home in **2022**



Source: Connected devices—GSMA connected living 2015; Number of devices per home in home with a family of 4

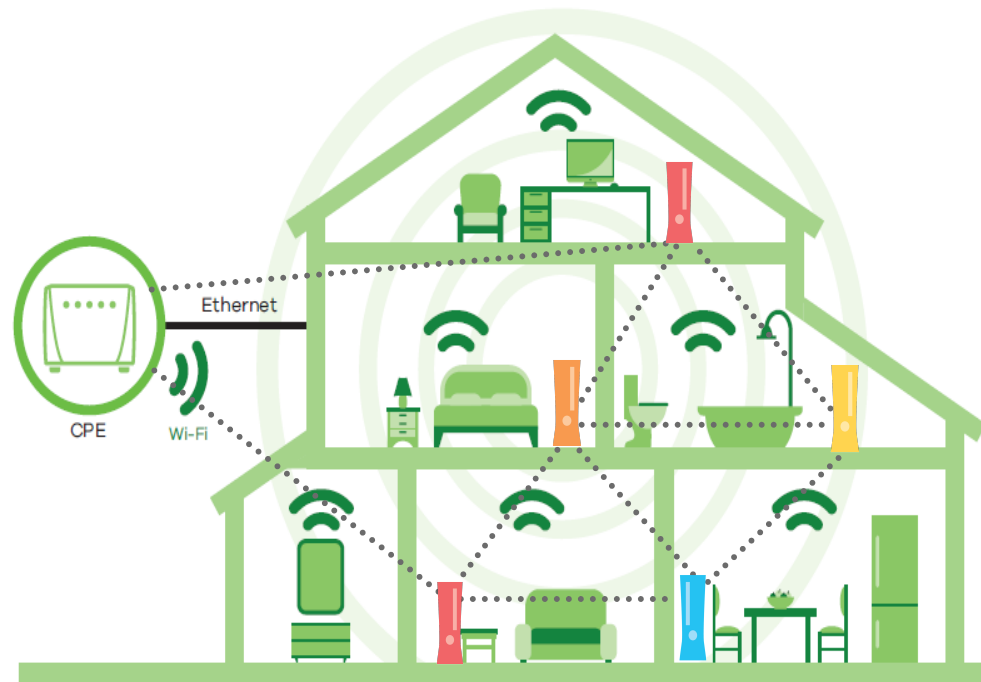
Internet of Things

IoT is growing with many different wireless technologies competing to become the major standard. This create compatibility issue and require the deployment of extra hardware and software for connecting devices.



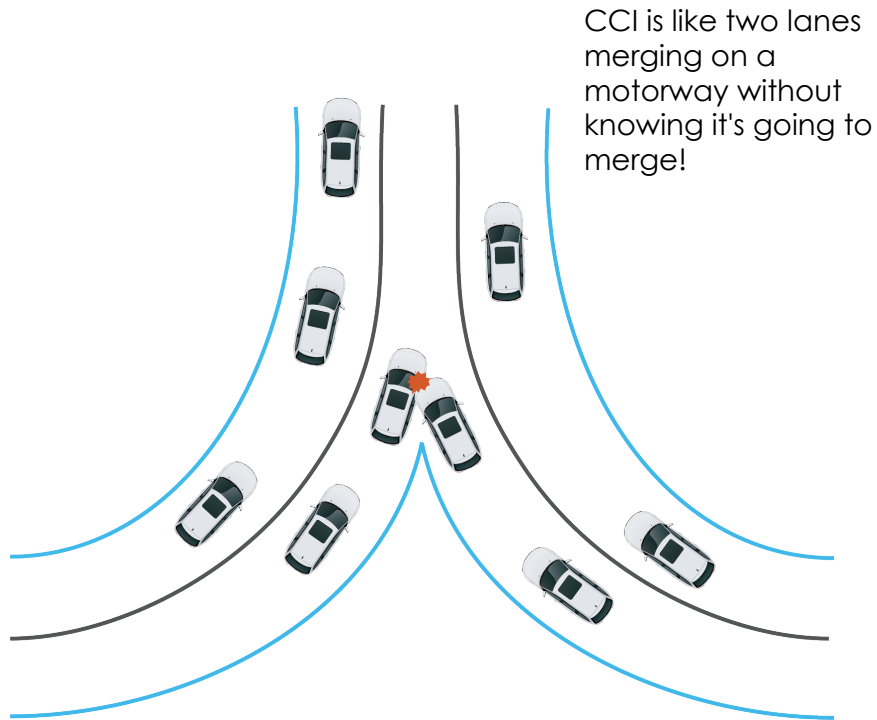
Multiple AP Environment

With the popularity of mesh network to solve the coverage issue, Access points are everywhere, indoors and outdoors. In the meantime, it also create more interference and congestion issue.



Co-Channel Interference (CCI)

Co-channel interference occurs between two access points (APs) that are on the same frequency channel. The reason why this should be considered when deploying Wi-Fi is that co-channel interference can severely affect the performance of your wireless LAN (WLAN) so much so that the effects can make the connection unusable.



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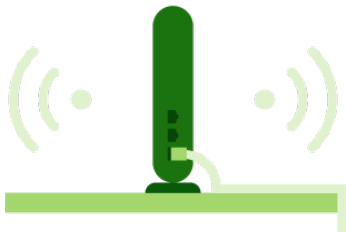
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Technology Trend



WiFi Performance

Peak Throughput
for single client



Overall Capacity



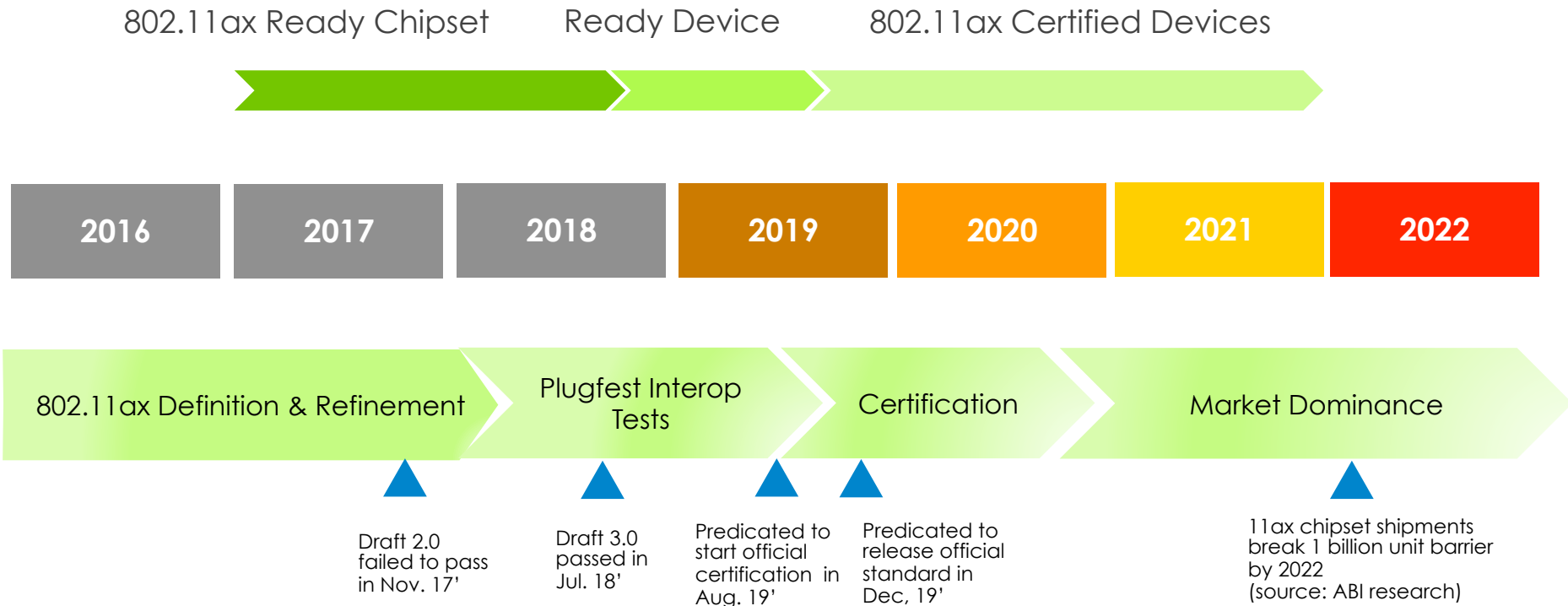
802.11 b/g/n

802.11ac Wave 1




802.11ac Wave 2

802.11ax

Expected Schedule for 802.11ax devices



New WiFi naming system

WiFi Technology	Wi-Fi generation names	UI visuals
802.11ax	Wi-Fi 6	
802.11ac	Wi-Fi 5	
802.11n	Wi-Fi 4	

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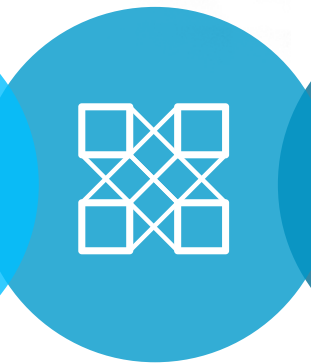
Key Features





10G Wi-Fi

Theoretical top
speed of 9.6Gbps



Larger Capacity

4 x Capacity,
and performance



Dual Band

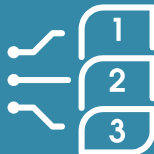
Operates in both
2.4Ghz and 5Ghz



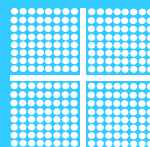
8x8
MU-MIMO
DL/UL



OFDMA
Orthogonal Frequency
Division Multiple Access
(DL/UL)



RUs
Resource Unit
Scheduling



1024 QAM
Higher modulation
rates



BSS Color
BSS Frame coloring



TWT
Target Wakeup
Time

DL & UL MU-MIMO

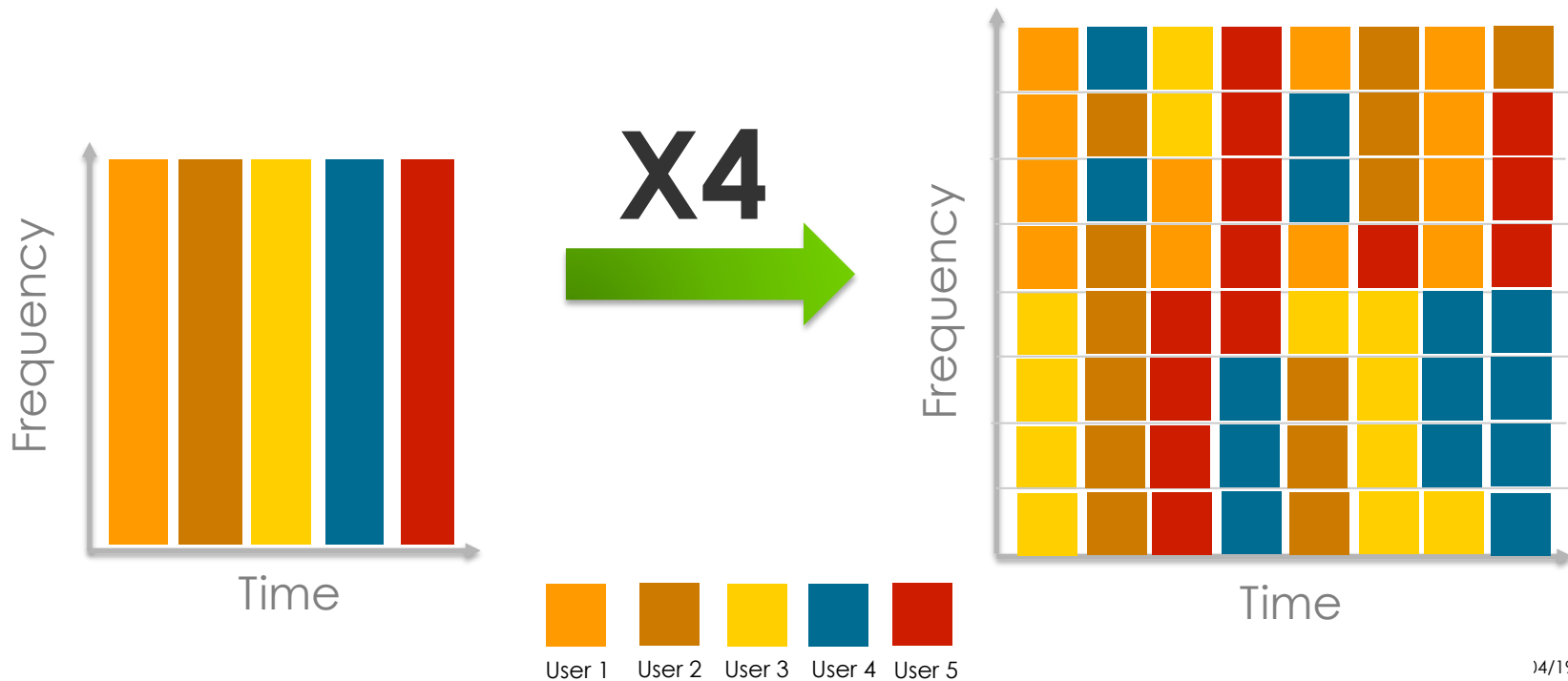
Increase capacity and coverage

Multi-user MIMO sends different data to different user simultaneously. 802.11ac supported MU-MIMO only in the downlink direction in 5GHz band, and 802.11ax extends it to both **downlink** and **uplink** in **2.4 GHz** and **5GHz** bands.



OFDMA

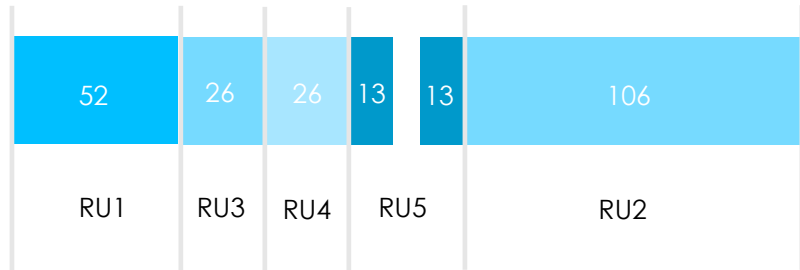
Improves user experience in dense environment



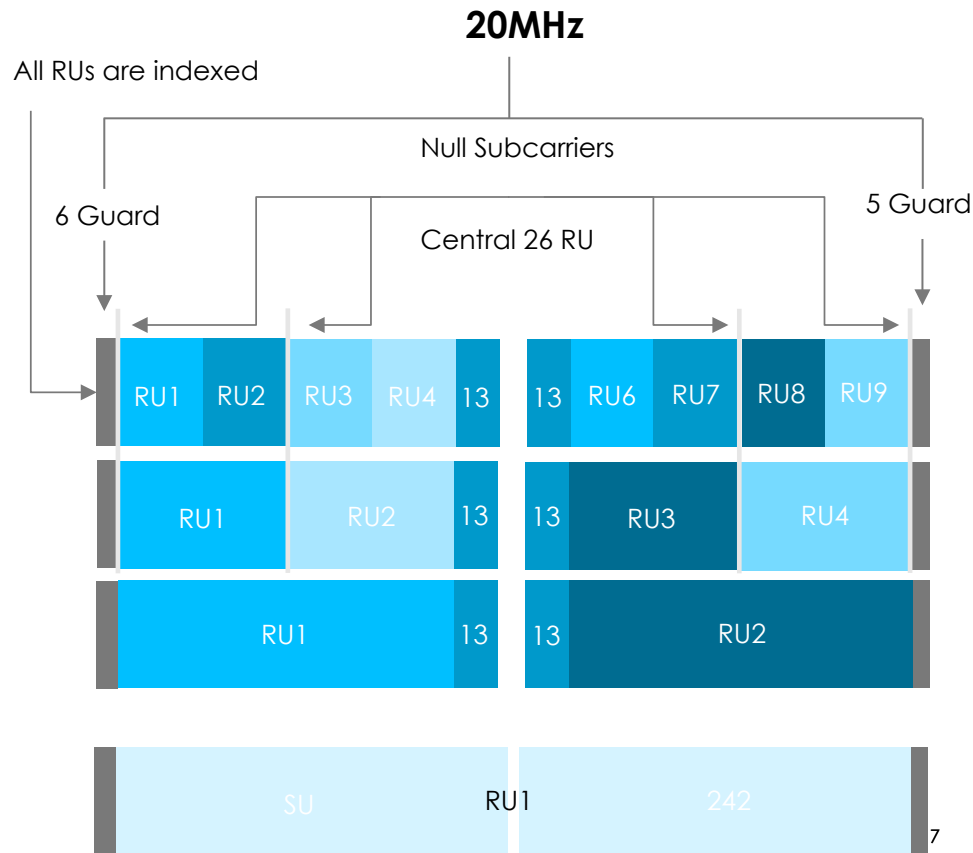
Resource Units

Increase efficiency

RU sizes can be mixed



The various combinations on how the frequency is divided into RUs. It is dynamically applied by control information, e.g. scheduling





Current 802.11ac

20MHz Channels

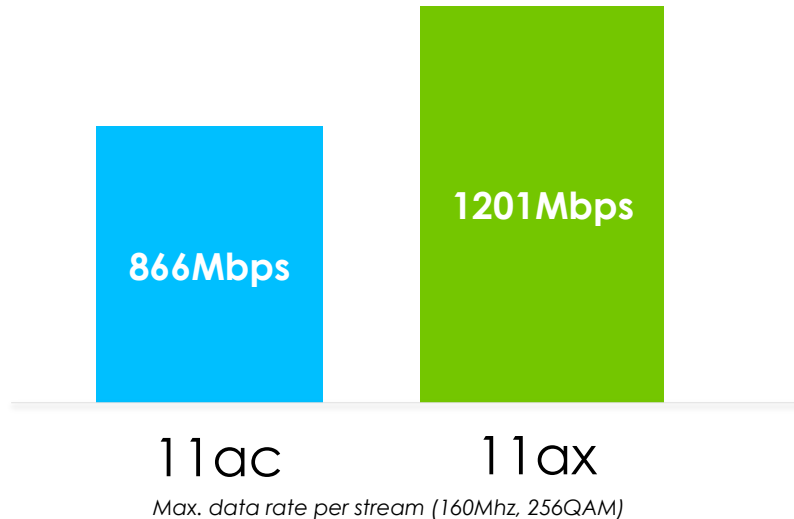


802.11ax Resource Units

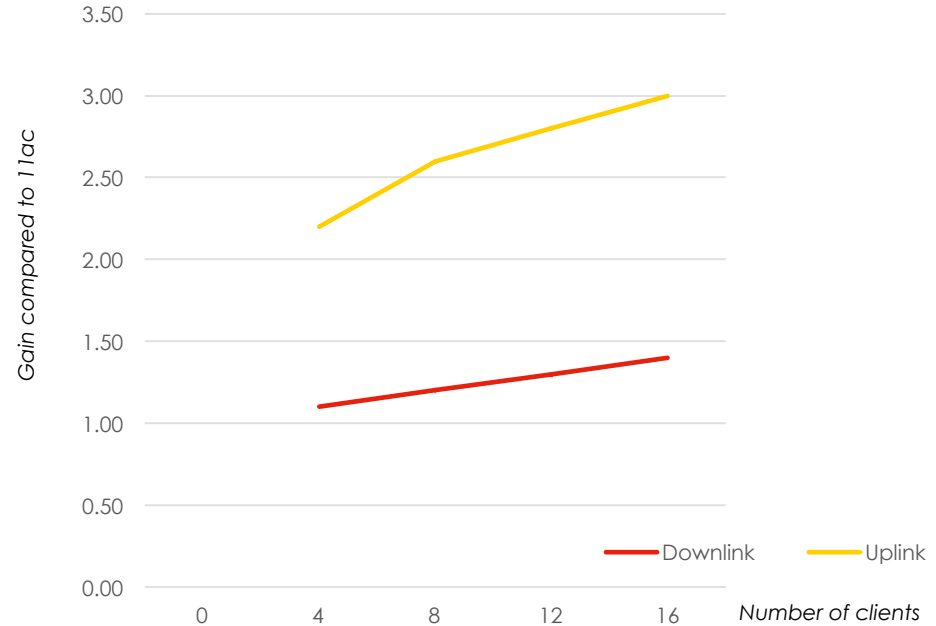


Higher Efficiency

Increase overall network throughput



802.11ax vs 802.11ac throughput gains (1500B/100B)

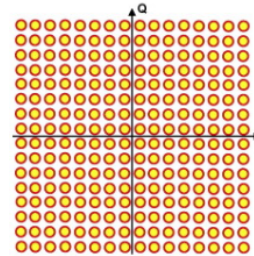


1024 QAM

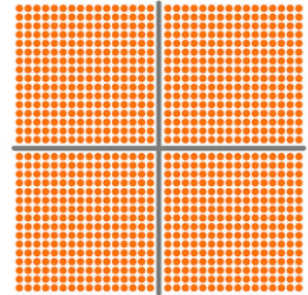
Increase PHY data rate

802.11ax use 1024 QAM to enable higher peak data rates at short range. Compared to 802.11 ac with 256 QAM, the peak PHY rate is increased by 25%. AP is able to support Gigabit WiFi with 2x2 11ax.

+25%



256 QAM

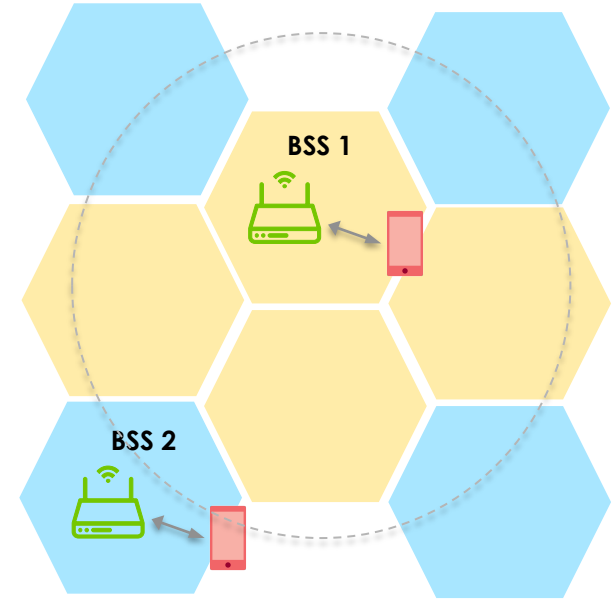


1024 QAM

BSS Coloring

Improve Coverage and Performance

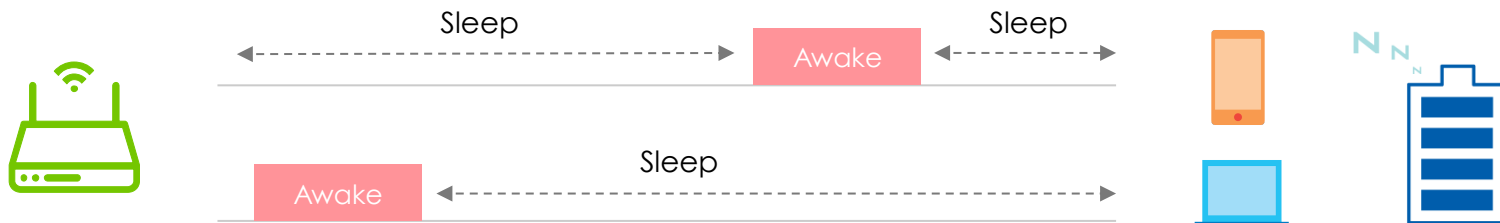
BSS coloring is a mechanism to assign a different color per BSS, which allow access points and clients to recognize data streams from other networks. If the BSS color indicates that the detected transmission is in a different BSS, then the STA can start transmission without waiting. It prevents unnecessary channel access contention from neighbouring BSS and therefore enhance coverage.



Target Wake Time

Extend Battery Life and Uplink Scheduling

Target Wake Time (TWT) is a power saving mechanism. Client and AP negotiate to set up an agreed schedule for client to wake up, which allows client to save power. AP can also use TWT to put multiple clients to sleep and wake up in different time frame to reduce uplink contention.



802.11ax Benefits



4x increase in capacity

MU-MIMO can serve up to 8 simultaneous users for both **uplink** and downlink in dense scenarios.

1024QAM increase up to **25%** higher capacity vs. 256QAM.



Higher efficiency

OFDMA carry multiple user data in the same channel bandwidth to increase overall efficiency.



Internet of Things

TWT extends battery life and schedule uplink access to prevent contention.

20MHz-only allows new class of WiFi chip for low-cost IoT devices



Improved coverage & performance

BSS color prevents unnecessary channel access contention from neighbouring BSS and therefore enhance coverage.

802.11ax in the real world

- Where are the 802.11ax clients?
- Is there any benefits for legacy clients?

NO

802.11ax AP will not improve the performance or efficiency of any legacy clients (802.11a/b/g/n/ac)

YES

As more 802.11ax clients mixed into the client population, they can free up more valuable airspace for the legacy clients and enhance the overall efficiency.

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Product Roadmap



Selected Products with 802.11ax

GPON

2.5G

XGSPON

10G SFP+

10G

IAD
4x4 + 4x4
AX6000

PX5501
MP September 2019



EX5501
MP August 2019



PX7501
MP May 2019



AX7501
MP May 2019



EX7501
Q3 2019



Access Point/
Repeater

WX3300
Q3 2019



2x2 + 4x4
AX3600
2.5G + 1G LAN

WX7700
Q4 2019



4x4 + 8x8
AX11000
2.5G + 1G LAN

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Questions?

