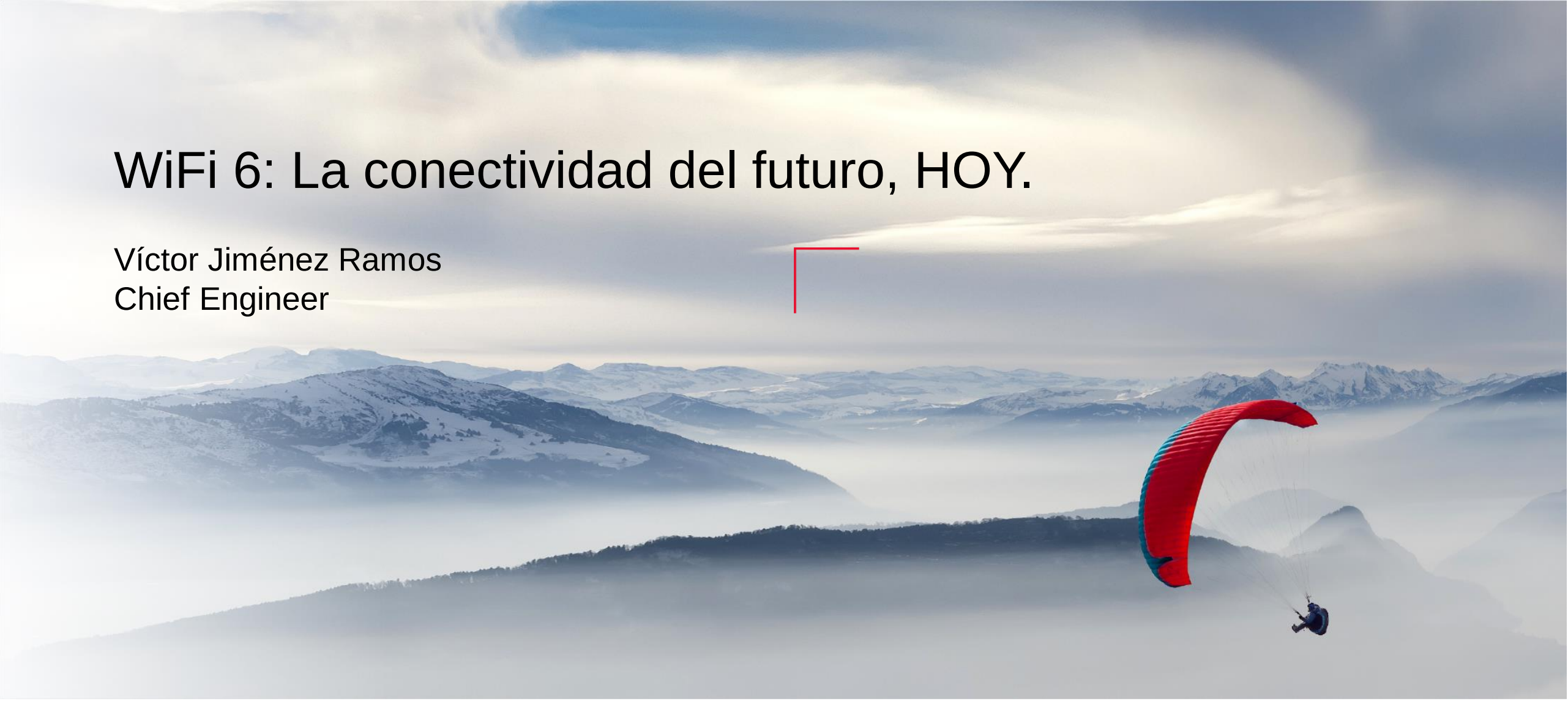
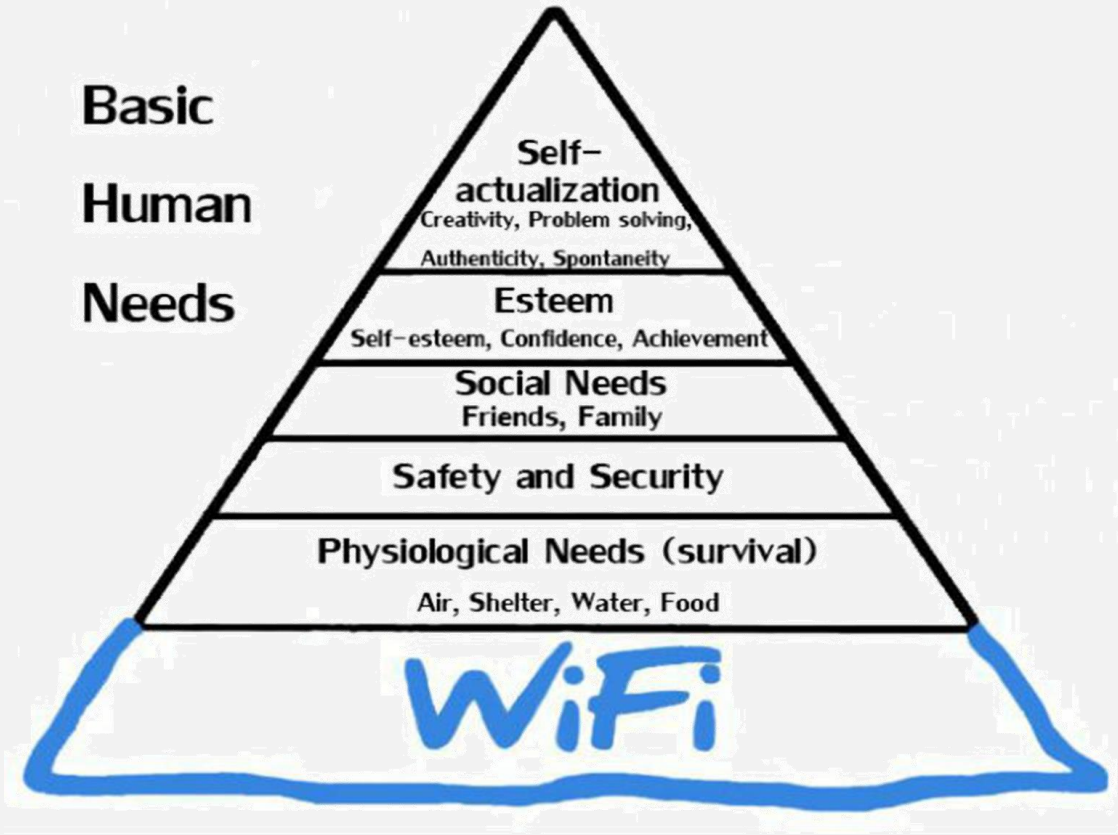
WiFi 6: La conectividad del futuro, HOY.

Víctor Jiménez Ramos
Chief Engineer

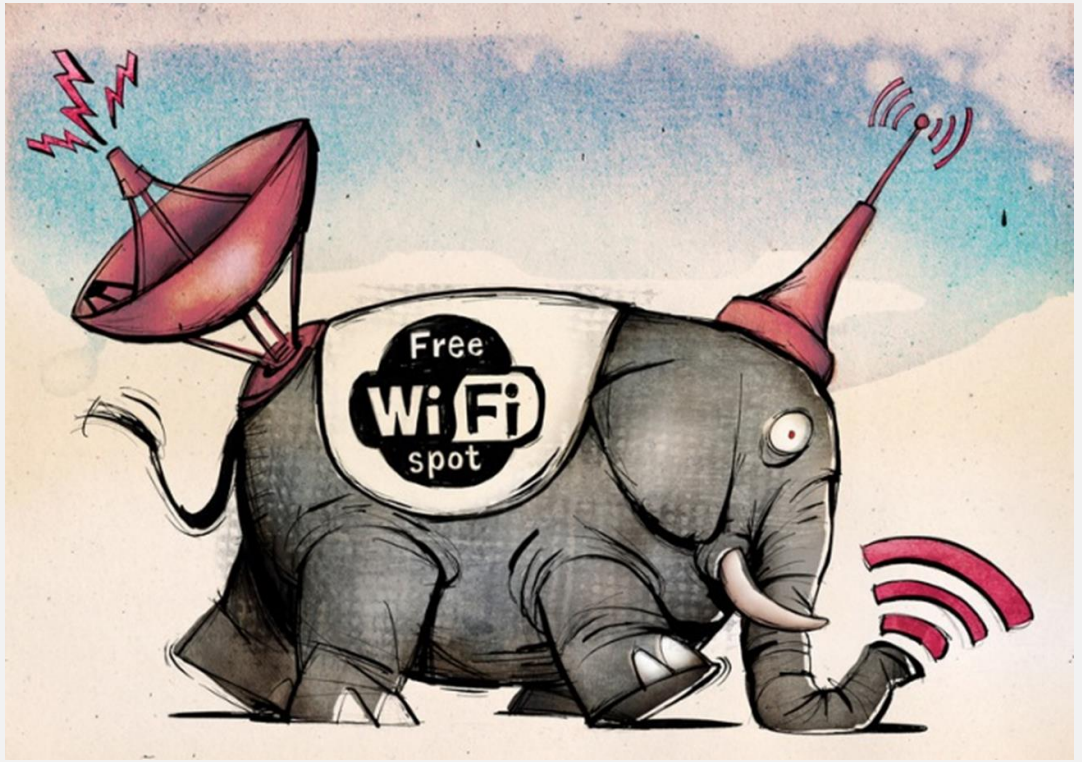


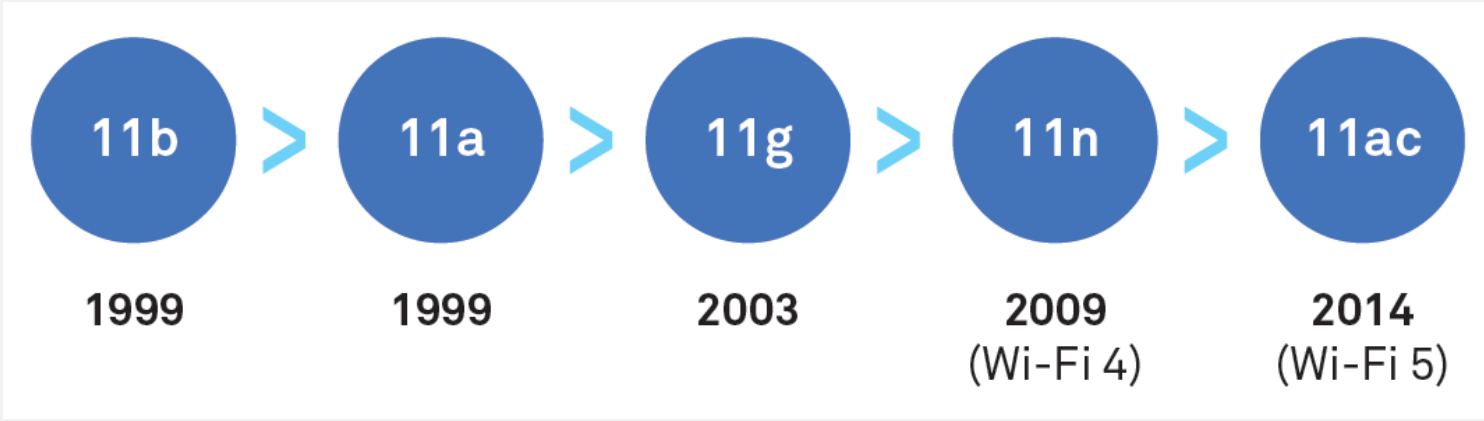
What is WiFi today?



The advance of technology is based on making it fit in so that you don't really notice it, so it becomes part of everyday life- Bill Gates

WiFi, so far…

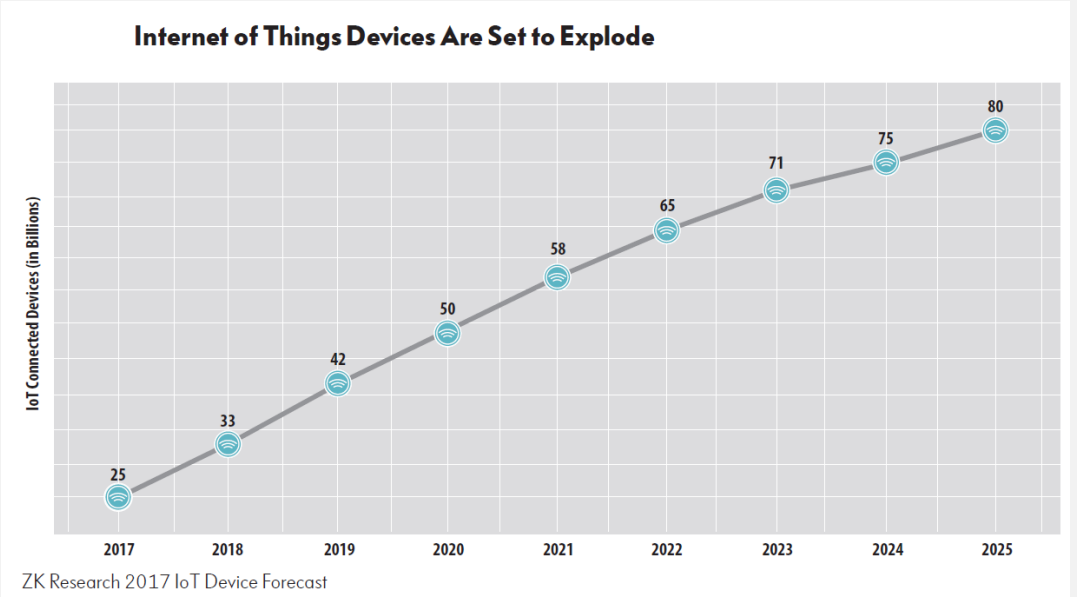

Free
Wi Fi
spot

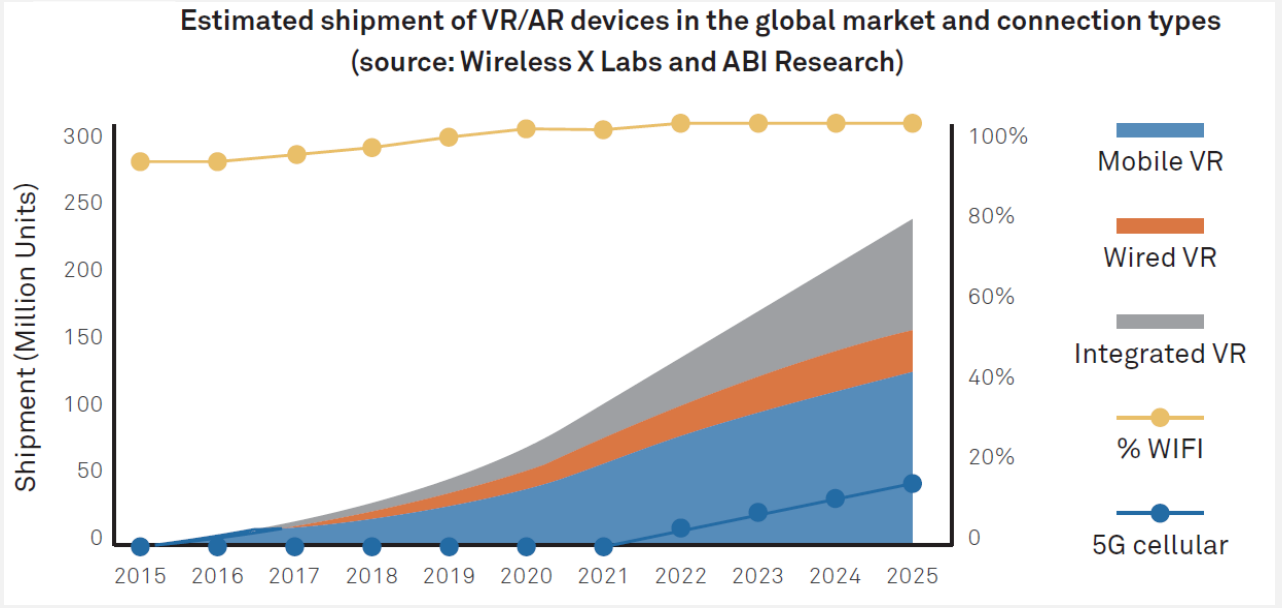

11b
11a
11g
11n
11ac
1999
1999
2003
2009
(Wi-Fi 4)
2014
(Wi-Fi 5)

The next WiFi have to…

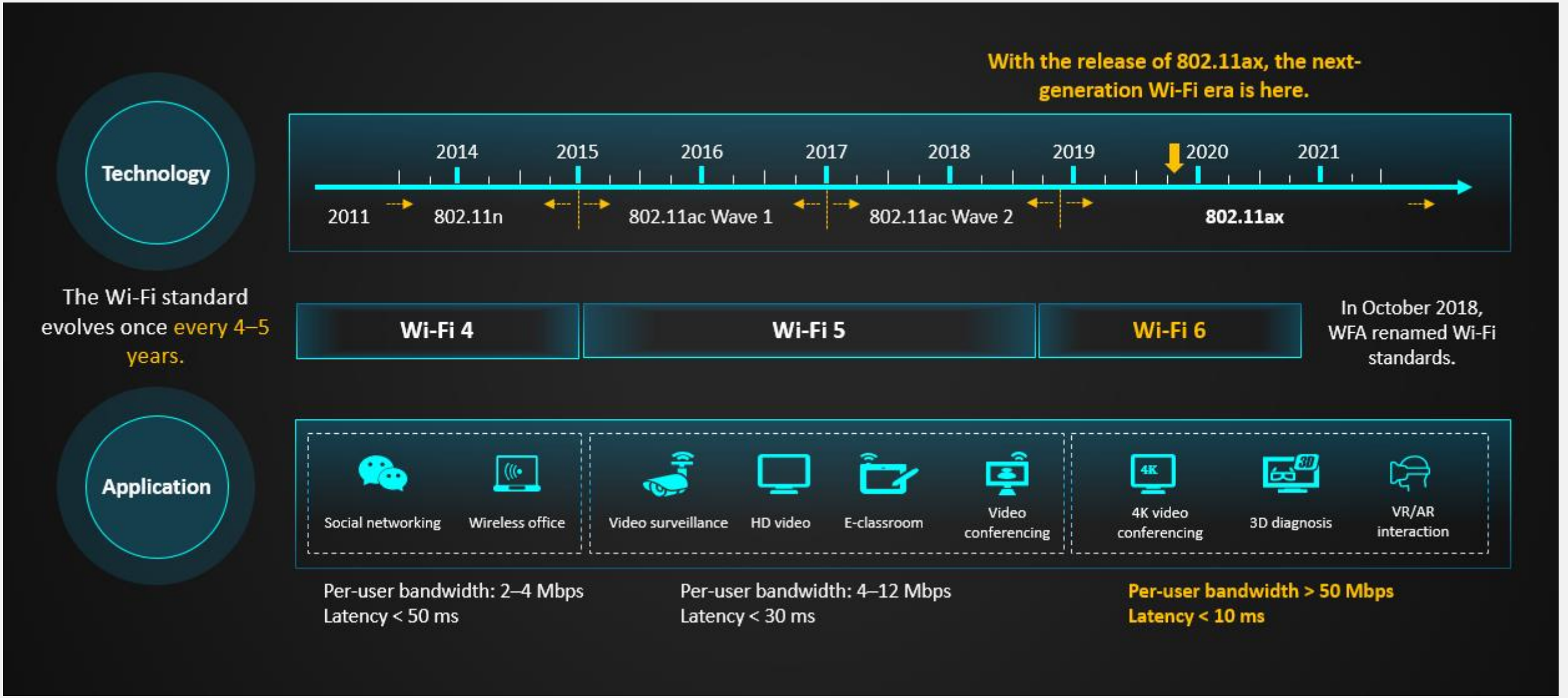
Bandwidth requirements of applications

Scenario	Application	Bandwidth	Delay
Office	Video conferencing	30Mbit/s	100ms
	4K wireless display	50 Mbit/s (peak value)	50ms
	VoIP	512kbit/s	20ms
	360° VR live broadcasting	50 Mbit/s	10–20ms
	Conference live broadcasting	30 Mbit/s	50ms
Education	Mobile gaming	3 Mbit/s	80ms
	Interactive gaming	200 Mbit/s (full interaction)	10–20ms
	VR distance education	60 Mbit/s	10–20ms
Healthcare	AR	60 Mbit/s	20ms





WiFi 6


Technology
With the release of 802.11ax, the next-generation Wi-Fi era is here.
2014
2015
2016
2017
2018
2019
2020
2021
2011
802.11n
802.11ac Wave 1
802.11ac Wave 2
802.11ax
The Wi-Fi standard evolves once every 4–5 years.
Wi-Fi 4
Wi-Fi 5
Wi-Fi 6
In October 2018, WFA renamed Wi-Fi standards.
Application
Social networking
Wireless office
Video surveillance
HD video
E-classroom
Video conferencing
4K video conferencing
3D diagnosis
VR/AR interaction
Per-user bandwidth: 2–4 Mbps
Latency < 50 ms
Per-user bandwidth: 4–12 Mbps
Latency < 30 ms
Per-user bandwidth > 50 Mbps
Latency < 10 ms

Huawei promotes the **Development** of the Wi-Fi 6 standard and industry

Huawei has submitted **163** new proposals, accounting for **25%** of all proposals and ranking **No.1**

Osama, Huawei expert
Chairman of the IEEE 802.11ac/ax Working Group

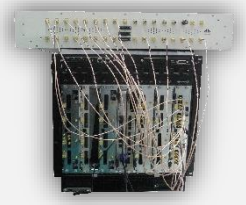
Huawei takes 6 seats in the 802.11 Working Groups:

- Edward: Chairman of the 802.11ay Working Group
- Donald Eastlake: Chairman of the 802.11ak Working Group
- Yunsong Yang: Vice Chairman of the 802.11aq Working Group
- Jiamin Chen: Chairman of the 802.11aj Working Group

Large-scale commercial use of Huawei Wi-Fi 6 APs

10+ customers have selected Huawei Wi-Fi 6

2014 2015 2016 2017 2018 2019 2020



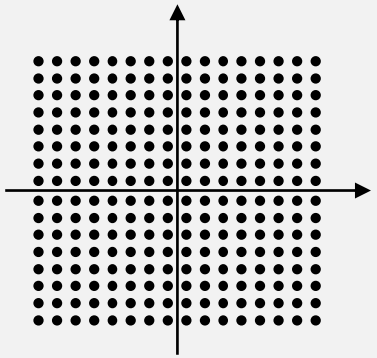
Huawei released the first 10G Wi-Fi prototype in the industry.

Huawei released the first Wi-Fi 6 AP in the industry.

Huawei's Wi-Fi 6 AP became the industry's first one verified by Tolly.

What does Wi-Fi 6 improve (vs Wi-Fi 5)?

High Bandwidth

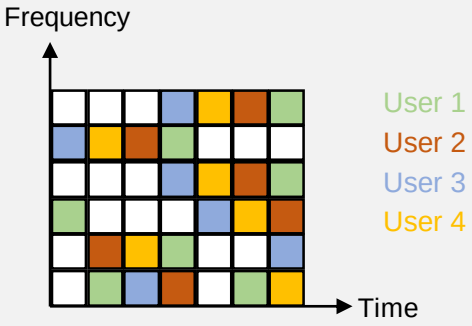


1024-QAM

8x8 MU-MIMO

- Up to 9.6 Gbps
- 4 x higher bandwidth

Large Capacity

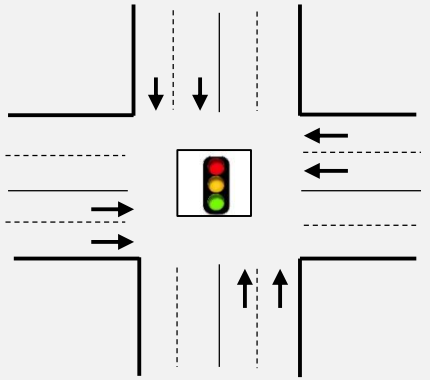


UL/DL OFDMA

UL/DL MU-MIMO

- 1024 access users (per AP)
- 4 x higher concurrent capacity

Low Latency



OFDMA

Spatial Reuse

- Uplink ordered scheduling, latency reduced to 20 ms
- Average latency lowered by 50%

Low Power Consumption

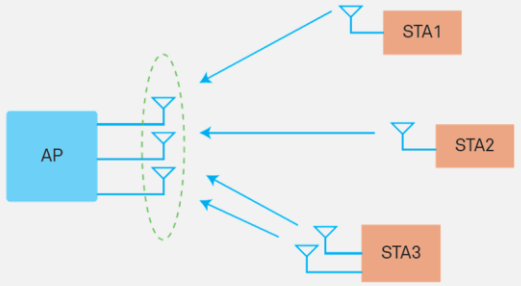
TWT

20MHz-Only

- Target time wakeup (TWT) mechanism
- Terminal power consumption reduced by 30%

How Wi-Fi 6 improves Network Bandwidth

Factors affecting the Wi-Fi rate: **UL MU-MIMO, subcarriers, signal transmission time, and coding mode**



Wi-Fi 5
DL MU-MIMO

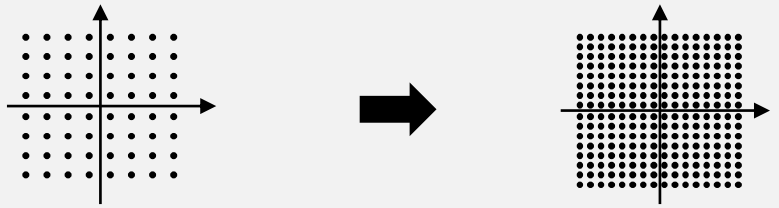
Wi-Fi 6
DL and **UL** MU-MIMO

Wi-Fi 5
234 subcarriers

Wi-Fi 6
980 subcarriers
(The rate of each spatial stream increases by 5%.)

Wi-Fi 5
Transmission time:
3.2 us/times

Wi-Fi 6
Transmission time:
12.8 us/times
(The rate of each spatial stream increases by 6%.)

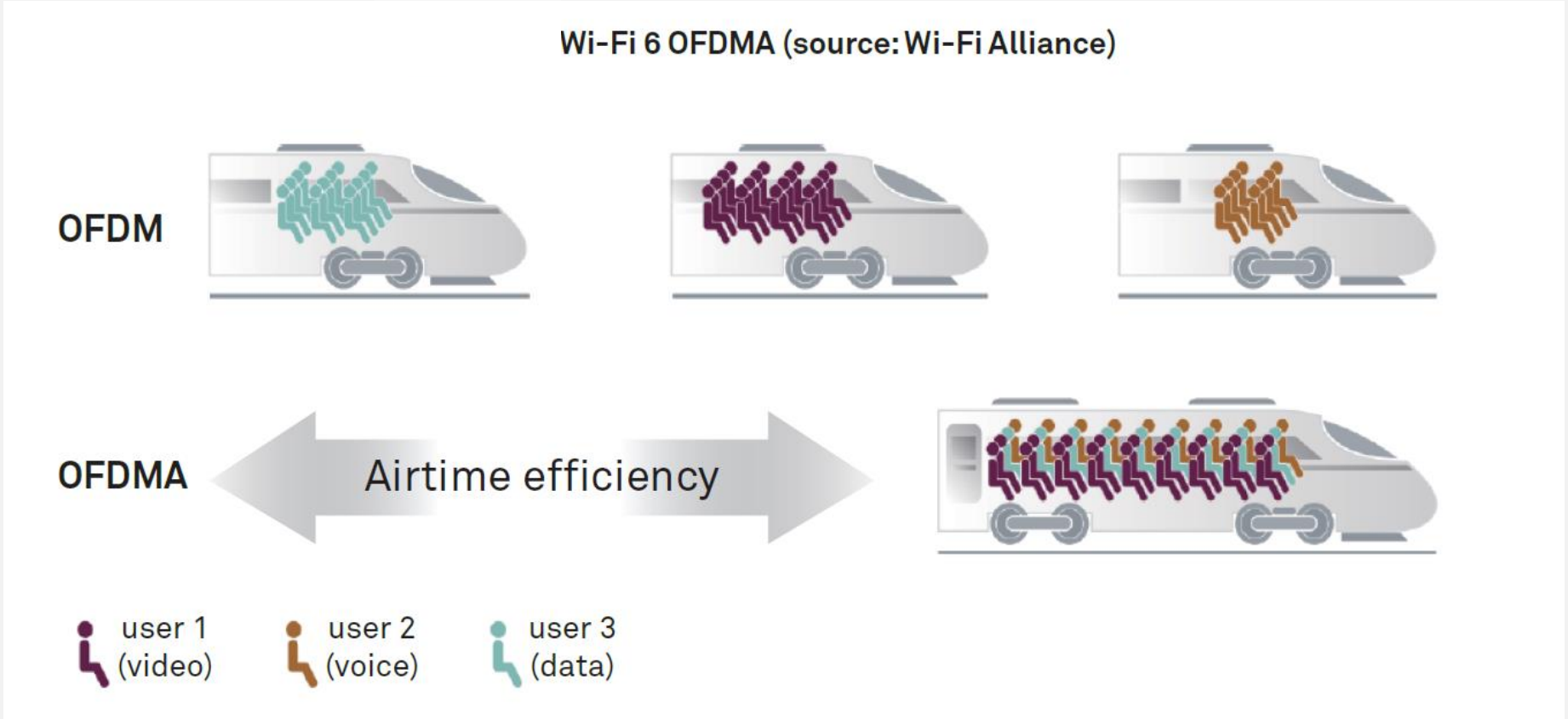


Wi-Fi 5
256-QAM coding

Wi-Fi 6
1024-QAM coding
(The rate of each spatial stream increases by 25%.)

How Wi-Fi 6 improves Concurrent Capacity

Factors affecting the concurrent capacity: **Spatial stream and spectrum utilization**



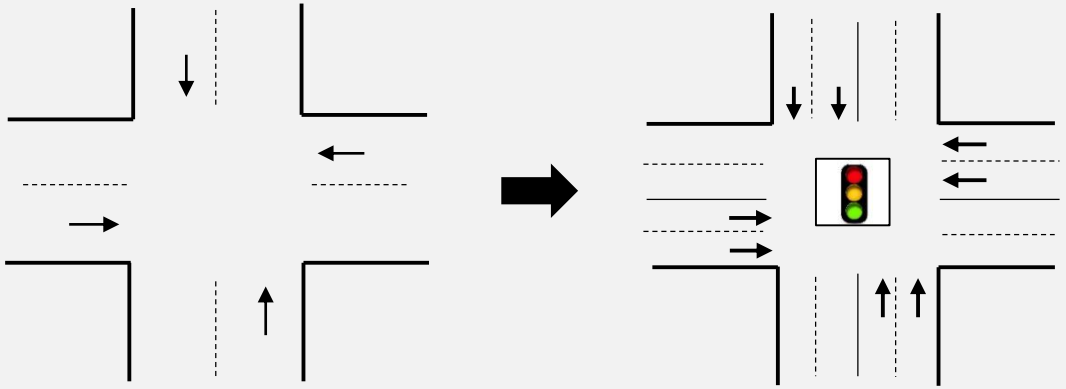
Wi-Fi 5
OFDM
(Each user exclusively occupies channel resources.)

Wi-Fi 6
OFDMA
(Multiple users share channel resources.)

Spectrum utilization: More than 30x ⬆

How Wi-Fi 6 reduces the Network Latency

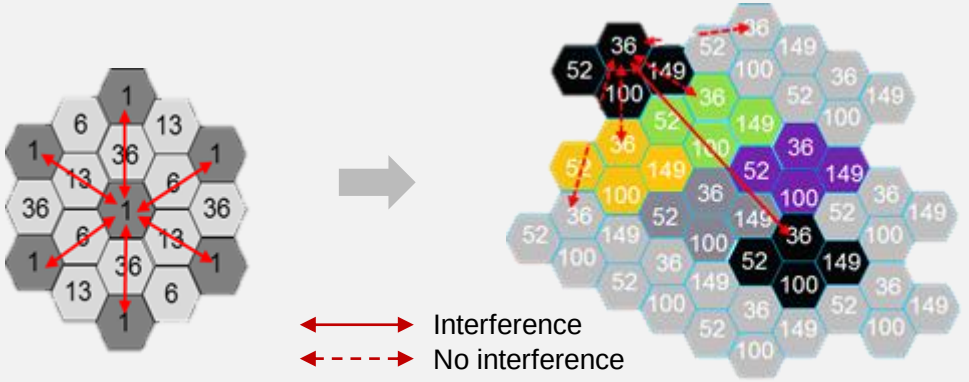
Factors affecting the Wi-Fi network latency: **Spectrum utilization and air interface quality**



Spectrum utilization: More than 30x

Wi-Fi 5
OFDM
(Like a single lane without traffic lights, multiple users compete for resources in a disordered manner.)

Wi-Fi 6
OFDMA
(Like multiple lanes with traffic lights, resources are scheduled for multiple users in an ordered manner.)



Interference rate:30%

Wi-Fi 5
CCA power adjustment
(Co-channel interference is easy to occur.)

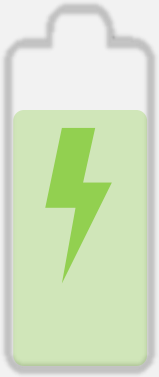
Wi-Fi 6
BSS coloring
(Different users on the same frequency are marked with different colors and do not interfere with each other.)

How Wi-Fi 6 lowers the Power Consumption

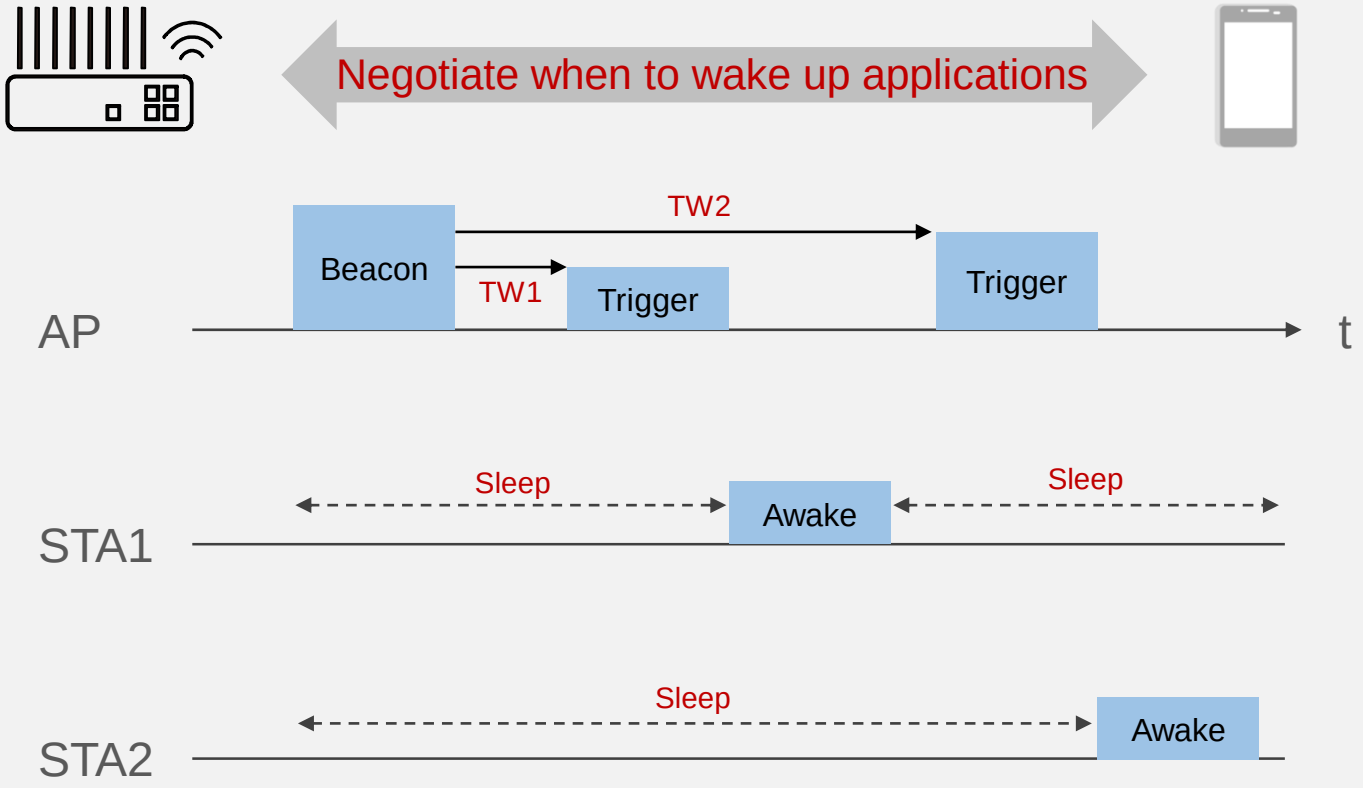
Factor affecting the battery service life of terminals: **High power-consuming applications**

Target Wakeup Time

(TWT)



Wake up applications on demand, reducing power consumption by 30%



HUAWEI WI-FI 6

THE FEATURE-SPEED WI-FI IS HERE

Powered by HUAWEI Wireless Technology

Thank you.

把数字世界带入每个人、每个家庭、
每个组织，构建万物互联的智能世界。

Bring digital to every person, home, and
organization for a fully connected,
intelligent world.

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