H3C WLAN products

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2. H3C WLAN & Solutions
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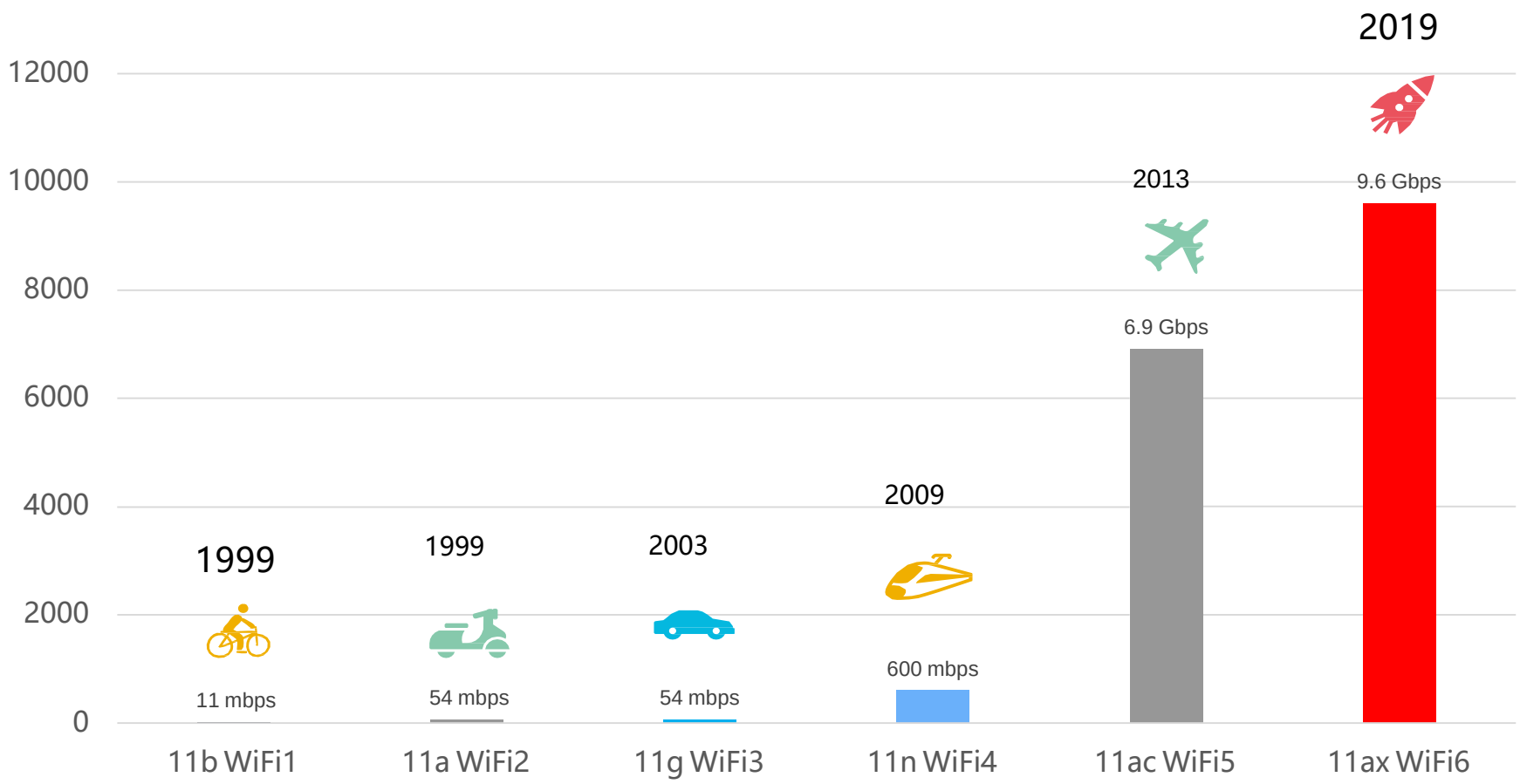
/01 WLAN History and Challenges

History of Wi-Fi Technology

WiFi-6 Speed 872.7 Times Faster than WiFi-1



WLAN Scenarios

High-Density

Multiple Frequencies to the Extreme

Enterprise

Performance

Transportation

High-Speed Switching

Education

IOT Convergence

Outdoor

IP68 Protection

Stadium

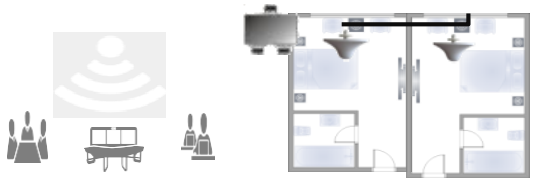
Smart antenna

WLAN faces multiple challenges

Challenge 1: Diversified Wi-Fi deployment solutions

Indoor Scenario

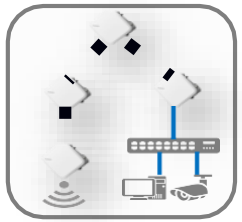
•Offices, classrooms, exhibition halls, hotels, dormitories, and hospital wards scenes are clearly differentiated, and it is difficult to adapt to a single solution



Outdoor Scenario

•Outdoor long-distance coverage

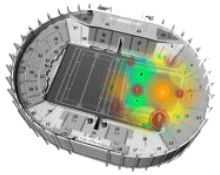
•Outdoor high temperature and rain environment, equipment reliability and stability requirements are high;

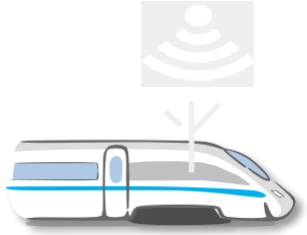


Railway & Stadiums

•High-density stadiums

•Rail transit 120Km/h+ fast switching





WLAN faces multiple challenges

Challenge 2: Wi-Fi technology bottlenecks affect user experience

High density access

User concurrency rate is high, network resource scheduling is unreasonable, Poor Internet experience 。

High requirements for mobile user experience

Poor terminal roaming, frequent online and offline, user fatigue, and poor Internet experience.

Wi-Fi Bottlenecks

High reliability of network equipment

Lack of redundant backup, poor user service reliability.

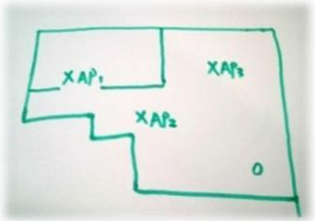
Wireless security

There is a lot of interference in the wireless environment, and rogue terminals and hacker attacks threaten network security.

WLAN faces multiple challenges

Challenge 3: Network planning, installation, and maintenance restrict large-scale deployment

Complex network planning and design



•The on-site environment is complex and diverse, and it is difficult for engineers to deal with it manually

Complex equipment installation

•The large number of APs and complex installation result in huge waste of labor and time costs

Inconvenient network O&M

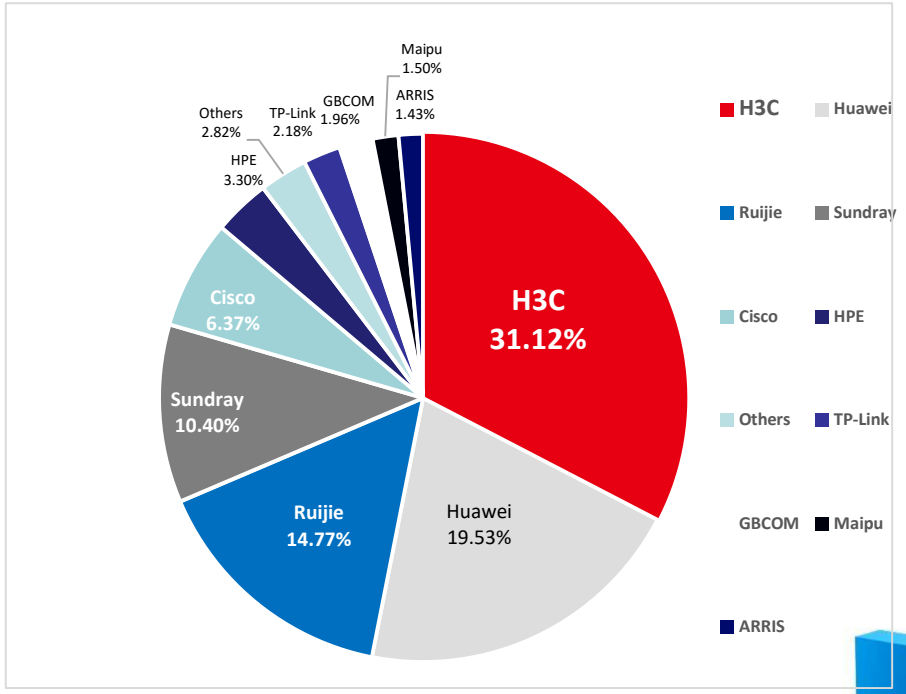
•Network operation status is difficult to assess, and faults are difficult to locate

/02

H3C WLAN & Solutions

No.1 Market Share in China and Niche Player WW

IDC Report : 31.12% market share



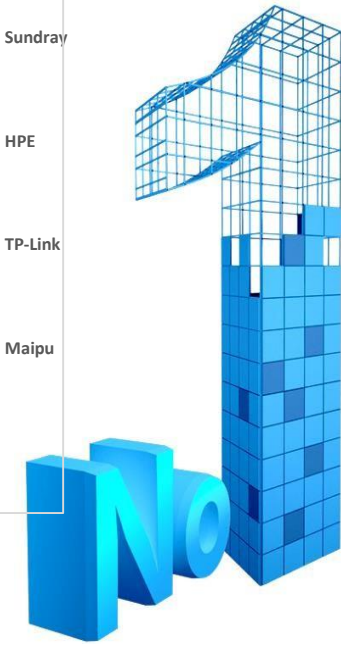


Figure 1. Magic Quadrant for the Wired and Wireless LAN Access Infrastructure

High-quality WLAN and Service Resources

750+
Wireless Patents

2 Billion
R&D Investment

500+
R&D WLAN Staff

6
R&D Centers

4000+
Partners in WW

H3C Wi-Fi Solutions

Scenarios

Solutions

- Indoor
- Outdoor
- Wall-plate
- High-density
- Railway
- Mesh/WDS

WLAN Tech

- WRRM
- High Density Booster
- Smart Antenna
- User Awareness

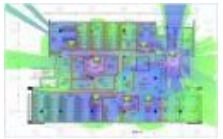
WLAN Products

WLAN patents

Full scenarios Products

Survey Tool

O&M Plat



Online Survey Tool

H3C Wi-Fi with deep accumulation, innovative technology and diversified deployment solutions provides the users best experience

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H3C WLAN & Solutions

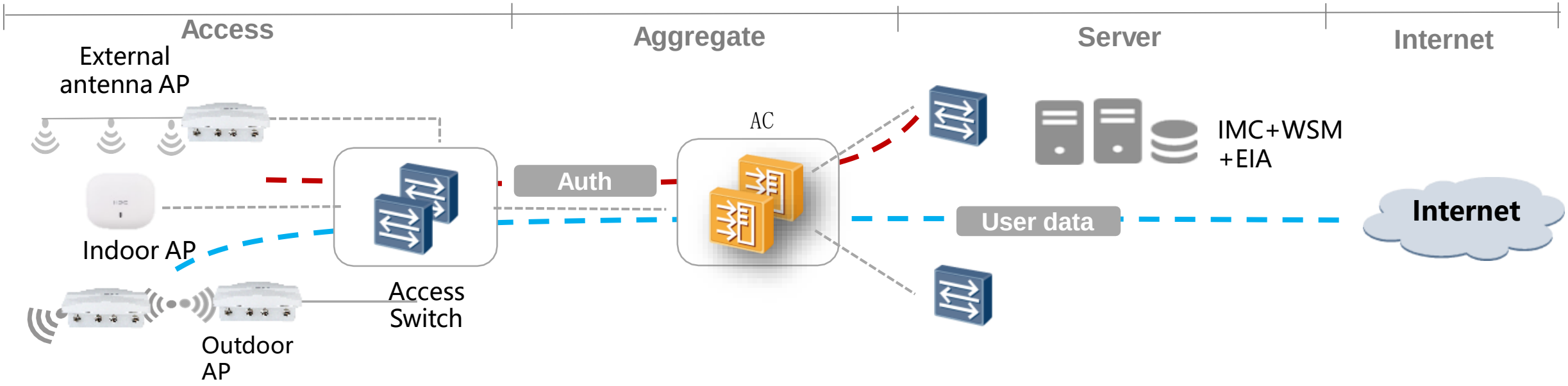
Different networking solutions

Indoor Solutions

Outdoor Solutions

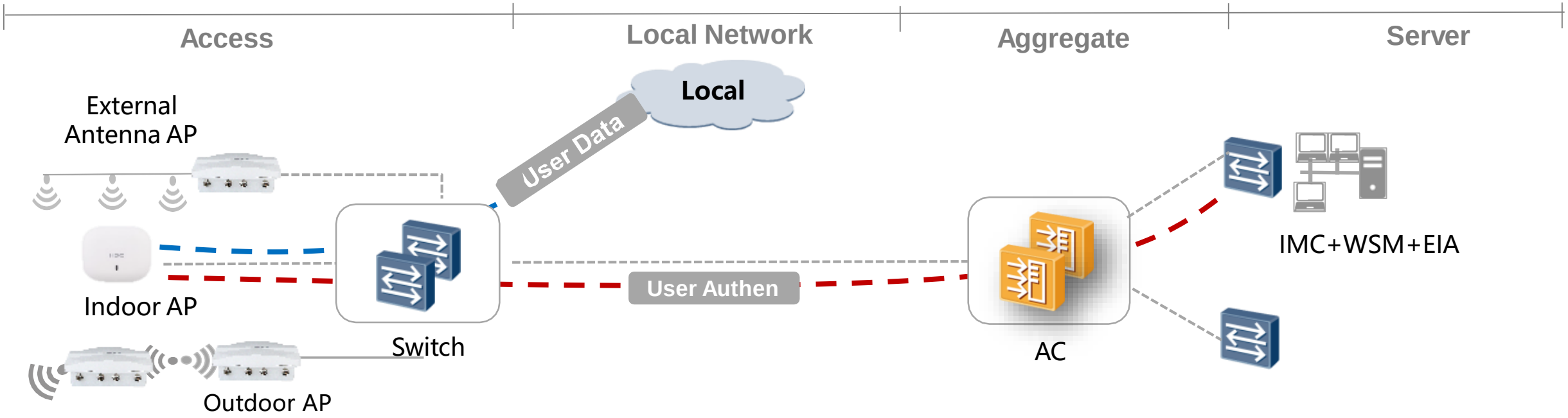
Railway and Stadiums Solutions

Centralized traffic forwarding mode



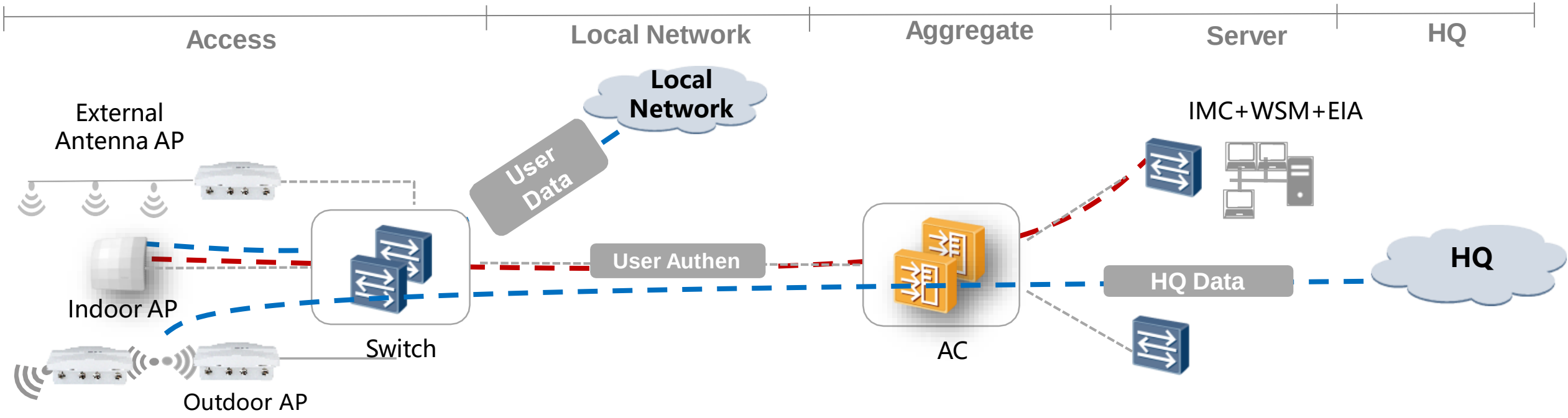
Scenario	AC	User Auth	Network O&M
▪User data and authentication are centrally processed by AC ▪AP/AC supports cross-layer 2 and layer 3 networking	▪ AP, user DHCP server ▪Unified configuration of AP parameters ▪ Unified user policy configuration ▪User authentication control point	▪ Policy Center ▪ Portal server ▪ Radius server ▪MAC authentication server	▪AC web page network management ▪ IMC+WSM ▪AC/AP network management

Local traffic forwarding mode



Scenario	AC	User Authen	Network O&M
▪ It is suitable for branch office network. Save link bandwidth between AP/AC ▪Both the customer gateway and the DHCP server are in the local network ▪Local forwarding user authentication can be handled centrally by AC ▪AP/AC supports cross-layer 2 and layer 3 networking	▪ AP, user DHCP server ▪Unified configuration of AP parameters ▪Unified user policy configuration ▪ User authentication control point	▪ Policy Center ▪ Portal server ▪ Radius server ▪MAC authentication server	▪AC web page network management ▪ IMC+WSM ▪ AC/AP network management

Traffic mixed forwarding mode



Scenario	AC	User Authen	Network O&M
▪realize forwarding by AP and forwarding by SSID. If the headquarters uses the centralized forwarding mode, the branch office network uses the local forwarding mode ▪ User authentication in both modes is handled centrally by AC ▪AP/AC supports cross-layer 2 and layer 3 networking	▪ AP, user DHCP server ▪ Unified configuration of AP parameters ▪Unified user policy configuration ▪User authentication control point	▪ Policy Center ▪ Portal server ▪ Radius server ▪MAC authentication server	▪AC web page network management ▪ IMC+WSM ▪ AC/AP network management

/02

H3C WLAN & Solutions

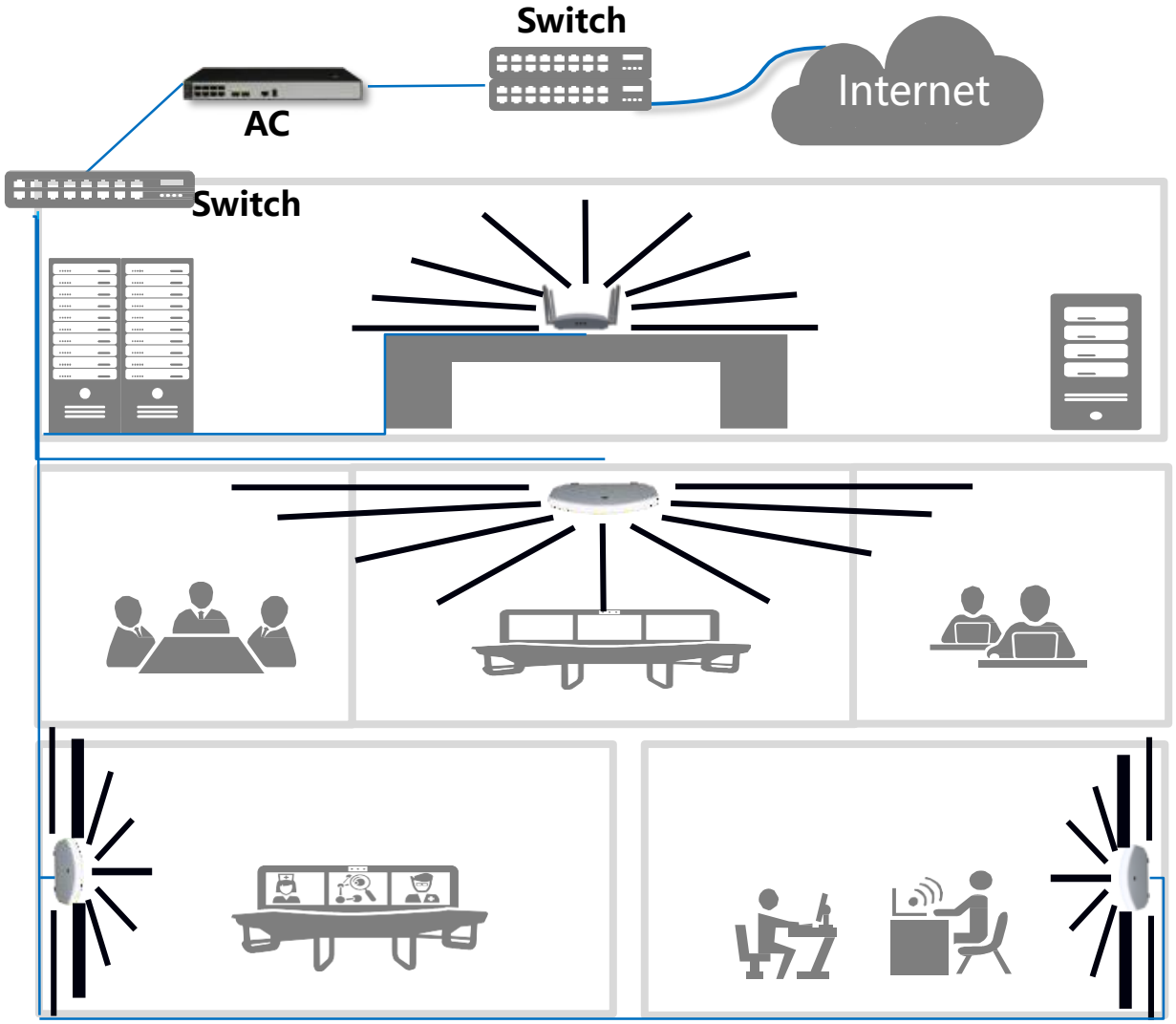
Different networking solutions

Indoor Solutions

Outdoor Solutions

Railway and Stadiums Solutions

Indoor scenarios



Scenarios

- Enterprise office, classroom, lobby, exhibition hall, etc.

Product Selection

- Indoor AP：WA5300,WA6300,6600 series
- High density：Tri-radio AP
- High-end AC：WX38,WX58 series
- Low-end AC：WX18 series

Highlights

- The full range of 802.11ac/11ax APs can be flexibly matched to meet the requirements of different deployment scenarios
- A variety of ACs meet the management needs of different scales of wireless networks
- AC 1+1 hot backup, N+1 redundant backup

Wall-plate indoor scenarios

Easy Deployment

- 86mm international standard
- 3 minutes installation
- Cost of installation reduced by 50%

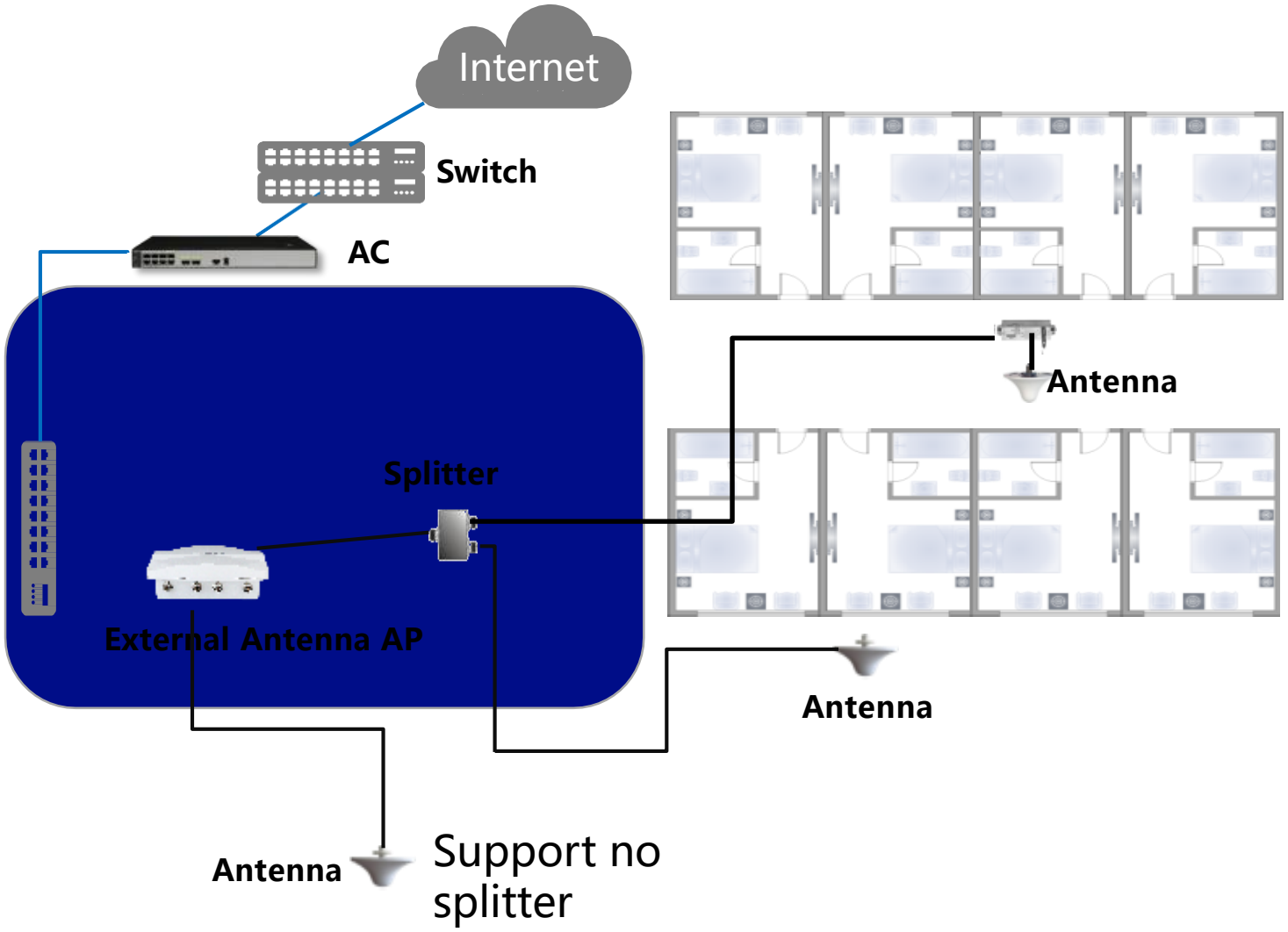
High Speed

- 2.4G/5G Dual band
- Support 2*2 MU-MIMO
- 1.2G+0.575 high bandwidth

Multi-ports

- 1 uplink and 4 Gigabit LAN ports for additional IP devices

Indoor X-share scenario



Scenarios

- Warehouse, corridor,dormitory

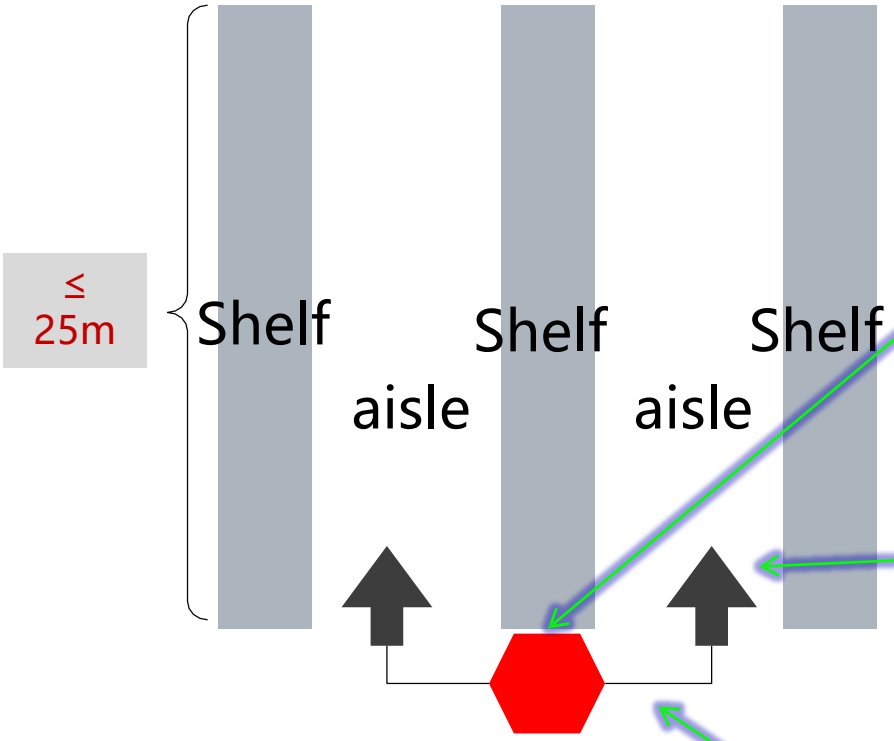
Product Selection

- WA6620X,WA6628X,WA6526E

Highlights

- Flexible deployment and cost-saving

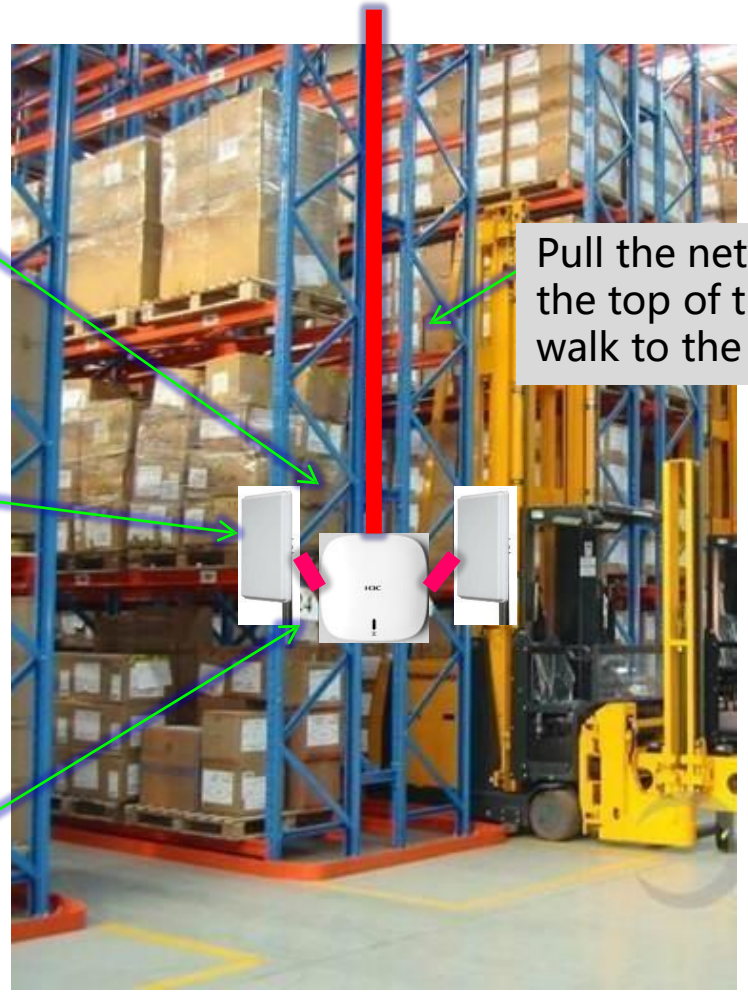
Warehouse case



It is recommended that the AP be placed on the end of the shelf

The height of the panel antenna is 3 meters, and it is tilted downward to the aisle

The cable can be pasted on the shelf and it is not allowed to cross the shelf (because the forklift will scratch it)



Pull the network cable to the top of the shelf and walk to the cable rack

- WA6620X,WA6628X,WA6526E support this solution since they all have external antenna port

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H3C WLAN & Solutions

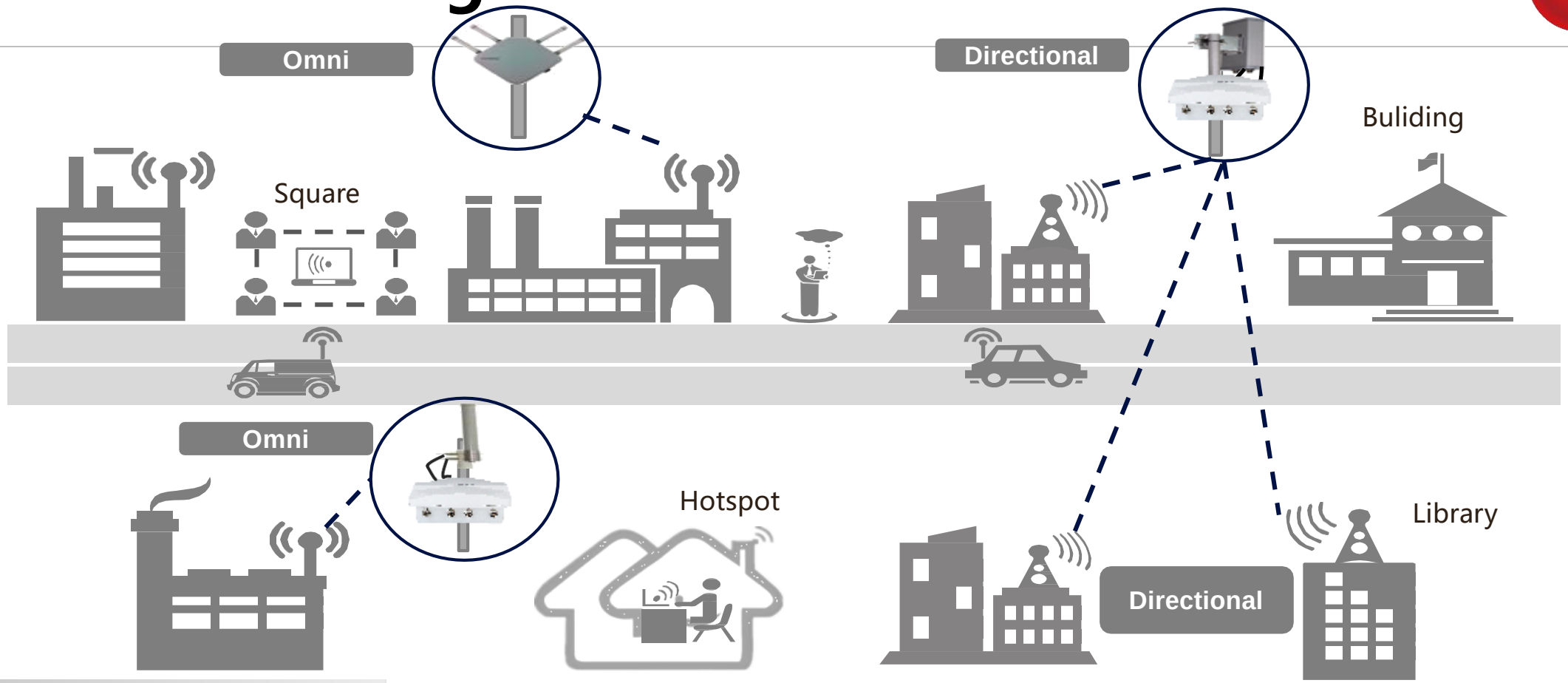
Different networking solutions

Indoor Solutions

Outdoor Solutions

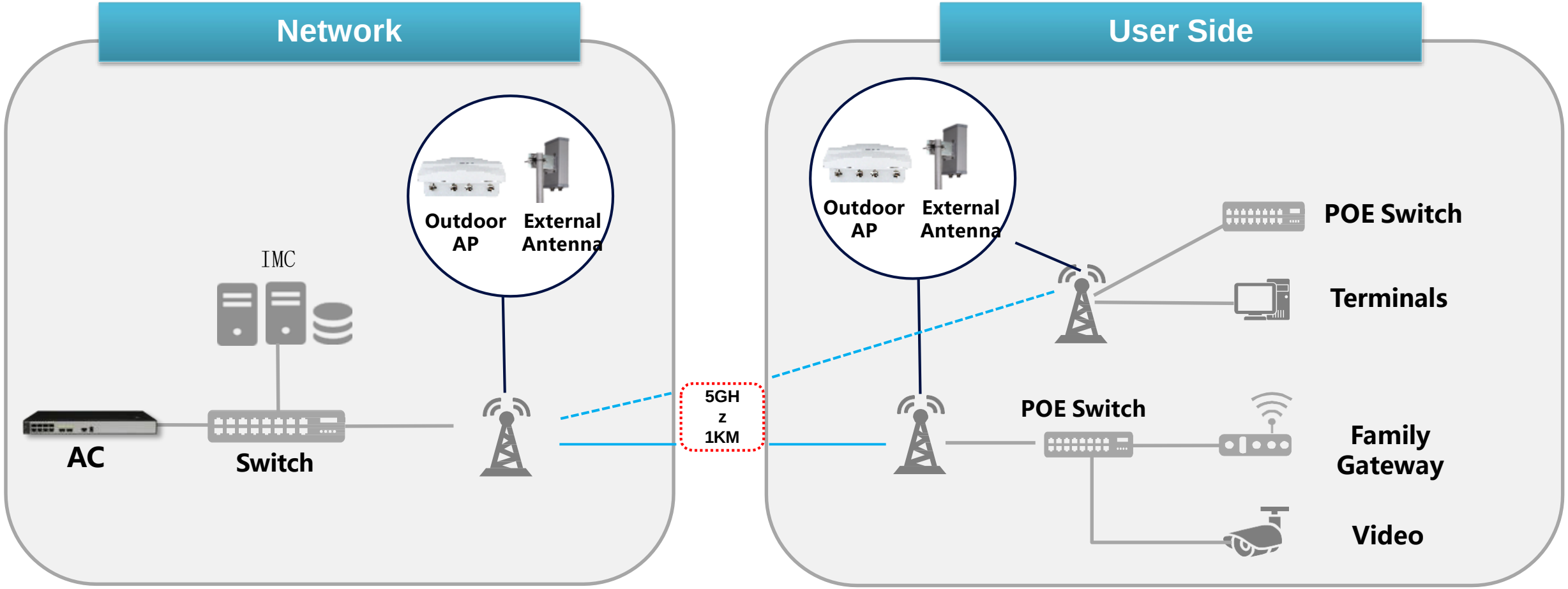
Railway and Stadiums Solutions

Outdoor coverage scenarios

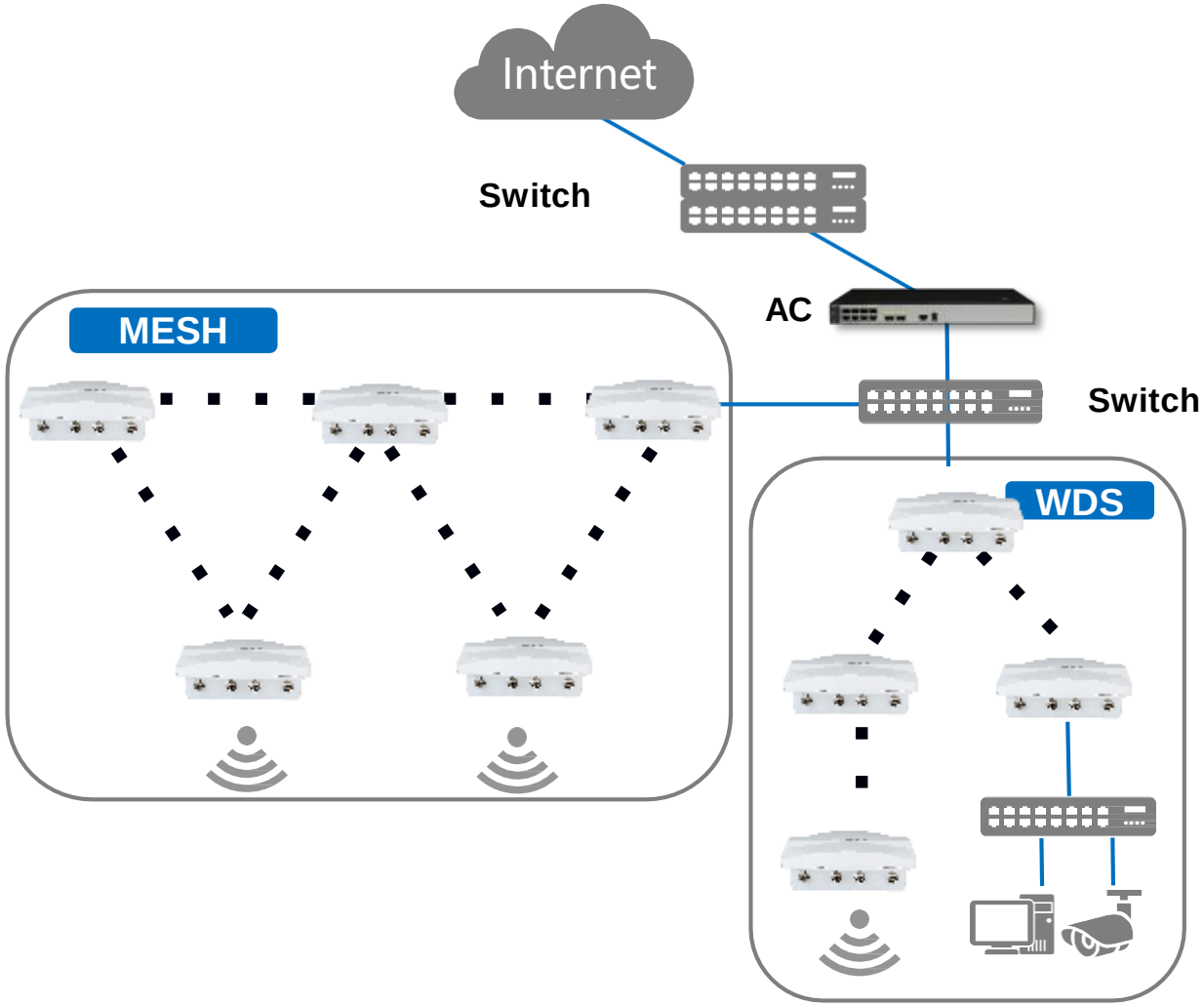


Scenario	Highlights	Product
▪Teaching buildings, dormitory buildings, libraries, plazas, public hotspots, pedestrian streets, etc.	▪AP has no external lightning protection device is required ▪AP is easy to install, improve engineering efficiency and reduce labor costs	▪ WA6620X ▪ WA6628X ▪ WA6630X

Outdoor long-distance deployment



Outdoor bridging scenario



Scenarios

- In areas where wiring is inconvenient, WDS and MESH networking can be used instead of wired links to achieve data bridging and coverage

Product

- Wi-Fi 6 AP

Highlights

- Outdoor AP no external lightning protection device is required
- Outdoor AP is easy to install, improving engineering efficiency and reducing labor costs
- Support Mesh network load balancing based on link quality

Outdoor industrial design adapts to various harsh environments

Fully built-in lightning protection

H3C Outdoor AP

=

AP

+

4 antenna-fed lightning protection devices (5KA)

+

Lightning protection device for network port (6KV)

+

AC lightning protection device (20KA)

Protection grade IP68

Dust Protection

Water Protection

Meet various harsh environmental requirements
High stability and reliability
Cost savings

High and low temperature resistance -40~60 degrees

/02

H3C WLAN & Solutions

Different networking solutions

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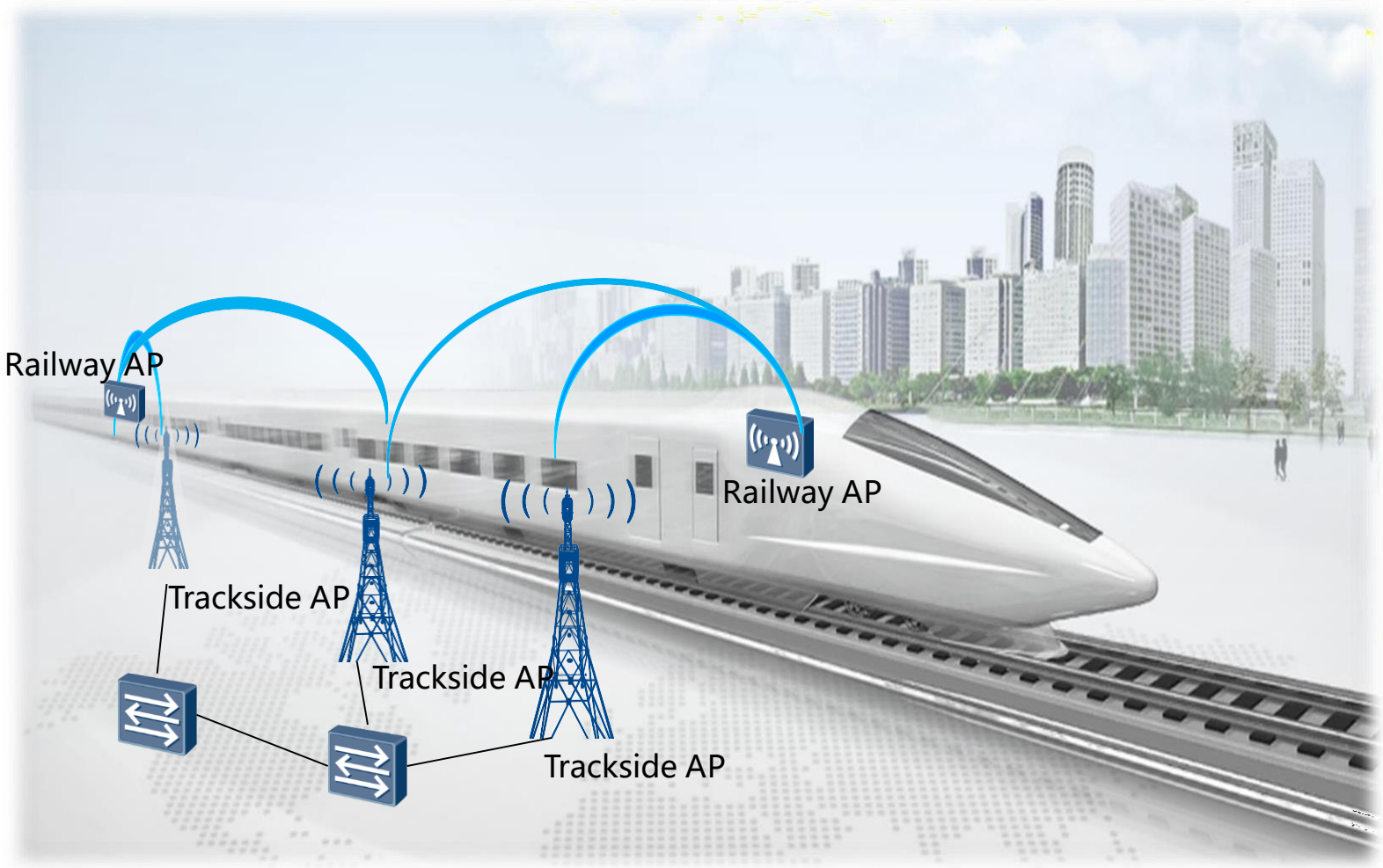
Railway and Stadiums Solutions

Railway Wi-Fi solution



Fast Switching

- Vehicle-ground communication fast switching technology
- 160Km/h+ per hour, switching time <30ms, "zero" packet loss

High Bandwidth

- The latest generation of 802.11ax rail transit products
- 1G wireless bandwidth between vehicle and ground

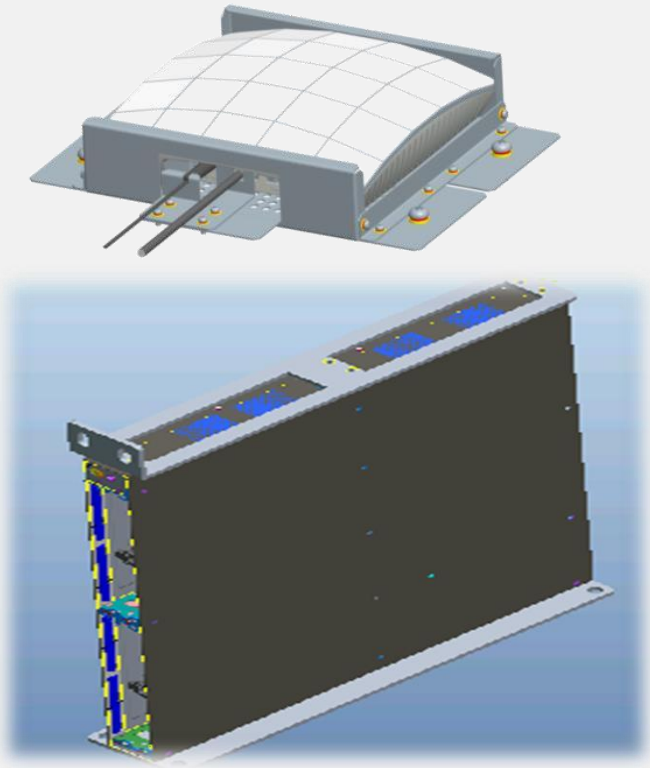
Stable

- **Professional Anti-vibration design**

Professional Anti-vibration design

M12 Interface

Anti-vibration



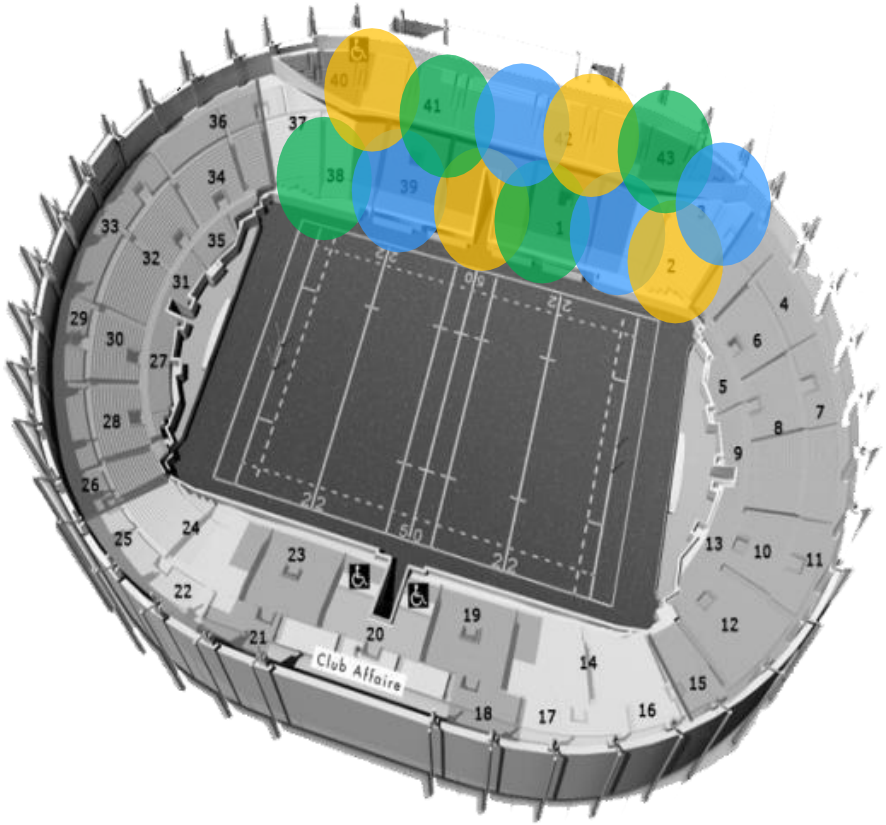
Standards

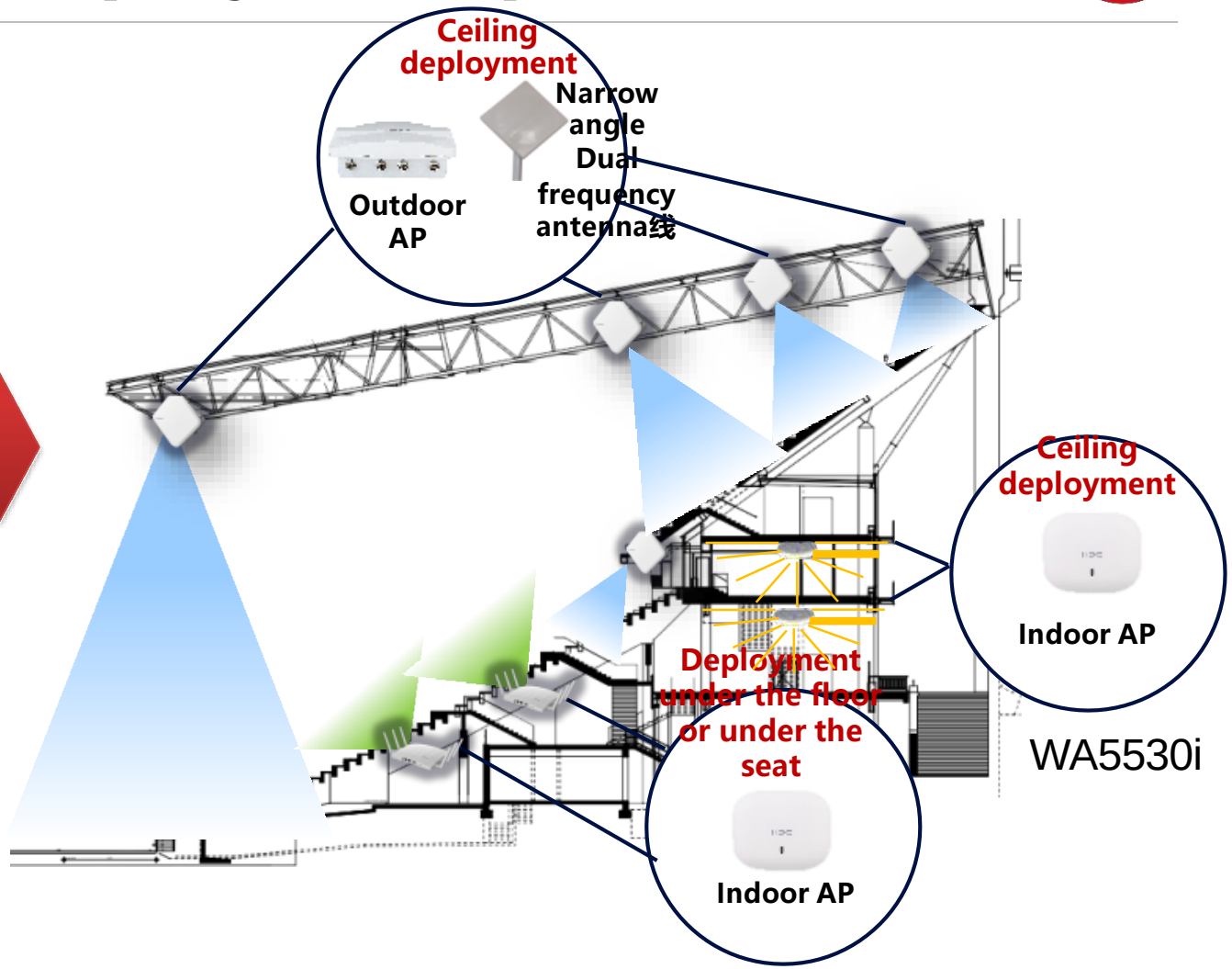
EMC:EN50121-3-2

Anti-vibration IEC61373

Fire and flame retardant
EN/DIN 5510

High-density stadiums deployment plan





- Different stadium scenes need to flexibly choose a combination of deployment methods according to the on-site environment

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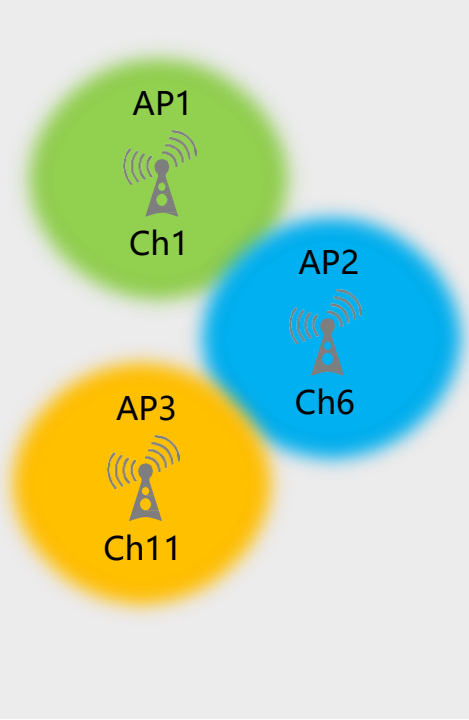
H3C Innovative WLAN Technologies

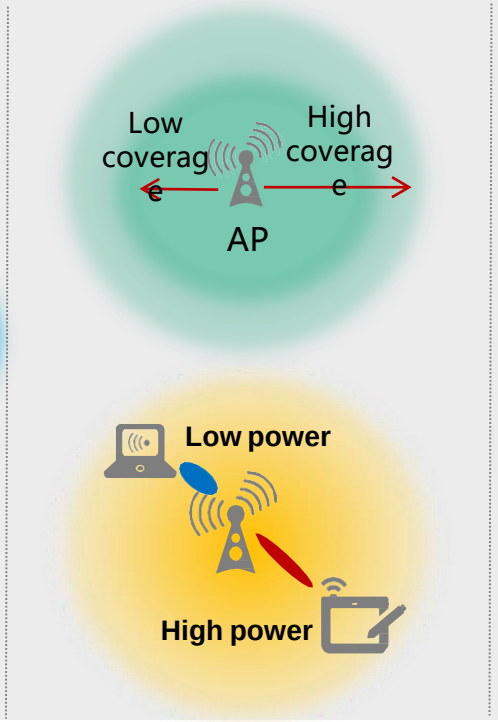
WRRM-Automatic RF Optimization

Dynamic channel adjustment



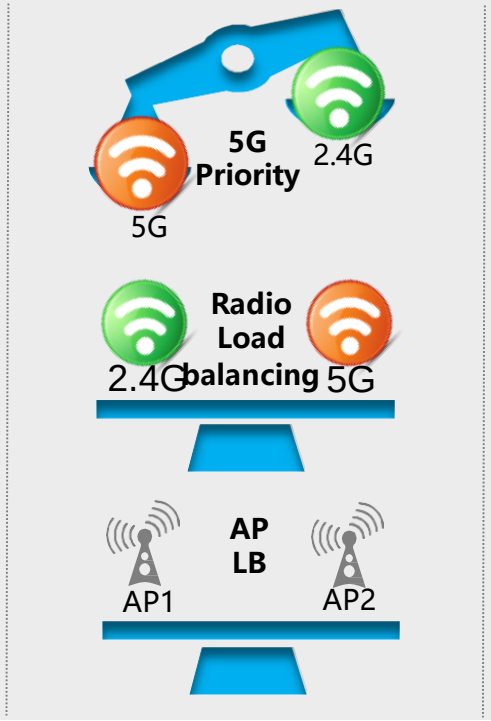
- Automatic channel deployment, shorten deployment time, and flexibly respond to network changes

Dynamic power adjustment



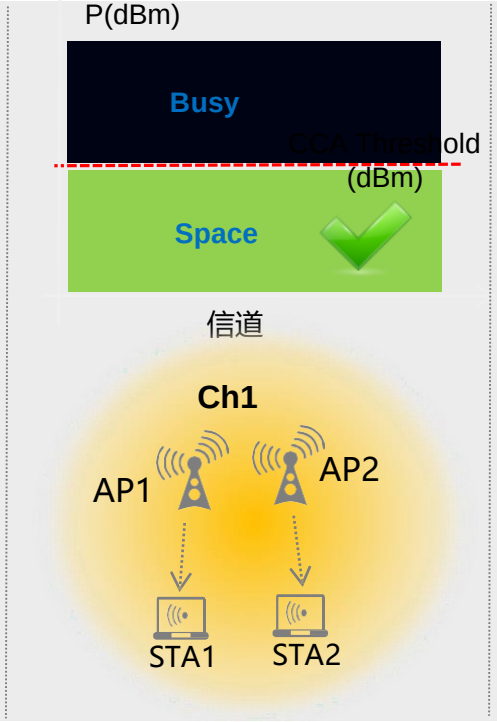
- Automatically adjust the transmission power to avoid interference and fill in blind spots

Dynamic load balancing



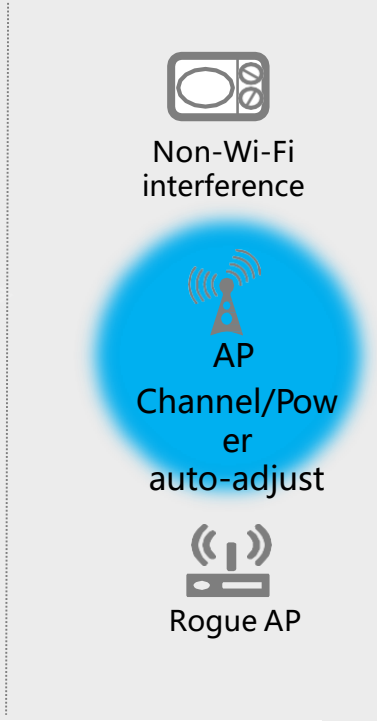
- Balance access resources within and between APs to improve overall network performance

CCA channel interference assessment



- Automatic channel interference tuning to improve the transmission performance of the system in an interference

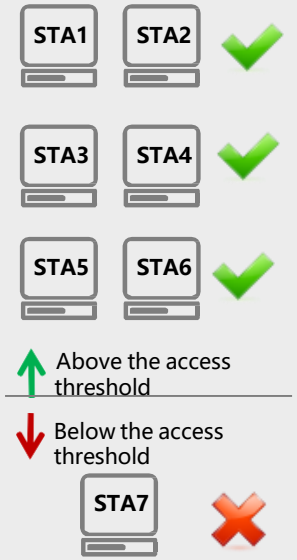
Illegal device interference



- Automatic detection of illegal equipment, automatic optimization of wireless parameters, and

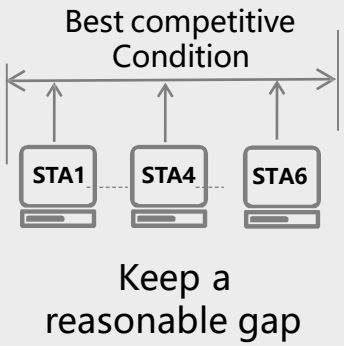
High Density Booster-SACP,RROP

Low speed terminal Access control



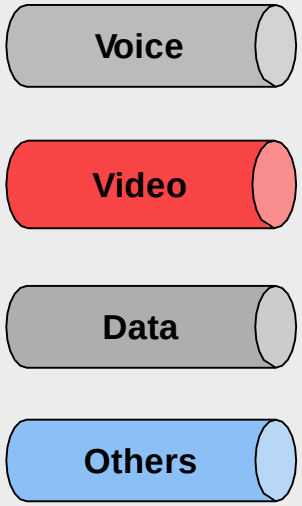
- Restrict low-speed terminal access and improve air interface efficiency

Multi-user Conflict control



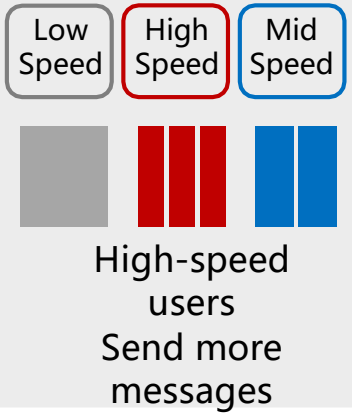
- Adjust the terminal competition, reduce conflicts, and improve transmission efficiency

WMM Qos



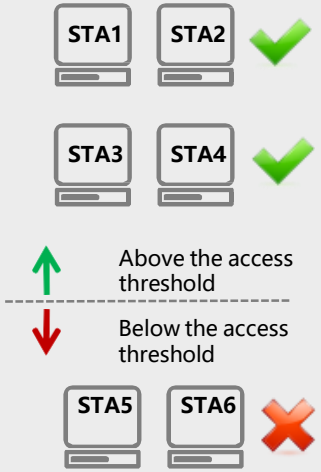
- Wireless QoS scheduling, important business first

Airtime Fairness



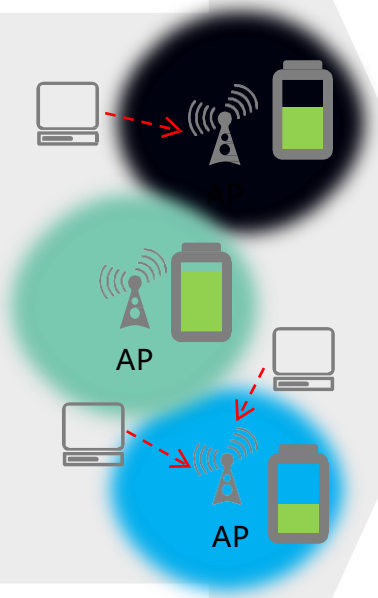
- Let users share wireless fairly and transmit more data

Low speed terminal Access control



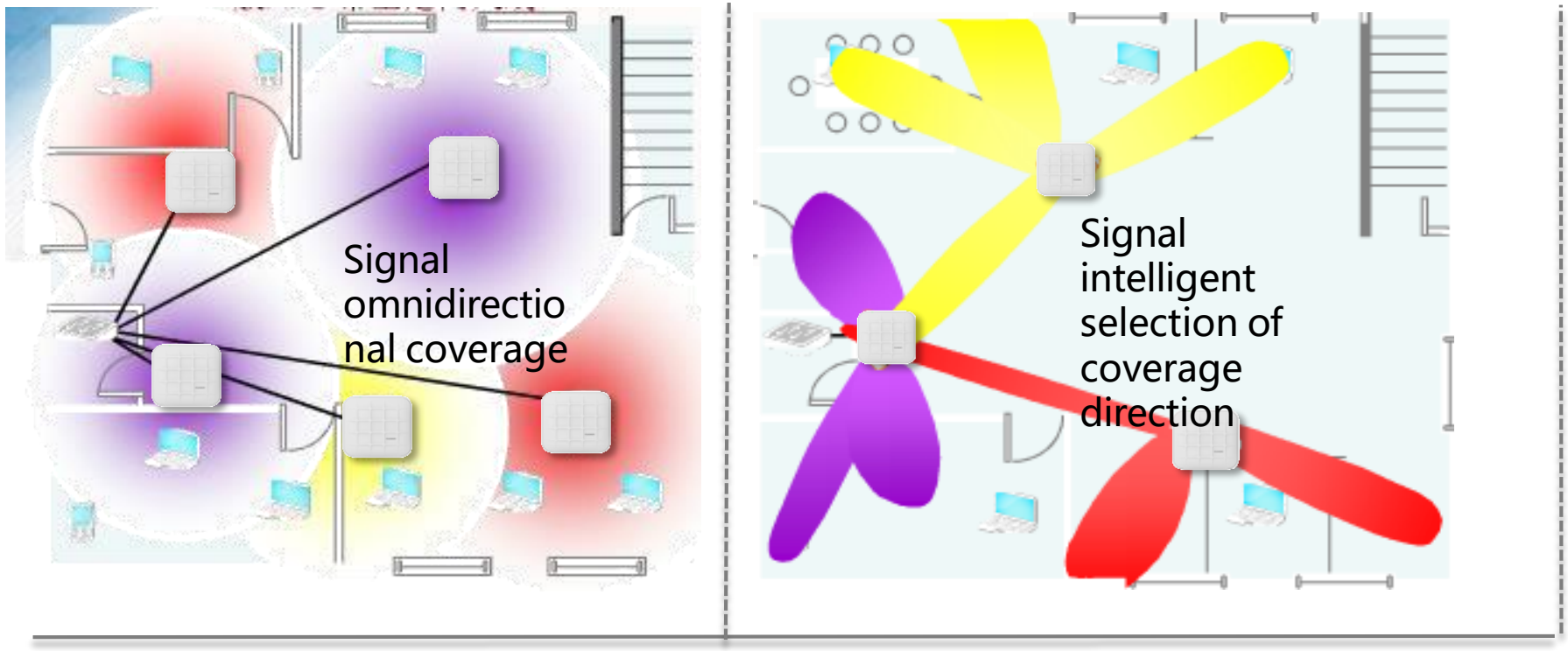
- Low-speed terminals automatically limit offline, improving air interface efficiency

Multi-user CAC Scheduling



- Coordination of roaming resources on the entire network to maintain reasonable AP utilization

Smart Antenna-Smart antenna array



Traditional wireless network

Smart antenna array

Smart antenna advantage:

1. **increase AP coverage distance and reduce the number of APs deployed**
2. **Intelligent control of AP coverage to reduce interference between adjacent Aps**
3. **Adjust wireless phase to increase AP gain**
4. **Signal sensitive switching to ensure wireless signal quality**

User Awareness-terminal recognition

Brand A-Computer

Brand C-Phone

Brand B-Computer

Brand D-Phone

Policy based on terminal type

- According to the terminal type, the authentication page is automatically adapted,
- Assign different policys according to the terminal type such as VLAN/ACL/bandwidth limit

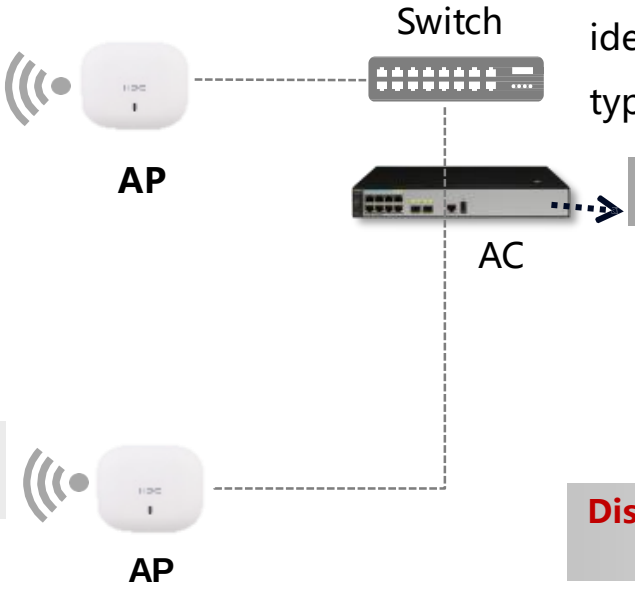
Laptop

Phone

Pad

Same account, different terminal types of policy

- Support the same user account allocation according to terminal type
- Different business strategies, detailed user authority control granularity



- AC through terminal MAC address, HTTP, User-Agent information and DHCP option to identify vendors and terminal types

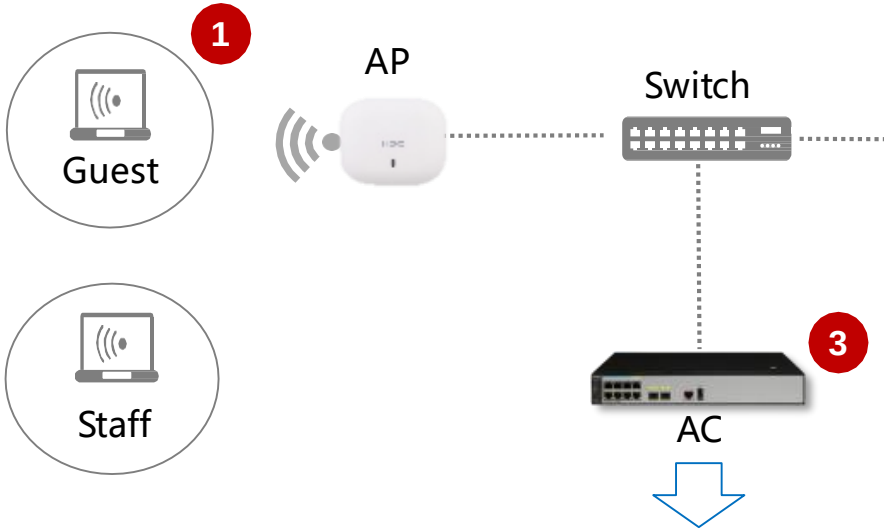
Authentication message carries terminal type information

Policy Center

Distribute policy based on terminal types

- Deliver policy based on the reported terminal type information
- Restriction, user isolation strategy

User Awareness - dynamic user group authorization



Account and user group binding

- Guest account-guest group policy
- Employee account-employee group strategy

Guest group policy configuration

- Bandwidth authorization: 1Mbps
- ACL authorization: denied access to internal resources
- Service VLAN: Guest service VLAN
- User isolation: communication between users is prohibited

Employee group policy configuration

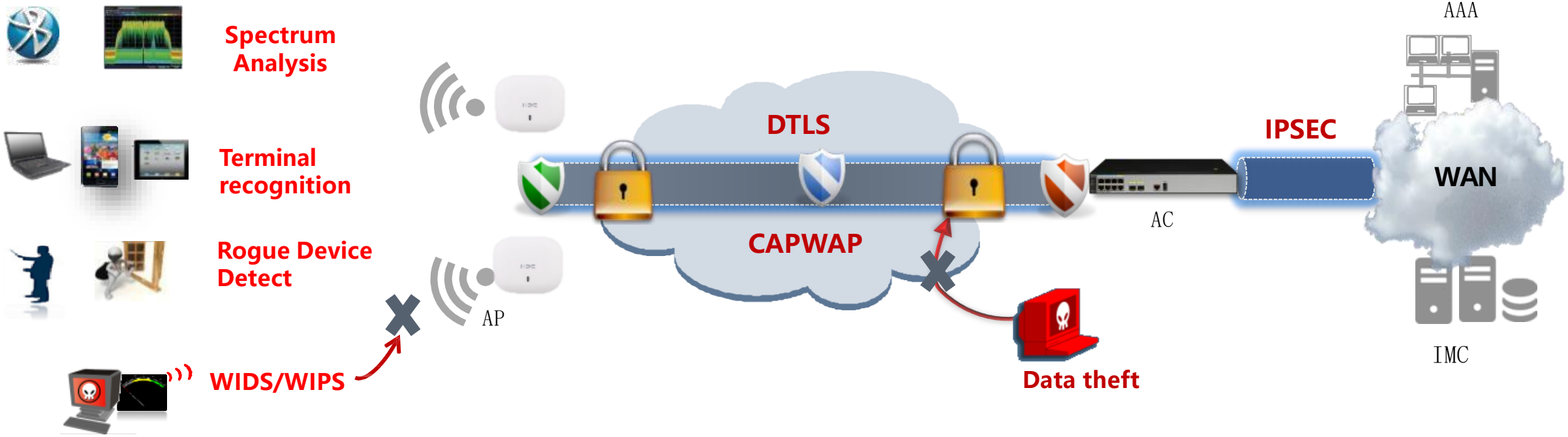
- Bandwidth authorization: 4Mbps
- ACL authorization: can access the company's business platform
- Service VLAN: employee service VLAN
- User isolation: allow users in the group to communicate, prohibit
- Stop user communication between groups

① User Authentication

② Radius sends user groups to AC

③ AC enforces user group policy

Converged wireless security solutions



Security on the wireless side

- Spectrum analysis of non-Wi-Fi devices
- WIDS/WIPS
- Wireless attack detection
- Rogue device identification countermeasures

Data protection backup

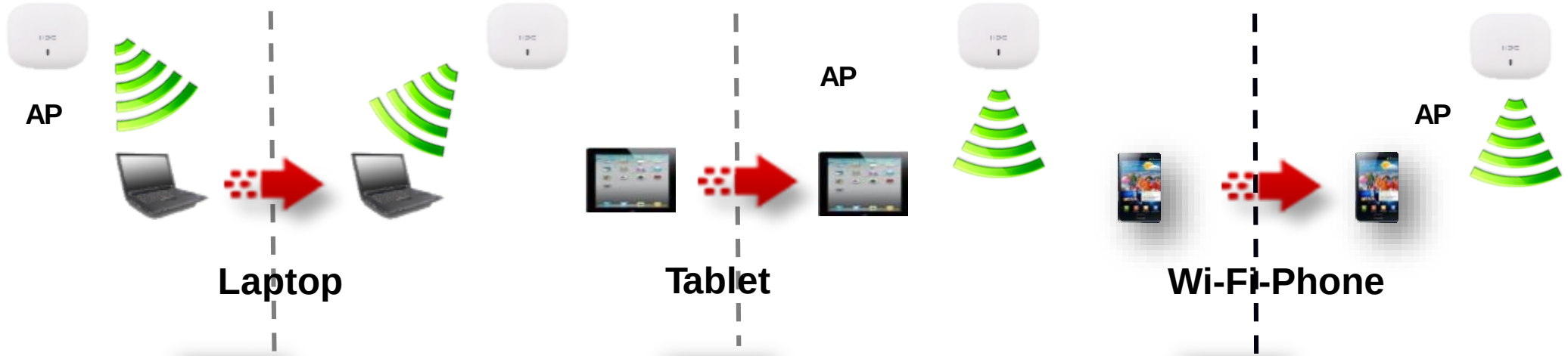
- DTLS (Datagram TLS) real-time encryption protection
- Standard CAPWAP wireless tunnel protocol
- AC1+1 hot backup, N+1 backup
- AC upstream IPsec tunnel

Multiple authentication access schemes

- Multiple access control methods such as MAC/802.1X/Portal
- Portal + MAC hybrid authentication
- WPA2,WPA3

Seamless roaming-seamless perception

Seamless roaming, uninterrupted business



Fast roaming in the second and third layers of AC

- Meet the roaming needs of users in different forwarding modes
- Fast switching, uninterrupted business, no need to re-authenticate users

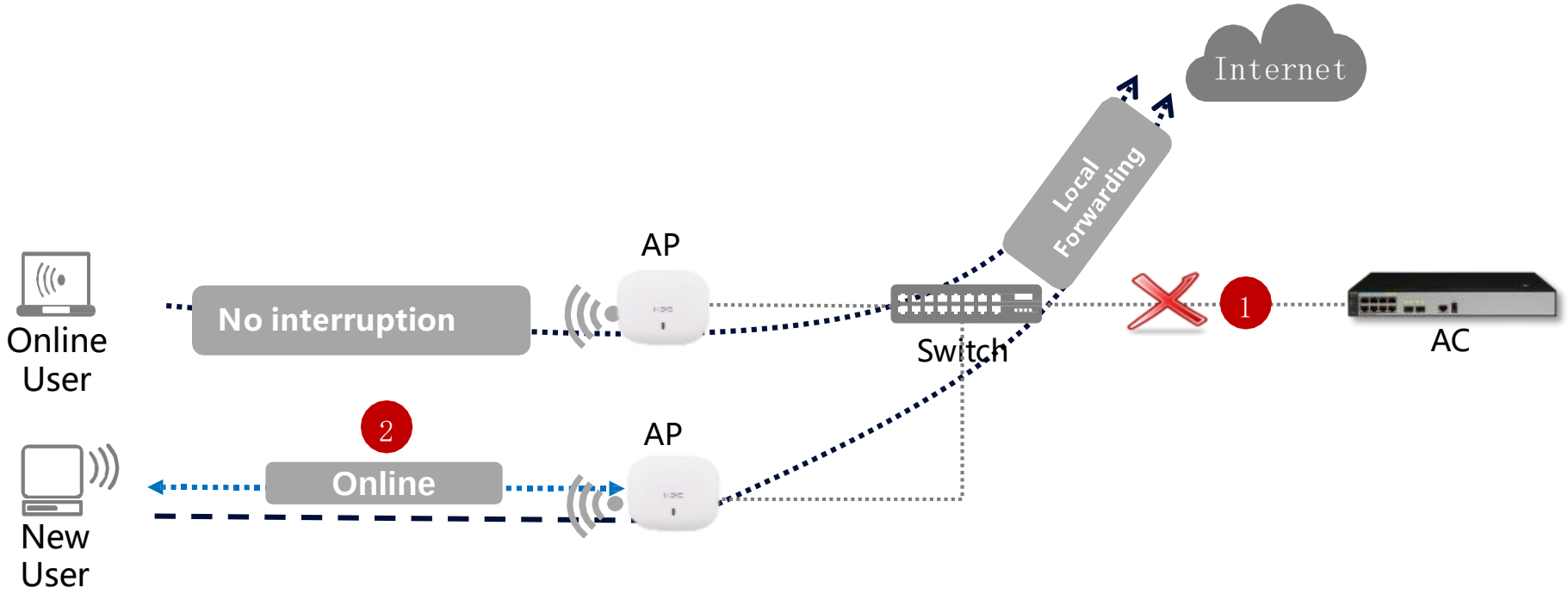
Seamless roaming between the second and third layers of AC

- Meet the roaming needs of users in different forwarding modes
- seamless switching, uninterrupted business, no need to re-authenticate

Seamless indoor and outdoor roaming

- Seamless indoor and outdoor roaming
- Professional network planning to achieve wireless roaming in the park

Remote AP-Continuous service



① CAPWAP disconnect

- After the CAPWAP link is interrupted, online user services will not be interrupted, and data will continue to be forwarded

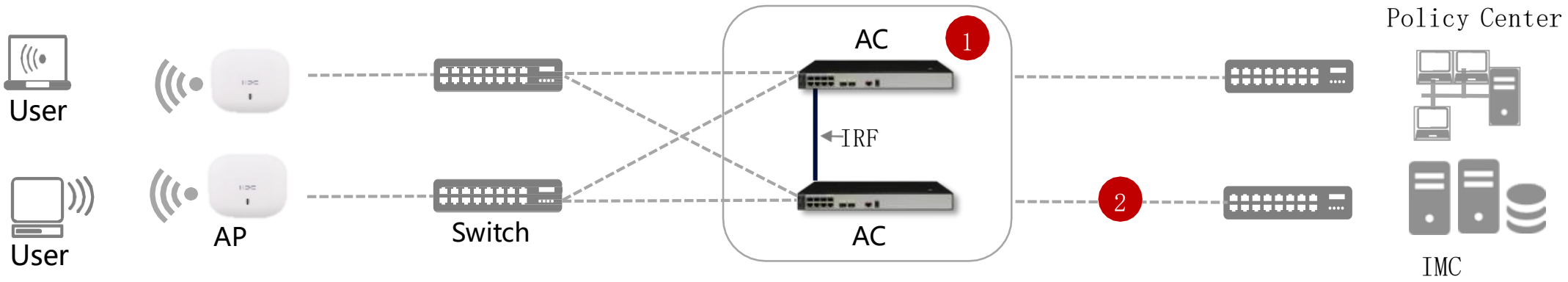
② New Users Online

- When the security policy on the wireless side of the AP is open system authentication, shared key authentication (WEP), and WPA/WPA2-PSK, new online users can access and go online. User data is forwarded through the local forwarding mode.

Scenarios

- For small wireless networks without AC backup, the service life mode can ensure uninterrupted user data forwarding and improve service reliability 。

AC 1+1 IRF-High reliability



IRF

- AC address virtual: facing the AP, the active and standby ACs use one AC address

Business real-time backup

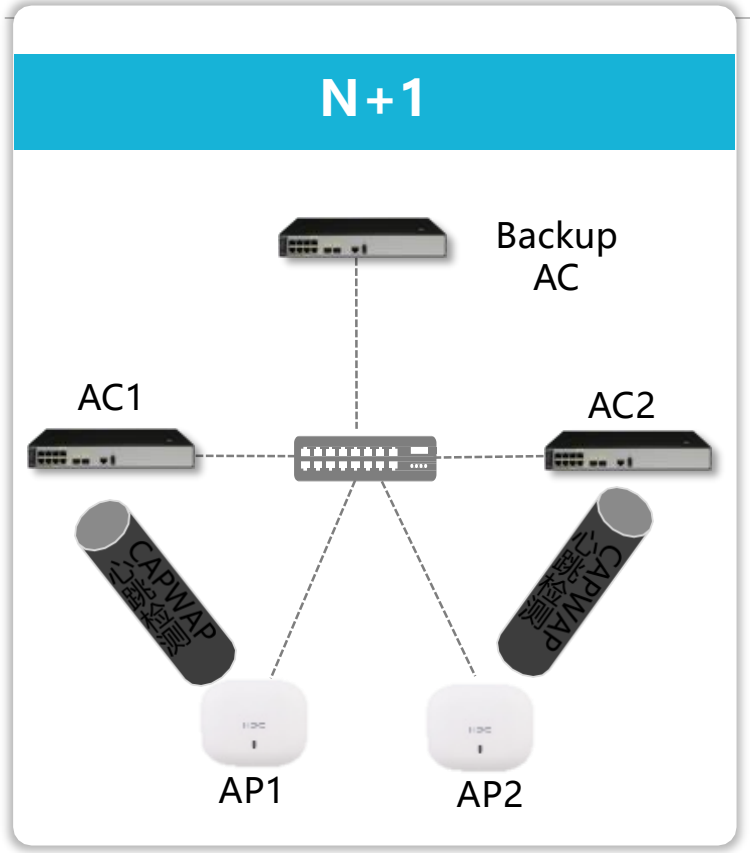
- User data information backup
- CAPWAP tunnel information backup
- AP table entry backup

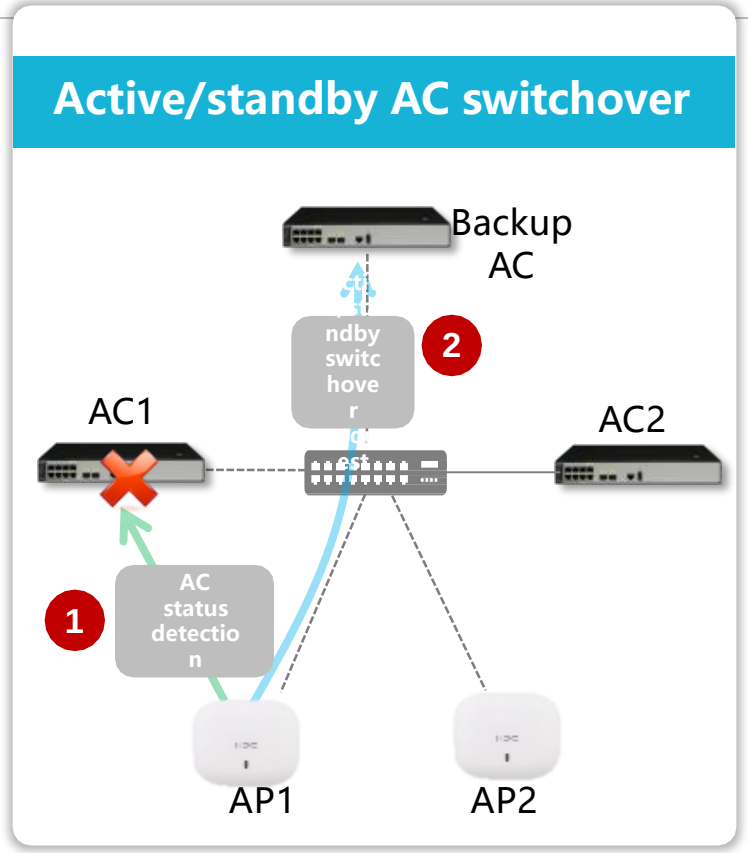
1+1 hot standby switch detection

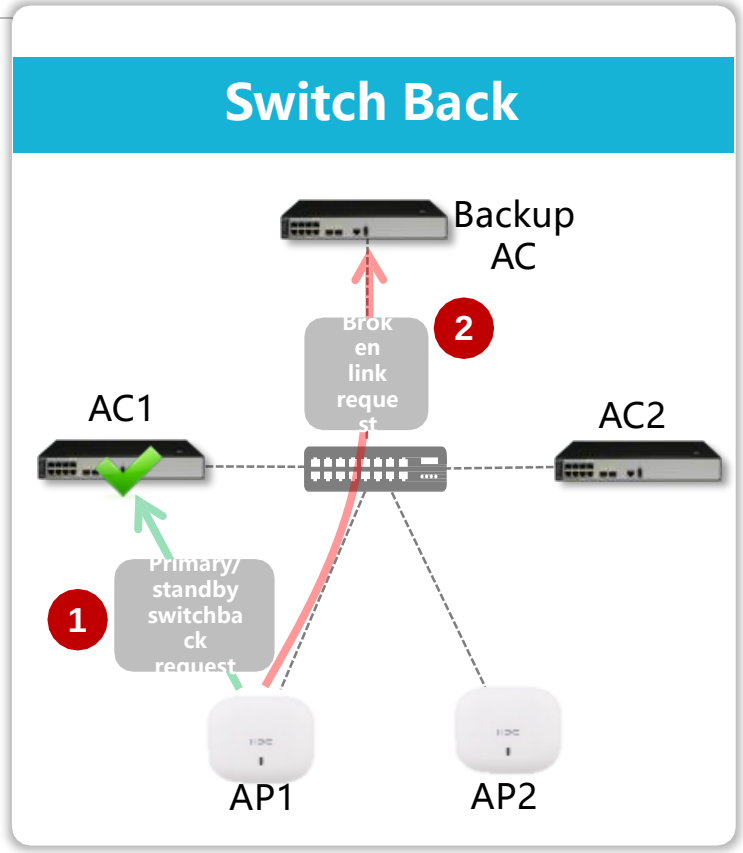
① AC whole machine inspection

② AC Uplink Detection (BFD)

AC N+1 redundant backup







Scenarios

- In a large-scale campus scenario where multiple ACs are deployed at the same time, use the N+1 backup function to improve the reliability of the overall network service and reduce the purchase cost of AC equipment

N+1 backup

- The backup AC provides backup services for all main ACs at the same time
- Support automatic active/standby AC switching and state recovery

/04

H3C WLAN Products and O&M Platform

H3C WLAN Product Family

Wireless Controller

High-end Access Controller series

vAC | WX5860H | WX3840H | WX3820H

AC Gateway and AC Card series

WX1840H | WX1820H | WX1810H-PWR | WX1804H-PWR | AC Cards

Wireless Access Point

High-end AP products

802.11ax / 11ac wave2 series

WA6628 | WA6622 | WA6638 | WA6630X

Mid-low end economical AP products

802.11 wave2 series/Cloud AP/Wall-jack

WA538 | WA536 | WA530/cloud | WA510H | WA530X

New Generation IoT AP

3-radio indoor/outdoor series

WA5330 | WA5530X | WA5530i

Wireless Access Point

New 11ax AP products

WA6620X | WA6628X | WA6628E-T | WA6330 | WA6320 | WA6320H

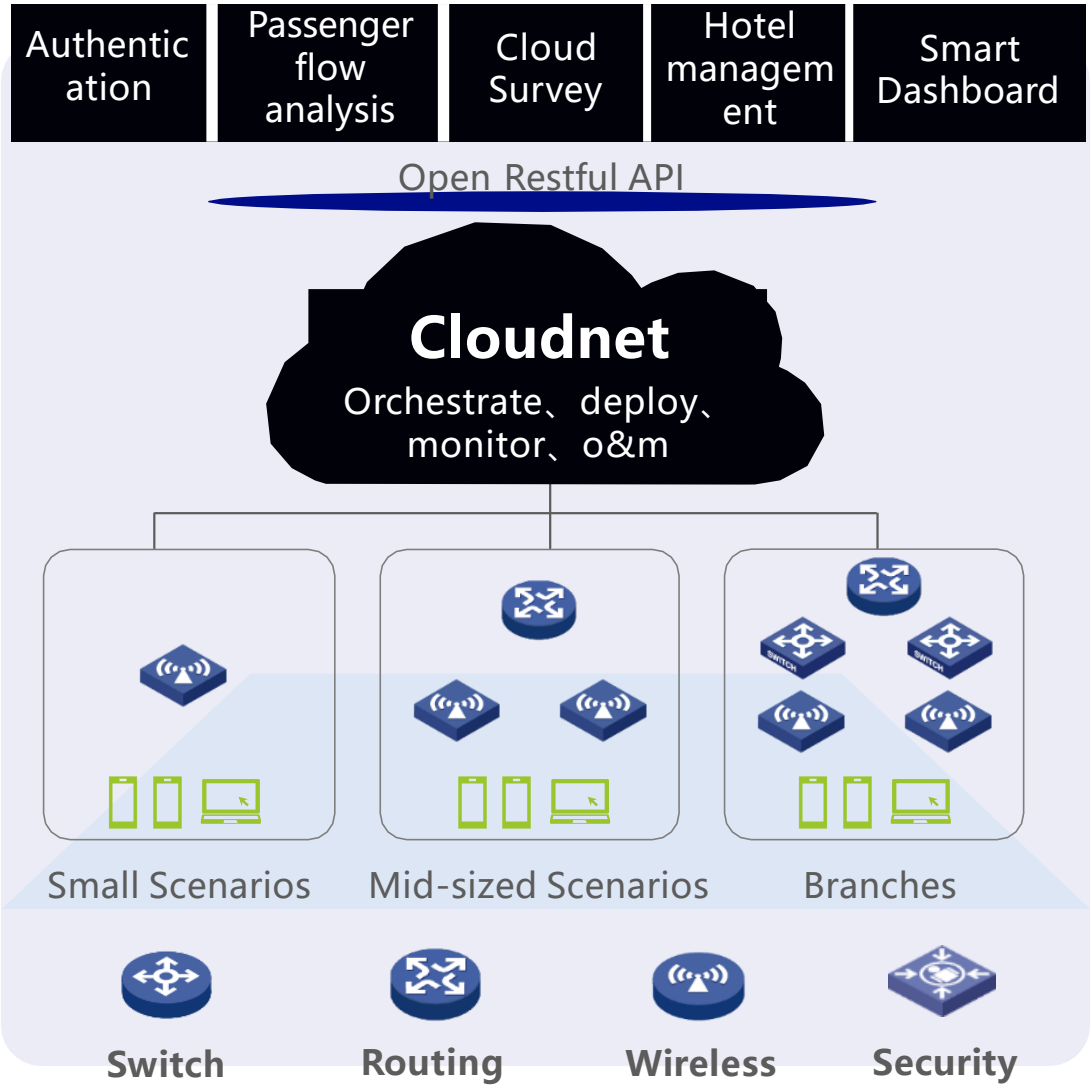
IoT Products

T310
IoT Module

T301 IoT Module
BLE/LoRa/RFID/ZigBee

Chained Architecture

H3C CloudNet Solution



ZTP Deployment on site

- Zero touch provisioning
- Stateless connection
- GUI，easy handle

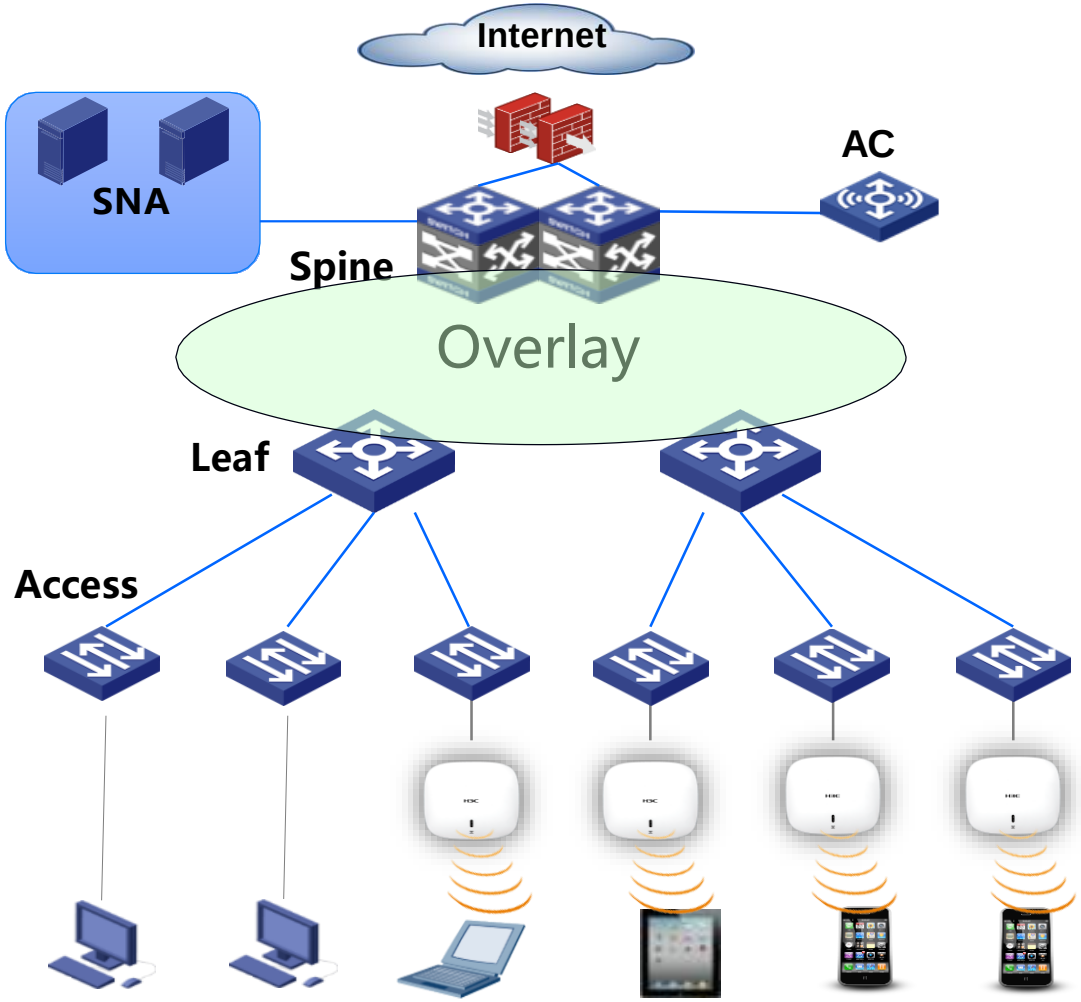
Cloud Management

- Cloud o&m，visualization
- Oasis app，light-weight
- AI，Big data

Value-added

- Marketing
- Flexible authentication
- Open API

AD-Campus Unified Wired & Wireless Solution



Unified Management

SDN architecture

One-key deployment

Multi-service AC card in core switch

Unified Forwarding

Unified wired and wireless network users

Wireless local forwarding

Unified monitoring and controlling outlet traffic

Unified Policy

Wired and wireless group policy delivered by Director to L3 GW

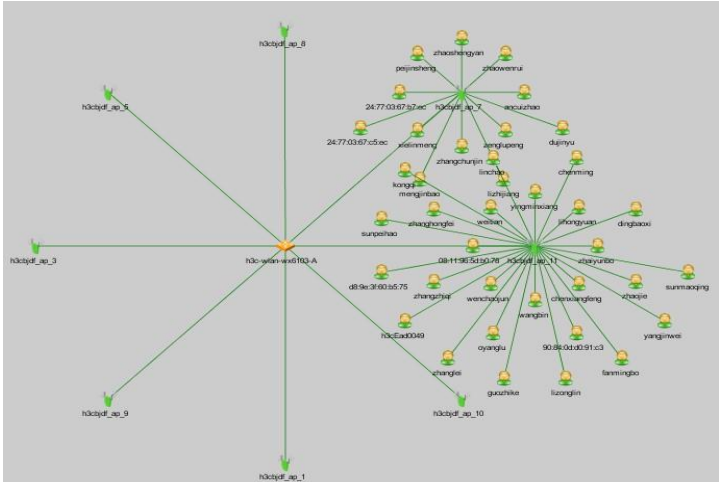
Unified security policy delivered to Firewall

Whether wired or wireless, IP remaining unchanged while roaming in campus

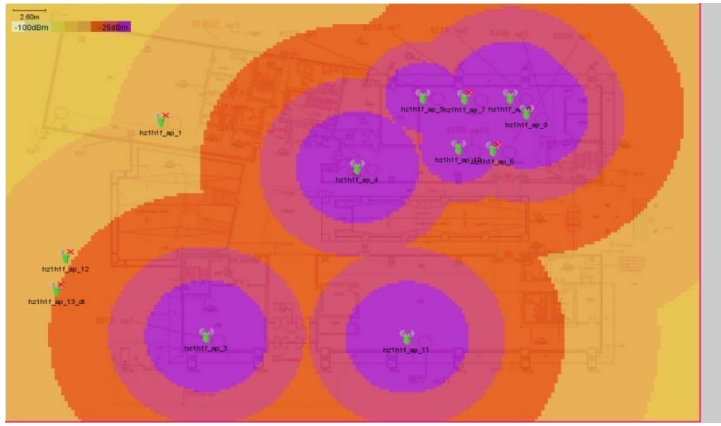
WSM-Wireless Service Management

iMC WSM (Wireless Service Management)

- **Unified topology management**
- **RF signal coverage management**
- **Wireless security management**
- **Wireless statistical report**
  - Performance index
  - Warning and alarm index
- **User management**
  - Username and IP/MAC address
  - Signal intensity
  - RSSI/SSID/Channel, etc.

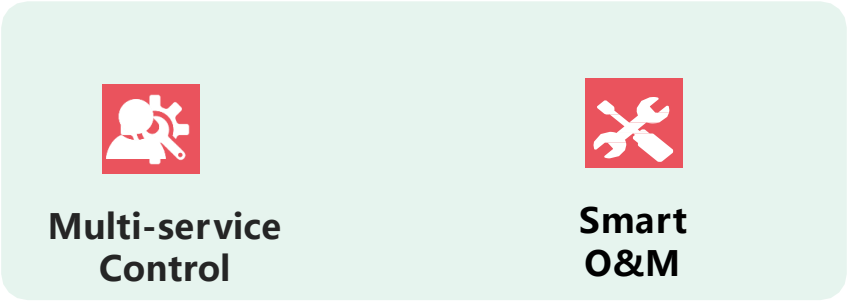


Wired & Wireless Unified Topology



Wireless RF Coverage Management

WBC Super Controller



Multi-service

- AC cluster, license sharing, entire network AP and access virtualization
- Wireless coverage ISSU, live upgrade
- Roaming center
- Open platform, can flexibly support third-party business

Smart O&M

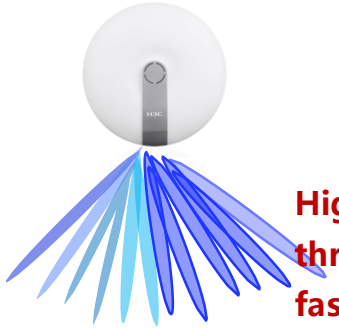
- Site survey, deployment, acceptance
- Doctor AP simulates terminal services in real time, self-checking network
- Problem identification and self-healing
- Progressive optimization

/05

H3C WLAN Tolly certification

Wi-Fi 6 Indoor Flagship AP-WA6628/WA6638

12 Spatial streams/Tri-radio

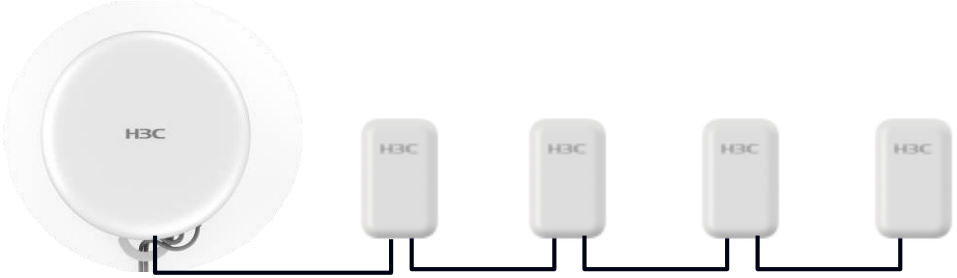


5.95Gbps

Highest single-client wireless throughput, representing the fastest Wi-Fi connection speed that has been tested by Tolly

High performance、reliability

- Dual PoE ports（hot backup on ports）
- DTLS for hardware secure
- Multi-rate 10GE+1GE, improve reliability and availability



- External IoT: suitable for IoT clear goals in the initial stage of network construction
- Built-in IoT: Suitable for unclear current needs but future IoT needs.

Built-in/external IoT module

WA6628 supports up to 100 clients to simultaneously stream 4K videos smoothly

TEST REPORT

Tolly Report

Product	Tolly Verified
WA6638	
WA6628	1. 5GHz radio Wi-Fi 6 single user performance, HE80, 8x8:8 mode single user performance ≥4.145Gbps HE160, 4x4:4 mode single user performance ≥4.176Gbps, a third-party test report issued by an authoritative laboratory is required 2. Multimedia concurrency performance, each terminal has a throughput of at least 2Mbps, the device can support ≥450 terminals at the same time smooth on-demand 3. 4K video performance, each terminal has a throughput of at least 30Mbps, the device can support ≥100 terminals at the same time and smoothly 4. The throughput of the device is 10 terminals with 5GHz radio frequency, and 5 terminals with 2.4GHz radio frequency. The maximum throughput of the device is ≥4.5Gbps
WA6622	1. The product supports MU-MIMO, SU-MIMO performance ≥980Mbps, MU-MIMO performance ≥1840Mbps, MU-MIMO is 1.8 times of SU-MIMO performance
WA6330	1. Multimedia concurrency performance, each terminal has a throughput of at least 1Mbps, and the device can support ≥610 terminals simultaneously and smoothly 2. The throughput of the device is 5GHz radio frequency 10 terminals, and the 2.4GHz radio frequency 5 terminals, the maximum throughput of the device ≥1.78Gbps 3. 5GHz radio frequency Wi-Fi 6 single-user performance, HE80, UDP traffic in 2x2:2 mode, 5GHz radio 1: Upstream performance ≥948Mbps, Downstream ≥948Mbps; 5GHz Radio 2: Upstream ≥945Mbps, Downstream ≥ 945Mbps
WA6320	1. Concurrency performance, each terminal has a throughput of at least 2Mbps, the device can support ≥350 terminals at the same time and smoothly 2. The throughput of the device is 5GHz radio frequency 10 terminals, the 2.4GHz radio frequency 5 terminals, the maximum throughput of the device ≥1Gbps

Thank You