Huawei Wi-Fi 6

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26 Years of Development, Huawei Continues to Promote the Advancement of Data Communication Technologies

14

Global research centers

100+

Scientists/Top experts

11000+

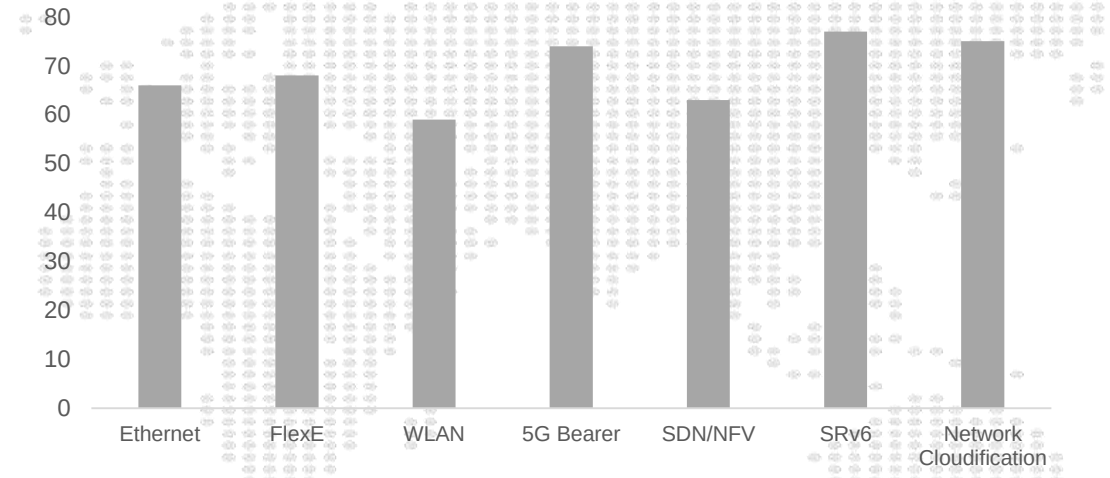
R&D professionals

~15%

R&D investment/revenue

Top spot in Wi-Fi 6/IPv6+/network slicing/400GE

Huawei contributions to **430+** IETF RFCs



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Highly Recognized by the Industry

Huawei CloudCampus

Campus Switch

2020 Global Campus Switch Enabling Technology Leadership Award

Wireless Solution

Forrester Strong Performance

CloudCampus Solution

2020 Gartner Customer Choice

SD-WAN

2020&2021 Gartner Customer Choice

Huawei CloudFabric

Data Center Switch

The Forrester Wave™: Open, Programmable Switches For a Businesswide SDN,Q3 2020

2020 Global Data Center Switch Technology

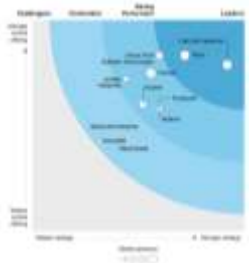
Interop Best of Show Award

2020 Gartner Customer Choice

Huawei HiSec

Firewall

Gartner: Challenger Magic Quadrant



AI Firewall

Forrester Strong Performer

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Huawei Continues Leading the Market Share of Data Communication Industry

Campus Network

AirEngine

Wi-Fi AP

No.1

in the enterprise WLAN market in China

*2020

DC Network

CloudEngine

Data Center Switches

No.1

in 10GE+25GE port delivery worldwide

* 2020, Gartner

WAN

NetEngine

WAN Routers

No.1

in the global carrier router market share

* 2017~2020

Security

HiSecEngine

USG Firewalls

No.1

in the market share of enterprise UTM firewalls in China

* 2020 Q3 IDC

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Участие Huawei в развитии Wi-Fi 6

В 2018 году Huawei представил первую в индустрии беспроводную точку доступа нового поколения Wi-Fi 6, со скоростью 10G - **AP7060DN.**

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U.S. vs Huawei

- В мае 2019 года Huawei и 70 дочерних предприятий попали в черный список американского Минторга.
- Google, Intel, Qualcomm, Broadcom и еще ряд американских компаний официально объявили о приостановке всех бизнес-процессов, связывающих их с Huawei.

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Huawei xEngine – чипы на основе AI

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Запуск новых продуктов Wi-Fi 6

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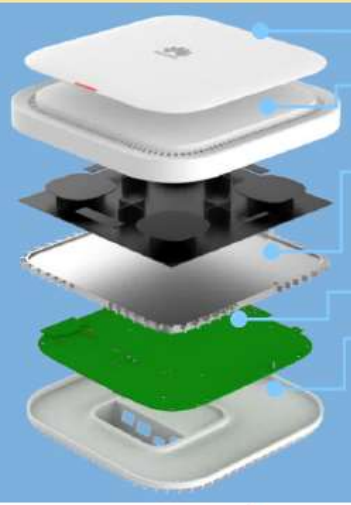
Запуск новых продуктов Wi-Fi 6

7 ключевых технологий Huawei



1. Модули расширения IoT
2. Smart Antenna
3. Большая емкость и широкое покрытие
4. SDR (Software-defined radio) гибкое разделение радио
5. Независимый радиомодуль для сканирования
6. Все серии продуктов поддерживают технологию устойчивости к помехам 3GPP 5G.
7. Встроенный чип IoT (RFID/BLE/ZigBee/Thread)

Категория	Дизайн	Характеристики производительности (количество потоков MIMO)
Флагман		Максимально 16 пространственных потоков Пропускная способность 10,75 Гбит/с **7–8 Гбит/с (по фактическим результатам тестов), это в два раза превышает показатели конкурентов**
Модель профессионального класса		Максимально 12 пространственных потоков
Стандартная модель		Максимально 8 пространственных потоков

Гибкое переключение режима работы радио

- Оптимальная производительность, достигаемая за счет оптимизации сети на базе ИИ.
- Программный апгрейд, увеличение количества пространственных потоков

Уникальная технология Huawei, не поддерживаемая конкурентами

- **AirEngine 8760-X1-PRO**
  - 4+8+4
  - 4+12
  - 4+8+сканирование
- **AirEngine 6760-X1**
  - 4+4+4
  - 4+8/4+6+сканирование
  - 4+6
- **AirEngine 5760-51**
  - 2+2+4
  - 4+4/2+4+сканирование
  - 2+4/2+2+2

Huawei	Конкуренты
4+12	4+8
4+6+3$^{-й}$	4+4
2+4+3$^{-й}$	2+2

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AirEngine: Новые модели

AirEngine 5761R-11/11E

1xGE optical + 1xGE
MIMO **5Ghz**: 2x2; **2.4Ghz**: 2x2
1.775 Gbit/s

AirEngine 6761-21T

1x2.5GE + 1xGE
MIMO **5Ghz**: 4x4 & 2x2; **2.4Ghz**: 2x2
6.575 Gbit/s

AirEngine 5761-21

1x2.5GE + 1xGE
MIMO **5Ghz**: 4x4, **2.4Ghz**: 2x2
5.375 Gbit/s

AirEngine 5761-11W

1xGE + 4xGE + 2xRJ45 passthrough
MIMO **5Ghz**: 2x2, **2.4Ghz**: 2x2
1.775 Gbit/s

AirEngine 6761-21/21E

1x2.5GE + 1xGE
MIMO **5Ghz**: 4x4; **2.4Ghz**: 4x4
3.55 Gbit/s

AirEngine 5761-11

1xGE
MIMO **5Ghz**: 2x2, **2.4Ghz**: 2x2
1.775 Gbit/s

AirEngine 5761-12W

1xGE + 4xGE + 2xRJ45 PoE passthrough
MIMO **5Ghz**: 2x2, **2.4Ghz**: 2x2
1.775 Gbit/s

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AirEngine: Контроллеры

WLAN ACs

s12700E, 7700, 6700-H, 5700-H switches

Support from 1K to 10K APs

AR routers

Support from 8 to 128 APs

iMaster NCE-Campus

Support up to 200K APs

Leader AP

Support from 12 to 48 APs

AC6800V

Forwarding performance of 60 Gbit/s
Managing a maximum of 10K APs
Providing access to a maximum of 100K users

AC6805

Forwarding performance of 40 Gbit/s
Managing a maximum of 6K APs
Providing access to a maximum of 64K users

AirEngine 9700-M1

Forwarding performance of 20 Gbit/s
Managing a maximum of 2K APs
Providing access to a maximum of 32K users

AC6508

Forwarding performance of 6 Gbit/s
Managing a maximum of 256 APs
Providing access to a maximum of 4K users

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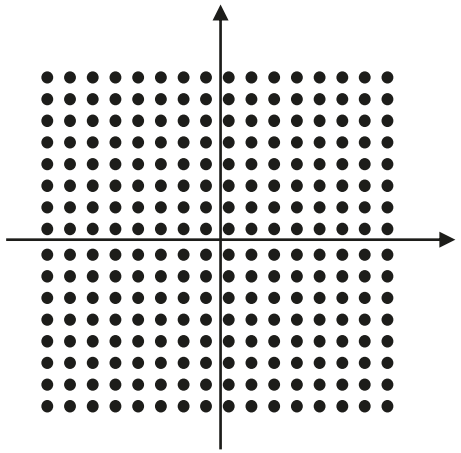
Что нового в Wi-Fi 6?

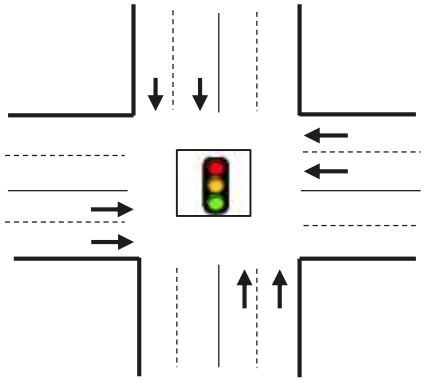
Высокая скорость



1024-QAM
8x8 MU-MIMO

- Скорость до **9.6** Gbps
- **4x** пропускная способность

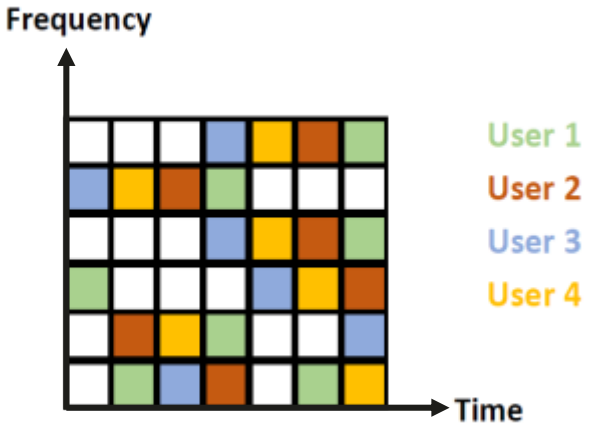
Высокая плотность



UL/DL OFDMA
UL/DL MU-MIMO

- До **1024** клиентов на 1 ТД
- **4x** одновременных пользователей

Низкие задержки



OFDMA
Spatial ReUSE

- Планирование ресурсов по потребностям
- Latency в среднем меньше на **50%**

Энергопотребление

TWT
20MHz-only

- TWT – управляемый доступ к радиоэфиру
- Уменьшение расхода батареи терминалов на 30%

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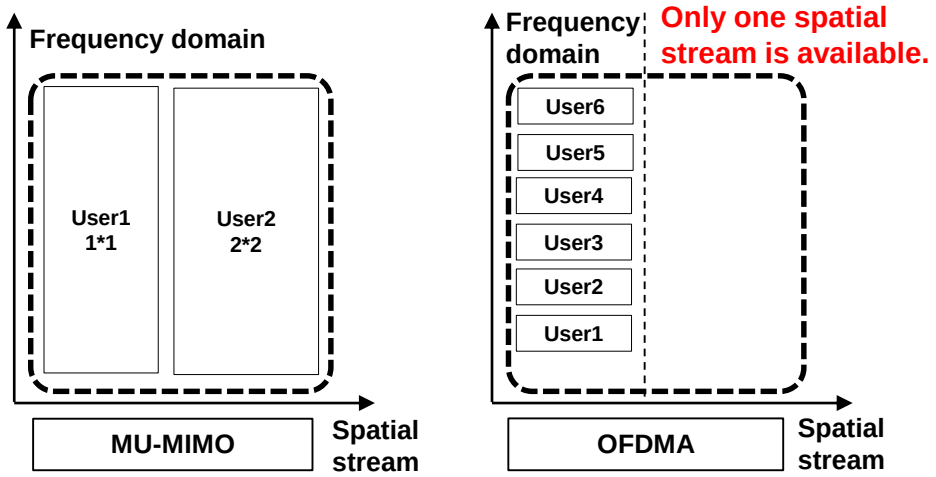
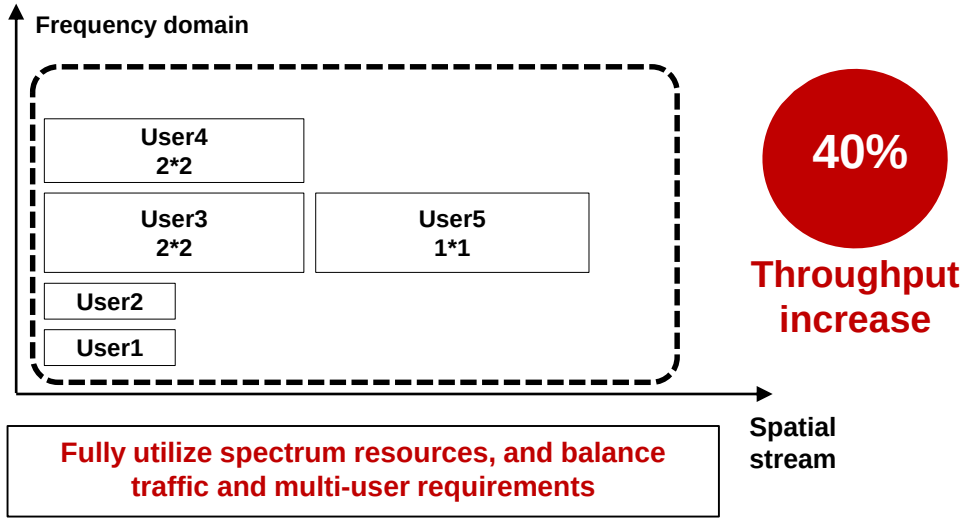
MU-MIMO & OFDMA Joint Scheduling, Addressing the High-Density Concurrent Capacity Issue

Industry: **mutually exclusive MU-MIMO and OFDMA scheduling**



Huawei AirEngine: **MU-MIMO + OFDMA joint scheduling**



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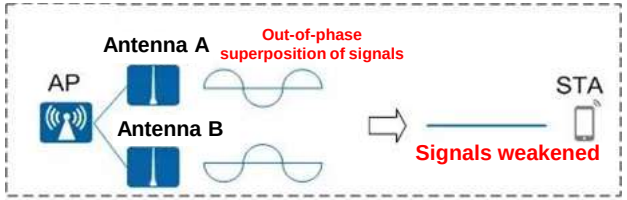
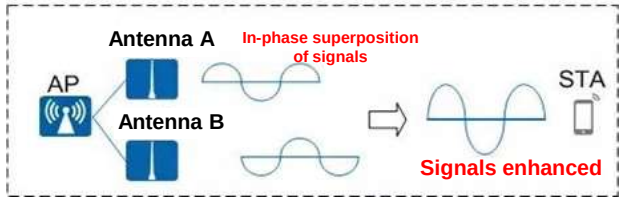
Industry-Leading Dual-Band Smart Antenna, with a 20% Longer Coverage Distance

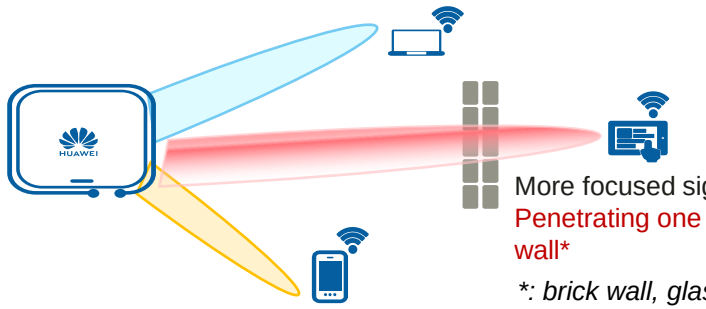
Industry: omnidirectional antennas



Huawei: Smart Antenna



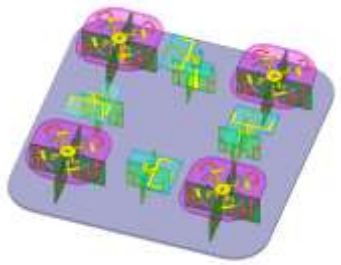
Note: Cisco Wi-Fi 6 APs do not have smart antennas.



More focused signals
Penetrating one more wall*

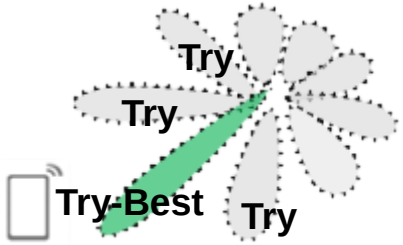
**: brick wall, glass, wooden door, etc.*

Unique hardware design



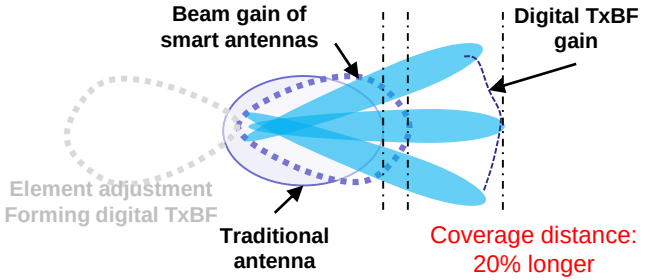
- Patented dual-band co-planar design, smaller AP size
- 4 elements for each antenna and 2^{48} beam combinations, achieving all-round beamforming and more accurate beams

Beam training



- Patented intelligent beam training algorithm for selecting the beam with the maximum gain
- Flexible environment adaptation, enabling always-on optimal signals for users anytime, anywhere

Codirectional matching for digital beams



- Flexible direction adjustment for antenna beams and digital beams to maximize the signal gain in the target STA direction

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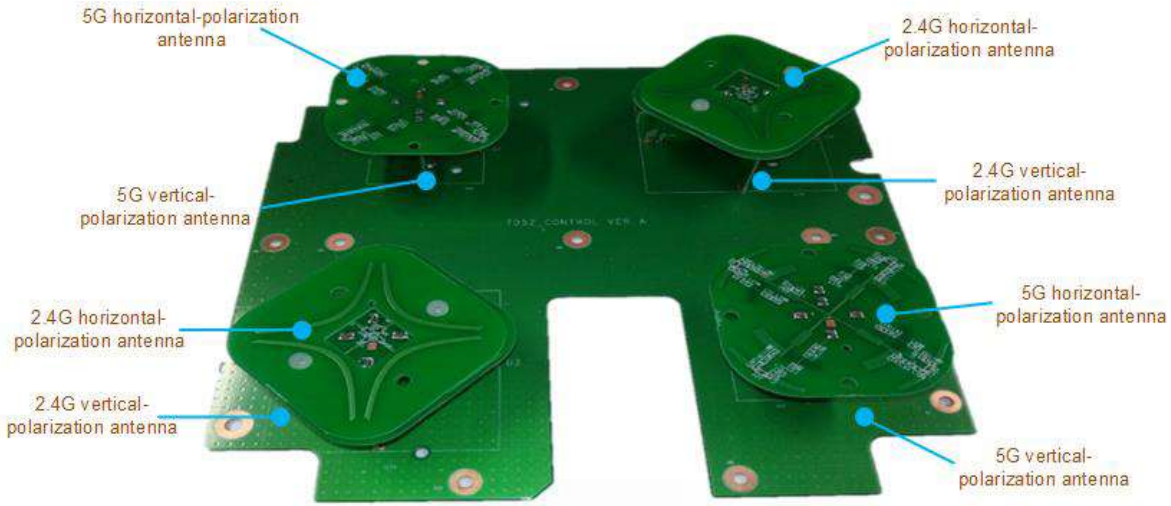
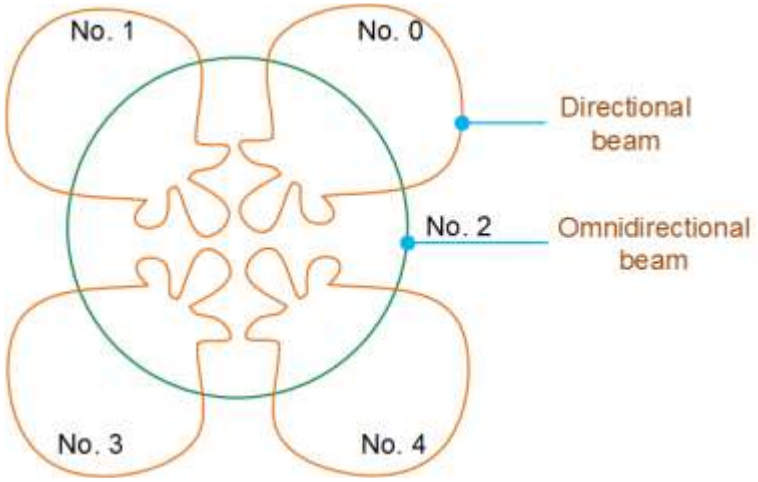
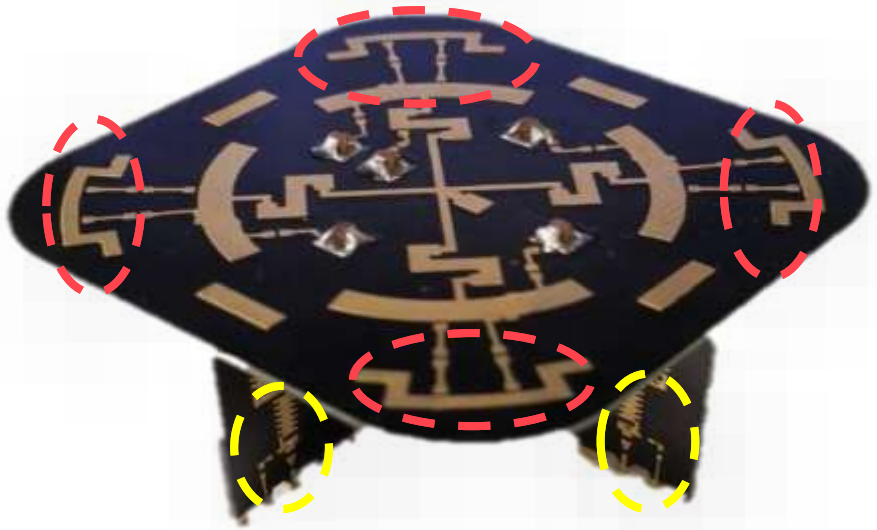
Huawei Smart Antennas







- 16 антенн: 2.4Ггц: 4, 5Ггц: 12
- 4 элемента на антенну
- 2^{48} комбинаций направлений луча
- Подавление помех до 15 dB

Чем больше антенн, тем сильнее будет производительность суперпозиции сигнала

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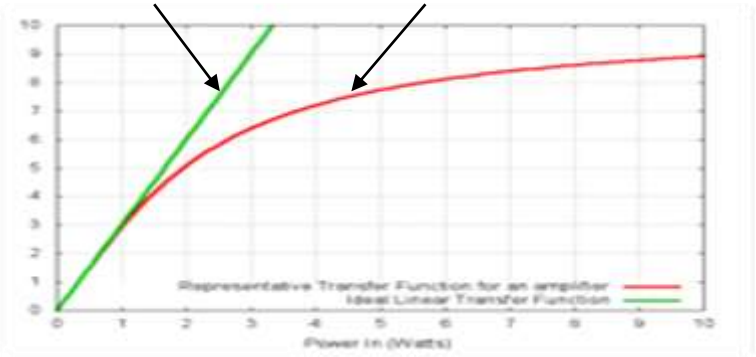
DPD Technology Improves the Transmission Distance of the DL 1024-QAM High-Order Rate by 30%

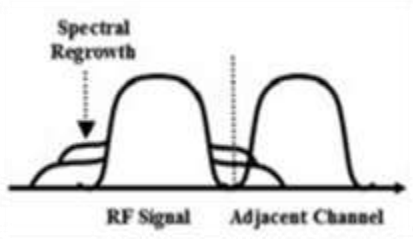
Non-linear effect of the power amplifier (PA)

Ideal linear amplification

Actual amplification curve (non-linear)

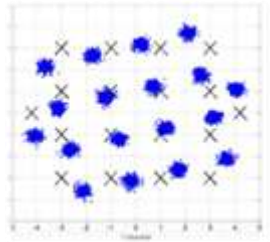


Out-of-band distortion: spectrum regeneration



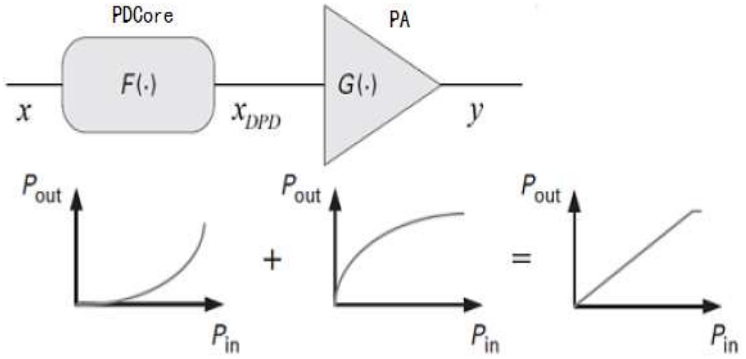
Adjacent-channel interference increases, affecting neighboring devices.

In-band distortion: constellation distortion



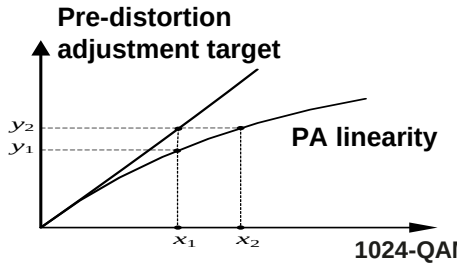
Higher bit error rate (BER) is generated, making signal receive difficult.

Digital Pre-distortion (DPD)

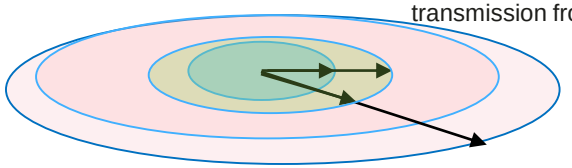


Non-linear signals that are opposite to the PA are generated to offset the non-linearity of the PA.

Note: DPD requires special hardware circuit design, which is not implemented by Cisco.



1024-QAM: increases the transmission from 8 m to **11 m**.



256-QAM: increases the transmission from 10 m to **15 m**.

Transmission distance at a high-order rate	Huawei	Cisco
256-QAM	15 m	10 m
1024-QAM	11 m	8 m

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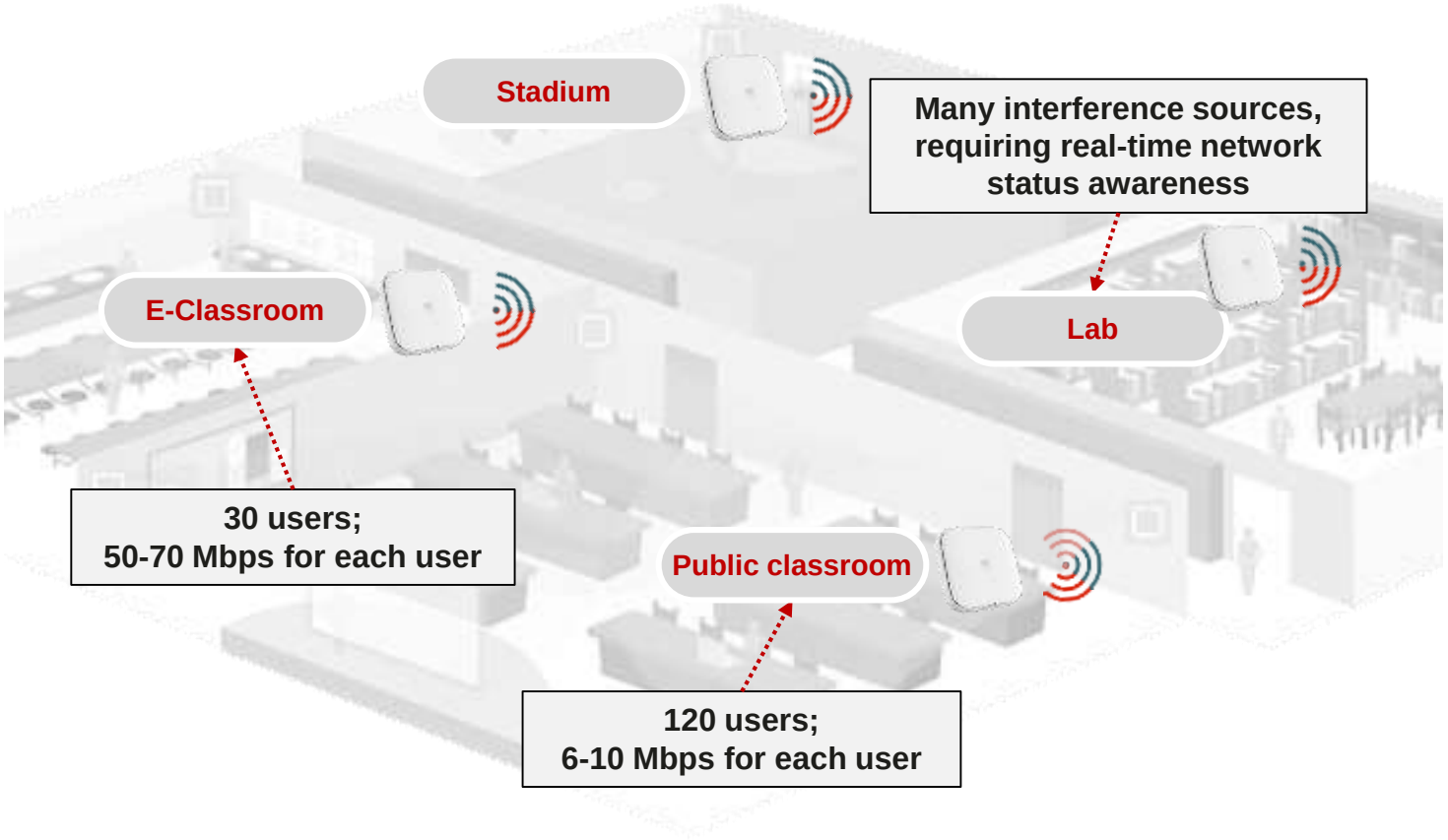
Industry's Unique SmartRadio Air Interface Optimization — SDR: Flexibly Adapting to Different Scenarios

- **SDR 2.4 G/5G AP**
- Flexible switchover of radio modes: dual-radio, triple-radio, and dual-radio + independent radio for scanning



Customer Benefits:

1. In high-bandwidth scenarios, the dual-radio mode is selected to provide ultra-large throughput.
2. In high-concurrency scenarios, the triple-radio mode is selected to allow more users to access the network.
3. In scenarios with severe interference, the dual-radio + independent radio※ for scanning mode is selected. In this mode, the independent radio for scanning is used to monitor and optimize the network quality in real time without affecting the performance. *※To be supported in R20C00*
4. On a large-scale network, APs in one model but different modes can be deployed to better adapt to traffic of different types in multiple service scenarios. This approach also improves the network-wide performance and reduces the TCO.

Comparison between Huawei and other vendors

	Huawei	Cisco	Aruba	H3C
SDR	Supported by high-end APs	* Will be supported by mid-range and high-end APs	* Will be supported by mid-range and high-end APs	Not supported

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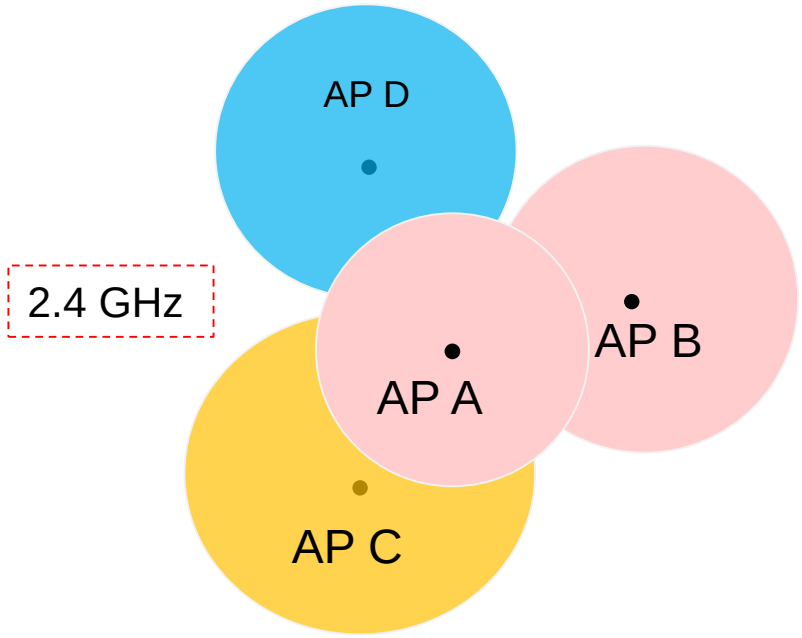
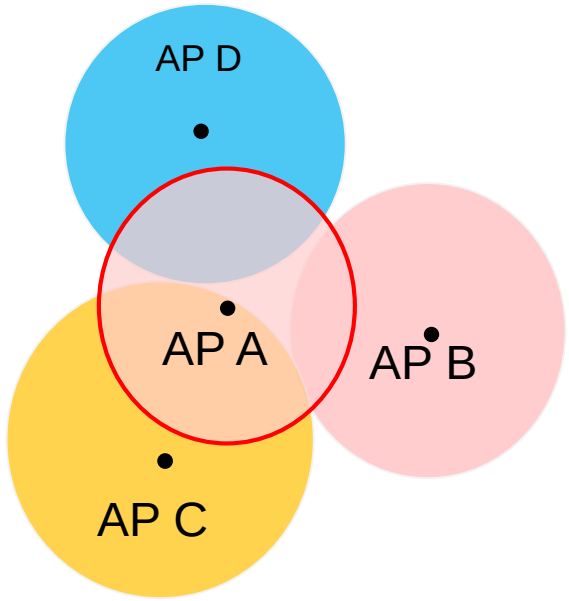
Industry's Unique SmartRadio Air Interface Optimization — DFA: Dynamically Identifying Redundant Radios and Effectively Reducing Interference

Initial State



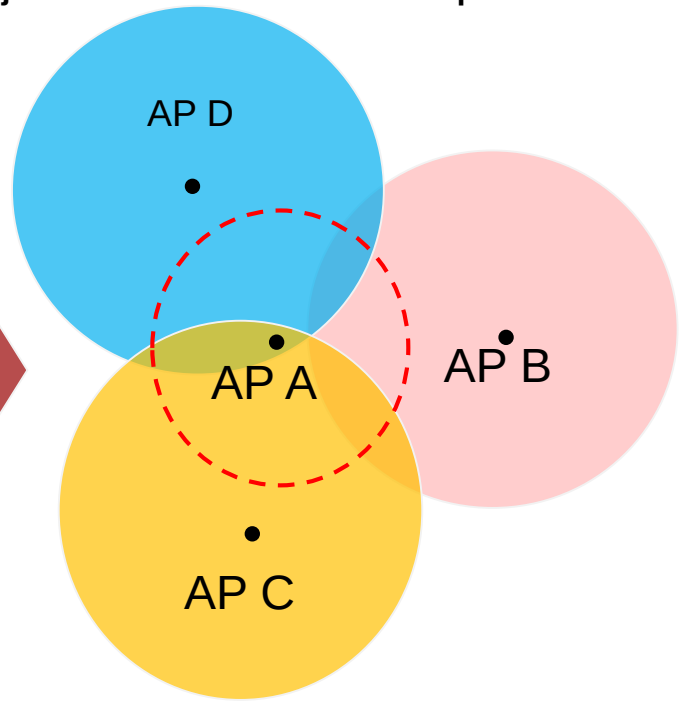
- Interference on the 2.4 GHz channels

Determine redundant radios



- Redundant 2.4 GHz radios after calculation

Adjust the channel and transmit power



- Adjust the 2.4 GHz transmit power of other APs and disable the 2.4 GHz channel of AP-A to reduce interference.

- Dynamic frequency assignment (DFA): automatically calculates whether 2.4 GHz radios of APs are redundant, adjusts the power, disables the redundant radios, or enables the APs to switch to the monitor mode.
- If an AP becomes faulty, the AC re-calculates the network-wide signals and adjusts the frequency band, channel, and transmit power of the APs accordingly.

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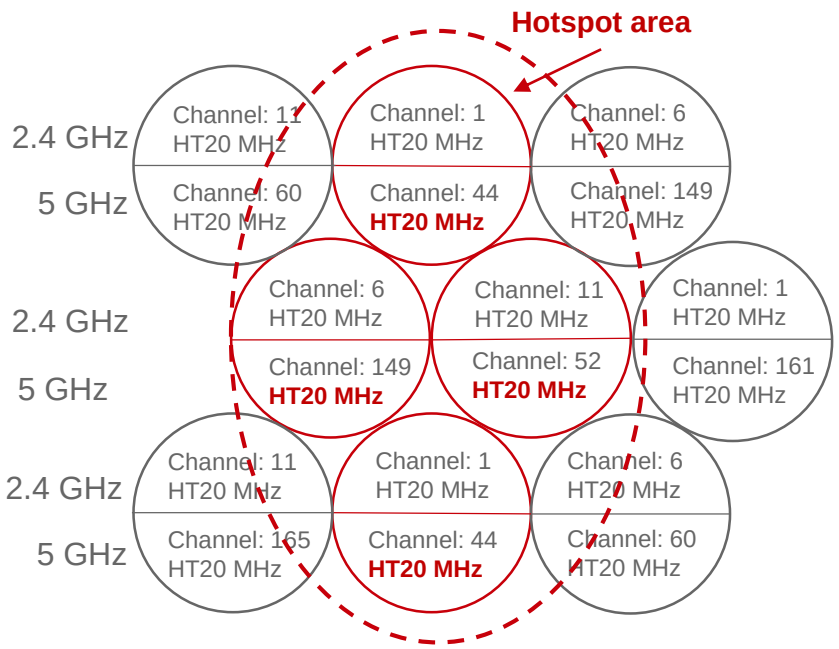
Industry's Unique SmartRadio Air Interface Optimization — DBS: Dynamically Adjusting the Bandwidth for Network-Wide Bandwidth Improvement

Pre-adjustment



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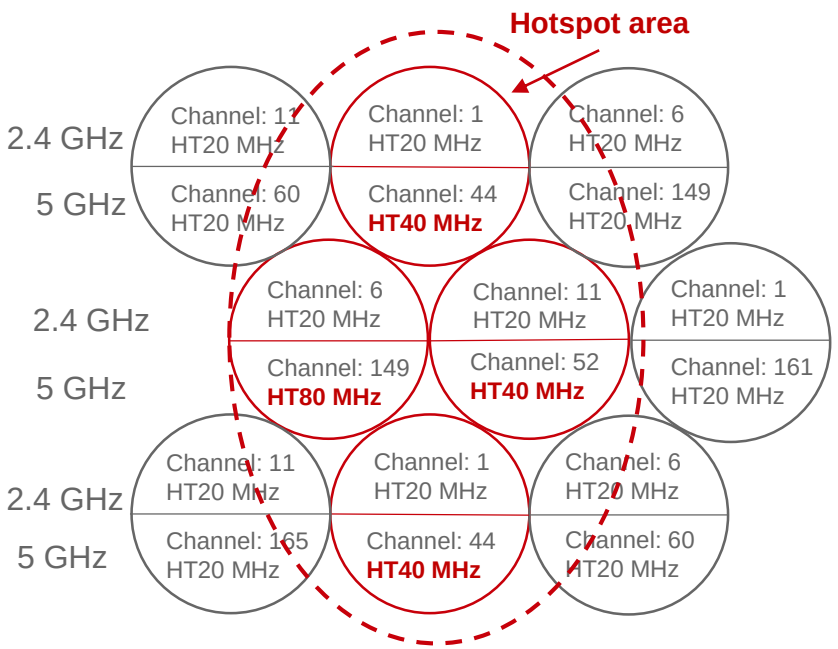
Post-adjustment



Early network planning: To ensure no interference on all channels, the AP works in HT20 mode by default. This mode limits user bandwidth to some extent.

Channel detection and traffic identification algorithm: Preferentially allocate more network resources to core areas with heavy traffic volumes, improving the network-wide throughput by more than 20%.

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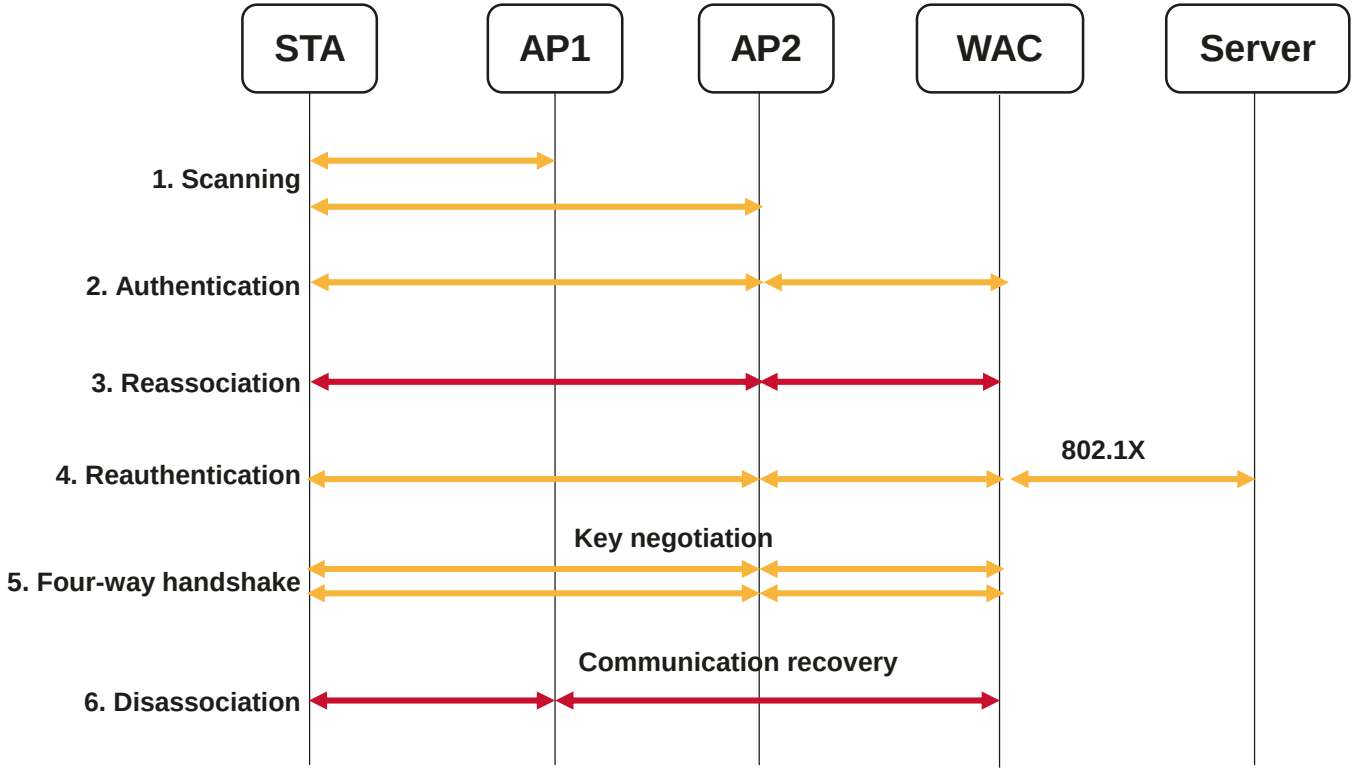
Device-Pipe Synergy Mechanism Prevents Service Interruption or Frame Freezing Caused by Long Roaming Handover Latency



Huawei lossless roaming (office)

Requirements for the roaming handover latency in office scenarios:

- **Online video (1080p) without frame freezing**: Service latency < 20 ms

Source: White Paper of UHD Video over Home Wi-Fi Network Solution

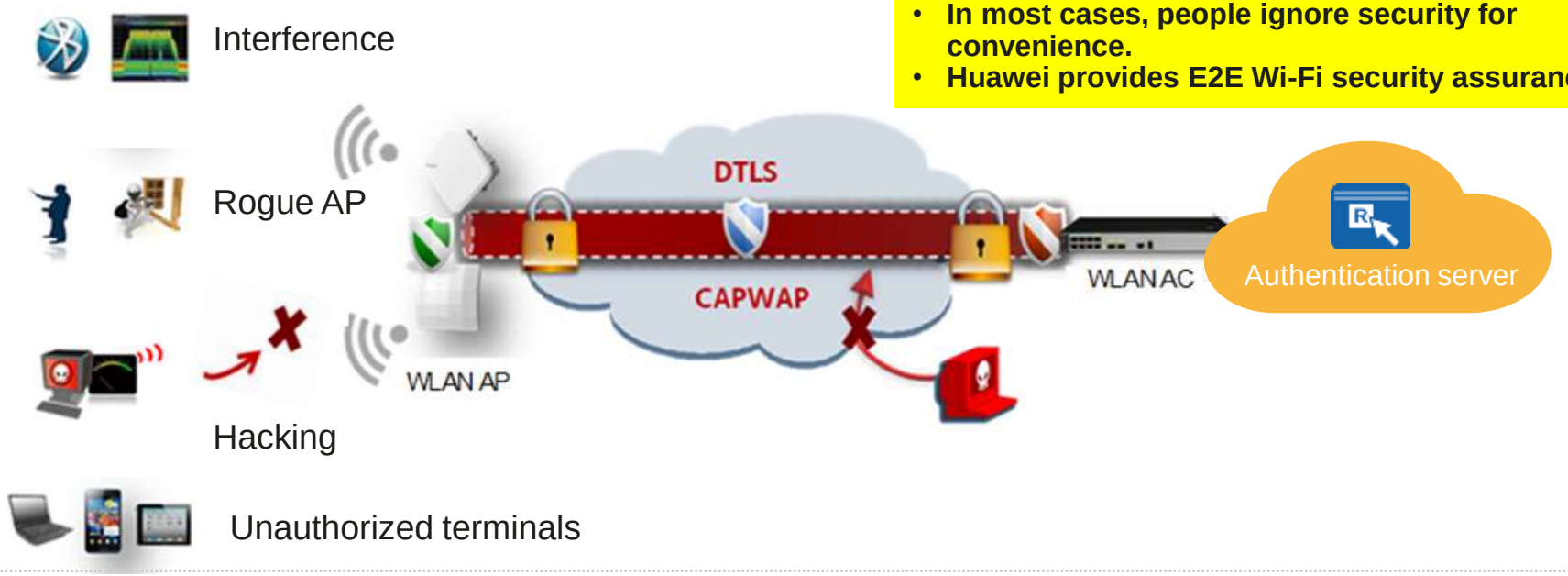
※ Supported by EMUI 10.1 or later

	Common Roaming	PMK Fast Roaming	11R Over the Air	11R Over the DS (Distribution System)	Huawei Lossless Roaming※
Latency (air interface interaction)	1s	300 ms	30–50 ms	20–30 ms	< 10 ms
Latency (service recovery)	1s	320 ms	80 ms	40 ms	< 10 ms
Roaming process (steps)	1–6	1–3, 5, and 6	1–3 and 6	1, 3, and 6	3 and 6
Competition			A, H, and R	C (optimized for Apple terminals)	H (optimized for Huawei terminals)

HUAWEI

Безопасность на всех уровнях

- **The Wi-Fi protocol itself is secure.**
- **In most cases, people ignore security for convenience.**
- **Huawei provides E2E Wi-Fi security assurance.**



Air interface security

- Spectrum analysis for interference identification (**independent RF scanning**)
- WIDS/WIPS air interface **attack defense**
- Rogue AP **identification and countermeasure**

Access security

- Authentication: MAC/802.1X/portal authentication
- **Authorization**: **Free mobility and unified authorization**

4W1H refined control policy: Who, Where, What, When, How

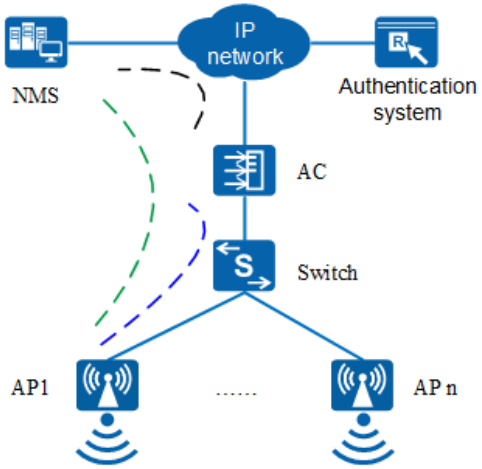
- **Protection**: policy control and virus filtering at the network ingress

Encryption security

- **Air interface management frame encryption**: PMF
- **Air interface data encryption**: WEP, WPA, WPA2, **WPA3**
- **Wired tunnel hardware encryption: DTLS and IPsec**

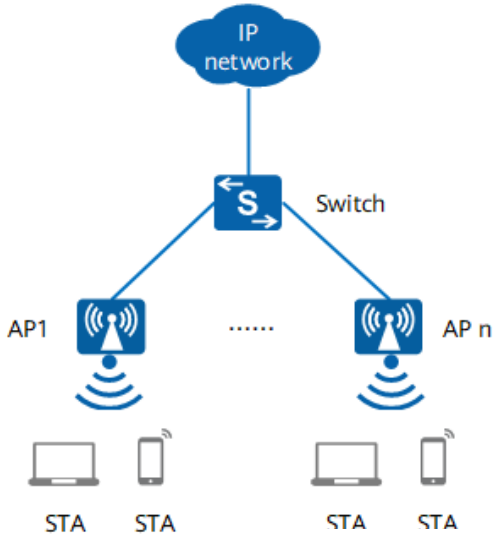
HUAWEI

Подходы к инфраструктуре Wi-Fi



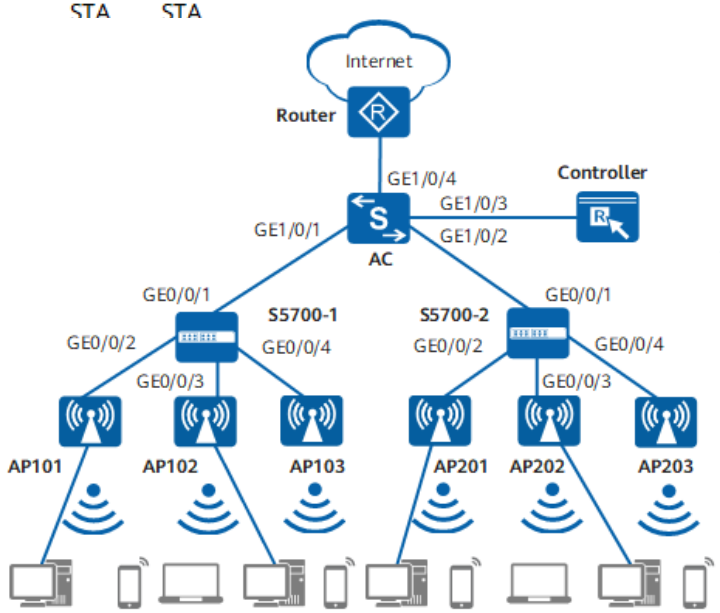
WAC + Fit AP

1



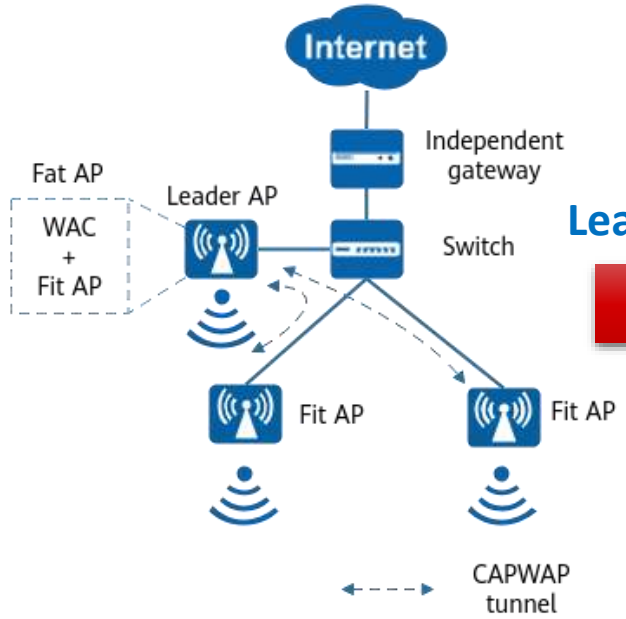
Agile Switch:
WAC + Fit AP

2



Chassis Switch:
WAC/ACU2 + Fit AP

3



Leader AP

4

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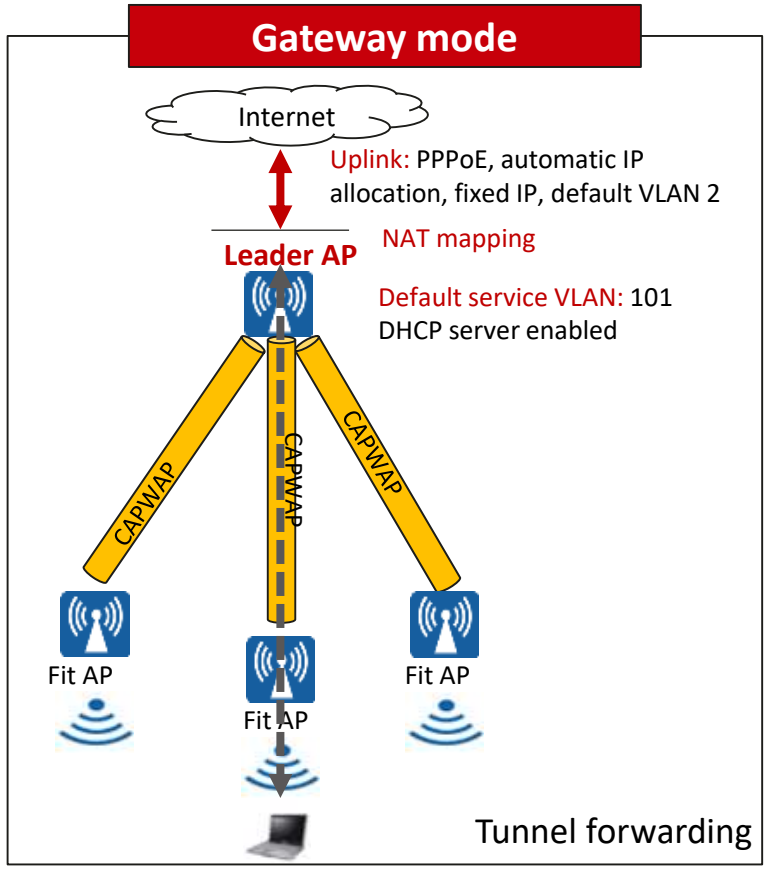
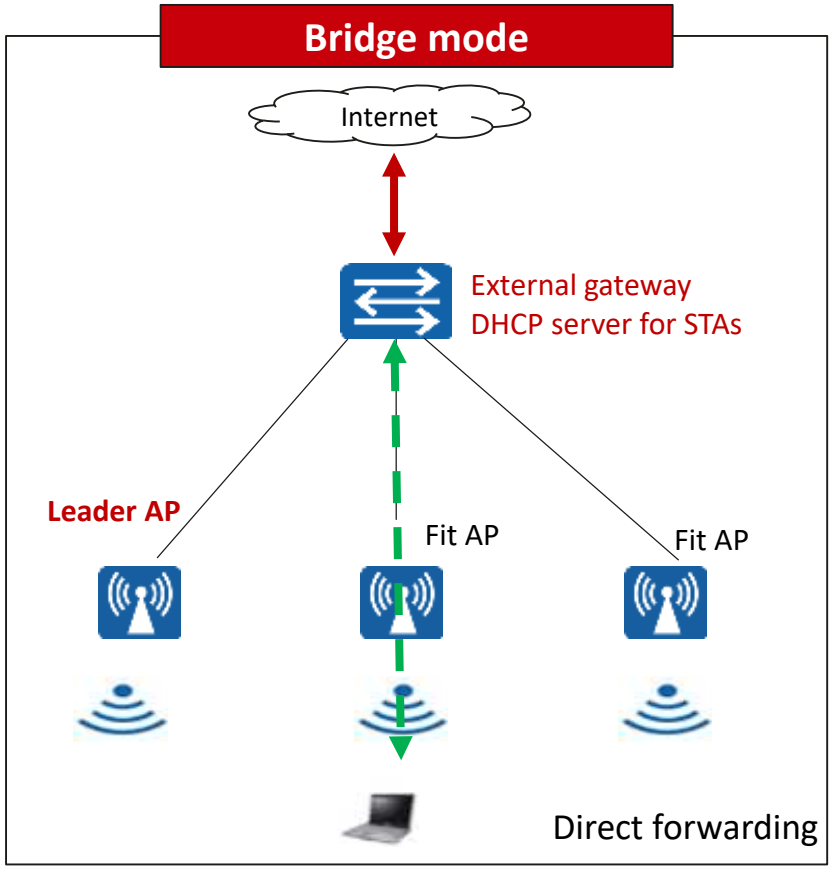
Подходы к инфраструктуре Wi-Fi

Leader AP позволяет точке доступа работать как контроллер, для управления собой и другими точками доступа в режиме Fit.





Особенности:

- AirEngine 8700 серии: **48 APs** (direct forwarding), **24 APs** (tunnel forwarding)
- AirEngine 6700 и 5700 серии: **24 APs** (direct forwarding), **12 APs** (tunnel forwarding),
- Leader AP работает начиная с версии VRP V200R020**C10**
- Возможность настройки через мобильное приложение **CloudCampus APP**.

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Подходы к инфраструктуре Wi-Fi

Wi-Fi 6 Agile Distributed Solution

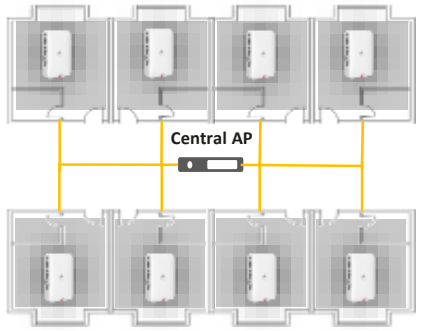
Central AP
AirEngine 9700D-M

Простота развертывания и гибкое расширение
1 central AP for 48 rooms
Uplink: 4 x 10GE optical port
Downlink: 24 x GE electrical port

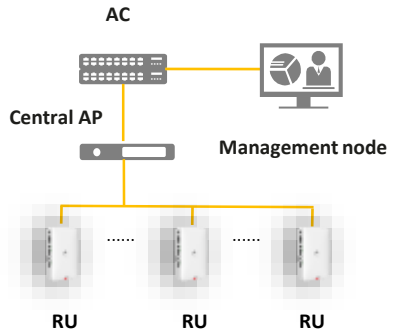
&

Smart RU
AirEngine 5761-11WD

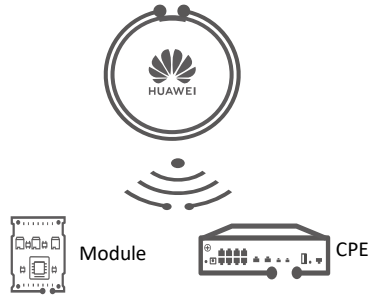
Smart antennas **ensure always-on signals for users**.
Upstream port: GE electrical port
Downlink: 4 x GE electrical ports
Path through: 2*RJ45



Wired/Wireless coverage without coverage holes
Wi-Fi & 4 x GE downlink port



90%+ management licenses saved



Secure and seamless terminal access

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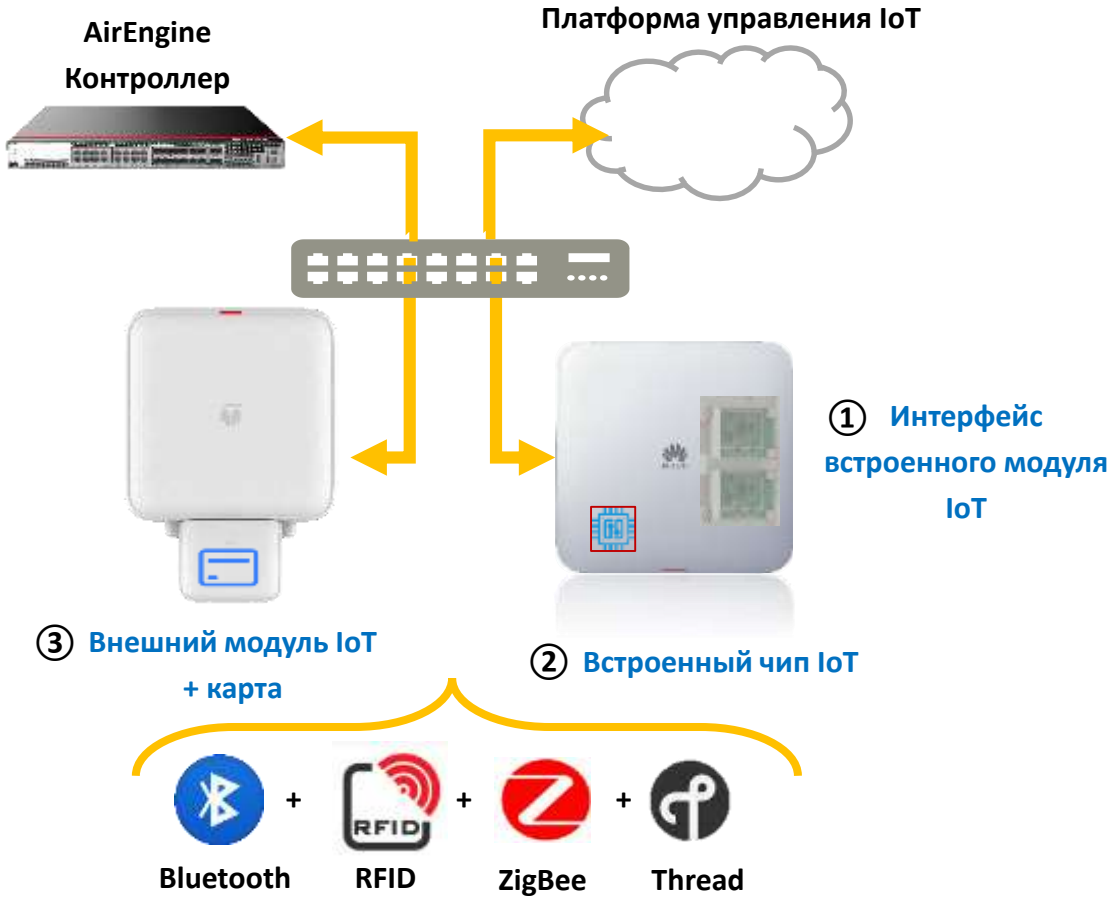
Подходы к инфраструктуре Wi-Fi

Конвергенция Wi-Fi и IoT для современных кампусных сетей



Система эл. ценников: автоматическое обновление цен на товары. Уменьшение объема ручных операций на 90%

Контроль состояния здоровья учащихся, постоянное внимание к физическим показателям

Интернет вещей для повышения качества услуг в больницах

Управление офисными ресурсами, повышение эффективности использования ресурсов на 100%

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Подходы к инфраструктуре Wi-Fi

Конвергенция Wi-Fi и IoT для современных кампусных сетей

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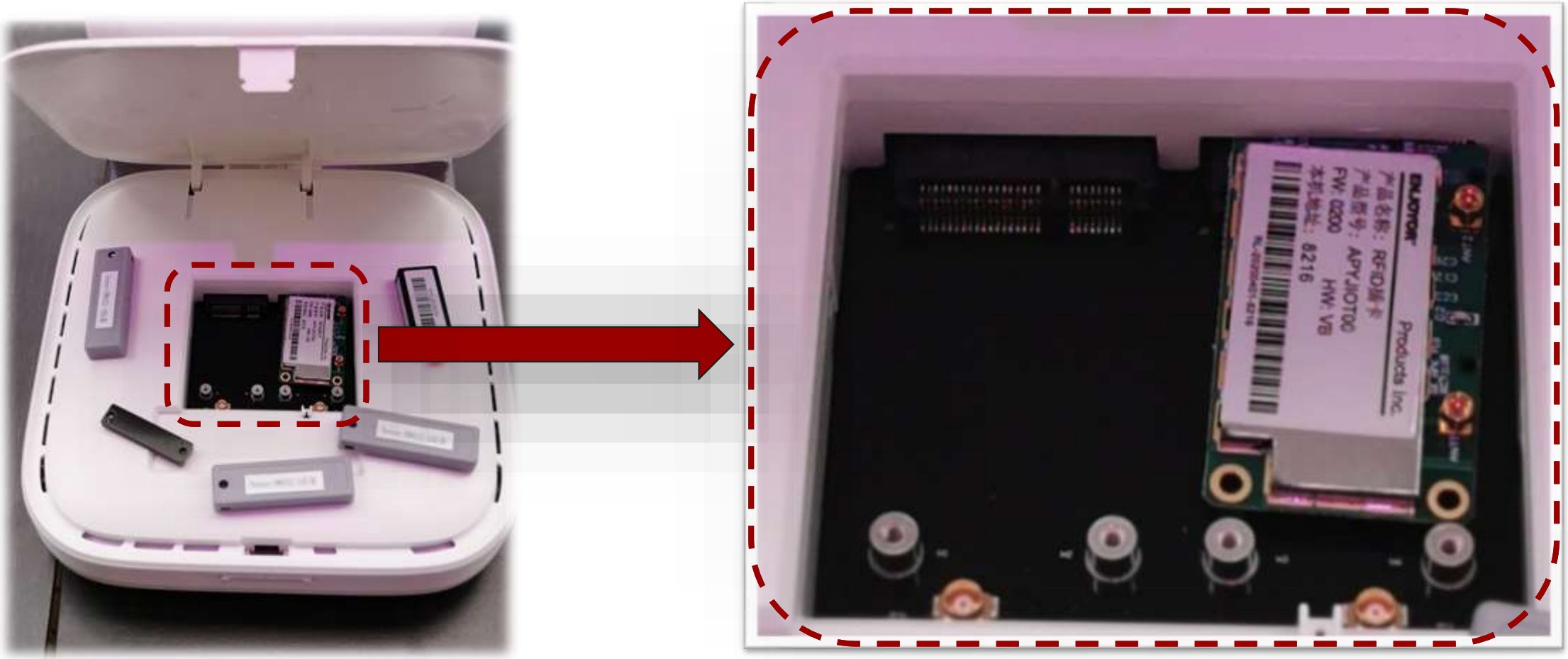
Подходы к инфраструктуре Wi-Fi

Конвергенция Wi-Fi и IoT для современных кампусных сетей



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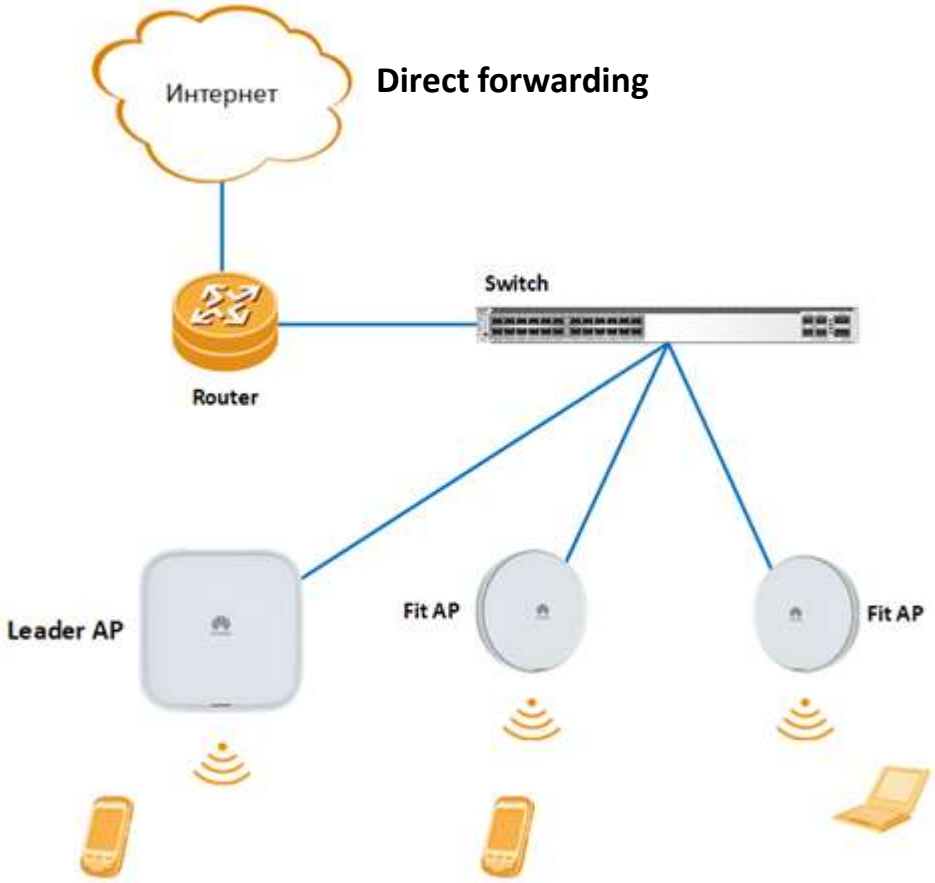
Опыт настройки: Leader AP



CloudCampus APP

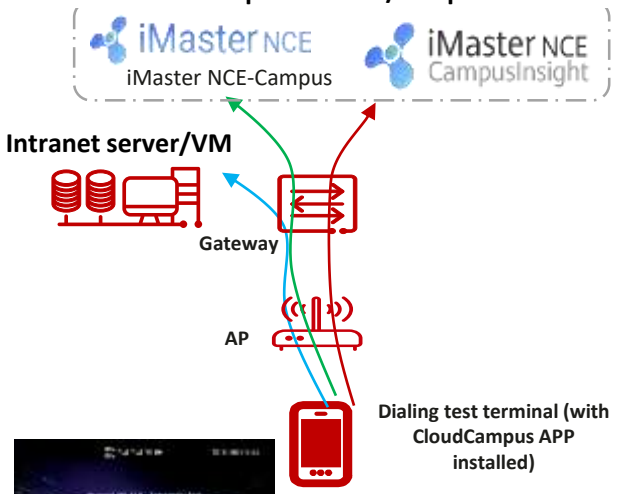
Verfügbar in der AppGallery

HUAWEI

Terminal Dialing Test, Real-Time Network Diagnosis, Intelligent Issue Analysis, Professional Report Interpretation

Deployment solution

Scenarios: Huawei public cloud/ On-premises



Zero-cost rapid deployment

- **Network reachability** can be tested
- CloudCampus APP can be installed only on **Android phones**
- Analysis reports are **immediately generated**
- CampusInsight can be shared in a region

Professional report interpretation

Dialing test report

Provide comparison reports of networks built by different vendors, comprehensively evaluate the overall user experience of Wi-Fi networks, analyze network issues, and provide network optimization guidance.

Evaluation result overview

AP Vendor	Project Name	Test Time	Test Result
[redacted]	N10	2021/04/12 06:59-07:09	All metrics are qualified.
[redacted]	N10	2021/04/12 06:59-07:09	Bandwidth, Ping. The test result is poor: Bandwidth: Average 173 Mbps, Disqualification rate 100% Ping: Average 15 ms, Disqualification rate 27%

Metrics overview

Vendor	Average Value	Excellent Rate	Qualified Rate	Evaluation	Evaluation Interpretation	Fault Locating
[redacted]	-58 dBm	60%	80%	Qualified	The signal strength is very weak. Deploy more APs to supplement coverage.	•The actual transmit power of the AP is low. •There are obstacles, such as walls and folding screens, between the STAs and AP.
[redacted]	-60 dBm	40%	83%	Qualified	The signal strength is very weak. Deploy more APs to supplement coverage.	•The actual transmit power of the AP is low. •There are obstacles, such as walls and folding screens, between the STAs and AP.

Test details

Project Name: N10 Test Time: 2021/04/12 06:59-07:09

Address	RSSI	Bandwidth	Website Connectivity	Intranet Upstream	Intranet Downstream	Internet Upstream	Internet Downstream	Ping	File Download Test	vMOS
1F-East	-62 dBm	331 Mbps	2201 ms	155 Mbps	150 Mbps	152 Mbps	180 Mbps	7 ms	28 MBps	4.3
1F-South	-56 dBm	350 Mbps	1995 ms	173 Mbps	146 Mbps	169 Mbps	148 Mbps	7 ms	23 MBps	4.5
1F-West	-57 dBm	362 Mbps	2117 ms	158 Mbps	162 Mbps	175 Mbps	154 Mbps	10 ms	25 MBps	3.8

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iMaster NCE-CampusInsight

Basic Information

Metric Overview

Possible Cause	Troubleshooting Object	Suggestions
Interference exists between co-channel interference APs.	Interference AP	Suggestion 1: Manually trigger RF calibration. Take AC6605 V200R009C00 as an example. Run the calibrate manual startup command in the WLAN view to manually trigger RF calibration. For other versions or device types, see the corresponding configuration manual. Suggestion 2: Reduce the number of broadcast frames sent by interference APs on the air interface. The following uses AC6605 V200R009C00 as an example: Step 1: Run the beacon-5g-rate command in the SSID profile view to set the transmission rate of 5GHz Beacon frames to 9 or 12 Mbit/s. Step 2: Run the beacon-interval command in the RF profile view to set the interval for the AP to send Beacon frames to 200 TUs.
The client traffic is heavy.	Wireless client	Suggestion: Configure rate limit for clients. Take AC6605 V200R009C00 as an example. Run the rate-limit command in the traffic profile view to set the rate limit for upstream and downstream packets of all STAs or each STA in a VAP. For other versions or device types, see the corresponding configuration manual.
Low-efficient clients occupy air interface resources.	Wireless client	Suggestion 1: Check whether other clients are connected to the AP. If it does not affect other users, it will be treated according to the actual situation. Suggestion 2: Manually trigger RF calibration when there are multiple inefficient users. Take AC6605 V200R009C00 as an example. Run the calibrate manual startup command in the WLAN view to manually trigger RF calibration. For other versions or device types, see the corresponding configuration manual. Suggestion 3: Enable the smart roaming function to suppress low-efficient clients. The following uses AC6605 V200R009C00 as an example: Step 1: Run the smart-roam roam-threshold command in the RRM template view to set the smart roaming threshold. You are advised to set the SNR to 25. Step 2: Run the smart-roam quick-kickoff-threshold command in the RRM template view to set the threshold for quickly and forcibly bringing clients offline. You are advised to set the SNR to 20. For other versions or device types, see the corresponding configuration manual.

⚠ If the above suggestions do not resolve the issue, please check the device further: AP4

Подходы к инфраструктуре Wi-Fi

Проект ГК «ЛАНИТ» строительства ИТ-инфраструктуры на стадионе «**Открытие Арена**» занял 2 года.

Было проложено 4500 портов СКС, сделана СКПТ на 180 ТВ-панелей, введены в эксплуатацию две СХД на 50ТБ каждая, четыре двухсокетных Rack-mount сервера для платформы виртуализации

87 точек Wi-Fi, АТС на 250 абонентов и 36 базовых станций DECT.

HUAWEI

Huawei support digital transformation of largest Russian retail company

X5 RG is Russia's largest food retailer, dedicated to creating, developing and actively managing a portfolio of retail products with unique value propositions and brands, and promoting these brands to Russian customers with different needs.

The Customer give most attention to network stability and aimed to build the High availability network infrastructure.

❖ Requirement and Challenges

✓ Need **easy O&M** of LAN and WLAN equipment

✓ Prefer **cost-effective solution** for stores

❖ Solutions

✓ **Large-capacity AC solution**: AC6800V cluster manage more than 40K AP

✓ **Campus switches**: More than 2500 switches deployed

❖ Customer Benefits

✓ **Wi-Fi technology**: helped customer centrally control the WLAN network of all stores

✓ **Store campus**: provide HA LAN network for multifarious accessing

HUAWEI

Transneft SSII-2 project

Transneft *is a Russian state-owned transport monopoly, the largest oil pipeline company in the world. JSC "Transneft" is operating over 70 thousand kilometers of trunk pipelines. It transports about 90% of oil and 30% of oil products produced in Russia*

❖ Requirement and Challenges

- ✓ **Scalable solution** for complete LAN upgrade from CISCO for all company offices in Russia for about 55000 employees
- ✓ Complex infrastructure with **O&M** systems and **NAC** for all ports
- ✓ Provide **performance reserve** for 5-7 years future

❖ Solutions

- ✓ **New generation S-series switches and Wi-Fi 6 APs**: 6787 pcs switches and 1220 AP
- ✓ **Agile controller Campus**: whole Network Admission Control for wired and wireless clients
- ✓ **Flexible expansion**: the solution can integrate the equipment already

❖ Customer Benefits

- ✓ **Wi-Fi 6 technology**: it provides the highest traffic bandwidth available in the market, increased capacity, extended battery life of Wi-Fi 6 clients
- ✓ **Agile controller** Campus additional automation for efficient management
- ✓ **Transparent network**: switches with telemetry support for efficient network monitoring and troubleshooting

HUAWEI

Huawei CloudCampus support digital transformation of retail company

One of the largest retailer in Russia with more than 26000 stores throughout the Russia. Customer started digital transformation of their business to improve OPEX and create new revenue sources based on IT services. The Customer give most attention to solution scalability, easy of use, automation and fast deployment for new services, data availability and efficient management and visibility of network infrastructure.

❖ Requirement and Challenges

- ✓ Scalability, **solution has to support up to 200000 managed devices**
- ✓ Need of an **easy O&M** of new LAN and WLAN equipment
- ✓ **Automation** to speed up deployment of new services and eliminate human errors

❖ Solutions

- ✓ **Wi-Fi 6 APs**: More than 2500 indoor APs installed
- ✓ **New campus switches**: More than 1500 switches deployed
- ✓ **iMaster NCE-Campus**: Single management solution for all network equipment

❖ Customer Benefits

- ✓ **Wi-Fi 6 technology**: it provides the highest traffic bandwidth available in the market, increased capacity, extended battery life of Wi-Fi 6 clients
- ✓ **iMaster NCE-Campus**: Agile and smart management and security.
- ✓ **Flexible expansion**: Easy integration of new switches and APs

HUAWEI

Huawei Wi-Fi 6 help Post of Russia to build a smart logistic centers

Russian Post is a national postal operator of Russia. Russian Post employs about 390,000 people and has over 42,000 post offices, more than 35 logistic centers, with its headquarters in Moscow. Logistics centers help to provide a market-demanded level of service quality for senders of letters and parcels, including improving the speed, reliability and safety of shipments. Logistics centers are located in the centers with the largest annual volume of mail.

❖ Requirement and Challenges

- ✓ New warehouses, need of **new Wi-Fi technology** to overcome high bandwidth demand.
- ✓ Need of an easy and **intelligent O&M** of modern LAN equipment
- ✓ **Location service** with the highest accuracy
- ✓ **Lossless roaming**

❖ Solutions

- ✓ Wi-Fi 6: More than 100 indoor **AirEngine 6760-X1E** installed per one logistic center with WLAN controller built-in **CloudEngine S12700E**
- ✓ **Agile controller Campus**: access management, free mobility
- ✓ **iMaster NCE-CampusInsight**: streaming telemetry, analyzer, predictive optimization, real-time simulation, AI

❖ Customer Benefits

- ✓ **Wi-Fi 6 technology**: SmartRadio Lossless Roaming, increased capacity, extended battery life of Wi-Fi 6 clients, highest bandwidth
- ✓ **Agile controller Campus**: Agile and smart management of security
- ✓ **iMaster NCE-CampusInsight**: Automation, easy troubleshooting
- ✓ Flexible expansion: Easy integration of new switches and APs

HUAWEI

Huawei helps VTB to renovate office network

***VTB Group** operates a large international network across CIS countries; Armenia, Belarus, Kazakhstan and Azerbaijan. VTB also has banks in Austria and Germany which are part of the European sub-holding headed by VTB Bank (Europe) SE.*

❖ Requirement and Challenges

- ✓ Renovated building, **need to replace outdated LAN infrastructure**
- ✓ Need of **Wi-Fi** for corporate and guest use
- ✓ **Different security zones** for users
- ✓ **High speed** connections to network core

❖ Solutions

- ✓ **Wi-Fi 6 APs**: 80 indoor AP installed covering 8 floors
- ✓ **MPLS to user port**: Any security zone can be provided to users
- ✓ **New S5731-H and S6730-H switches**: long lifecycle, cutting edge technology stack

❖ Customer Benefits

- ✓ **Wi-Fi 6 technology**: it provides the highest traffic bandwidth available in the market , increased capacity , extended battery life of Wi-Fi 6 clients SDN ready network
- ✓ **SDN network**: Only Agile Controller needed, no equipment swap to build
- ✓ **Increased links bandwidth**: Possible future increase to 40G/100G

HUAWEI

Leading Industry Development, Contributing to Industry Standards, and Winning Industry-Wide Recognition

AirEngine

AP7060 Wi-Fi 6 AP

No. 1

Contributor to Wi-Fi 6 standards

39%

Global Wi-Fi 6 market share

*Q3 2018 to Q3 2019

Gartner peerinsights customers' choice 2020

Customers' Choice

2020 Gartner

NetEngine

8000 series routers

No. 1

Contributor to SRv6 standards

31%

Global router market share

Gartner peerinsights customers' choice 2020

Customers' Choice

2020 Gartner

CloudEngine

data center network switches

No. 1

World's first intelligent and lossless DCN

82%

CAGR

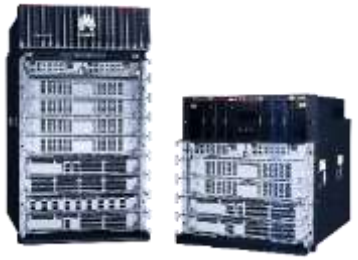
Gartner peerinsights customers' choice 2020

Customers' Choice

2020 Gartner

HiSecEngine

USG series firewalls



No. 1

First to embrace AI firewalls

68%

Growth in the Chinese industry market

FORRESTER

Strong Performer

2020 Forrester Wave

HUAWEI

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