Ruijie Enterprise Office Production Network Solution

Flexible & Seamless Connection — Upgrade Your Experience with Ruijie Networks

Solution Highlights

Ruijie Enterprise Office Network Solution helps you address the challenges of enterprise office and production networks, bringing the following benefits

| Flexible working experience | Multi-purpose scenario adaptability | Cost reduction through centralized management | Intelligent and visualized O&M |

Introduction

Current Situation and Trends of Enterprise Networks

? Are you prepared to addressincreasingly new demands of enterprise office and production networks?

Flexible Work

- Remote work and flexible office have become the new norm for enterprise operations. A large number of employees require remote access through VPNs, placing significant strain on network infrastructure and bandwidth. Furthermore, flexible work in the office requires wireless networks to be stable and fast. To meet these needs, enterprise networks must be flexible, secure, and reliable, enabling employees to work securely and efficiently from anywhere.

Cloud Service Integration

- The rise of cloud services has transformed the conventional architecture of enterprise networks. Enterprises are increasingly relying on cloud services to improve business flexibility and scalability, including public cloud, private cloud, and hybrid cloud. As the scale of cloud services increases, conventional network operation and maintenance (O&M) methods cannot meet complex demands of cloud network management. In this context, network automation and AI technologies are increasingly applied to network management to enhance O&M efficiency and troubleshooting capabilities.
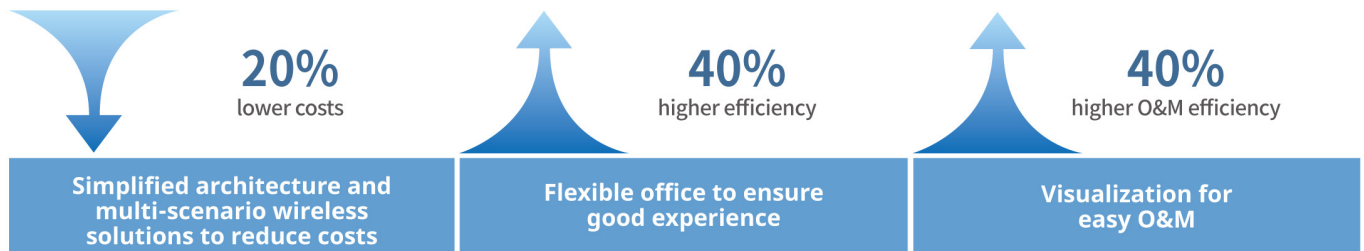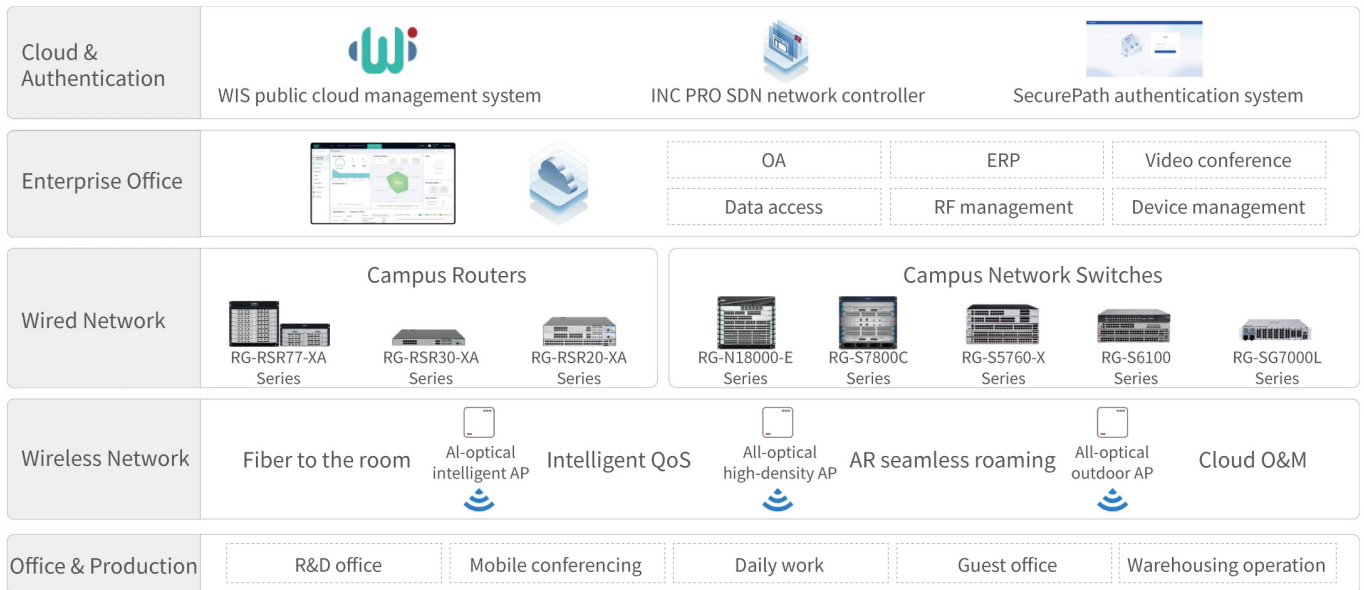
Network Security

- With the **increasingly sophisticated nature of cyberattacks,** enterprises are facing a growing number of network security threats. How to protect data security has become the focus of enterprise network management. Therefore, enterprise networks need to achieve a **Zero Trust** security level. This means that the default assumption is that the internal network is insecure, and authentication and authorization are required for any access request, thereby reducing internal threats and enhancing network security.

Solution Overview

Solution Architecture Design

Ruijie Enterprise Office Network Solution is built on the next-generation all-optical network architecture. With this solution, Ruijie Networks helps customers solve network construction and O&M problems in various scenarios, reducing network construction costs, improving network use experience, and enhancing network O&M efficiency.

Cloud & Authentication	WIS public cloud management system	INC PRO SDN network controller	SecurePath authentication system

Enterprise Office		OA	ERP	Video conference
		Data access	RF management	Device management

Campus Routers

Campus Network Switches

Wired Network	RG-RSR77-XA Series	RG-RSR30-XA Series	RG-RSR20-XA Series	RG-N18000-E Series	RG-S7800C Series	RG-S5760-X Series	RG-S6100 Series	RG-SG7000L Series

Wireless Network	Fiber to the room	Al-optical intelligent AP	Intelligent QoS	All-optical high-density AP	AR seamless roaming	All-optical outdoor AP	Cloud O&M

Office & Production	R&D office	Mobile conferencing	Daily work	Guest office	Warehousing operation

20%
lower costs

40%
higher efficiency

40%
higher O&M efficiency

Simplified architecture and multi-scenario wireless solutions to reduce costs

Flexible office to ensure good experience

Visualization for easy O&M

Solution Highlights

Flexible Working Experience

Ruijie Networks offers stable and efficient network services utilizing innovative technologies such as hybrid scheduling, AR wireless seamless roaming, and wireless intelligent QoS. This ensures smooth operation of mission-critical applications and significantly improves the network experience of VIP users. This solution caters to the flexible office needs of modern enterprises. It enables employees to easily access company resources anywhere and anytime, thereby improving work efficiency and business continuity.

Multi-purpose Scenario Adaptability

In high-density terminal environments in warehouses and various indoor and outdoor settings, Ruijie Networks' solution provides high-performance and reliable network devices to ensure business continuity. The AR wireless seamless roaming technology ensures that mobile terminals can maintain stable connections at any location. In addition, Ruijie provides a series of scalable wireless access points (APs) and switches to meet network requirements of different environments such as warehouses, production workshops, logistics centers, and office buildings.

Cost Reduction Through Centralized Management

Ruijie Networks' solution centralizes management of network resources across multiple branch offices, simplifies the network architecture, reduces costs of cabling and construction, and provides flexible network expansion capabilities for enterprises. The network controller supports plug-and-play functionality for remote modules, which makes the deployment of new devices faster and simpler, and effectively reduces the O&M workload.

Intelligent and Visualized O&M

Ruijie Networks' solution integrates dynamic security defense, cloud-based visualized O&M, key terminal mobility visualization, and wireless O&M based on global maps, providing comprehensive intelligent network optimization and troubleshooting capabilities to improve O&M efficiency. The dynamic security defense function can detect and block network threats in real time to ensure enterprise network security.

Application Scenarios

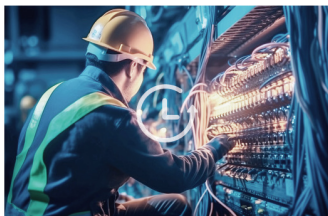## Enterprise Office Scenario: Flexible Connection

**?** Do you encounter the following problems on the enterprise campus network?

01 ▷ There are wireless coverage dead zones in High-Density Scenarios (Meeting Rooms and Staff Canteens), and network lags occur when a large number of terminals are connected, affecting normal operation.

02 ▷ Information points in the office area are frequently adjusted, and conventional network devices have complex cabling, resulting in long construction and deployment time.
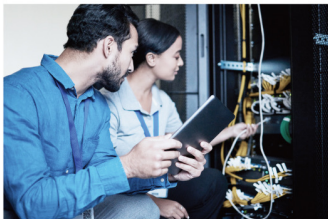
03 ▷ Network fault locating relies on manual experience and reactive response results in prolonged recovery time and affecting business continuity.
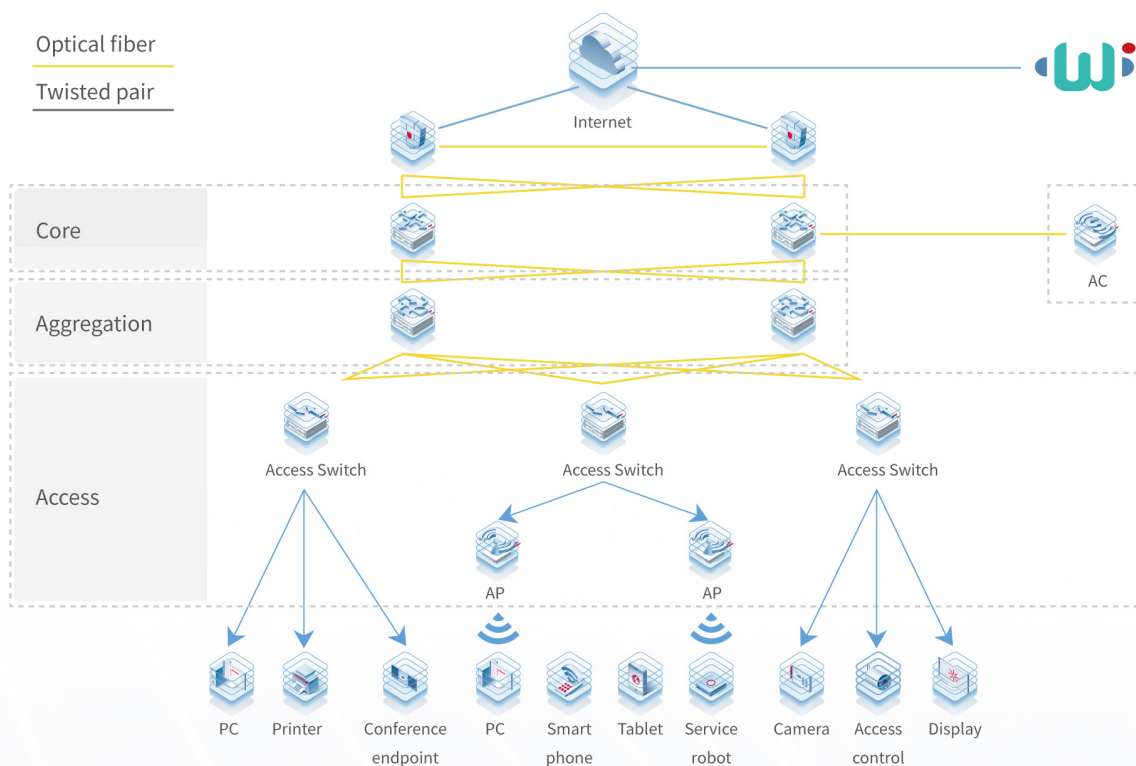

04 ▷ The increasing demand for data sharing and mobility office among various departments and frequent personnel changes increase the risk of sensitive information leakage.

✔ Solution Benefits

📋 Enterprise Office Scenario Solutions

One Network for Multiple Purposes and Multi-service Integration

- One network for multiple purposes: Integrated devices (a single device supports wired and wireless functions), deployment, and O&M for both wired and wireless networks to save CAPEX and OPEX.
- Multi-service integration: Only one physical network needs to be built to carry multiple types of services.

⏱ High-Capacity APs for High-Performance Infrastructure

- Ruijie 's high-capacity APs adopt **the latest Wi-Fi 7 technology,** which provides higher throughput and lower latency in high-density environments, meeting the needs of large-scale concurrent connections.
- **The RF isolation technology** effectively reduces interference between different frequency bands, **improving multi-band performance by 30%** and ensuring network stability.
- **The smart antenna technology** can automatically adjust the signal orientation, improve the signal strength and quality, and **increase the signal-to-noise ratio by 100%,** significantly improving the network performance.

Dynamic Tuning Delivering Optimal Experience in High-Density Scenarios

- **The Correct-Link technology** optimizes the wireless signal transmission path to minimize signal interference, and **the AirReorder technology** balances service load on multiple concurrent terminals.
- This function identifies greedy terminals that occupy too much resources and limits their speeds, and offers **guaranteed services for VIP users** to ensure the network performance of key services.
- With **AR wireless roaming,** terminals can seamlessly switch among APs, ensuring uninterrupted mobile conference and providing users with a "zero latency" network experience.
- By **dynamically adjusting channels and power,** the AP can proactively **identify and suppress interference signals,** ensuring network stability in high-density environments.

Cloud Intelligence Making Networks Simpler

- Ruijie Networks realizes real-time monitoring of network **connection status and experience of each terminal** through the intelligent cloud management platform. It ensures stable and efficient network services for every user.
- The cloud-based visualized O&M tool combined with the AI technology automatically analyzes the root cause of network faults, improving the fault locating efficiency **from hour-level to minute-level,** and greatly reducing the impact of network faults on services.
- Utilizing big data analysis and AI algorithms, Ruijie Networks can **forecast potential network issues and proactively prevent them.** This approach reduces response time and enables the network to self-heal.

Enterprise Production Scenario: Production Efficiency Improvement
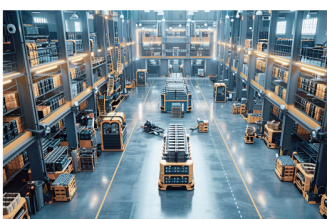
❓ Does your enterprise warehouse network encouthe following problems?

01 ▷ In diversified scenarios such as high-bay warehouses, 3D warehouses, and steel-structure platforms, there are many physical obstacles, resulting in unstable network signals and affecting the operation efficiency.

02 ▷ PDAs, AGVs, and other devices in the warehouse frequently move, resulting in frequent wireless roaming and handovers. This leads to packet loss and delays, ultimately affecting the smooth operation of production

03 ▷ Cold chain services need to operate in extremely low temperatures (as low as −40°C), and common network devices are difficult to operate stably and prone to failures.
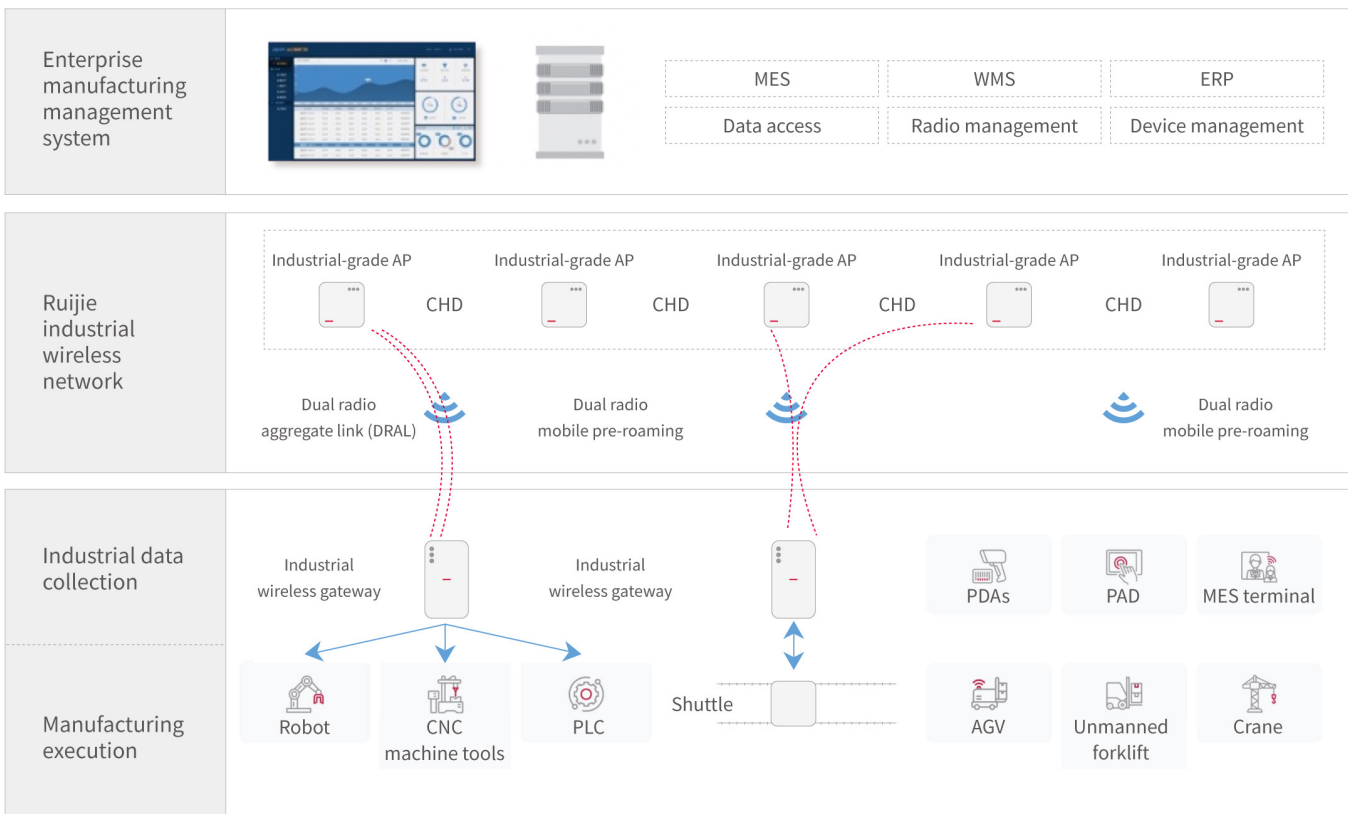
04 ▷ A large number of wired and wireless terminals for services including office, security monitoring, and production operations, and the deployment and maintenance require massive labor resources. Manual configuration requires significant time and effort.

✓ Solution Benefits

Enterprise production scenario solutions

Enterprise manufacturing management system		
MES	WMS	ERP
Data access	Radio management	Device management

Ruijie industrial wireless network

Industrial-grade AP	Industrial-grade AP	Industrial-grade AP	Industrial-grade AP	Industrial-grade AP
CHD	CHD	CHD	CHD	

Dual radio aggregate link (DRAL)   Dual radio mobile pre-roaming   Dual radio mobile pre-roaming

Industrial data collection

Industrial wireless gateway   Industrial wireless gateway   PDAs   PAD   MES terminal

Manufacturing execution

Robot   CNC machine tools   PLC   Shuttle   AGV   Unmanned forklift   Crane

Uninterrupted mobile production reduces production costs by 30%

- **The AR wireless seamless roaming technology** ensures uninterrupted roaming handover of mobile devices in warehouse environments, ensuring continuous connections and reducing production delays caused by device disconnection and network interruptions.
- **The intelligent QoS technology** provides service guarantee based on priorities for key production services, ensuring stable data transmission in warehousing and production, reducing network interruptions, and improving production continuity.
- Ruijie provides network devices with **industrial-grade IP rating,** which can stably operate in extreme environments and ensure continuous operation of cold chain warehouse networks.

Real-time wireless data collection, improving operation efficiency by 40%

- **Dynamic spectrum optimization technology** optimizes radio channel selection to enable interference-free and low-latency Wi-Fi in warehouse environments.
- **High-capacity APs** are deployed to support high-concurrency access, ensuring stable network performance in the case of multi-client access.
- **Smart antenna technolog** automatically adjusts the signal direction and allows signals to penetrate obstacles, thereby ensuring signal coverage in each work area and achieving seamless network connection.

Visualized and easy O&M, improving the O&M efficiency by 40%

- On RG-WIS, Ruijie's **intelligent cloud management platform,** all network devices can be managed in a centralized manner, providing visualized network status monitoring for the entire network and reducing maintenance costs.
- RG-WIS improves the efficiency of **network fault locating from hours to minutes,** significantly reducing the impact of network faults on warehousing services.
- Through AI-powered big data analysis, **proactive prevention of network issues** is implemented, reducing the reactive response time, improving the self-healing capability and the O&M efficiency.

Multi-Branch Scenario: Centralized Management to Reduce Costs

## ? Do you encounter such problems in multi-branch scenarios?

01 ▷ With numerous enterprise branch offices and stores scattered in different locations, resulting in a lack of centralized and standardized network management. Network device management and configuration become complex and time-consuming.

02 ▷ The traditional cabling method resulting in overloaded cable tray and high construction and cabling costs and time. The cabling on the cable tray is not scalable, which cannot meet the future business growth and scalability requirements.
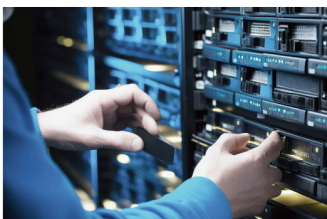
03 ▷ The service requirements of enterprises with multiple branch offices or stores change rapidly, and the existing information points cannot meet business growth requirements. When adding information points, users usually need to re-cable, which is time- and labor-consuming and affects the smooth operation of services.
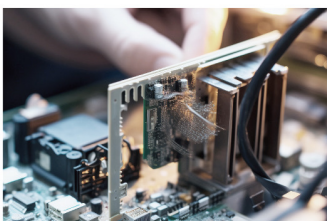
04 ▷ Devices from different vendors lack centralized O&M, and the configuration and management cannot be performed in a unified manner. Frequent network changes caused by service adjustment, store reorganization, and other factors greatly increasing the O&M workload and complexity.
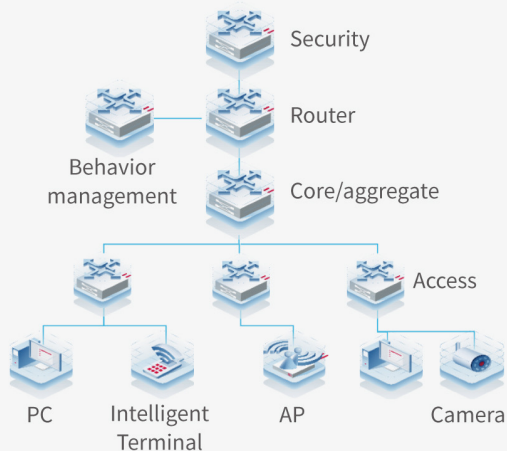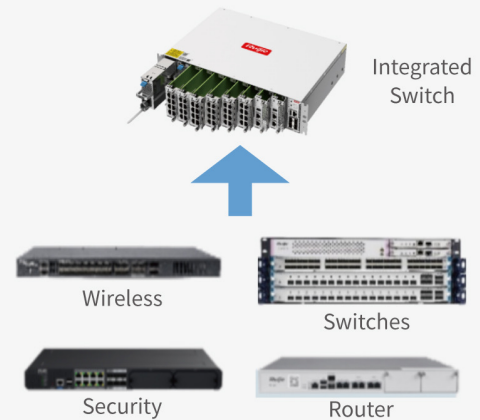
Solution Benefits

Multi-Branching Scenarios Solutions

Traditional Multi-tier Architecture	Integrated Switch, One Device One Network, Large One-layer Architecture

Multifunctional core all-in-one machine-integrating switching, wireless, routing and basic protection

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Easy deployment: One-layer architecture, one device serving the entire campus

- The core device integrates the switching, wireless, routing, and basic security protection functionalities, serving the entire campus with one device. This reduces network nodes to enable easy deployment.
- Modular design: Users can choose from multi-rate line cards, routing cards, and line cards supporting basic security features on demand.

Cost reduction: fewer information points, simplified cabling, and lower construction costs

- With simplified cabling and reduced number of information points, the network construction and deployment costs are effectively decreased.

Easy planning: automatic loop prevention for remote units, device deployment before network planning, and zero-touch provisioning and replacement

- Automatic loop prevention of remote units: The system automatically detects and prevents network loops to ensure network stability.
- Device deployment before network planning: Remote units can be deployed first and planned later, and support zero-touch provisioning (ZTP). Client devices can be used in plug and play mode.
- Zero-touch replacement: Faulty devices can be quickly replaced without reconfiguration, ensuring business continuity.

Higher efficiency: Centralized policy delivery, unified management, and simplified O&M on the integrated switch

- Unified management: The core device in the headquarters centrally manages the branch offices to implement unified policy delivery and management.
- Visualized O&M platform: The intelligent visualized O&M platform uniformly monitors the entire enterprise network and automatically detects network faults to improves the fault locating and troubleshooting efficiency.

Key Technologies and Advantages

Key Service Assurance

- **Hybrid identification,** which classifies key business flows and then identifies key applications based on multi-flow level queue scheduling, ensures that key applications have the highest EDCA priority.
- **AR channel scheduling algorithm.** After AI Radio scans neighbor APs for traffic congestion on the same frequency, it notifies the neighbor APs through the AC to limit the rate of high-traffic services.
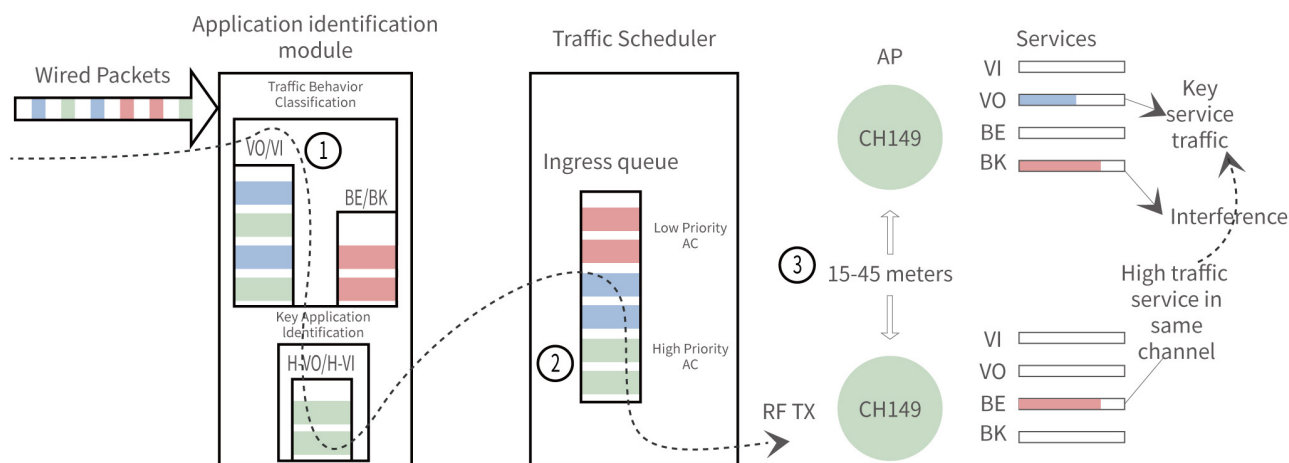
Benefits

- **Accurate identification:** The mainstream application feature library supports five-tuple custom key business.
- **Flexible and lightweight deployment:** Centralized forwarding is completed at the AC layer and local forwarding is completed at the AP layer to identify and schedule policies.

VIP Guard

AR Radio Guard

- WIS Cloud and AI Radio are adopted to perform VIP wireless experience tracking, analysis, and optimization

VIP experience guard
Create your own wireless experience

1. VIP experience tracking
2. Baseline data modeling
3. Expert analysis system
4. WIS intelligent optimization

Customer Benefits
- Real-time insight into VIP user experience
- Proactive and intelligent VIP service optimization

Technical Effect
- Seconds-level RF environment insights
- Multi-dimensional wireless experience tracking
- In-depth analysis and optimization of VIP experience

Product Capabilities
- AI Radio performs real-time VIP cruise
- WIS cloud interaction, early tracking and warning
- Visualized analysis and optimization of VIP user experience
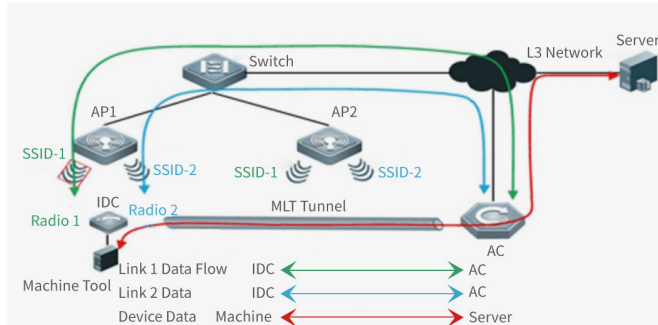
Seamless Roaming

Coverage Hole Detection (CHD)

Ruijie CHD technology
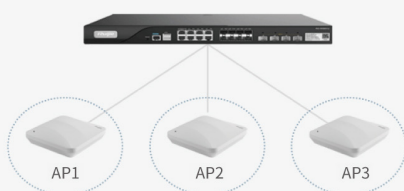
AP1 AP2 AP3

The wireless controller automatically establishes a neighboring relationship with APs and actively detects malfunctions on APs.

- The wireless controller automatically establishes a neighboring relationship with APs and proactively detects faults on APs. If an AP is faulty, coverage holes may exist. CHD enables the device to detect coverage holes and automatically adjust the transmit power of the AP in seconds without affecting services.

Dual-link data transmission technology

Server
L3 Network
Switch
AP1   AP2
SSID-1
SSID-2   SSID-1   SSID-2
IDC   Radio 2   MLT Tunnel
Radio 1
AC
Machine Tool   Link 1 Data Flow   IDC → AC
Link 2 Data   IDC → AC
Device Data   Machine → Server

- Dual-link data transmission technology solves the problem of single-frequency NIC interruption. The technology achieves roaming switchover and meets high-performance requirements at the speed of 80 km/h.

AR wireless seamless roaming

AI Radio   AI Radio
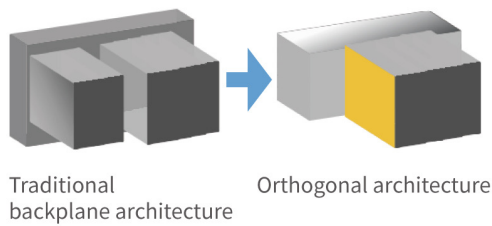
Quickly obtain client information
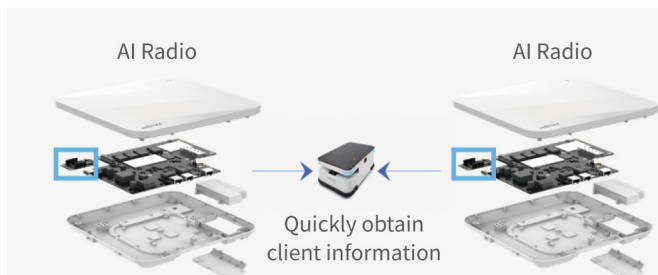
- AI Radio can detect the signal strength of STAs and steers them to the optimal AP, achieving seamless roaming and service continuity.

Benefits

- Seamless Roaming of SOE Intelligent Warehouse, Non-stop **AGV and PDA Services, Improving Productivity.**

One Device for One Network

RG-SG7000L integrated switch

⭐ Industry-leading compact and dense modular all-in-one machine

- Orthogonal architecture: Orthogonal architecture is applied to small- and medium-sized core switches for the first time in the industry. This greatly enhances interactive performance and provides better user experience.
- Modular design: Multi-rate line cards and routing cards to cater to varying needs.
- High-density layout: Subcards are inserted vertically to lower hardware costs while the high-density layout reduces the equipment height and saves the rack space (2 RU).
- Forward-looking design: The resources between boards are independent and do not interfere with each other. The independent computing capabilities meet the needs of flexible service expansion in the future.
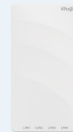
Traditional backplane architecture   Orthogonal architecture

Products

Enterprise Wireless

RG-WS6512	**RG-AM5528-SF**	**RG-MAP852-SF-M**	**RG-AP9861-R**
High-performance AC supporting 1152 AP management	Master AP, 24 x 2.5G optical ports, 24 x power ports	Micro AP, Wi-Fi 6 Dual-Radio 2.976 Gbps	Wi-Fi 7, 18 Spatial Streams, 24.436 Gbps, AI Radio Indoor AP

RG-AP880-E	**RG-AP680-O(V3)**		
Wi-Fi 6E 7.780 Gbps, 8 Streams, 5GE combo SFP port Indoor AP	Wi-Fi 6, 2.976 Gbps, 2.5Gbps SFP Port, Omnidirectional Antennas, Outdoor AP		

Campus Network Switches

RG-N18000-E Series

High-density Large-buffer Core Switch for Cloud Architecture Network

RG-S7800C Series

Modular Campus Core Switch

RG-S6120 Series

20-Port 10G (Compatible with 2.5G) Layer 3 Managed Core and Aggregation Switch

RG-SG7000L Series

Fixed 10G Integrated Switch, Supporting PoE+
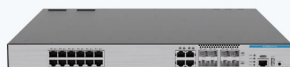
RG-S5760-X Series

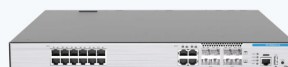Layer 3 Enterprise-Class Core or Aggregation Switch

Campus Routers

RG-RSR77-XA Series

Multi-service Core Modular Router

RG-RSR30-XA Series

24-Port Multi-service Fixed Aggregation Router
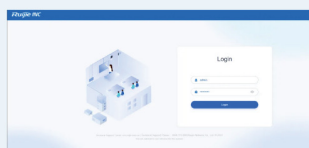
RG-RSR20-XA Series

Multi-service Fixed Access Router
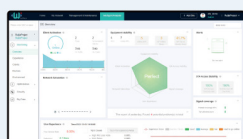
RG-RSR830 Series

Cost-effective Mobile Router

Unified O&M & Simplified Authentication

RG-INC-PRO

Intent Network Commander & SDN Network Controller

RG-WIS

Cloud Management Network

RG-iData-SecurePath

Network Access Control and Policy Engine

Project Case

COFICAB Group

📰 Background

COFICAB Group is a global leader in the automotive cable industry, operating in 12 countries across four continents. With 14 production bases, 6 distribution centers, and 4 R&D centers, the Group employs over 4,500 people. COFICAB collaborates closely with major domestic and international automobile manufacturers, including Daimler, Ford, General Motors, and BMW. In response to the growing new energy vehicle market, COFICAB invested in COFICAB Cables (Tianjin) Co., Ltd, which is set to become the Group's largest R&D center. This new facility, spanning 22,000 square meters, will employ 250 people. As market demand grows, COFICAB plans to build a second workshop to support business expansion.

⊚ Challenges

- In the new 310-meter-long workshop, deploying ELV cabinets with Ethernet cables in the center will take up space and impact aesthetics, particularly for the MES system already in place. This setup will also complicate maintenance.

- Smart factory construction requires higher data collection capabilities. Adjusting monitoring points or device locations necessitates redeploying and removing Ethernet cables, making management challenging.

- The rising price of copper increases the cost of wired network deployment, hindering the digitalization process in new factories.

💡 Solution

- By designing an Ethernet all-optical network layer and WLAN coverage, combined with an all-optical network security system and O&M system platform, COFICAB built a network characterized by high bandwidth, simple O&M, and low cost.

🛢 Benefits

- High bandwidth supports future expansion: All 10G optical fiber links extend to the workshop, with high-density Wi-Fi 6 APs deployed, tripling capacity. Optical fiber access eliminates the 100-meter distance restriction of Ethernet cables.

- Easy maintenance and management: Optical networks are easy to upgrade without changing cables. Multiple small cabinets are set up based on information point density, equipped with 8-port to 24-port SOE switches supporting PoE. The solution is convenient, fast, and supports plug-and-play functionalities and rapid expansion.

- High cost-effectiveness and cost reduction: Integrated cabling costs are lower than traditional Ethernet, saving approximately 20,000 meters of Ethernet cables and reducing overall customer costs by over CNY 100,000.

More Information

For more information about Ruijie Networks, visit the official website or contact your local distributor:

- Ruijie Networks official website: https://www.ruijienetworks.com/
- Online support: https://www.ruijienetworks.com/support
- Hotline support: https://www.ruijienetworks.com/support/hotline
- Email support: service_rj@ruijienetworks.com

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