# Cisco Service Provider Wi-Fi Solution 3.0

Cisco® Service Provider (SP) Wi-Fi 3.0 is a carrier-grade solution providing operators with a platform for business and service innovation. The Cisco SP Wi-Fi solution now includes Next-Generation Hotspot and Cisco Connected Mobile Experiences. These technologies join the complete Cisco solution, offering intelligent access points, an intelligent services cloud and an award-winning mobile packet core.

The Cisco SP Wi-Fi solution (Figure 1) includes the following elements:

- A complete portfolio of intelligent access points includes the Cisco Aironet® 1550 Series for outdoor and metro deployments and the Cisco Aironet 1600, 2600, and 3600 Series for indoors. Silicon-level integration supports crucial network functions, including interference mitigation, resource management, band selection, and video optimization.

- An intelligent services cloud (ISC) provides critical network management, subscriber management, and policy control with the Cisco wireless controller, the Cisco Mobility Services Engine (MSE), and the Cisco Intelligent Services Gateway (ISG). The Cisco intelligent services cloud gives you the flexibility needed to deploy, operate, and manage networks with hundreds of thousands of access points, and it lets you turn on different services by simply pointing and clicking. All aspects of the Cisco ISC help reduce operating costs, including zero-touch provisioning, for "hang-and-go" deployments, and centralized interference mitigation and troubleshooting for easier network maintenance.

- The mobile packet core, with the award-winning Cisco ASR 5000 Series, provides standards-based capabilities that allow operators to transparently and securely integrate Wi-Fi, femtocell, and macro radio networks in the Cisco ASR 5000 Small Cell Gateway. The Cisco ASR 5000 Series includes common subscriber management, policy, and authentication functions, delivering transparent service integration to Wi-Fi and femtocell users. The Cisco ASR 5000 Series Small Cell Gateway is already widely deployed today, providing multivendor interoperability.

Across all these components, you can use the Cisco Prime™ platform, a unified network management solution that supports an intuitive user experience as it integrates operations across Cisco products, technologies, and networks.

Figure 1. Cisco SP Wi-Fi End-to-end Solution
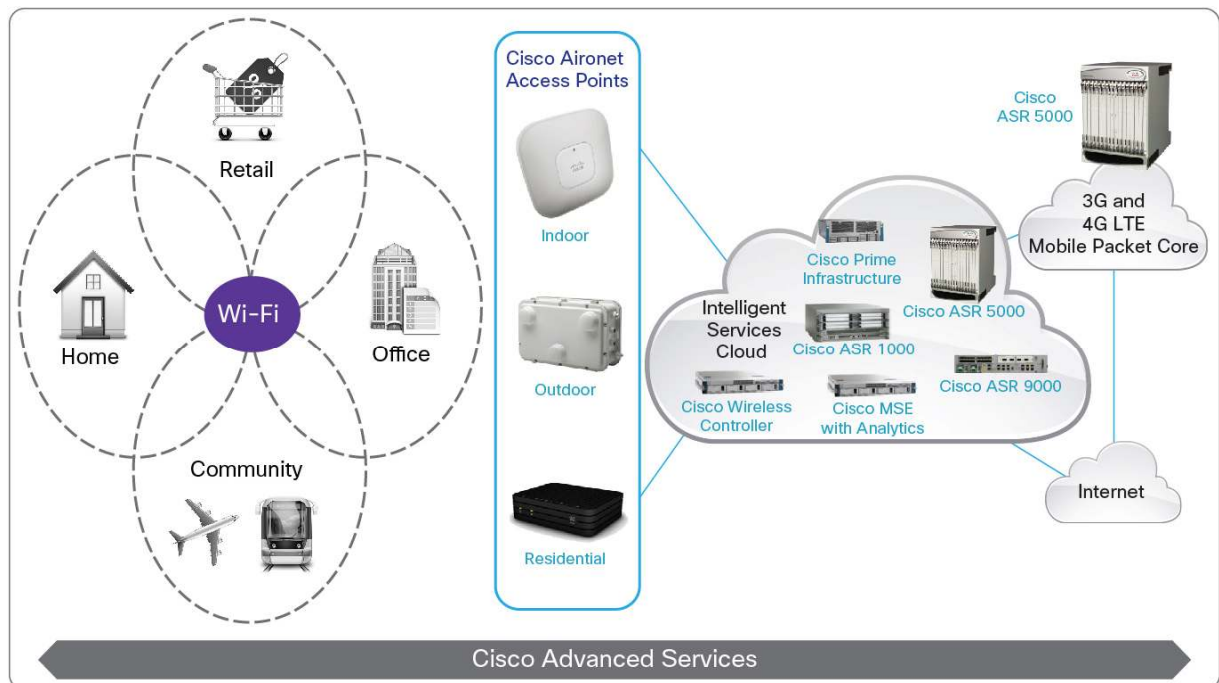
Architecture Models and Use Cases

Metro Wi-Fi and hotspot deployments are the two main architecture models supported with the Cisco SP Wi-Fi Phase 3.0 solution.

Metro Wi-Fi Deployment

- Cisco ASR 1000 Series: Client Layer 2 traffic is sent from the Cisco wireless controller to the Cisco ISG session manager from the Cisco ASR1000 Series.

- Cisco ASR 9000 Series: Client Layer 2 traffic is sent from the Cisco wireless controller to the Cisco subscriber awareness gateway from the Cisco ASR 9000 Series.

- Cisco ASR 5000 packet core policy integration: Client Layer 2 traffic is sent from the Cisco wireless controller to the IP services gateway (IPSG) provided by the Cisco ASR 5000 with Extensible Authentication Protocol (EAP) authentication and web authentication.

- Packet core integration provides wireless controller-based Proxy Mobile IPv6 (PMIPv6) with mobile access gateway (MAG) support and Cisco ASR 5000 PMIPv6 with local mobility anchor (LMA) support.

- Packet core integration with Cisco ASR 1000 Series Intelligent Wireless Access Gateway (iWAG): This integration addresses use cases for 3G gateway General Packet Radio Service (GPRS) support node (GGSN) and 4G PIMPv6-LMA (on the Cisco ASR 5000) using the Cisco ASR 1000 Series for PMIPv6-MAG. This Cisco SP Wi-Fi solution architecture allows mobile operators to integrate SP Wi-Fi users into an existing GGSN environment or use Cisco ASR 5000-based PMIPv6-LMA.

- Packet core integration with Cisco ASR 5000 Enhanced Wireless Access Gateway (eWAG) for 3G GGSN: This Cisco SP Wi-Fi solution architecture allows mobile operators to integrate SP Wi-Fi users into an existing GGSN environment, using a Cisco ASR 5000 eWAG with EAP-subscriber identity module (SIM) authentication.

Hotspot Deployment

- Client Layer 2 is terminated in the access zone router (AZR), and from there, traffic is sent to the ISG session manager with a Layer 3 connection and flex-connect local switching in the AZR access interface.

The main use cases and features for the Cisco SP Wi-Fi Solution 3.0 are shown in Table 1.

Table 1. Cisco SP Wi-Fi Solution Features and Use Cases

Market Segments and Features	Use Cases
Layer 2 Metro Wi-Fi deployment	• Open authentication • Web authentication (web-login) • Web authentication (one-click) • Voucher-based authentication • Prepaid (time or quota) • EAP-SIM • EAP-PEAP • Passpoint • Open Transparent Auto Logon (TAL) (MAC-based)
Layer 3 Hotspot Deployment	• All the Layer 2 features except Hot Spot 2.0 • Wireless Service Provider Roaming (WISPr) 1.0 • TAL (MAC-based with Dynamic Host Configuration Protocol (DHCP) lease query) • IP-TAL
Packet Core integration with IPSG	• Web authentication (using WLC LWA) • Web authentication (WLC redirect to external portal) • Web authentication using Cisco ASR 5000 (Gx interface-based) • EAP-SIM • EAP-Protected Extensible Authentication Protocol (PEAP)
Packet core integration with PMIPv6-MAG on wireless controller	• EAP-SIM authentication • Gx-based, web-based authentication from the LMA user device capability
Packet core integration with iWAG	• EAP-SIM authentication • EAP-SIM authentication with online charging (Gy interface-based) • EAP-PEAP • EAP-TTLS • Inter-MAG mobility for PMIPv6 • Intra-MAG mobility • PMIPv6-MAG, GTP and Cisco ISG coexistence
Packet core integration with eWAG	• Cisco ISG eWAG with Radius/DHCP proxy • Cisco ISG eWAG with unclassified MAC or MAC-TAL • Cisco ISG without eWAG (L2 or flat model)
Lawful intercept (LI)	• Identified solution for ISG-based architecture which leverages the SII support on the Cisco ASR 1000 Series • Detailed architecture specification and solution design available • No active involvement from the Cisco SP Wi-Fi Service Manager side required
SIGTRAN interface support	• Integrated signaling transport (SIGTRAN) interface support for Cisco Prime Access Registrar • EAP-SIM authentication service in Cisco Prime Access Registrar extended to use SIGTRAN-M3UA interface for home location register (HLR)

Platforms and Software Releases

Table 2 summarizes Cisco SP Wi-Fi Release 3.0 platforms and software releases and provides links to product information.

Table 2.   Cisco SP Wi-Fi Solution Release 3.0 Platforms and Software Releases

Equipment	Software Release	Product Information
Cisco Aironet Indoor Access Points 1142, 1261, 1261N, 1600, 2600, 3500, and 3600	7.4.100	Cisco Aironet 1140 Series Access Point data sheet Cisco Aironet 1260 Series Access Point data sheet Cisco Aironet 1600 Series Access Point data sheet Cisco Aironet 2600 Series Access Point data sheet Cisco Aironet 3500 Series Access Point data sheet Cisco Aironet 3600 Series Access Point data sheet
Cisco Aironet Outdoor Access Points 1552E/1552EU, 1552C/1552CU	7.4.100	Cisco Aironet 1550 Series Access Point data sheet
Cisco 5508 Wireless Controller	7.4.100	Cisco 5508 data sheet
Cisco 8510 Wireless Controller	7.4.100	Cisco 8510 data sheet
Cisco Mobility Services Engine	7.4.100	Cisco Mobility Service Engine data sheet
Cisco ASR 1000 Series	3.8.1	Cisco ASR 1000 data sheet
Cisco ASR 5000 Series	StarOS 14.0MR	Cisco ASR 5000 data sheet
Cisco ASR 9000 Series	Cisco IOS® XR 4.3.0	Cisco ASR 9000 data sheet
Cisco Prime Infrastructure	1.3	Cisco Prime Infrastructure data sheet
Cisco SP Wi-Fi Service Manager for Cisco Prime	SM1.2.1 or QNS 5.3.4	Cisco SP Wi-Fi Service Manager data sheet
Cisco Prime Access Registrar	6.0.1	Cisco Prime Access Registrar data sheet

Cisco SP Wi-Fi Services Overview

Our SP Wi-Fi Services portfolio is a comprehensive set of services representing a holistic approach to the total lifecycle of service provider Wi-Fi engagements. Starting with a proof of concept, it covers the end-to-end spectrum of planning, building, optimization, and operation services, each assured by Cisco service-level agreements (SLAs). These services are flexible and can be customized.

- Cisco SP Wi-Fi Proof of Concept Service
  - Demonstration of a centralized management system, with zero-touch service fulfillment for rapid deployments of meshed access points, using a cloud-based architecture hosted in a Cisco data center
- Cisco SP Wi-Fi RF Plan and Build Service
  - Professional services from Cisco and our Wi-Fi specialized partners
  - Help in planning and deploying the RF components of the Cisco SP Wi-Fi solution
  - Analysis of architectural readiness, with guidance on selecting and prioritizing locations for Wi-Fi
  - RF expertise to obtain the most from your wireless access points
  - Coverage and capacity planning
  - Post-deployment RF analysis assistance to promote deployment success

- Cisco SP Wi-Fi Core Plan and Build Service
  - Professional services from Cisco and our Wi-Fi specialized partners
  - Help planning and deploying the core components of the Cisco SP Wi-Fi solution
  - Analysis of architectural readiness and assistance with the SP Wi-Fi deployment design
  - Start-to-finish deployment assistance, including a mobile subscriber policy enforcement system
  - Pre-deployment validation to help ensure deployment success
  - Post-deployment knowledge transfers to help ensure your understanding of the solution
- Cisco SP Wi-Fi Solution Support Service (Reactive)
  - Expert assistance to streamline operation of the Wi-Fi architecture
  - Quick isolation and remediation of unplanned service disruptions
  - Tracking and identification of the root cause of disruptive incidents, which provides valuable information for design changes and to help you scale with mobile subscriber growth
- Cisco SP Wi-Fi Optimization Services (Proactive)
  - Expert analysis and recommendations for transforming your Wi-Fi architecture into a high-performing, efficient environment
  - Help creating a strategy for managing all the critical components of the Cisco SP Wi-Fi architecture using a suite of Cisco hosted network management applications
  - Availability and performance optimization expertise to validate your planned design changes
  - Collaboration in developing a strategy for managing software releases and changes
  - Continuous learning activities that help your IT staff become more self-sufficient
- Cisco SP Wi-Fi Assurance Service (Preemptive)
  - Extension of the measurement and analytical capabilities provided by your Cisco SP Wi-Fi architecture
  - Real-time monitoring of various key performance indicators (KPIs) from Cisco network operations center
  - Comprehensive analytics using fault, capacity, availability, and performance information to help ensure reliable operations
- Cisco SP Wi-Fi Operate Service (End-to-End Platform Management)
  - Monitoring of the managed devices in the your environment to help ensure access points and controllers are properly activated and provisioned
  - Management of incident and problem resolution
  - Identification of operational trends to continually improve performance

For More Information

For more information about the end-to-end SP Wi-Fi architecture, services, and product details, please see cisco.com/go/spwifi.