

## Cisco ServiceMesh

**Q. What is Cisco® ServiceMesh?**

**A.** Cisco ServiceMesh is an integrated, tested, and manageable end-to-end system that securely and dynamically provisions subscriber access and value-added services across wireless mesh networks. The solution allows service providers to move quickly from proposal to profitability while working closely with municipalities and partners.

**Q. What are the applications for Cisco ServiceMesh?**

**A.** There are three general usage models for outdoor wireless networks, each supporting multiple applications:

- Municipality and city agency applications such as automated meter reading, mobile data access, and land management
- Public safety applications such as video surveillance and use by police and emergency services
- Public use applications, including use by residents, businesses, and tourists

**Q. What are the benefits of Cisco ServiceMesh to a community?**

**A.** Cisco ServiceMesh is a comprehensive wireless broadband network design that enables multiple public municipal services over a single infrastructure, including public safety for police, fire and emergency services, automatic meter reading (AMR), and remote access to city operations applications such as permit verification and compliance. It also provides the opportunity to offer services to connect citizens with the government, and citizens to each other and the Internet. Cisco ServiceMesh allows for a more secure and vibrant community through ubiquitous broadband network connectivity.

**Q. What is needed for a service provider to operate a successful outdoor wireless mesh network?**

**A.** The following is needed:

- A sound business model with paying customers for government, business, and residential applications
- A Wi-Fi access network with low operational costs
- A backend infrastructure to handle wholesale models, interconnection with large customer domains, and provisioning of services

**Q. What differentiates Cisco ServiceMesh?**

**A.** Cisco ServiceMesh is the industry's first solution that combines an industry-leading access network with a fully integrated backend network. The benefits are numerous, and best explained in three parts:

The Access Network

- The Cisco Compatible Extensions Program provides improved security and performance for participating devices.
- Radio resource management delivers dynamic channel assignment, autotransmit power control, and coverage-hole detection.

- Zero-touch configuration provides for autoconfiguration of access points, and a self-healing network.
- An intelligent routing algorithm establishes the best path to the root access node.
- Encrypted links provide for rogue access-point detection and blacklisting, and for intrusion detection.
- Central management provides automatic service load balancing across wireless LAN (WLAN) controllers, and centralized client blacklisting across the network.
- The unified architecture manages both indoor and outdoor access points, and systemwide monitoring of all access points.

#### The Backend Network

- With Cisco ServiceMesh, service providers can cost-effectively deploy and operate the access network. To reduce total cost of ownership, Cisco ServiceMesh uses a centralized control architecture that dynamically responds to varying conditions, and provides optimal route selection if a failure occurs or the radio environment changes.
- Service providers can combine indoor and outdoor wireless networks, integrate the control and monitoring of networks, as well as use policies and application mobility across networks.
- Service providers can manage access to the network. Whether free access, prepaid access, subscriptions, or corporate contract users, Cisco ServiceMesh manages identification and subsequent monitoring and enforcement of the agreed service.
- Service providers can offer applications to multiple customer groups from one converged platform. They can simplify network and policy design involved in offering many different applications to municipalities, small businesses, wholesale resellers, or consumers directly.
- Service providers can provision services from integrated components. Designing portal pages, setting up payment platforms, logging subscribers' details, controlling service levels per subscriber, and enforcing agreements—all backend functions are integrated into Cisco ServiceMesh.

Cisco ServiceMesh helps service providers deploy quickly and with lowered integration risks, delivering a complete system that offers the following characteristics:

- Integrated across many components
- Tested for functions working together as specified
- Hardened for scale and performance in real-life deployments
- Documented with best practices for optimal system performance
- Proven through deployments in multiple networks worldwide

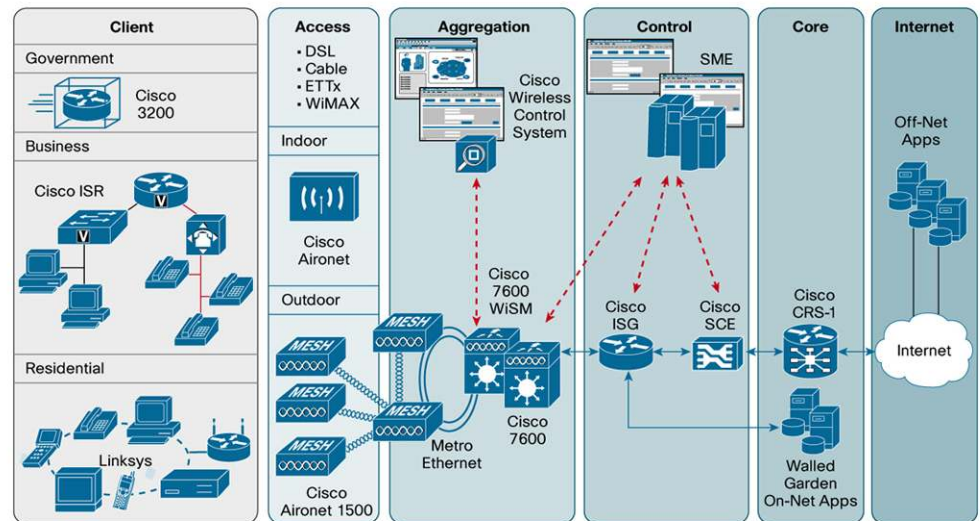
#### **Q. Who are the target customers for Cisco ServiceMesh?**

- A.** Cisco ServiceMesh targets any customer developing a wireless mesh service. Customers could be a city, county, or service provider (telco, cable operator, or ISP).

#### **Q. What are the components?**

- A.** The Cisco ServiceMesh system diagram shown in Figure 1 represents each of the hardware and software building blocks that can be enabled as part of the overall Cisco Service Exchange Framework. Each building block can be added to a base wireless access and aggregation network to enhance the solution and add functions as required.

Figure 1.



**Q. What is the Cisco Compatible Extensions Program?**

**A.** The Cisco Compatible Extensions Program ensures that participating products in the network can use advanced features such as security and power management available in WLAN and voice-over-IP (VoIP) technologies. The features are special software enhancements based on existing communications standards. The Cisco Compatible Extensions Program specifications are implemented by silicon providers and device manufacturers for laptops, handheld devices, and mobile phones. Approximately 90 percent of new Wi-Fi devices shipped are certified Cisco Compatible, leaving service providers assured their networks will take advantage of Cisco Compatible Extensions. Cisco ServiceMesh provides centralized intelligence to manage how Cisco Compatible clients attach to and roam within the WLAN, better balancing network load and providing transparent, fast roaming for customer applications.

**Q. What about interoperability with existing indoor wireless systems?**

**A.** Cisco ServiceMesh bridges outdoor wireless with other access networks, providing high-speed, cost-effective wireless connectivity between multiple fixed or mobile networks and clients. Indoor and outdoor access points are managed under the same controller with the same architecture, providing systemwide monitoring of all access points; common policy development and application; transparent roaming from indoor to outdoor; Layer 2/3 infrastructure support for cable, WiMAX, fiber, DSL, and other access technologies; and quality-of-service (QoS) capability from wired to wireless with IEEE802.11e.

**Q. How does Cisco ServiceMesh keep the municipal mesh network secure?**

**A.** Cisco combines real-time monitoring functions with advanced analysis capabilities to provide one of the industry's most advanced and effective wireless protection systems (WPS). Whether protecting an existing wireless network from unauthorized activity or preventing the deployment of wireless networks altogether, the Cisco Wireless Protection System is a vital component in protecting business-critical networks.

RF is an open medium, making WLANs susceptible to a variety of attacks. Cisco WPS provides multiple levels of security to protect the network from this type of malicious activity. The Cisco approach is the only solution by which all access points can simultaneously monitor

the air on all channels while at the same time providing 802.11 services, thereby providing a single, integrated security management system.

The Cisco WPS is designed to detect excessive interference and unusual user activity and adjust channel assignments and access control accordingly, protecting legitimate wireless users from denial of service (DoS), void11, and other attacks. In addition, it is designed to prevent address spoofing of wireless devices to avoid FakeAP and similar attacks. The Cisco solution also is designed to "blacklist" users who make repeated unsuccessful login attempts, preventing dictionary attacks. Finally, it is designed to detect and adjust RF coverage areas to limit the effectiveness of NetStumbler and similar tools. The result is an RF domain that can protect both wireless and wireline resources from unscrupulous activity.

**Q. How does Cisco ServiceMesh deal with RF interference?**

- A.** The Cisco wireless mesh solution has both self-monitoring and self-healing mechanisms for effectively dealing with RF interference. Cisco offers the only WLAN infrastructure with patent-pending Radio Resource Management (RRM) techniques that essentially provide "an RF engineer in the system". With Cisco ServiceMesh, network administrators can quickly deploy a highly reliable and secure system with minimal operational costs and little RF expertise.

Cisco ServiceMesh controllers and access points are designed to regularly monitor the health of the network. Cisco access points are capable of delivering service while still monitoring the environment. Information that is continuously gathered includes:

- Receiver Signal Strength Indicator (RSSI) per channel
- Interference per channel
- Noise per channel
- Presence of rogue users
- Number of users associated with an access point

If any blockages or access-point failures are found during monitoring, creating RF coverage holes, the system is designed to invoke its self-healing algorithms and modify the RF within the network by automatically adjusting power levels of other access points to compensate. If the controller is unable to cover up the coverage hole, the controller is designed to report the hole through a trap. The RF coverage hole can be graphically viewed in the Cisco WCS. This information is distributed to controllers that use this information to compute and deliver the best possible RF topology for the entire network.

Another unique aspect of the Cisco outdoor wireless solution is that it is also designed to continually monitor and adjust individual access-point power and channel assignments based on an "RF domain" or view of the entire system. The algorithms are dynamic and designed to work in real time so that both channel assignment and power assignment happen continually. So, if you are adding a new access point, or if there are changes in the environment, the system can react appropriately to maintain a level of maximum performance. The solution offers truly "dynamic" auto-RF capabilities.

For more detail about RRM, please see the following link:

[http://www.cisco.com/en/US/products/ps6306/products\\_white\\_paper0900aecd802c949b.shtml](http://www.cisco.com/en/US/products/ps6306/products_white_paper0900aecd802c949b.shtml)

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**Q. What are some of the other challenges to deploying a municipal wireless network, and how does Cisco ServiceMesh address them?**

- A.** It is critical that a wireless mesh solution be correctly designed, deployed, and operated to balance mobility needs and security requirements. Cisco can help service providers and municipalities deploy a robust, dependable mobility solution by taking a lifecycle services approach that addresses all aspects of deploying, operating, and optimizing a complete solution, including people, processes, and technology.

Cisco ServiceMesh includes a portfolio of Cisco Advanced Services—specialized consulting services for customers and partners across the lifecycle of a wireless mesh solution:

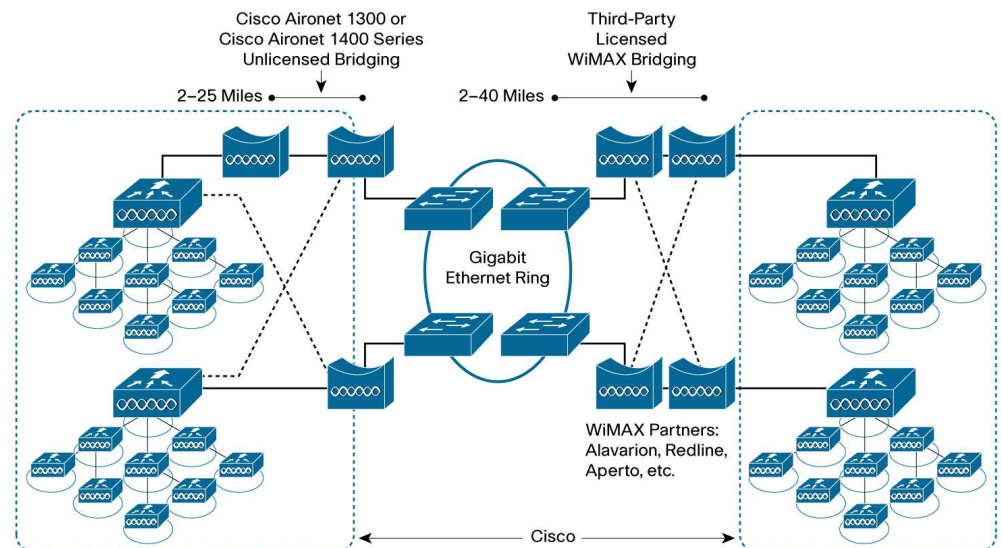
- Planning—Wi-Fi Mesh Technical Feasibility Study Services
- Design—Wi-Fi Mesh Detailed Design Consulting Services
- Design—Wi-Fi Mesh Site Assessment and Design Services
- Implementation—Wi-Fi Mesh Implementation Services
- Optimization—Wi-Fi Mesh Optimization Services

Cisco and its partners are specialists in wireless products and technologies, business analysis, and project management. Cisco services are available through various service programs designed to help accelerate customer success throughout the network lifecycle.

**Q. How does WiMAX fit into outdoor wireless mesh networks?**

- A.** Licensed WiMAX is seen as a complementary technology—one of the options for aggregating WiFi mesh islands, as seen in Figure 2.

**Figure 2.**



**Q. How do I find a partner in my community that offers Cisco ServiceMesh applications?**

- A.** Cisco works through the company's specialized Advanced Technology Provider (ATP) Program partners to deliver a wide range of outdoor wireless mesh applications, from disaster management to automated meter reading to hot zones. Please refer to the Cisco Partner Locator to find a specialized partner near you:

[http://tools.cisco.com/WWChannels/LOCATR/jsp/partner\\_locator.jsp](http://tools.cisco.com/WWChannels/LOCATR/jsp/partner_locator.jsp).

**Q. What does it mean to be a specialized Cisco ATP partner? Why is that important to me?**

- A.** Cisco Certified ATP partners can help ensure that organizations assess business needs, design the right solution, and facilitate implementation and maintenance to help ensure

network availability. Cisco ATP partners are uniquely qualified and trained to help you implement a Cisco ServiceMesh solution. Cisco recognizes ATP partners for their knowledge and expertise in designing, installing, integrating, and supporting comprehensive, real-time solutions.

**Q. Is Cisco ServiceMesh available now? Is it available globally?**

**A.** Cisco ServiceMesh is available globally today.

For more information, please visit [www.cisco.com/go/servicemesh](http://www.cisco.com/go/servicemesh).



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