



Cisco Universal Small Cell Solution: A Platform for Service Innovation

BENEFITS

- Proven, end to end indoor small cell solution with real-time adaptive RF, making deployment and operation an IT-centric task like Wi-Fi - simple, low-cost and scalable.
- Broad range of Wi-Fi, 3G, 4G and multimode access points that are built with the intelligence of a radio engineer on board. Our integrated SON capability means that network design doesn't have to be complicated or costly. Basic principles can be applied to the design, and it works, saving thousands of dollars in site planning.
- Integration with carrier Wi-Fi at the access point, in the backhaul, within the core network, and encompassing policy systems - the only credible route to automate the integration of licensed and unlicensed access technologies.
- Integration with Cisco SON Suite, the only deployed system that can coordinate multi-vendor Macro RAN and small cells - means small cell deployments are not an isolated investment, but part of the living network.
- Hundreds of service providers already have a Cisco mobile packet core, making them equipped to fire up a Cisco small cell or carrier Wi-Fi deployment. And for those who don't, the industry's first commercially deployed virtualized packet core from Cisco can dramatically reduce the barrier to market entry.
- Access to the world's largest enterprise channel to add cellular to existing Wi-Fi deployments - a new market for service providers.

With the increased demands on the mobile network, service providers are investing in small cell solutions to help optimize and monetize consumer and business services on mobile devices across 3G, 4G, and Wi-Fi networks. The Cisco Universal Small Cell Solution applies architectural innovation to mobile networking, transforming small cells into a platform for service innovation. The Cisco Universal Small Cell Solution is innovative, easy to deploy, and proven in mobile networks across the world.

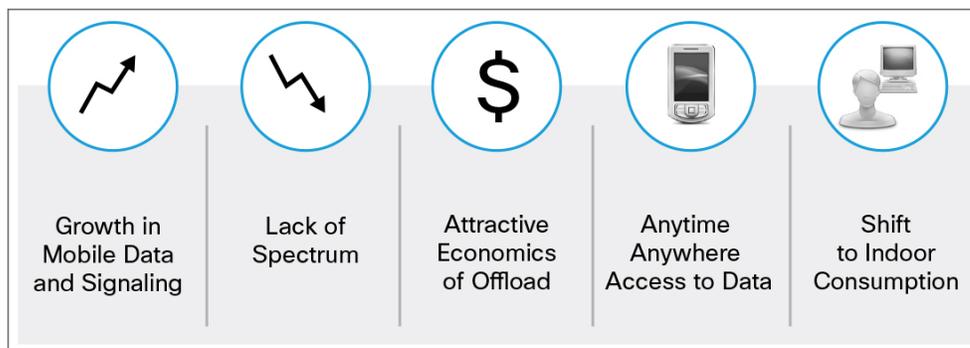
Deploying small cells can help operators become value-added "Mobile IT Providers" to their customers. Cost-effective deployment models are key to an operator's ability to scale to meet the growing small cell demand.

Cisco builds on our extensive knowledge of mobile network architecture to provide operators a true end-to-end solution that is easy to deploy and that can scale up or scale down as needed. The Cisco Universal Small Cell solution includes a portfolio of consumer and business access points, along with SON, management, and orchestration, giving operators confidence that they are running their network efficiently with carrier grade quality at a reduced total cost of ownership (TCO). Our small cell technology also works across vendor, technologies, and packet cores to help ensure transparent integration between macro and small cell networks. The Cisco Universal Small Cell Solution is fully deployable today and complies with the small cell architecture and interfaces as defined in the 3GPP standards, delivering unprecedented Quality of Experience (QoE).

Market Trends

Several trends in the market are causing operators to incorporate small cell solutions into their network infrastructure plans (Figure 1).

Figure 1. Small Cell Market Trends



- [Cisco Visual Networking Index™](#) shows that operators can expect mobile data traffic to increase nearly 10-fold over the 5 years between 2014 and 2019. Analysts also point to the exponential growth in signaling traffic helping to promote the data growth.
- Coupled with this growth in traffic is the lack of available new spectrum and the difficulty for operators to quickly and cost-effectively add new macro cell sites. In this environment, small cell solutions become very attractive.
- Distinctions between consumer and business services on mobile devices have become blurred. Small cells can help deliver those services transparently across third- and fourth-generation (3G and 4G) cellular networks and Wi-Fi.
- Wireless usage is shifting indoors. Network analytics show that the majority of mobile data usage - close to 80 percent - is indoor and nomadic, rather than truly mobile. Macro networks were built for voice on the go. Small cell networks are designed to address modern mobile data traffic patterns.
- Small cells offer new monetization opportunities by taking advantage of the intelligence inherent in the network, including policy, hyperlocation, context, application, and device information. Businesses can use this information to engage with their customers in new ways, including through augmented experiences, location-based content, and personalized loyalty programs.

Why Small Cells?

Today, operators are investing in small cell solutions to help optimize consumer and business services on mobile devices across 3G, 4G, and Wi-Fi networks due to the increased demands on their network. Deploying small cells allows mobile operators to improve their service value proposition and provide efficient connectivity and coverage for all users. This is first realized by simply enhancing indoor coverage, which improves the user experience for all of the mobile services consumed in-building. This includes voice and mobile data services, such as high-definition streaming and live video that require high throughput.

Secondly, and more interestingly, small cells offer new services that will only be available when the users are under small cell coverage. Cisco believes there are tremendous opportunities for adding value through software intelligence at the intersection of Enterprise and Operator networks. As a result, we strive to deliver unique value to our customers by focusing on providing operators the resources to reach enterprise customers, new and proven small cell incremental revenue streams, and services to help simplify small cell deployment and reduce operating expenses (OpEx) costs. These new opportunities rely on the ability to detect that the user has arrived at home, in the office, or in a public venue.

Residential and Home Services

Residential and Home services are linked to local breakout capabilities that help enable the small cell to locally route traffic within the home network. This brings two additional benefits. First, it allows the operator to offload that traffic from the mobile core network. Secondly, the mobile handset can then become a true component of the mobile home network per the connected home standards (for example, those for a media player or media server). Examples of connected home services include:

- Backup of mobile hosted content (music or pictures) to the home PC
- Playing videos or slide shows from the phone to another device
- Transforming the phone into a remote control for other devices
- Automatic profile switch when entering home (for example, moving from business to personal services)
- Short Message Service (SMS) alert when a family member comes home
- Application triggering with a state change (for example, linking with Facebook)

Enterprise Services

A set of enterprise services are also available that allow integration of home small cell services with enterprise services. The main benefit is that any user can access those services without needing any specific client on their phone. Moreover, the architecture helps to ensure optimum user experience with full coverage and mobility.

Examples of enterprise services include:

- Integration of mobile handsets with the enterprise PBX dial plan and services.
- Local access to the enterprise LAN.

Cisco Universal Small Cell Solution Advantages

Cisco's response to recent market trends has been to build a converged network from inside the enterprise where the need is greatest, to simplify the deployments by building radio engineering into APs, and to create 3G, 4G and Wi-Fi building blocks that can be deployed in several configurations to meet any given deployment scenario. Cisco applies its extensive knowledge in architectural innovation to mobile networking, transforming small cells into a platform for business and service innovation.

The Cisco Universal Small Cell Solution is easy to deploy, innovative, and proven across the globe.

- Frictionless and simple deployment: Cisco offers operational ease by applying network intelligence that is based on years of design and implementation expertise. From radio performance to policy and management to backhaul, we design simplicity into our solution to keep operators' costs down and mobile users satisfied.
- Innovation for business results: Cisco is guiding the market toward a unified and scalable standards-based licensed and unlicensed architecture for wireless service delivery, meeting the needs that result from the dramatic increases in consumer and business capacity requirements. On top of this we add analytic tools that operators use not only to monitor the network, but to monetize the network, unlocking new business models.
- Real-world heterogeneous networking: We deliver standards-based self-organizing network (SON) technology, not just for fully integrated heterogeneous 3G, 4G, and Wi-Fi networks, but also for multivendor network deployments. Our solution provides an elastic, flexible architecture of infrastructure and software with intelligence.

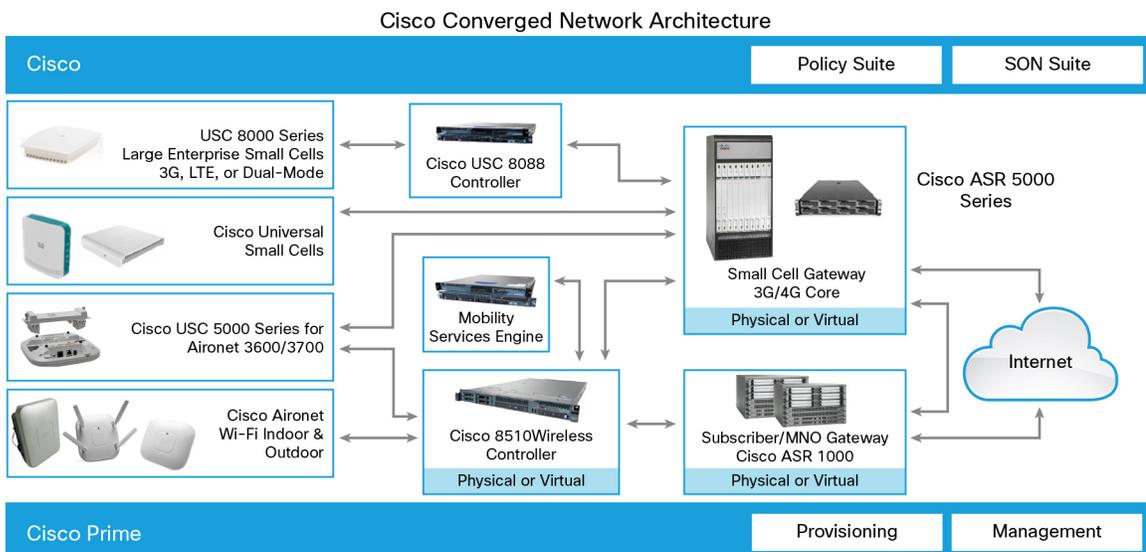
Cisco offers more than products; we offer an easily deployed solution. We have a dedicated Advanced Services team that is experienced in delivering large commercial small cell solutions. To help service providers deploy the solutions efficiently and successfully, Cisco offers professional services for custom design, implementation, integration, and support of the small cell network. With this approach, Cisco is in a unique position to help operators go to market quickly with new and enhanced small cell services.

Cisco Universal Small Cell Architecture

The Cisco Universal Small Cell Solution is an end-to-end architecture that integrates 3G, LTE, and carrier-grade Wi-Fi with SON technologies for an efficient and highly secure heterogeneous network (HetNet). Several components of the architecture are available in either physical or virtual form factors. The primary elements depicted in Figure 2 are:

- Residential, enterprise, and venue small cells
- Small cell controller
- Small cell gateway
- Management and provisioning

Figure 2. Cisco Universal Small Cell Solution



Residential, Enterprise, and Venue Small Cells

The Cisco Universal Small Cell (USC) 3000 Series, 5000 Series, 7000 Series, and 8000 Series provide the right access point for every environment, from the home to the enterprise to high-density urban environments such as venues (Figure 3). Cisco small cells are fully managed by the mobile operator to help ensure that the network is highly secure and well controlled.

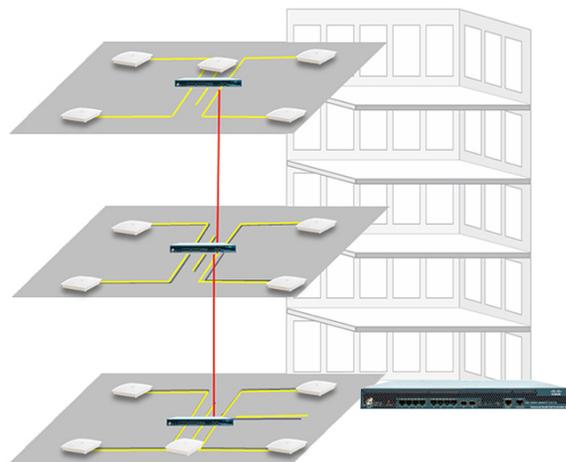
Figure 3. Cisco Universal Small Cell Series



Cisco Universal Small Cells for Large Enterprise

The Universal Small Cell 8000 Series is our flagship portfolio designed for the large enterprise market. The enterprise customer presents a unique set of challenges to network operators due to the increasing value they place on mobile applications to increase worker productivity, their desire to reduce fixed infrastructure costs, and their need increase employee satisfaction. The Cisco USC 8000 Series offers mobile operators single-mode, dual-mode, and dual-carrier multi-mode options for indoor small cells that can provide improved coverage and capacity to up to 64 simultaneous users using the existing in-building Ethernet LAN infrastructure (Figure 4). This highly scalable portfolio includes self-configuring, self-optimizing, and self-healing capabilities, and can be quickly and easily deployed by technicians with no cellular experience, making this one of the most cost-effective small cell solution available to date.

Figure 4. Cisco Universal Small Cell 8000 Series In-Building Installation Example



The Cisco USC 8000 Series includes the Cisco Universal Small Cell 8088 Controller, a single, high density, multi-technology controller for management and auto-configuration of the in-building small cell system. The Cisco USC 8088 aggregates all the small cells within an enterprise. This allows for fast, easy deployment over Ethernet LAN and provides a virtualization environment for hosting third party applications.

The Cisco USC 8000 Series also features the Cisco Universal Small Cell 8718, a module that uses the Cisco Aironet™ 3600 Series and 3700 Series Wi-Fi installed base to provide large enterprises a simple and convenient solution to improve mobile coverage and capacity. The module simply plugs into the Cisco Aironet access point to take advantage of the existing power, real estate and backhaul, providing a rapid-to-deploy licensed radio network extension on the footprint of a Cisco Universal Wi-Fi Solution.

Cisco Universal Cell Small for Medium and Small Enterprises

The Cisco USC 7000 Series and 5000 Series are designed to provide 3G, 4G, or dual mode services within small and medium sized enterprise. The portfolio includes standalone APs that can provide 3G and 4G coverage and capacity where needed indoors, and features the Cisco Universal Small Cell 5310, a modular small cell unit that can be plugged into a Cisco Universal Wi-Fi infrastructure (Figure 5) for deployment convenience and ease. Once a mobile network operator activates the small cell units, the small cell base stations in the enterprise can efficiently deliver carrier grade mobile services indoors while offloading traffic from the outdoor macro network. This approach not only improves the mobile user experience, but it also reduces operator network and operations costs through intelligent policy-based operation and commodity in-building backhaul.

Figure 5. Cisco USC 5310 with the Cisco Aironet 3700 Series



Cisco Universal Small Cells for the Home/Small Office

The Cisco USC 3000 Series offers a dedicated small cell base station for the home or a small office environment that can efficiently deliver 3G or 4G, mobile services indoors while offloading traffic from the outdoor macro network. The Cisco USC 3000 Series provides a better mobile user experience for the end user as well as reduces costs to the service provider by eliminating the need for additional, and more expensive, macro base station sites in a residential area.

Cisco ASR 5000 Series Small Cell Gateway

The Cisco ASR 5000 Series Small Cell Gateway is an integral element in the Cisco Universal Small Cell Solution. The Gateway (Figure 6) provides service providers exceptional levels of carrier-grade security, and availability, transparent mobility between network types, market-leading IP Security/Internet Key Exchange Version 2 (IPsec/IKEv2) tunnel performance, and integration of multiple network functions as subscribers roam between 3G, 4G, and Wi-Fi networks. Its unique hardware and software architecture is ideally designed for the small cell gateway application. The Cisco solution is 100 percent standards-based, on a single platform that scales to millions of small cell subscribers in a single chassis, resulting in a low total cost of ownership. It has a proven track record of successful deployments in packet core networks across multiple vendors.

The Cisco Small Cell Gateway is part of the Cisco ASR 5000 Series, the Cisco Evolved Packet Core Platform (EPC). Many features of the Cisco ASR 5000 Series are now also available virtualized in the vEPC that combines all packet core services - for 4G, 3G, 2G, Wi-Fi, and small cell networks - into a single solution. It provides those network functions as virtualized services, so operators can scale capacity and introduce new services much faster and more cost-effectively.

Figure 6. Cisco ASR 5000 Small Cell Gateway



Small Cell Backhaul

Cisco ASR 901 Secure Mobile Transport Platform NAT Acceleration Engine

As mobile traffic will now traverse from enterprise networks across public networks it is critical to ensure the integrity of the both the enterprise and carrier data. Cisco ASR 901 Series Aggregation Services Routers with highly secure mobile transport for enterprise small cell backhaul provide superior performance and scalability by including:

- Assured deployment for end-to-end networks with exceptional network resiliency and availability
- Accelerated time-to-market for innovative new services
- Intelligent wide area network and RAN optimization promotes superior user experience

Cisco ASR 901S Series

Small cell backhaul can present challenges in outdoor urban environments where broadband networks may not be easily accessible. Cisco has solved this problem by bringing intelligent routing to outdoor cell sites where metropolitan small cells are being deployed. The Cisco ASR 901S Series Aggregation Services Routers (Figure 7) are environmentally hardened small cell routers designed to support the backhaul of multivendor heterogeneous small cell networks from any vendor through Ethernet and IP interfaces. By employing the Cisco ASR 901S Series, operators can reduce backhaul operating costs, simplify deployment and provisioning, and enhance their profit opportunities with premium mobile and Ethernet services.

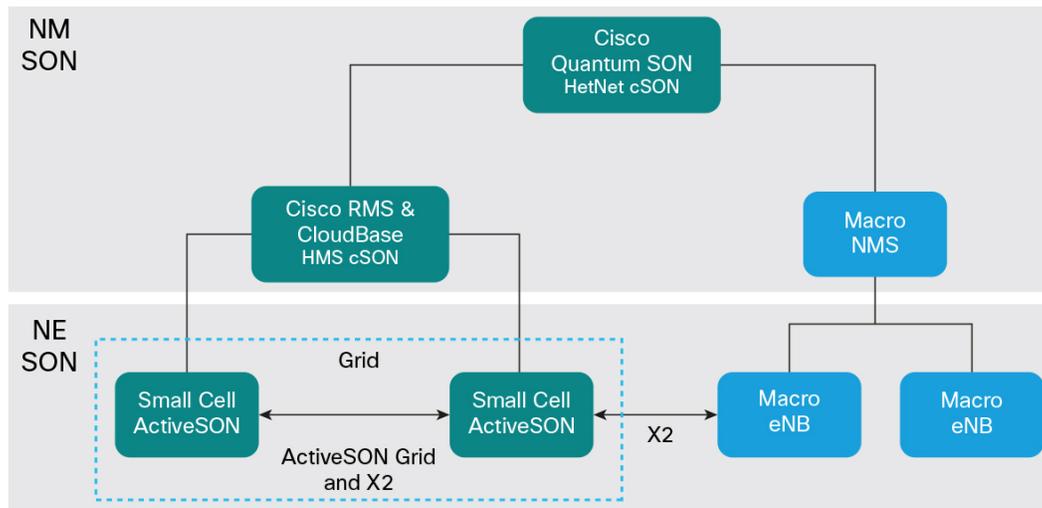
Figure 7. Cisco ASR 901S Series Aggregation Services Router



Cisco Self-Optimizing Network

The size and complexity of multivendor heterogeneous networks necessitate SON technology and the move to live and automatic optimization in the radio access portion of the network. Cisco SON is our hybrid self-optimizing network architecture that operates at different layers of the network. Cisco Active SON and the Cisco SON Suite can be fully integrated with each AP in the Cisco USC portfolio and support Cisco's converged services platform for an end-to-end solution (Figure 8). It provides resilient, automatic operation, with self-installation, self-optimization, and self-healing, even in shared frequency indoor environments. These capabilities help reduce OpEx and improve QoE.

Figure 8. Cisco Hybrid SON Architecture



Cisco USC Active SON

Cisco Active SON, which operates at the network element layer, is an intelligent and automatic provisioning software for improving the installation and performance of a grid of small cells in a given location. Active SON conducts local coordination of the small cell grid via the LAN to solve the lack of X2 connections as well as helps manage primary scrambling codes, conflict avoidance, detection, and resolution. Providers can use Active SON for peer-to-peer discovery and signaling, which help sets key parameters such as neighbor lists, and dynamically adjusts traffic between cells, based on availability, congestion, and blocking of radio resources. This helps ensure traffic within a cluster of cell sites is evenly balanced across all access technologies.

Cisco SON Suite

The Cisco SON Suite operates at the network management level to efficiently integrate small cell grids into the macro network to create a truly heterogeneous multivendor, multitechnology radio access network (RAN). Cisco SON provides seven features that help operators run their network more efficiently and effectively:

- **Automatic Neighbor Relations:** Identifies missing or redundant neighbors and automatically reconfigures optimal neighbor lists according to actual current priority. This allows continuous, smooth transition between cells of high-quality calls, with full utilization of the existing network infrastructure.
- **Automatic Parameter Optimization (APO):** Facilitates automatic planning and setting of radio network parameters. APO assists in the tasks of introducing cells to the network and copying the neighbor list between cells for swapped or rehomed cells.
- **Capacity and Coverage Optimization:** Manages the tradeoff between coverage and capacity by handling dynamic traffic distribution, design faults, and real-life network operational constraints.

- **Dynamic Interference Management:** Automatically detects problematic cells and areas and reduces the interference caused by them. This is accomplished by changing the tilt of the overshooting cell or reducing the common pilot channel.
- **Dynamic Load Balancing:** Responds to the rapidly changing and unpredictable load demands on the network. This increases the efficiency of the network, and increases the utilization of existing infrastructure to address limited mobile network resources.
- **Dynamic Self-Healing:** Identifies cell outages and performs initial corrective measures to resolve the issue and notify the operator.
- **Mass Event Handling:** Helps service providers maintain a high level of service during mass events despite the erratic traffic patterns generated by the presence of tens of thousands of customers in one geographical venue.

Cisco Universal Small Cell RAN Management System (RMS)

Small cells can present several challenges to operators due to a large number of small cell devices, the wide array of small cell deployment scenarios (residential, enterprise, public), and advanced interference management requirements. To address these issues, Cisco developed the USC RAN Management System (RMS) to automate all key activation and management tasks for the small cell, which help deliver a comprehensive solution to real-world challenges of small cell deployments. RMS provides the following small cell management features:

- **Cisco Universal Small Cell CloudBase™ System:** Cisco USC CloudBase facilitates plug-and-play activation and zero-touch provisioning, allowing new products to activate without service provider-specific configuration. This helps ensure low-cost scalability, maintenance, and new service delivery.
- **Location Verification:** Cisco USC RMS location verification provides a number of methods for small cell location verification and detection of location change in accordance with 3GPP standards.
- **Configuration:** Cisco USC RMS uses TR-069 protocol and the TR-196 data model to assist in small cell configuration and grouping. This helps reduce the effort of managing parameters in a customer's IT system. These groups can be customized depending on customer specific use cases. In addition, customers can create their own group types and select a parameters list for each created group.
- **Firmware and Software Automation:** Cisco USC RMS manages firmware and software using an automated process. Multiple use-cases for firmware upgrades are supported, including automatic upgrade on initial activation, on-demand upgrade of individual small cell, bulk upgrade during maintenance window, automatic on-connect upgrade, and rollback of firmware if required.
- **Fault and Performance Management:** The TR-196 data model allows small cells to expose extensive fault information. For Enterprise environments, the small cell can be configured to automatically send TR-069 notifications to the dynamic provisioning environment (DPE) that can in turn transform them into simple network management protocol (SNMP) alarms and send to the service provider OSS.
- **Status Monitoring:** The small cell status monitoring functions allow service provider personnel to quickly assess the operational state of the small cell deployment. The status data maintained at the CMHS servers can be queried by reporting tools and combined with provisioning data into status reports. When troubleshooting a specific small cell, the status monitoring data provides a history of small cell connectivity and may help isolate connectivity issues from service issue.

Small Cell Service Assurance: Cisco Prime

Small cell service assurance is provided by three components of Cisco Prime™ Carrier Management: Cisco Prime Network, Cisco Prime Performance Manager, and Cisco Prime Central.

Cisco Prime Network

Cisco Prime Network provides automated discovery of network elements, configurations, and services. With Cisco Prime Network, network operators can visualize dynamically discovered virtual connections through topology displays and navigate through corresponding device configurations. Cisco Prime Network eliminates the need for manual inventory and configuration tracking. In addition, Cisco Prime Network provides real-time visibility into network element configurations, helping operators gain rapid insight to the likely root cause of network errors.

Cisco Prime Performance Manager

Cisco Prime Performance Manager is a performance monitoring component of the Cisco Prime Carrier Management suite for small cell access points and gateways. Cisco Prime Performance Manager is an easy-to-deploy and easy-to-use solution for gathering and reporting performance statistics, even in multivendor networks. It provides actionable information that spans core, aggregation, and access networks, with a comprehensive set of prepackaged reports. Cisco Prime Performance Manager transparently integrates with Cisco Prime Network, providing operators with visibility into network key performance indicators (KPIs). The combined solution provides both post-event fault management and information to proactively avoid future disruptions.

Cisco Prime Central

Cisco Prime Central provides a highly secure, common interface to all components of the Cisco Prime Carrier Management suite. It provides a single view of integrated operator workflows, as well as fault monitoring across the mobile small cell network.

Cisco Virtual HetNet

Mobile Operators constantly push the evolution and requirements for heterogeneous networks while driving to keep costs low, and so a natural area of research has grown around understanding what elements of the RAN and the small cell architecture as a whole can be virtualized. Virtualization allows control and data planes to be managed on standard data center infrastructure and requires an orchestration layer to be included, so the virtualized infrastructure can be deployed, managed and monitored in an ongoing, real-time fashion. Cisco is leading this effort in key industry bodies.

In the meantime, we've tested and implemented Cisco Virtual HetNet as part of our end-to-end Cisco Universal Small Cell Solution (Figure 2). Cisco combines all the components required to add capacity & density with small cells tightly tied with Macro optimization. The Cisco Virtual HetNet delivers a pre integrated solution that significantly increases time-to-market and lowers OpEx.

Cisco Advanced Services

Mobile operators can realize the full value of the Cisco Universal Small Cell Solution with professional and technical services from Cisco together with our partners. We can help mitigate risk, accelerate time to market for new revenue-generating services, and improve the end-customer's experience. Cisco Services has unparalleled experience and expertise implementing large commercial small cell deployments, and integrating systems and network services. We help operators speed time-to-value and resolve issues quickly using specialized tools, best practices, a collaborative delivery model, and an extensive global support infrastructure.

As operators plan, build, and manage the Cisco Universal Small Cell Solution, we promote success through a lifecycle approach customized to specific needs. Software-enabled smart service capabilities provide better visibility, better information, and better understanding at every stage.

- **Plan:** Create an agile infrastructure and cost-effective strategy with service capabilities ranging from architectural consulting to detailed design.
- **Build:** Speed time to value and reduce deployment risks through solution validation, solution integration and deployment, and migration support. Validate that the solution meets requirements through specialized labs for small cell interoperability testing and system verification testing.
- **Manage:** Improve performance, availability, and resiliency; reduce costs through service offerings that provide better network insight, help improve network inventory management and health, and identify and mitigate potential problems before they can affect the network.

Why Cisco?

Operators worldwide are choosing Cisco to take full advantage of the enormous opportunities available in the small cell marketplace. We provide a carrier-grade, end-to-end solution, and can help operators deliver standards-based transparent mobility and the differentiated user experience that customers are asking for as they use their mobile devices to move between consumer and business environments. We have a channel to market for premise-based deployments, with tens of thousands of trusted partners built over years of enterprise deployments.

The Cisco Universal Small Cell Solution is more flexible than other platforms on the market, allowing operators to use a single architecture to target the widest range of licensed and unlicensed small cell opportunities and implement flexible business models, while gaining efficiencies that improve profitability and productivity. Cisco can help service providers cost-effectively deploy a network extension from an existing intelligent network infrastructure to deliver small cell services today and prepare for the next generation of revenue-generating home and enterprise services. Cisco is dedicated to industry standards, and actively participates in the key industry bodies that are defining the small cell standards, including 3GPP, the Small Cell Forum, Digital Living Network Alliance (DLNA), and the Broadband Forum. We contribute recommendations, incorporate standards compliance into our development cycles, and support new releases as they are defined.

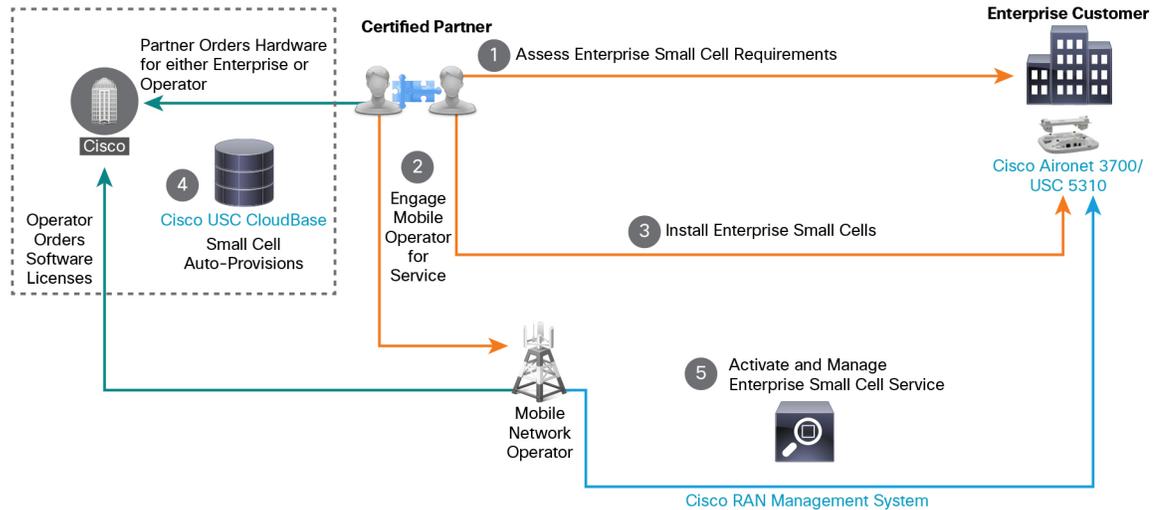
The Cisco Universal Small Cell Solution is not just about snapping a module into an access point, or providing power and backhaul without the need to add new cabling. It goes way beyond that. It is about knowing what it takes to run bullet-proof services to our customers. It's about having the relationships with CIOs worldwide to understand their requirements, and having the products to meet those requirements. It's about leveraging our relationships with Wi-Fi channel partners worldwide to scale the deployment of Enterprise small cells to a capacity that no other vendor can begin to address.

Fueling Enterprise Small Cell Consumption

The Small Cell Enterprise Select program challenges the traditional approach to 3G and LTE licensed enterprise radio deployments. The program taps into Cisco's extensive certified partner network, which has been supporting enterprise mobility for over a decade. Rather than using the same costly model required to deploy macro cell sites or distributed antenna systems from the mobile network operator to the enterprise, Cisco has developed a model that engages our extensive enterprise partner program to deploy 3G and LTE as part of the partners' Wi-Fi offer and practice.

Cisco Small Cell Enterprise Select (Figure 9) allows Cisco certified partners to coordinate with mobile operators to meet enterprise customer in-building small cell design, implementation, and service criteria. The program allows Channel partners to offer an elevated service offering to the enterprise that is fully customizable to meet their end-customers' requirements. This enhanced relationship, in turn, can lead to higher customer satisfaction and retention rates as well as new market opportunities.

Figure 9. Cisco Small Cell Enterprise Select Business Process



Summary

Cisco is partnering with mobile operators across the globe to strategically approach the small cell market. This approach dramatically increases scalability while reducing the cost of small cell deployments, which helps operators roll out small cells more widely, quickly and cost-effectively. The Cisco Universal Small Cell Solution is about simplicity, combining Cisco's software automation tool set, with our mobile packet core solution, and our un-paralleled reach into the enterprise. We see small cells as just one element in a converged mobility evolution.

For More Information

For more information about the Cisco Universal Small Cell Solution, visit <http://www.cisco.com/go/smallcell> or contact your local Cisco account representative.



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: www.cisco.com/go/trademarks. Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)