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Parallel Wireless Indoor 3G/4G/Wi-Fi Coverage Solution

Overview

Parallel Wireless 3G/4G/Wi-Fi solution for indoor coverage/enterprise is a 3GPP standards-based NFV-SDN-enabled solution that easily scalable to suit any size enterprise. The solution enables service providers to deploy reliable indoor enterprise solutions at pennies per square foot while at the same time reducing the complexity of deployment and maintenance.

The solution is based on the cellular access point (CAP)/enterprise femto and integrates 3G, 4G/LTE, and Wi-Fi with real-time network orchestration, flexible scheduling, interference mitigation, resource optimization, traffic prioritization and enterprise-grade security. HetNet orchestration with real-time network SON, resource optimization and traffic mitigation on HetNet Gateway (HNG) enables seamless mobility for users indoors and out and makes network deployments fast and simple with no RF planning or complex system integration required.

Figure 1

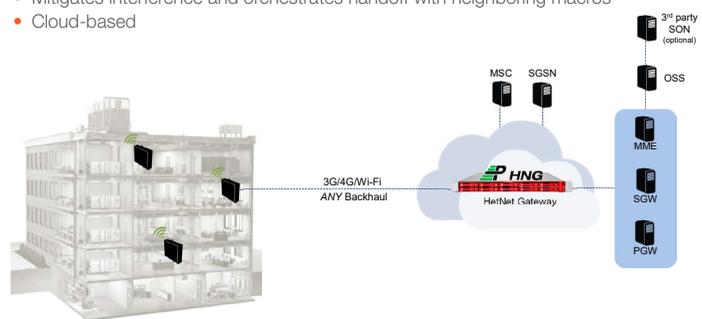
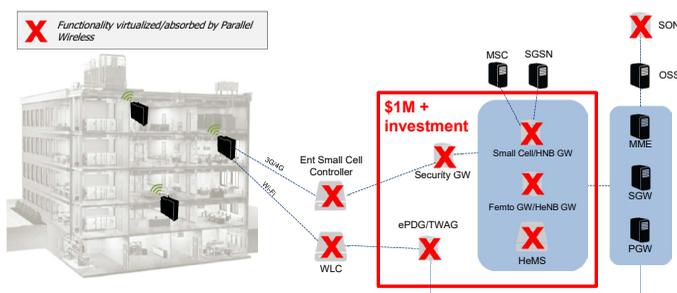
Traditional vs. Reimagined Enterprise Architecture

Reimagine Traditional Small Cell Ent Soln Architecture

Over 1M investment is required in Core Gateways Alone

Reimagined Traditional Small Cell Ent Soln Architecture

- "White box" Femtos with integrated Wi-Fi orchestrated by HetNet Gateway (HNG)
- Eliminates extra "boxes"
- HNG performs "enterprise gateway" functionality with 3G, 4G, Wi-Fi gateway functions as VNFs
- Mitigates interference and orchestrates handoff with neighboring macros
- Cloud-based



Components

Enterprise femtocell (Cellular Access Point or CAP)

The Cellular Access Point (CAP) hardware family is a software-defined – multi-mode – multi-band Enterprise femto which integrates cellular (single mode or multi-mode/multi-carrier) and Wi-Fi access in the same form factor and provides low cost but high QoS coverage for enterprises of any sizes. The Parallel Wireless approach gives mobile operators the flexibility to choose any Original Device Manufacturer (ODM) CAP hardware, resulting in much lower hardware CAPEX. As these designs combine 3G, 4G/LTE and Wi-Fi functions into a single footprint, using common network connectivity and power, this greatly simplifies the installation and maintenance process.



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Reimagine Your Network
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The CAP is available in dual or single mode. The single mode CAP supports either 3G/UMTS and Wi-Fi or 4G/LTE and Wi-Fi, The dual-mode CAP supports both, 3G/UMTS and 4G/LTE, and Wi-Fi. This design approach helps to achieve the right level of deployment flexibility and attractive economics for Service Providers to deliver variants for a wide-variety of Enterprise deployments with the lowest cost per unit and coverage bringing overall Capex expenditures to over 90% of savings.

HetNet Gateway from Parallel Wireless auto-configures and auto-optimizes CAPs, including traffic mitigation and integration with the nearby macro network. The initial install won't require RF planning or complex system integration and can be done in under a day.

HetNet Gateway

HetNet Gateway (HNG), a cloud-based SDN- and NFV-enabled network orchestrator/enterprise gateway, which logically sits between enterprise RAN and the Core, runs on any Intel COTS server, optimizes the network and manages Enterprise Femtos including integration with macros to provide a seamless user experience for voice and data. As a result, indoor coverage can be provided at much lower cost, making them as easy and as cost-effective as enterprise Wi-Fi.

HetNet Gateway also enables several voice services such as VoLTE and low-cost VoWiFi. VoLTE enabled by HNG is more efficient than existing VoLTE services as it need only run over one virtualized gateway (HNG) rather than over each gateway individually, thus reducing latency. HNG's multi-mode capabilities also allows the use of existing voice services such as 3G and since HetNet Gateway has visibility into any type of traffic (any G cellular or Wi-Fi), voice calls can be given priority to ensure that calls are not dropped. Because HNG enables newer voice services such as VoLTE and VoWiFi while also providing existing voice services, enterprises are given more flexibility for their voice calls. As all services are anchored on HNG, handoff between voice services is made seamless so there are less dropped calls. HNG also enables seamless handoff between different macro networks so users' calls will not drop once they leave the building.

Summary

Network function virtualization (NFV) and software-defined networking (SDN) are being used to enable Parallel Wireless 3G/4G/Wi-Fi Enterprise architecture that simplifies and cuts the costs of wireless deployments in the enterprise with the end goal to make cellular deployments as cost-effective and easy as Wi-Fi.

This enterprise solution not only improves indoor coverage at a significantly reduced cost, but also enables new service offerings for both operators and business owners. Auto-configuration, self-optimization, and traffic mitigation capabilities can all be provided by a HNG to help better the network. By including network coordination capabilities, this network orchestrator improves network resource utilization and optimizes user traffic to improve indoor coverage while also reducing costs, extending existing network investments, and reducing the impact on the overall network performance. Additionally, interference mitigation capabilities on HNG will help to reduce network congestion to further improve the network performance and reduce strain on the core.