

Carrier Wi-Fi Calling For Hospitality

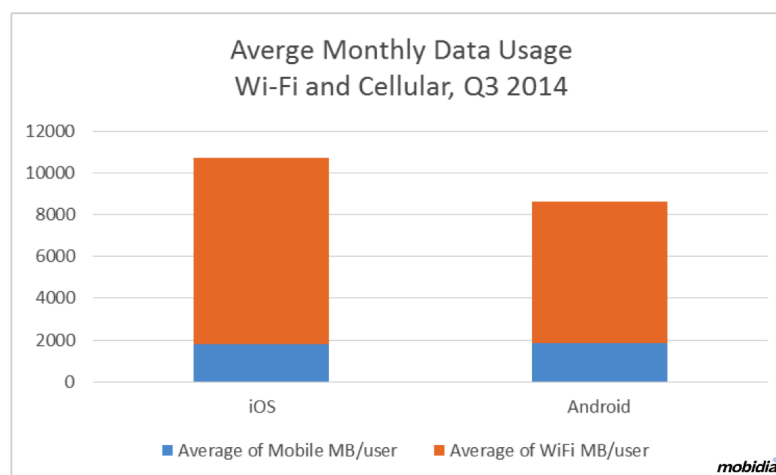
USING SMART WI-FI TO DELIVER A CARRIER-CLASS VOICE OFFERING

While the focus of this brief is on the hotel guest or MDU tenant experience, the benefits and capabilities of Carrier Wi-Fi Calling are equally applicable to employees working in these buildings. By providing robust mobile voice and SMS coverage over Wi-Fi inside their properties, owners can avoid the additional costs of deploying parallel systems for internal communication.

Introduction

In today's "wireless first" world (or is it "wireless only"?), hotels, apartments, condos, student housing, and other multi-tenant/guest facilities must meet their customers' high expectations, for data, voice, and messaging services. Customers make booking and conference decisions based on services provided by the property. The expectation of connectivity, both data and voice, is of critical importance to the guest. The quality of these services shape their opinion of a facility and ultimately affect their decision to do business with one property or another.

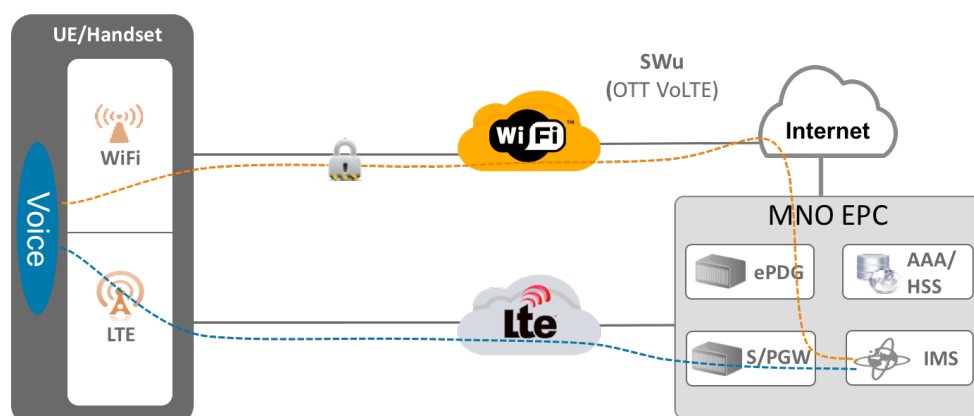
Figure 1: Mobidia Survey on U.S. Data Usage of Wi-Fi on Smartphones



Wi-Fi Calling Goes Mainstream

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Figure 2: Tunneling Wi-Fi Calling Traffic into the Evolved Packet Core



Wi-Fi has long been the wireless technology of choice to meet the data demands for these types of situations, with its unrivaled capacity, simplicity, affordability, and flexibility. Combined with nearly universal support on smartphones, tablets, notebooks, and other consumer electronics, we've moved from the age of "Wi-Fi as an amenity" to "[Good] Wi-Fi as a necessity", and that trend doesn't seem to be changing or losing momentum.

While Wi-Fi has been great for meeting the swelling demand for data, what happens when your guest or prospective tenant pulls out their phone to make a call or send a SMS message and sees that they have the dreaded "No Service" notification or such a poor cellular signal that they can't make or complete a call. What if that call is in regards to a critical business or personal matter? Will they be coming back to your property or signing that lease?

Carrier Wi-Fi Calling

"But, it's out of my hands! I don't control the mobile operators' placement of their towers. And we just completed this state-of-the-art, LEED-certified building which is good for the environment and minimize our energy needs. It's not my fault it also acts like a Faraday cage in terms of blocking all outside signals!" All true - but does any of that matter to your frustrated customer?

The good news is that now the same Wi-Fi infrastructure that is providing an exceptional data experience, can also be leveraged to provide high quality voice and SMS coverage within a property.

Carrier Wi-Fi Calling allows cellular network operators to extend voice and SMS coverage for their subscribers to areas where only a Wi-Fi signal is available. Or as some of the marketing campaigns put it, "Turning every Wi-Fi connection into a cell tower!" Initially launched by a handful of mobile operators in the US and Europe, including T-Mobile, EE, and most recently AT&T. Carrier Wi-Fi Calling will soon be offered by several "Tier 1" mobile operators in the US and a growing number of operators around the world.

While it has been possible for some time to make a VoIP call from a smartphone using an app like Skype, WhatsApp, Viber, or the like, Carrier Wi-Fi Calling is different in that the experience is transparent to the user. While in Wi-Fi only coverage, they can place or receive a call, send or receive a SMS, in the same way and using the same dialer or messaging interface that they use when in cellular coverage. And their mobile number is also used for Carrier Wi-Fi Calling.

The mobile operator enables Wi-Fi Calling by implementing some new capabilities in the core of their networks to support VoIP and SMS over IP (known as IMS) and a gateway function (ePDG) that allows their subscribers' phones to connect to these IMS subsystems over the Internet. When the subscriber moves into an area where there is no cellular service but they have Internet connectivity via Wi-Fi, the phone does a lookup for the gateway address, sets up a secure IPSec tunnel to the gateway, and then

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registers to the IMS subsystem via this tunnel. All of this happens transparently to the subscriber. At this point, any voice or SMS messaging traffic would flow between the mobile network and the subscriber via this IPsec over Wi-Fi connection. A more detailed technical overview of Carrier Wi-Fi Calling is available [here](#)

Wi-Fi Optimizations for Carrier Wi-Fi Calling

While just about any Wi-Fi equipment can be used to support a minimal Carrier Wi-Fi Calling experience, the objective for those in the Hospitality and MDU industries is to consistently provide a very positive experience for their guests, and to indeed delight them. In order to satisfy such customer expectations, the WLAN system will need to provide the following capabilities:

- Provide the strongest possible signal to and from the subscriber's smartphone. [\[BeamFlex\]](#)
- Ability to intelligently prioritize Wi-Fi Calling voice traffic if congestion situations occur. [\[SmartCast\]](#)
- If Wi-Fi Calling voice traffic is not correctly 'marked', it must be automatically and properly recognized, marked, and prioritized.
- As the guest or tenant moves through the property, the Wi-Fi Calling voice session should be maintained as the connection is handed off from access point to access point. [\[SmartRoam\]](#)

Figure 3: Enhancing Downlink Performance with BeamFlex Adaptive Antenna Technology

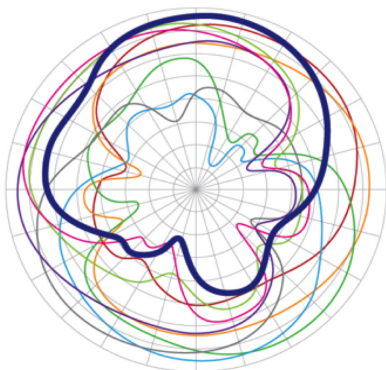
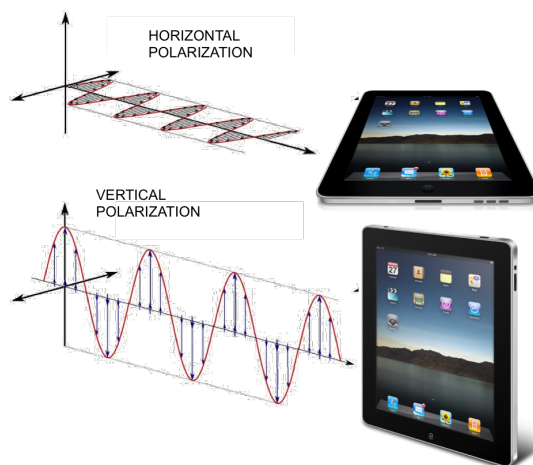


Figure 4: Enhancing Uplink Performance with Polarization Diversity

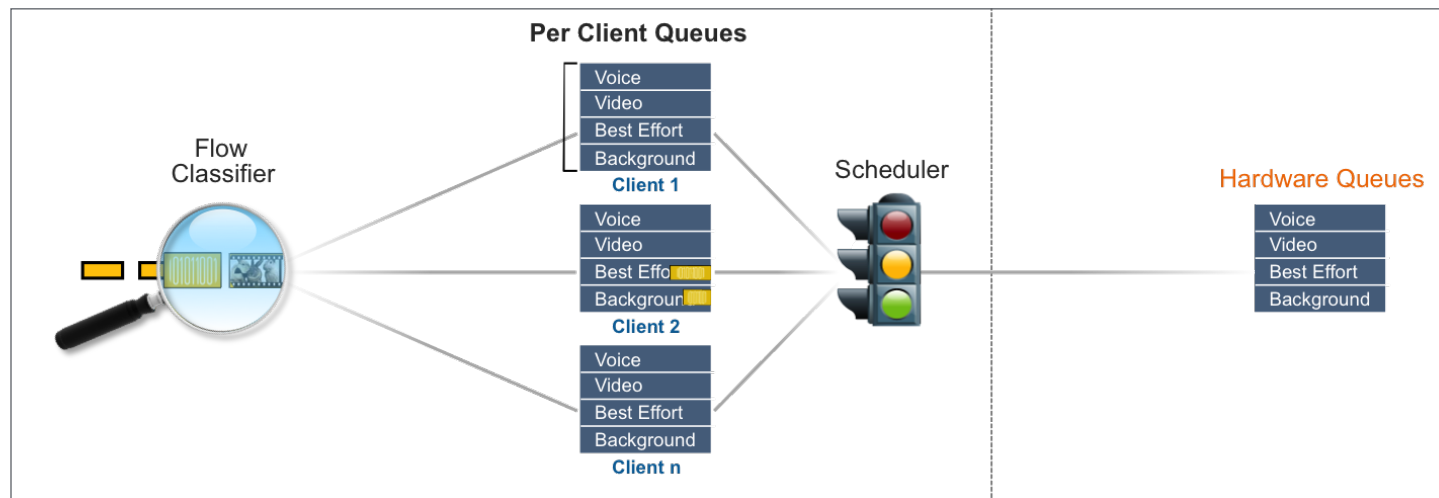


While not a hard requirement for optimizing Carrier Wi-Fi Calling, many mobile operators see Hotspot 2.0 support as a desired 'foundational' technology. Hotspot 2.0 offers many benefits in and of itself, automating the Wi-Fi connection experience and encrypting the airlink. Because it automatically connects the mobile device whenever in range of a supported access point, Hotspot 2.0 is seen as foundational for Wi-Fi Calling as it gets the mobile subscribers connected to the Wi-Fi network in the first place. Either a cellular SIM or property-provided username/password can be used as the authentication credential for Hotspot 2.0 based service. Some recent examples of Hotspot 2.0 as an enabling technology for Carrier Wi-Fi Calling include Sprint's roaming agreement with Boingo, and T-Mobile's trial with Bright House Networks. More detailed information on Hotspot 2.0 is available on the Ruckus TechTak page.

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Figure 5: SmartCast Smart Scheduling of Low-latency Voice Traffic



While not strictly-speaking an 'optimization', another advantage that Wi-Fi has over either Distributed Antenna Systems (DAS) or licensed Small Cells is that Wi-Fi is inherently a Neutral Host wireless service. With DAS or licensed Small Cells, equipment must be installed for each mobile operator due to the use of separate, discreet licensed frequencies by those operators. In DAS installations, which are typically only economical in very large public spaces, the antenna system is shared, but separate micro base stations are needed, one per mobile operator. With licensed Small Cells, separate radio nodes would need to be deployed for each operator (essentially creating a number of parallel Small Cell networks, each operating on different bands). By contrast, Wi-Fi operates in the same unlicensed frequency bands around the world (2.4 GHz and 5 GHz specifically). And because the Carrier Wi-Fi Calling service functions as a tunneled IPSec connection over public networks, the Wi-Fi infrastructure at a property can provide services for multiple operators and their subscribers. This makes Wi-Fi Calling a much less expensive solution to the property owner.

Summary

The deployment of Carrier Wi-Fi Calling by mobile operators is creating new opportunities for the hospitality and multifamily dwelling industries to provide high quality indoor mobile voice and SMS coverage at a fraction of the cost and complexity of traditional in-building DAS and licensed Small Cell solutions. However, in order to meet the expectations of guest and tenants for a good service experience, the Wi-Fi equipment that is utilized must support the advanced capabilities covered here. Hotspot 2.0 can be used as an enabling technology to automatically connect the mobile subscribers to the property's Wi-Fi network.

