Voice where you want it, when you need it. Always.

Mobile voice solutions offer numerous benefits to companies. Always available mobile employees are more communication efficient and therefore productive. Today corporations have two basic choices for mobile voice solutions — cell phones and mobile smartphones. Cell phones are readily available, but can be expensive and may not always work in some buildings. Furthermore, cell phones lack many of the advance productivity tools that today’s smartphones provide.

To get the advantages of mobility and to utilize the advanced features of enterprise-class digital PBXs, enterprises must use mobile phones that are capable of running over wireless networks. Voice Over Wi-Fi, or VoWiFi allows enterprise-grade smartphones to operate over a wireless signal. The smartphones can operate anywhere there is sufficient wireless signal strength, providing enterprises the benefits of mobility and the advanced features (and reduced cost) of digital PBXs.

The benefits of VoWiFi include:

• Reduced mobile cellular minutes
• Improved productivity
• Decreased installation and maintenance cost
• Better separation of personal and work calls
• Increased coverage area

Challenges to implementing VoWiFi

Using VoWiFi provides multiple advantages for enterprises, but it also presents some challenges for IT. The four key challenges when deploying VoWiFi are:

1. Having ubiquitous Wi-Fi coverage
2. Maintaining high-quality voice calls
3. Allowing seamless roaming across disparate networks
4. Minimizing network congestion

Ubiquitous coverage

Many Wi-Fi networks have grown up in an ad hoc manner with no real design or consideration for providing 100% coverage for the entire building/campus. For voice calls to work properly there must be coverage anywhere phones may need to operate including places such as stairwells, basements, and bathrooms.

High-quality voice calls

For users to accept using VoWiFi, the sound should be just as good as mobile phones — if not better. There are three main things that can affect the quality of a voice call: jitter, latency, and frame loss. Wireless networks should be designed in such a way as to minimize these effects on voice quality.

Seamless roaming

For VoWiFi, smartphones connect to wireless access points. As a user moves around the building, the phone will change connections from one AP to another, a process known as roaming. It is possible for the voice call to be dropped during the roaming process if the wireless network is not designed properly.

Minimize network congestion

VoWiFi traffic ultimately ends up on the standard data network. When using VoWiFi, additional network traffic will be introduced to the data network. It is important that this influx of new IP traffic does not adversely affect the other IP traffic on the network.

Making VoWiFi work

Although deploying VoWiFi presents some challenges for network administrators, there are several steps that can help overcome these challenges and let administrators have a VoWiFi network that will surpass the quality of the other phone systems.

Key elements to Xirrus solutions for VoWiFi are:

1. Design with sufficient signal strength
2. Plan for increased clients and traffic load
3. Minimize network latency
4. Eliminate network congestion
5. Enable seamless layer 2 and layer 3 roaming
Design with sufficient signal strength.

One of the key components for VoWiFi to work properly is a strong wireless signal everywhere phones are required to work. The smartphones that are used for VoWiFi typically require a much stronger signal to operate than laptops, or even tablets. Furthermore, as discussed above, there must be complete wireless coverage everywhere for the phones to be used.

Before implementing a wireless network, the required signal strength of the VoWiFi phones must be determined (typically a minimum of -67dBm to -65dBm). Next, the areas where the phones will be used must be verified. Once the coverage area is determined, an active site survey should be done with real access points to ensure that the suggested locations for the access points actually cover the entire area with the appropriate signal strength.

Plan for increased clients and traffic load.

When introducing VoWiFi to the network, the number of Wi-Fi devices on the network may be double or even triple what was there before VoWiFi was implemented. As such, there needs to be some planning to be sure that the handsets do not adversely affect the wireless network.

There needs to be enough wireless bandwidth to support the increase in user traffic. In order to increase the bandwidth, more radios need to be added to the network. The easiest way to add additional radios to a Wi-Fi network is to use multi-radio access points, like the Xirrus 4- and 8-radio Arrays. Xirrus Arrays provide 4X the Wi-Fi bandwidth available compared to traditional 2-radio access points. In addition to adding more radios, an effort should be made to move as many of the wireless clients (new VoWiFi handsets and existing computers) to 5GHz. This will help to address the co-channel issues that increase due to the higher density deployments of VoWiFi in 2.4GHZ systems.

Minimize network latency.

To maintain good voice quality, network latency needs to be minimized. A large portion of latency in VoWiFi calls come from the voice packets traversing the network. Traditional wireless networks increase the latency by using a thin AP/controller-based architecture. With the AP/controller architecture, any packets that come into the access points must also travel to the controller. This can add significant latency to the voice call.

A much better network design for VoWiFi networks is to have the controller embedded in the access point. This way, when the packets come into the access point, the data frames can be sent directly to their destination rather than having to go all the way back to the controller. This can significantly cut down on the call latency and greatly improve call quality.
VoWiFi provides many unique advantages. Groenhuysen, one of the largest rehabilitation and retirements communities in Europe, rolled out a wireless network to take full advantage of the many benefits of VoWiFi. Groenhuysen has over 25 locations throughout the Netherlands. Rather than spend money maintaining and upgrading its outdated landline phone system, Groenhuysen embraced the opportunity to provide more features and functionality. It is using VoWiFi to make its workforce more efficient and to provide better services to its patients.

Requirements
- Ubiquitous hospital-grade Wi-Fi coverage across 25 locations
- Support for VoWiFi phones
- Resilient Wi-Fi for mission-critical nurse call system

Implementation
- 1:4 Array placement compared to traditional APs
- Saving of 70 cable runs and switch ports per site
- 100% coverage for easy entry of electronic health records (EHR)
- Support for 7,000 employees and 4,000 patients

Summary
As enterprises look to be more efficient and try to reduce operating expenses, they are turning to VoWiFi. VoWiFi can allow anytime, anywhere access for employees and utilize all of the advanced functions of today’s digital PBXs. VoWiFi also can be implemented with a much greater footprint and with much lower cost than cellular networks.

VoWiFi provides some great benefits for corporations, but the wireless network must be designed properly with high-performance Wi-Fi in mind. The Xirrus Wireless Array has the greatest wireless coverage and performance in the industry making it the ideal solution for VoWiFi implementations.

For more information
For more details about how Xirrus can help you solve the pending influx of wireless devices, visit us at www.xirrus.com or send us an email at info@xirrus.com.

About Xirrus
Xirrus provides unique, high-performance, array-based wireless solutions that perform under the most demanding conditions, while delivering wired-like reliability, superior security, and less infrastructure requirements. Xirrus is a privately held company headquartered in Thousand Oaks, CA.