

3G Wireless Rolls Out Slowly; 4G Waits in the Wings

It was nearly a year ago when we planned coverage of 3G/4G wireless in this issue. The progress toward the promised features of next-generation technology has not been accomplished at the speed we anticipated. There is progress, however, and here is a short report on some major carriers' activities and the outlook for the future.

3G Has Limited Service, But Shows Promise

In early 2002, Verizon became the first company to launch a 3G wireless telephone network in the United States, but that service is not available yet in all service areas. Cingular (including the former AT&T network) is the last into the 3G market and is rolling out the upgraded service in major markets this year. The company expects to have the coast-to-coast network in operation by the end of 2006. Sprint Nextel, as the merged companies will soon be known, has 3G upgrades underway as well.

3G technology has been touted as the "next big thing" in wireless phones, allowing users to send documents, surf the web, view graphics and streaming video, download music and even video-conference over mobile phones. What do users get with 3G? Today, there is a limited, but growing number of audio and video services, including the well-publicized camera phones and MP3-enabled phones. For larger displays and easier e-mail management, PDAs are a popular choice.

In a few areas, an adapter is available to connect the handset to a computer for Internet access at data rates noticeably better than dial-up. Whether the evolving set of 3G services is truly "broadband" or not is subject to interpretation, since data rates on the current networks are below those of DSL and cable modem.

Cost is a consideration, at least while the service level and areas of availability remain under development. A quick check of the Verizon Wireless web site shows that the cost of upgrading from a basic individual user voice plan to a full-feature broadband plan is currently \$30 per month, plus the cost of a phone, PDA or accessories that support these services. In addition, some of the handset-based services are subscription-based, adding to the total cost. And finally, network usage for these services counts toward users' plan minutes and roaming charges, although there are plans available with unlimited access.

What is 4G?

While 3G can be described as the original voice-based wireless network with add-on enhancements, the description of 4G is less well-defined. The bandwidth required for the level of service generally attributed to 4G (20 to 100

Mbps) cannot be supported in the existing cellular/PCS bands. For a better idea of what 4G ought to be, we should look at all current communications routes—3G wireless, WLAN, DSL and cable modem, perhaps even cable, satellite and terrestrial radio and television.

With this market-oriented analysis, it is easy to see that 4G will be a real challenge. What technology—or coordinated family of technologies—is required for a highly capable "broadband anywhere" system? There are a number of possibilities being explored.

One currently popular scheme combines 3G wireless with WLAN and WiMAX. Most realistic planners understand that the greatest concentration of users will be in easily identified urban, suburban, travel-related and business/industrial areas. From these areas outward, users would have access to mobile WiMAX for the highest level of service. WiMAX would also be the backbone network for WLAN access into additional areas, and as a backup when propagation limits WiMAX's reach. The currently-developing 3G wireless network would continue to serve customers without the need for high capacity, and would be the third tier backup for broadband users.

A problem with all highly-capable wireless services is serving exurban and rural areas with low population density. Some areas might be served with the type of point-to-multipoint service that has now evolved into WiMAX. Broadband over powerline (BPL) is touted as being a rural broadband solution, but the number of repeaters required may not be economical, not to mention the ongoing battle over interference to amateur, public safety and aviation radio services from BPL.

Satellite-based broadband services may provide an option, but cost will be a significant factor unless a sufficient base of subscribers is developed.

For now, many insiders are recommending that research continue on the elements that could become part of 4G wireless, but that plans for a specific system should wait until 3G wireless has been fully installed and users' preferences are clearly determined. They also believe that the coming deployment of WiMAX and urban WLAN networks will also provide feedback that is essential to a decision whether they should eventually become part of an integrated 4G system.

What is certain is that many people have come to rely on both wireless communications and the Internet for personal and business activities. The key question is then, "What should future communications systems provide in the way of services—and what performance is needed to deliver them?"