The Network *Inside* the Network

by Jerry Black

Today, with little or no end-user discrimination between *wireline* and *wireless* services, voice and all other feature-rich data services are expected from *all* service providers. In-building markets, which include workplaces; shopping, dining and entertainment venues; and our homes, are *strategic hot spots*. These locations are no longer "optional" or "secondary" coverage areas within the macro network.

Whether service providers use GSM or CDMA for 3G technology, their systems were primarily designed to serve deliver service throughout the *outdoor* or *macro* cellular network. Whatever amount of signal happened to penetrate inside structures—all the better. Today, the workplace represents a sizable market which, if not served, will lead to lost revenue or churn—or both. Nowhere else within the network do so many subscribers spend as much time, five days a week.

With enormous data telecommunications power and capability in the palm of a hand, who can resist exploiting it 24 hours every day, whether we need it or not? Previously, "voice" *ruled* (well, for many, it still does), but voice isn't as exciting as the data payloads now with our reach that will be parts of calling plans and service packages.

With a laptop computer and a network service provider high-speed card, we send email, surf the web and do nearly anything wirelessly that we could do in the office. But simply because wireless devices carry voice sessions indoors doesn't guarantee data sessions will be successful.

Historically, data speeds have varied widely. As a rule, if the data rate isn't at least *twice* as fast as a dial-up Internet connection, *it's just not "data."* Why would the speed be less? Isn't every service provider offering data rates capable of much more than this minimum limit? Of course they are—*in theory*.

Although many system characteristics govern wireless data throughput, *signal strength* on the forward *and* on the reverse path has much to do with the throughput *you* have at any specific location. Even with high-speed-*capable* networks, *your* connection could end up loping along at the 2× dial-up minimum rate. That is neither what you are paying for, nor what service providers want you to experience.

Because users are largely concentrated inside buildings, these venues become *a network inside the network* that must deliver nothing less than the best the service provider has to offer. Everyone answers to customers, and there is a lot of competition. Churn, along with as customer "DIS-SAT" ratings, does some ugly things within the service provider's organization. I'll leave it at that.

Because consistent voice quality is the primary network qualifier for any service provider, the service provider must have that factor covered solidly if there is any hope to attract and retain data-hungry subscribers. This means that voice-signal penetration must be quite good, in turn, to provide reliable, consistent and, yes, *maximum* data throughput. I am trying not to be too subjective or relative with such terms as *quite good* and *solidly*, but I refuse to refer to a certain number of "bars"—which is just about useless, considering the variables. I'll discuss specific signal levels in future issues of AGL.

When signal levels fall below a certain threshold, how do the service providers address this problem, given the cost of infrastructure and the time, effort and expenses connected with zoning approval for sites? The answer comes from the gene pool where these solutions were developed in the earlier days of cellular for treating areas of poor coverage within the macro cellular network. *That* discussion continues in the next installment in this series. agl

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Jerry Black will be joining AGL's columnists on a recurring basis in 2007 to discuss these and other topics relating to in-building antenna systems. Watch for his next article in the February/March 2007 issue.—Editor.

much less able to require its application under federal, state or local regulations.

As an industry, and as carriers, we have a long way to go with respect to the diffusion of DAS as supplementary use, much less a mainstream use. There are still many questions left to be answered with respect to both the benefits and limitations associated with outdoor DAS deployment from regulatory, technical, interoperability and cost perspectives. We have learned that there are many different types of DAS technology and ways in which to deploy it. We must exercise care in the dissemination of information, and be transparent about the advantages, drawbacks and the practical applicability of the technology. We must remain aware of regulatory challenges, and work with state and local authorities to lift barriers where it makes sense to deploy outdoor DAS.

While it is true that outdoor DAS is currently deployed in some geographic areas, it is not ready for general, everywhere deployment. As a carrier, we look forward to the day when we can say with confidence that municipalities understand its application and that outdoor DAS providers and carriers have partnerships that enable this technology to be used in the right circumstances. agl