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## **Wireless Last Mile Access Solutions and Implications for Utilities**

*Fast-moving developments in the wireless access market offer compelling reasons why utilities should be interested in this arena.*

**By David Shpigler**

As the challenges of operating networks in an economic downturn have become more severe, network operators have curtailed spending to a great degree and, instead, are refocusing their energies on supporting operations and marketing efforts that will drive more traffic on existing network infrastructure. However, the lack of presence of a ubiquitous last mile access platform has given service providers a substantial challenge.

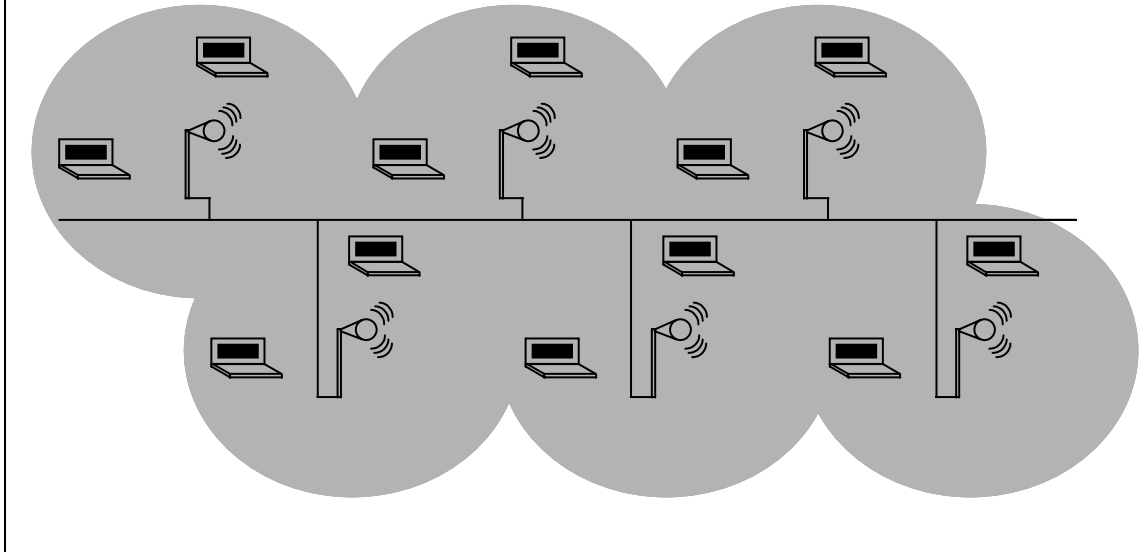
How can established networks create value without the end-user traffic that comes with establishing these last mile vehicles? And how can access be accomplished economically? While there is no one single “silver bullet” available, telecom operators are looking for new approaches to attack the problem. One of the directions in which they have been placing focus of late is within the wireless arena. Some of the leading technologies garnering the most attention today include wireless local area networks (WLANs), multichannel multipoint distribution systems (MMDS), free-space optics, and satellite.

First, this article profiles each of these technologies and identifies the viability and the developing trends associated with each. Second, it addresses why utilities should be concerned with these issues.

### **Wireless LAN**

The hottest phrase in the wireless industry today appears to be “wireless fidelity” (Wi-Fi). From telcos to Starbucks, organizations are trying to establish what potential the most talked about wireless application has. While technology providers are perfecting the application, others are determining what the right business model is to apply the technology and how to drive value to the consumer. With 802.11b, the most discussed WLAN application, service providers utilize unlicensed frequency spectrum in the 2.4 GHz range to deliver broadband solutions. Typical solutions provide an outdoor range of anywhere from 300 feet to 1 mile. As a result, there exists a wide variance in the potential coverage range - typically anywhere from a low of 500 kbps to a maximum of 11Mbps. In applications geared for enterprise use, the architecture is configured to reduce the number of users in order to ensure higher bandwidth delivery (see Figure 1).

Figure 1



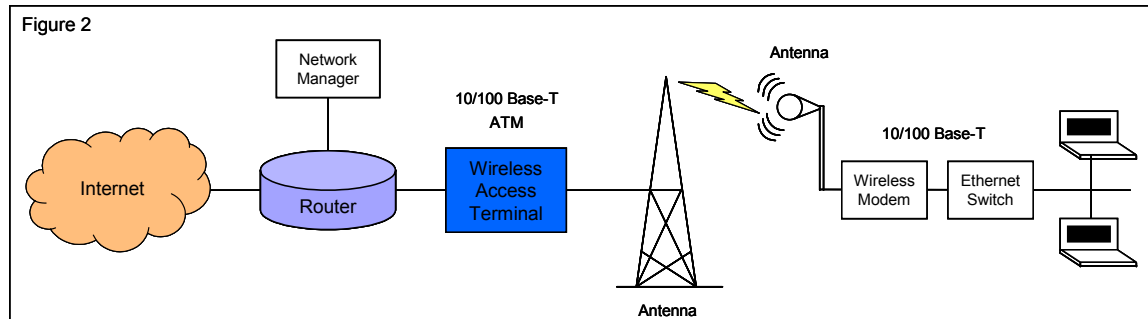
Advantages of the system include the low cost to deploy and the simplicity of customer installation. The opportunity to have customers buy network cards at a retail electronics store and “plug and play” is an added benefit for retail applications. However, interference and security are certainly concerns of the technology. While 802.11b is not heavily subject to weather, rain fade, or line of sight issues, competing transmissions in the area can affect performance. Furthermore, there are already numerous stories available about how the establishment of a WLAN system can be easily accessed by outside hackers. Nevertheless, the technology has generated wide-scale mass appeal.

For sure, the low cost of PC cards (currently around \$100) as well as the average monthly subscription fee (as low as \$10 per month) are driving consumer interest. However, we anticipate high levels of deployment of the technology in hotels and airports as the next big push is focused on the enterprise sector. Nevertheless, while the future appears bright for the technology, WLAN service providers need to overcome some operational hurdles. One of the key issues here is the lack of established roaming agreements among carriers that will allow individual operators to reduce needed coverage areas for each and to allow providers to jointly improve their economics by allowing all of them to reach a wider customer base in a more cost effective way. The lack of standard for roaming implementation among vendors is a key issue that needs to be resolved in order to support wider – and more profitable – deployment.

## MMDS

An area within the wireless market that appears to be enjoying a rebirth of sorts is MMDS. Unlike wireless LAN solutions, MMDS operates within licensed spectrum in the 2.5 GHz frequency that requires Federal Communications Commission (FCC) licensing. Developments in the field have been somewhat on-again-and-off-again, with

Sprint, WorldCom, and Nucentrix owning over 65 percent of all MMDS spectrum in the United States. MMDS is projected to offer solutions for both the residential and enterprise sectors, with differing deployment approaches offering a variety of user speeds (see Figure 2).

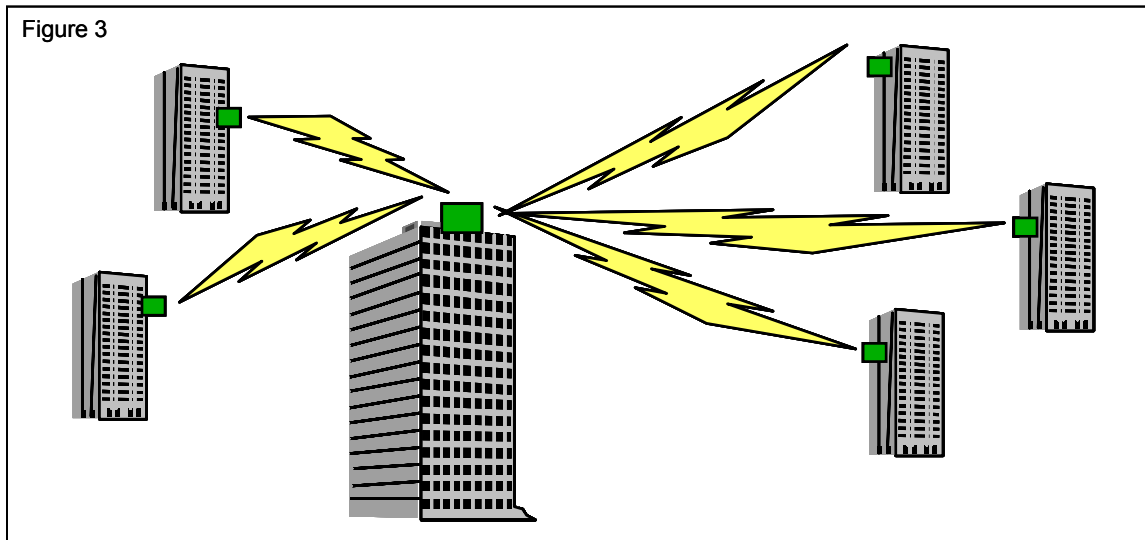


Speeds can typically range from a low of 600 Kbps to as high as 20 Mbps, again depending on deployment approach, but the technology is typically associated with low costs and moderate speeds. Installation is a very easy exercise relative to some other technologies, and its distance capability is a real benefit. People in the industry have expressed concern over the security associated with MMDS, but realistically this is not necessarily an area of weakness for the technology. Of greater concern are network reliability, sensitivity to weather and foliage, and line-of-sight limitations.

The real opportunity associated with MMDS lies in the distance capability it carries. Compared to local multipoint distribution systems, used by bankrupt companies Winstar, ART, and Teligent, MMDS offers lower speeds, but covers as much as 50 times the area. As a result, MMDS can more easily reach otherwise uneconomical residences and small- and medium-size enterprises, with far fewer towers. However, the lack of available spectrum presents challenges for new entrants seeking to take advantage of what the technology can offer. As a result, some growth in the aggregate – but with limited opportunities for “outsiders” – is anticipated.

## Free Space Optics

Free space optics is a relatively new arena of activity, with the utilization of lasers to deliver very high fiber-like broadband speeds without the need to lay fiber. Speeds can be very high – as much as 1 Gbps – but coverage is generally limited to short hops. The architecture is one of a hub-and-spoke system, with one central building being lit with fiber and nearby buildings being connected via laser signals. Unlike some other wireless applications, rooftop rights are not necessary; panels to receive the signal can be placed in windows facing the “hub” building, eliminating a key operating hurdle that has plagued so many service providers (see Figure 3).

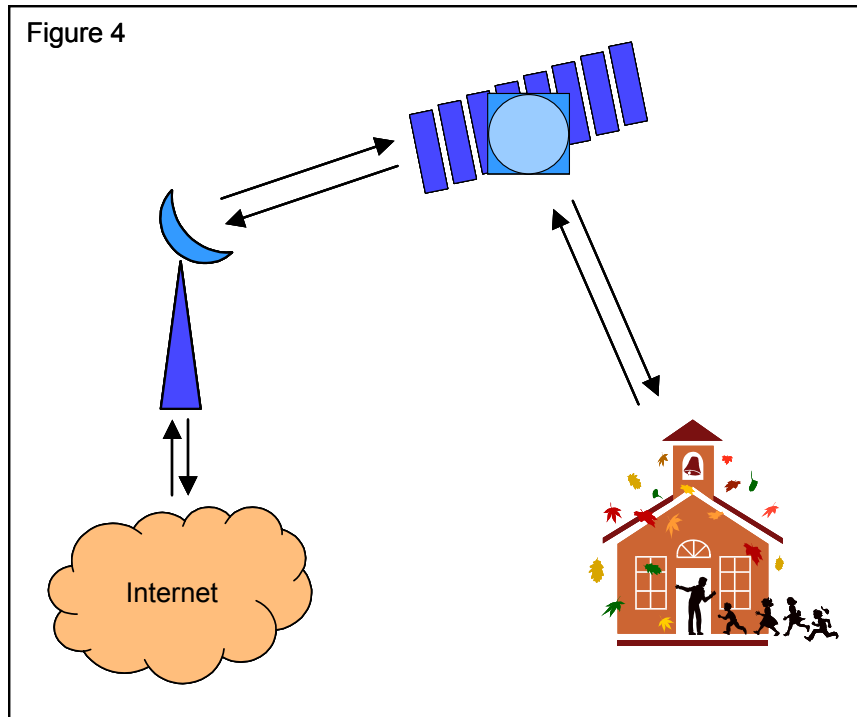


Free space optics is the answer to those who seek the benefits of wireless applications – the elimination of wired infrastructure – without many of the drawbacks. Typical wireless problems involve security issues, reliability, and speed. For free space optics, these issues are not a concern as the signal transmitted is fiber-like, resulting in a very high speed, reliable, and secure transmission. However, the technology is not without challenges, as it also features significantly higher cost than other wireless applications. In addition, fog conditions can threaten signal integrity, and perfect line-of-sight is needed. Nevertheless, for customers with stringent needs in security, reliability, and speed, free space optics presents a compelling option.

In terms of market deployment, the technology is heavily focused on the “tall and shiny buildings” in Tier 1 markets, and the high cost to deploy and the “big game” nature of the technology suggests limited opportunities in smaller communities. The relative novelty of the technology has resulted in small-scale deployments to date, but successful initial technology deployments and trials suggest that there is great promise for a niche play. The key for operators looking at this approach is that they can find comfort in the success-based nature of the technology, which is based on the fact that limited equipment needs to be deployed prior to customer sign-up.

## Satellite

Satellite transmission is one area being investigated further to support bandwidth access delivery. The delivery of the signal is handled by one of three satellite types: GEO (geostationary orbit), MEO (medium earth orbit), and LEO (low earth orbit). However, of these three, only GEO is attracting actual activity, with 42% of the earth’s surface covered and a significant number of customers. The lower cost of this deployment, relative to the very troubled LEO approach, has generated significant attention from the marketplace, and satellite transmission has emerged as the third provider of residential broadband access – behind cable modem and DSL (see Figure 4).



The benefit of satellite transmission lies in its ability to reach hard-to-reach places. Rural areas that have had a hard time presenting an economically compelling business case to service providers can be reached effectively with satellite transmissions. Since these areas are the ones with the lowest market penetration to date, they present the highest upside in the marketplace. Customer adoption, while still small in the aggregate, has seen growth reach as high as 70% during a six-month period. The development of a new Ka band further promises to deliver higher capacity to support additional competitive service offerings.

### The Case for Utilities

It is clear that developments in the wireless access market have lately been moving at a significant rate. Given the need to bridge the “last mile” economically, service providers are renewing their focus on this sector of the telecommunications market with increased attention. But, the question remains, what’s in it for utilities? Here are three potentially compelling reasons utilities should be interested in this area:

**Increased wireless traffic may support additional traffic on fiber networks.** More last-mile access avenues lead to more traffic on backbone networks that need to be supported. Many utilities with significant fiber between substations have built metro carriers’ carrier businesses to leverage existing assets. To date, many of the customers served within this wholesale strategy have been traditional carriers – competitive local exchange carriers and long-distance companies that have a need to move data within

the metro area. All utilities with fiber business lines should look at this new market opportunity – wireless operators.

**Additional wireless activity can result in gains for wireless infrastructure business lines for utilities.** There are very few utilities that have not aggressively pursued revenue opportunities in leveraging their infrastructure to support additional pole attachments, construction projects, and other real estate business opportunities. As a risk free business in challenging economic times, utilities are looking even harder at how to increase the value of these already lucrative operations. Utilities should view the market development in the field as a new opportunity to identify new ways to use their infrastructure and real estate businesses.

**Utilities may want to enter the wireless business themselves.** To date, most utilities have viewed new telecommunications business opportunities with a fairly limited focus. Currently and in the past, fiber deployment was a viable business strategy. Today, some utilities are pursuing developments in the powerline arena with great interest. Some utilities with fiber business lines should look carefully at the opportunities associated with the wireless industry as new potential avenues of activity.

Going forward, one can expect to see continued and significant changes in the wireless arena. Utilities should not ignore this potentially attractive segment of the market.

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