

# Exploring the Benefits of 3G Wireless Integrated into Business-Class Routers



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by Nathan Dyer and Eugene Signorini | August 2007

## Executive Summary

With new high-speed 3G wireless technologies taking shape in the marketplace, businesses now have new drivers to engrain mobility into business processes. Many firms use 3G for remote access connectivity for mobile workers. New advancements in downlink and uplink speed and lower network latency now enable 3G to be used for basic connectivity in the office to enable business-critical applications. 3G is no longer reserved for the mobile and field worker.

Business-class routers with integrated high-speed 3G wireless combine traditional enterprise router functionality, such as remote management and security, with mobility capabilities of 3G wide-area network (WAN) access. Utilizing high-speed 3G wireless networks, routers can replace or complement existing wireline infrastructure, such as dialup, frame relay and ISDN. Yankee Group predicts many use cases for routers with integrated 3G, such as:

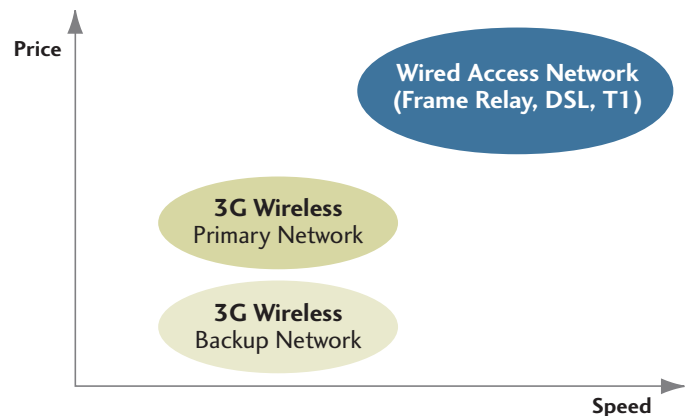
- **3G as backup access:** Companies implementing a business continuity and disaster recovery solution
- **Cost savings and usability:** Retail environments that rely on low-speed port connections for point-of-sale transactions or new store site locations where wireline access may not be available
- **Solution flexibility and rapid implementation:** Making use of temporary locations such as automated teller machine (ATM) connections at sporting events or data connectivity to support promotional retail kiosks

3G high-speed wireless provides secure, viable and cost-effective connectivity to rival some of these legacy wired WANs. Exhibit 1 shows how 3G wireless access solutions compare to traditional wired access in terms of network speed and pricing.

All businesses—both large and small—should closely evaluate using high-speed 3G wireless integrated into business-class routers. 3G wireless access should be incorporated into company business continuity solutions and should replace wired network connections requiring low bandwidth, high portability or rapid implementation. For added security benefits, routers with integrated 3G high-speed wireless can be connected to a dedicated MPLS or frame relay network. To make the most of enterprise infrastructure investment, companies should futureproof new solutions by evaluating wireless capabilities as a selection criterion.

**Exhibit 1**  
Network Speed and Access Price Dictate How Routers with Integrated 3G Will Be Deployed

Source: Yankee Group, 2007



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## I. Next-Generation High-Speed Wireless Access Provides New Possibilities for Businesses

### Enterprises Must Incorporate 3G High-Speed Wireless into Strategic Communications Initiatives

As companies develop their plans for strategic mobility, IT and communications initiatives, they must consider incorporating a broader set of technologies beyond traditional wireline access. High-speed wireless wide-area network access is the next frontier for enterprises as they attempt to meet the evolving requirements of their business and IT initiatives as well as ensure flexibility and business continuity for critical business processes.

The intent of this Yankee Group Report is to examine how enterprises can begin capitalizing on emerging wireless technologies today through the integration of 3G high-speed wireless into their communications infrastructure. This Report will:

- Examine how 3G high-speed wireless technologies are being integrated with router platforms to create new forms of backup and primary communications access
- Highlight the business and cost benefits that are gained from implementing business-class routers with integrated 3G wireless technologies
- Present deployment scenarios and implementation approaches for routers with integrated 3G access

## II. Business-Class Routers and 3G High-Speed Wireless Provide an Integrated Approach

### Understanding 3G and Next-Generation Wireless Wide-Area Technologies

Wireless operators globally are deploying high-speed 3G wireless wide-area data solutions to provide new communications options for both consumers and business customers. These high-speed networks are being deployed across two main technologies: EV-DO and HSDPA. We briefly describe each of these technologies below:

- **EV-DO** stands for Evolution-Data Optimized, the 3G cellular data standard for CDMA carriers such as Sprint Nextel and Verizon Wireless. EV-DO Rev 0 provides data download speeds in the 400- to 700-Kbps range. Introduced in 2006, EV-DO Rev A technology provides faster data download speeds with average speeds of 600 Kbps to 1.4 Mbps and an average upload speed of 350 to 500 Kbps.
- **HSDPA** stands for High-Speed Downlink Packet Access and is a 3G standard for GSM carriers such as AT&T (formerly Cingular Wireless) in the United States. HSDPA provides typical data download speeds between 400 and 700 Kbps with occasional higher bursts exceeding 1 Mbps.

High-speed wireless network technologies provide businesses with new possibilities, such as the ability to provide mobile application access for remote workers and explore wireless connectivity options as alternatives to traditional wireline access such as frame relay and ISDN.

### Understanding Routers with Integrated 3G High-Speed Wireless

Routers with integrated 3G wireless look and feel the same as traditional router CPE. What makes a router 3G-enabled is based on how it connects to the internet or a private enterprise network. Traditional routers rely on wired connections to the WAN such as frame relay, DSL and T1 lines. Routers with integrated 3G wireless connect to cellular networks without the tethered requirement of wired connections (beyond power source). In some cases, routers with integrated 3G wireless can access the WAN through both the 3G cellular network and the wired network.

Rather than purchasing dedicated 3G wireless routers to replace wireline routers, one equipment vendor is positioning solutions that add 3G wireless connectivity to wireline routers. The key component that mobilizes the router is the high-speed wireless interface card (HWIC). The HWIC is a module that slides into the router and contains the wireless modem used to access the 3G wireless network. Some HWIC modules support external radio frequency (RF) antenna connections to optimize and enhance cellular signals. The HWIC is analogous to notebook PC cards commonly available to business users and leading-edge consumers. Both modules enable 3G wireless WAN connectivity for the router (HWIC) and the notebook PC (PC card). The primary difference between the two products is the HWIC is designed to support multiple users simultaneously while the PC card only supports a single user.

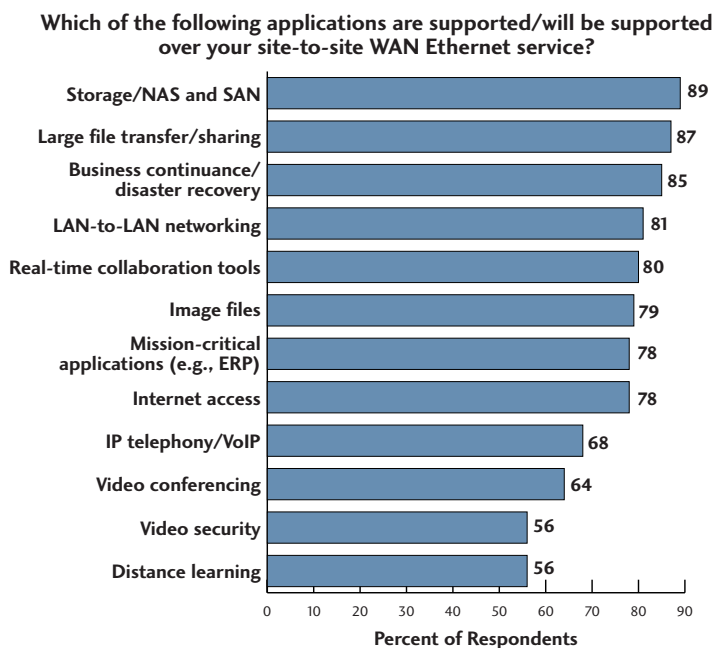
### III. Benefits of 3G High-Speed Wireless Integrated with Business-Class Routers

Many companies have already deployed high-speed wireless technologies to mobile workers for remote laptop connectivity and access to critical business applications. Yankee Group estimates that as of December 2006, more than 2 million users have adopted data cards and embedded modem modules in notebook PCs. However, 3G connectivity is also emerging as an alternative or backup to more traditional wireline connectivity options such as dialup, frame relay and ISDN. The high data rates and secure communication channel of 3G technologies such as EV-DO Rev A yield new opportunities in several critical business areas.

#### Exhibit 2

#### 3G Provides an Excellent Alternative to Wireline Connectivity for Business Continuity

Source: Yankee Group 2006 US Metro Ethernet Survey



#### 3G as Backup Data Access

Companies seeking network redundancy and business continuity for critical applications and communications can leverage emerging high-speed wireless networks as an optimal alternative to terrestrial wired connections. The Yankee Group 2006 US Metro Ethernet Survey of large business IT decision-makers revealed that business continuity/disaster recovery ranked among the most demanded requirements for WAN Ethernet service (see Exhibit 2). Additionally, IT can define which traffic can be permitted over the 3G high-speed network in the event of failover to prioritize mission-critical traffic.

#### Benefits

- **Network diversity:** High-speed wireless wide-area networks provide a distinct option from wireline access and provide reliable backup when wireline connections, such as a T1 line, suffer a physical disruption (e.g., a line being disconnected during construction).
- **Low-cost:** Like the primary use cases described above, backup access can come at affordable rates. Where unlimited and high-volume access isn't required in a backup scenario, monthly service fees can run as low as \$25 for 5 MB of connectivity.
- **High-speed throughputs** provide a higher-speed alternative to other wireline backup methods (e.g., ISDN); although 3G does not exactly match the throughput requirements of dedicated T1 access.
- **Routing intelligence:** Configuration for business continuity purposes can be done by the integrated router via backup interface command. This provides automatic failover to the wireless network when the wireline connection becomes unavailable.

## 3G as Primary Data Access

3G wireless data networks such as EV-DO Rev A, which provide uplink speeds up to 800 Kbps, offer a secure, high-speed and cost-effective alternative to traditional wireline access methods such as frame relay and ISDN. Many environments that rely on ports providing uplink access in the 56-Kbps to 256-Kbps range could benefit from added flexibility and mobility from 3G.

### Examples

- Financial services institutions and banks that rely on wireline access for ATM connections
- Retail environments that rely on low-speed port connections for point-of-sale transactions
- Setup of temporary (e.g., seasonal) locations such as promotional or retail kiosks
- New retail store or construction site locations where wireline connectivity may not be available
- Branch offices that rely on dialup or other lower speed connection access for remote workers

### Benefits

- **Reliable high-speed connectivity:** Speeds that rival or exceed traditional data circuits.
- **Flexibility:** Unlike wireline connections, 3G wireless connectivity also provides the value of mobility. For example, retail configurations can easily be reconfigured without the complexity of rewiring.
- **Rapid deployment:** 3G routers can be implemented and activated in days rather than weeks. For example, banks can deploy a temporary ATM location at a sporting event or concert venue.
- **Low cost:** Perhaps surprisingly, the higher speed and flexibility of 3G access can come at a discount. Where a typical frame relay connection can cost \$300 to \$350 monthly, 3G access can be procured for \$100 per month, representing a significant cost savings.

- **Security:** Cellular data networks can provide additional security compared to wireless access via 802.11 networks. Although companies can deploy a solution utilizing the public internet, an added layer of security can be achieved by connecting the 3G high-speed router to a dedicated MPLS or frame relay connection. Essentially, the router becomes a wireless port on the enterprise MPLS network.

## IV. Formulating an Approach for 3G Wireless Integrated into Business-Class Routers

### Service Providers and 3G

In the United States, several mobile network operators (MNOs) operate 3G wireless networks. Alltel, AT&T (formerly Cingular Wireless), Sprint Nextel and Verizon Wireless have launched 3G services since 2004. The first wave of 3G technology provided broadband-like speeds on the downlink, but only supported dialup quickness on the uplink. These wireless services enabled a wireline experience downloading and accessing information remotely and, not surprisingly, attracted many road warrior and field worker subscribers.

3G technology enhancements have increased uplink speed and decreased latency to provide a richer experience and broaden appeal and applicability to routers with integrated 3G wireless (see previous section). The largest MNOs have moved quickly to implement these 3G upgrades. Sprint Nextel and Verizon Wireless have launched enhanced 3G services in 2006, and AT&T has a planned rollout in 2008 for its version of fast uplink and low-latency 3G. The next step for MNOs is to develop new pricing and packaging strategies designed to incorporate technology benefits as solutions drift away from a single-user-based model.

In addition to providing basic network access, service providers also offer managed services around wired and wireless connectivity. These services include front-end design and implementation assistance, network access monitoring and diagnostics, and quality of service (QoS) tools to ensure the best service experience.

## Equipment Vendors and 3G

Equipment vendors realize the importance of incorporating 3G technologies into their router products. Much of the innovation surrounding wireless has been focused on the LAN, namely 802.11 (Wi-Fi). Although wireless LAN technology is still an important source of differentiation among the router community, new products are entering the market utilizing 3G technology on the WAN.

As with most new technologies, smaller niche vendors were the first movers into the 3G high-speed router market. Digi International, Kyocera, JBM and WAAV supply 3G router solutions specifically designed around cellular WAN connectivity and targeted at small offices/home offices (SOHOs) and small businesses. Among the more entrenched enterprise router suppliers, only Cisco has entered this market. Cisco is taking a different approach by offering 3G high-speed wireless solutions that mobilize their existing router portfolio targeting branch office and small business customers. Cisco customers do not need to throw away existing wired routers to enjoy the benefits of 3G.

## Collaboration Is Critical for Success

Service providers and equipment vendors must work together to ensure optimal performance and service reliability. This includes product-level integration such as solution providers establishing interoperability testing and network certification programs to drive the value of 3G WAN access. Customers also expect a short installation cycle and a seamless deployment of the technology. To achieve customer demands, collaboration is required along the service implementation, customer training and customer support phases. Exhibit 3 shows the level of integration required and the business benefits of deploying a router with integrated 3G high-speed wireless.

### Exhibit 3

#### Sprint Leverages Routers with Integrated 3G Wireless in Retail

Source: Yankee Group, Sprint and Cisco, 2007

#### Business Problem:

In today's competitive world, enterprise companies and public sector agencies are looking for ways to reap the benefits of reduced costs, obtain faster-to-market connectivity with secure business continuity and keep customer satisfaction high.

#### Solution:

Sprint Nextel is no exception to these market demands. The network operator has decided to install routers with integrated 3G high-speed wireless in Sprint retail stores and kiosks that support wireless products sold by Sprint Nextel and its affiliate partners. Sprint leverages this solution as the primary connection for retail kiosks and mobile locations.

#### Solution Drivers:

This new technology provides wireless backup capabilities to existing T1 access for redundant connectivity, ensuring that retail operations in Sprint Nextel retail stores continue. Before installing this solution, if a retail store experienced a network access outage, the guaranteed result was a loss of sales volume and a less than desirable customer experience.

The wireless router solution removes the delay and uncertainty from traditional wireline access and has an added benefit of being easy to replicate. Furthermore, the router with an integrated 3G solution provides a greater degree of certainty of a wireless connection in the case of a disaster or wireline outage.

## V. Conclusions and Recommendations

By integrating traditional router solutions with the latest 3G technology, new business cases have emerged for mobilizing the enterprise. 3G offers businesses flexibility and mobility not available via traditional wireline technologies. There is also a cost-savings component by engraining 3G into traditional business processes for many retail environments, banking and ATM installations, and branch offices. For businesses that are content with maintaining their wireline infrastructure, routers with integrated 3G wireless mitigate risk by providing a safety blanket of business continuity applications and emergency backup services.

Four of the five largest MNOs have launched 3G networks in the United States. With the latest 3G innovation, MNOs are addressing legacy challenges around wireless WANs, such as uplink thresholds, network latency, and pricing and packaging. Router vendors are also embracing 3G connectivity by teaming with MNOs to deliver best-in-class solutions. Some vendors have formed strategic partnerships with MNOs to deliver an end-to-end 3G integrated router solution complete with service implementation, customer training and customer support.

### Recommendations for Businesses

There are real benefits for many businesses by deploying routers with integrated 3G wireless. 3G access can be more than 50% cheaper than wired connections such as frame relay. Furthermore, true cost efficiencies can be realized by choosing a carrier that provides unlimited data that is competitively priced. Wireless solutions are also very flexible to reposition in a different location, while the speed of implementation is cut down to days—not weeks.

- **Develop a more reliable business continuity plan today with a wireless component.** Companies need to prepare for a network failure or catastrophic disaster. Many firms are adopting 3G wireless as a redundant or backup network because it is an alternative to relying only on terrestrial wired links and it offers relative ease of deployment and service management.
- **Wireline connections requiring low bandwidth are most ripe for routers with integrated 3G high-speed wireless access.** Consider the benefits available today from going with 3G wireless WAN such as portability, cost savings and reduced time for deployment. Wireless network speed and reliability are available today, and further improvements will continue to be cultivated. Consider managed network services to provide an optimal experience.
- **An added layer of security can be achieved by connecting the 3G integrated router to a dedicated MPLS or frame relay connection.** Essentially, the router becomes a wireless port on the enterprise MPLS network, which is a far more secure connection than a solution utilizing the public internet.
- **Futureproof new solutions by evaluating wireless capabilities as a selection criterion.** Whether CPE has wireless built in or it's enabled in an aftermarket approach, wireless connectivity is part of the future of network access. Enterprise infrastructure has long replacement cycles, and it's important that businesses make the most of their investment.

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