

Dell's Role in Expanding the Wireless Enterprise

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White
Paper



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Dell's Role in Expanding the Wireless Enterprise

Section 1 **Wireless Becomes Business Critical**

Wireless solutions are transforming business operations and increasing productivity by providing employees access to key applications, data and people from wherever they happen to be. Whether it's a customer's office, factory floor, airport lounge or a coffee shop, wireless connectivity provides a critical competitive advantage—enhancing productivity, efficiency and response times and separating leaders from also-rans.

Wireless proof points are plentiful and often compelling: Intel measured a return of \$4.6 million in productivity gains on a \$400,000 investment in wireless network infrastructure for 800 of its employees. Microsoft invested \$9 million to deploy wireless network access to 35,000 workers and saw a return of \$6.1 million a year, with full payback in 18 months. CIO magazine found that wireless network access raised average worker productivity by 22 percent.

Such results are helping to turn wireless data solutions into a mass market. By the end of 2004, nearly three-quarters of North American organizations had begun at least exploratory use of mobile/wireless solutions, according to IDC. By 2006, it says, two-thirds of the U.S. workforce will be mobile, and the market for mobile devices will exceed \$38 billion. Gartner, meanwhile, forecasts that mobile applications will increase their share of IT budgets from 2 to 5 percent today, to 8 to 10 percent by 2007.

Vendors such as Dell, Intel and Microsoft are driving wireless adoption by providing standard platforms that invite broad participation—sparking competition that, in turn, boosts performance and innovation and drives prices downward. As a result, the three key components necessary for wireless solutions—devices, networks and applications—are maturing rapidly. Note-book computers continue to advance in power, performance and battery life. Wireless networks are rapidly growing faster, more reliable and broader in coverage. Vendors are leveraging these trends into solutions that not only make mobile workers more productive but provide stronger security while speeding and simplifying deployment.

Dell, the leading notebook PC vendor, has wireless solutions as a top strategic priority—and provides a broad array of business-focused wireless products and services that support key standards and technologies. The vendor already includes wireless networking capability in more than 80% of its enterprise notebooks.

This white paper explains Dell's approach to wireless in the context of three critical wireless technologies:

1. High-bandwidth Wi-Fi networks, the hottest-growth area;
2. Wireless security; and
3. Wireless network and device interoperability.

It explains the limitations and evolution paths of each, as well as how they are used in the enterprise. It concludes with Summit Strategies' perspective in the growing wireless arena, including our reasons why businesses evaluating wireless data solutions should closely consider Dell.

Section 2 Dell's Wireless Connection

Dell's strategy for leadership in wireless, as in IT solutions overall, rests on a strong but simple strategy: providing products that combine top performance with the high levels of security, reliability and interoperability that businesses require. This is more difficult than it seems. Solutions with leading-edge performance may not be fully mature in terms of security and reliability, and vice versa. Dell's particular skill has been understanding the technology evolution process and mastering the art of timing—spotting the point at which leading-edge technologies achieve the maturity to be considered enterprise-grade.

Dell's wireless offerings span the full spectrum of relevant technologies, including Bluetooth, cellular and IEEE 802.11 standards. It designs its notebooks for long life—an average of 14 to 18 months, though some exceed 20 months. It supplements these products with a suite of wireless-related professional services, including wireless site surveys and deployment guidance.

These and other attributes have earned Dell a leadership position in notebooks. In 2003, Gartner recognized Dell for the strength of its strategic vision in notebooks and its ability to execute, placing the vendor in the upper right corner of its Magic Quadrant. In the fourth quarter of 2004, the consulting firm Technology Business Research (TBR) ranked Dell first in notebook customer satisfaction for the 27th consecutive quarter. Respondents to TBR's surveys rated Dell highest in delivery time/product availability, phone support, replacement parts availability, relationship with sales rep and overall value. Respondents rated each of those categories a "strength" for Dell and gave its competitors neutral ratings at best.

Dell ensures interoperability in its wireless products by hewing closely to industry standards, and by pursuing certification from key industry groups such as the Wi-Fi Alliance and leading network equipment vendors such as Cisco.

Dell is also closely involved with wireless technology evolution, including membership in key standards bodies. The vendor is represented on the board of the Wi-Fi Alliance, which tests and certifies Wi-Fi devices for compliance with IEEE specifications and interoperability, and is a member of the Bluetooth SIG (Special Interest Group). Its own workforce serves as a test bed; some 15,000 Dell employees in the Austin, Texas area access the corporate network via wireless LANs.

Dell continually evaluates emerging technologies for future notebook integration and works closely with business customers to understand their needs and recommend the most appropriate solutions and implementations. Technologies under current consideration include the 802.11n wireless specification, which will boost data throughput by means of smart-antenna technology; PCI Express, the next-generation input-output and graphics bus; and new wide-area broadband standards such as UMTS/HSPDA and CDMA 1xEV-DO.

Section 3 In Wireless, One Size Doesn't Fit All

Wireless personal-, local- and wide-area networks (WPAN, WLAN and WWAN) are quickly transforming how businesses work and provide users with access to corporate resources and data. Each of these technologies has its unique attributes and purposes that require thorough planning and expertise for companies to successfully deploy them and realize their full value. Let's examine each.

Wireless Personal-Area Networks: Short-range (25-100 feet) Bluetooth technology supports hardware such as cable-free keyboards and telephone headsets and enables the wireless transfer of data, as from a cell phone to a notebook or a digital camera to a printer. Its throughput has been slow—around 700 kilobits per second (Kbps)—but is improving rapidly. Dell is one of the first vendors to offer a Bluetooth 2.0 EDR (enhanced data rate) solution capable of 3 megabits per second (Mbps) throughput.

Wireless Wide-Area Networks: Public cellular networks, operating on licensed radio spectrum, provide the broadest coverage among current wireless technologies. Designed initially for voice communications, WWAN data throughput has historically been quite limited. However, carriers are aggressively deploying broadband-class infrastructure throughout their network footprints that offer significant performance improvements. There are two primary WWAN standards—GSM and CDMA. The GSM evolutionary path includes the GPRS, EDGE, UMTS and HSDPA air interfaces, and is prevalent throughout Europe and parts of North America and Asia. The CDMA standard provides 1xRTT, 1xEV-DO, and 1xEV-DV evolutionary upgrades, with major deployments found in North America and parts of Asia. Dell has direct relationships with a number of tier-one wireless carriers and offers a variety of WWAN connectivity options with its notebook computers.

Wireless Local-Area Networks: Broad vendor support and certification by the Wi-Fi Alliance (see Figure 1) have helped make 802.11-based WLANs the fastest-growing wireless market over the past few years. Starting the boom was 802.11b, which provides up to 11 Mbps data rate per access point and three non-overlapping channels, for a maximum of 33 Mbps with three access points deployed. The range of an 802.11b access point can reach 300 feet, though this distance is often shortened by radio interference from devices such as cordless phones and microwaves, which share its 2.4 GHz frequency band. A newer standard, 802.11g, uses the same band and delivers the same approximate range as 802.11b but provides greater capacity—54 Mbps data rate in each of three channels.

Because they operate in the same frequency range, 802.11b and 802.11g devices can coexist on the same network. However, when a network supports both types of clients, it reduces all users to the lower 802.11b speed. Maximum data rates today come from 802.11a, which provides 12 non-overlapping channels of 54 Mbps each, making 802.11a useful in data intensive environments. Just as important, 802.11a uses the less-crowded 5 GHz frequency band and suffers less from interference. However, this higher frequency band also means that 802.11a has a shorter effective range than “b” and “g,” only up to about 180 feet.

Figure 1

Dell Products Certified by Wi-Fi Alliance

The Wi-Fi Alliance has certified these Dell products for compliance with relevant IEEE standards and interoperability requirements.

Access Points
<ul style="list-style-type: none"> ◆ Truemobile 1170 Enterprise Access Point ◆ Dell Wireless 4350 Small Network Access Point ◆ Dell Wireless 2350 Broadband Router
External WLAN Cards
<ul style="list-style-type: none"> ◆ Dell Wireless 1350 802.11b/g PC Card
Internal WLAN Cards
<ul style="list-style-type: none"> ◆ Dell Wireless 1350 802.11b/g Mini-PCI Card ◆ Dell Wireless 1370 802.11b/g Mini-PCI Card ◆ Dell Wireless 1450 Dual-Band 802.11a/b/g Mini-PCI Card ◆ Dell Wireless 1470 Dual Band 802.11a/b/g Mini-PCI Card
WLAN USB Client Devices
<ul style="list-style-type: none"> ◆ Dell Wireless 1450 Dual-Band 802.11a/b/g USB2.0 Adapter

Source: Dell Computer

Vendors including Dell provide access points and client adapters that support both “b” and “g.” (PC Magazine recently reviewed Dell’s D610 notebook and called its 802.11g test results “some of the best we’ve seen.”) In addition, vendors increasingly are incorporating dual-band equipment that supports 802.11a as well as “b” and “g.” These dual-band solutions provide maximum flexibility and throughput but command premium prices—although the price delta is likely to shrink with time. In addition, Dell offers wireless-related professional services that include needs assessments, design, deployment, and ongoing support and maintenance.

Dell plans to incorporate 802.11n technology in its next generation of notebooks, boosting data rates in excess of 400 Mbps, and will offer both products and migration strategies that support emerging wireless technologies as they mature and become enterprise-grade.

Section 4 Protecting Corporate Assets

The WLAN boom would have been even stronger if many organizations hadn’t held off implementation because of security concerns. But steady technological progress and the resulting proliferation of enterprise-grade solutions mean that security need no longer inhibit WLAN adoption.

WLAN security is a function of two basic factors: user authentication and data encryption. Simple authentication methods such as EAP (Extensible Authentication Protocol) and LEAP (Cisco’s “lightweight” version designed specifically for wireless networks) require only a user name and password. They are easy to deploy and widely used, but they are vulnerable to password loss or theft. PEAP (Protected EAP) employs digital certificates that make it more secure, but it is also more difficult to deploy. For additional protection, some customers adopt biometric tools, such as fingerprint or iris scans, or smart cards.

Regarding encryption, the virtual private network (VPN) long predates the boom in wireless networking but remains an effective approach. Dell uses this method internally to secure communications among network users at its campuses in and near Austin, Texas. Still, VPNs can be expensive in large deployments, and the encryption/decryption process can adversely affect performance.

The 802.11b standard includes an encryption capability, called Wireless Equivalent Privacy (WEP), but it is relatively easy to hack, and easy to turn off—even inadvertently, as many have done, apparently without realizing the risk involved. WEP has been superseded by a much stronger form of protection known as Wi-Fi Protected Access, or WPA, that currently is the recommended solution for WLAN security. However, WPA itself is being replaced by an even stronger version called WPA2, a subset of the IEEE 802.11i protocol, based on the extremely secure Advanced Encryption Standard.

Corporations adopt different WLAN security solutions based on their existing infrastructure (for example, some EAP methods are proprietary to Cisco) and

on deployment considerations such as certificate requirements. Recognizing these different needs, Dell supports all standard security capabilities, including EAP, LEAP, PEAP, EAP-FAST, EAP-TLS, EAP-TTLS, IEEE 802.1x, WPA and WPA2.

As an additional security measure, Dell offers smart-card capability on certain notebooks in its Latitude D-Family product line. The solution includes an integrated smart-card reader, two smart cards and the necessary software. It is available in two versions, called “Pro” and “PKI” (Public Key Encryption). The Pro version provides strong but relatively low-cost protection for mobile data. It supports file and folder encryption and includes features such as a password vault for favorite Web sites. The PKI version includes all features in Pro, but also supports digital certificates for secure communication, including digital signatures on Microsoft Office documents. The PKI version is more complex, including a server-based component, and is more expensive. But it provides even more robust protection, plus the convenience that a lost key can be recovered from the server. (With the Pro version, one key is typically kept in a vault; if both are lost, the data cannot be recovered.)

Dell also supports the security provisions in Cisco’s interoperability program, Cisco Compatible Extensions (CCX), which we discuss in the next section. Dell supports all versions of CCX, including the new Version 3. New from Dell in the first quarter of 2005 is a technology called Trusted Platform Module (TPM), which provides for system authentication, rather than just user authentication, by means of an encryption chip and proprietary software linking the chip to security-aware applications. TPM is available on Latitude notebooks through Dell’s Custom Factory Integration service.

Clearly, Dell understands that wireless security is of paramount concern to enterprise customers, particularly given the ease with which mobile computing devices can be lost or stolen. Accordingly, the vendor has assembled as complete a set of security capabilities as is available, and routinely adds to and updates its offerings as the technologies mature. The result is that security need no longer be an inhibitor to enterprise WLAN adoption.

Section 5 Achieving Interoperability

Interoperability is crucial, especially for large organizations, which often have diverse IT infrastructures. This is especially true in the WLAN market, where scores of vendors provide access points, switches, routers, client network adapters, and the like. Support for open standards is crucial. It’s also important to mesh easily with the offerings of major vendors with large market shares—in networking equipment, that means Cisco Systems.

Dell is an original member of the network equipment vendor’s Cisco Compatible Extensions (CCX) program, launched in 2003 to promote compatibility and interoperability between Cisco’s WLAN offerings and those of other vendors.

Dell was the first vendor to be certified for the latest version of CCX, v3. As of January 2005, all Dell wireless and Intel client wireless adapters are Version 3 certified—except the desktop USB adapter, which is Version 2 certified (see Figure 2). CCX certification applies to client equipment only, not to access points or routers.

Figure 2 Cisco-Certified Dell Products

Most of Dell's WLAN products have passed interoperability testing under the Cisco Compatible Extensions (CCX) program.

Product	Supports	CCX Version
Axim X50 Series PDA	802.11b	v1
Inspiron Notebooks	802.11a/b/g	v1, v2, v3
Inspiron Notebooks with Centrino	802.11a/b/g	v1, v2, v3
Latitude Notebooks	802.11a/b/g	v1, v2, v3
Latitude Notebooks with Centrino	802.11a/b/g	v1, v2, v3
Precision Notebooks	802.11a/b/g	v1, v2, v3
Precision Notebooks with Centrino	802.11a/b/g	v1, v2, v3
Dell Wireless 1450 (802.11a/b/g) WLAN USB 2.0 Desktop Adapter	802.11b/g	v1, v2
Dell Wireless 1350 WLAN (802.11b/g) PC Card	802.11b/g	v1, v2, v3

Source: Cisco Systems

Section 6 Criteria for Evaluating a Wireless Vendor

Businesses of all types are under pressure to mobilize their workers without leaving them cut off from key data and applications. Increasingly the solution is wireless—but the solution must be robust, secure and cost effective to justify a share of IT budgets. What should businesses look for in a wireless solution vendor?

Experience is perhaps the most crucial of vendor criteria, given the plethora of options and the rapid pace of change in every aspect of wireless business solutions, from devices to network connectivity to applications. Vendors that simply resell products with which they have little experience may not know how well or poorly various components will mesh, or how quickly a given device or network plan may be superseded.

Customers also need vendors that can help them navigate through the thicket of wireless technologies and solutions. These options exist for good reason—they serve different purposes, and have different pros and cons. A vendor should offer a wide range of choices, but it also must be able to guide customers toward those that most effectively address their business goals and problems. The vendor should be willing and able to start with a small wireless deployment, prove its effectiveness, and scale as needed across the customer's organization and geographic territory. This necessitates some level of professional services capability to design the solution, implement it and provide ongoing support. These requirements are core strengths for Dell.

Finally, customers should look for staying power and leadership in a wireless solutions vendor. The wireless industry is still very young and highly volatile. Over the past few years, literally hundreds of wireless vendors have come and gone. This winnowing has been healthy for the industry, but it has left some customers stranded. In such a crowded and confusing marketplace, customers should look to a vendor whose leadership provides stability and rallies participants around key standards.

In its own wireless strategy, Dell applies the same philosophy that guides the rest of its business: a commitment to meeting customer needs with high-performance, standards-based products, supported by market-leading service.

Dell's philosophy is reflected in both its current product lineup (given its leading position in notebooks) and its support for key wireless technologies important to enterprise customers, such as 802.11, with its support for next-generation wireless standards such as 802.11n and PCI Express. Businesses looking to add or expand their use of wireless connectivity solutions should closely consider Dell for its combination of leading-edge and enterprise-proven products, services and support.

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