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The Future of Wireless Networks Is Now

Dramatic improvements have been made in the quality of wireless local area networks – What, then, explains the sloth corporate behavior?

Few will argue the point that wireless networks offer the fastest, most cost-effective, and convenient way to connect users both inside and outside of the enterprise. Fewer skeptics, still, will argue that high-speed wireless access is anything but inevitable. Yet, much corporate lethargy remains in the adoption of wireless networks. In a recent survey, 80% of the responding organizations had no wireless implementation, of any consequence, in production. The reasons for the inactivity are a curious admixture of technological hair-twirling and business executive naiveté.

HAIR-TWIRLING AS A SUBSTITUTE FOR ACTION

The technical community in many organizations maintains that as standards are still evolving and security precautions are uncertain it is prudent to go slowly or to not go at all in the deployment of wireless local area networks. Let's examine these issues in turn.

The granddaddy of wireless local area network (WLAN) standards, 802.11, was first promulgated by the Institute of Electrical and Electronics Engineers (IEEE) in 1997. Since that time, new standards have emerged, on average, every two years. And, if the emergence of ever-improved standards is a sign of progress in the field of over-the-air modulation techniques – and clearly it is – then we hope that there should never be an end in sight to this process.

Waiting to deploy a wireless local area network until standards have firmed-up makes as much sense as waiting to install a piece of important business software until every bug has been worked out. In both cases, paradoxically, stability is the first toll of approaching obsolescence. In other words, you delay at your own risk.



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WHY ARE TECHNOLOGISTS WRAPPED AROUND THE AXLE OF STANDARDS?

The current viable WLAN standard choices are: 802.11a, 802.11b, and 802.11g. The last two protocols operate in the 2.4GHz frequency, and both are subject to interference from appliances nearby. 802.11b operates at a maximum data rate of 11Mbps per second up to about 150 feet. 802.11g, on the other hand, has a maximum data transfer rate of 54Mbps per second up to 90 feet. It goes without saying that equipment that works with the 802.11g standard costs more money. Part of the added investment, however, supports backward compatibility with the 802.11b standard.

802.11a supports bandwidths up to 54Mbps per second and signals in a frequency spectrum of 5GHz. The higher frequency of this modulation ensures a minimum of interference from other devices in the area. The higher frequency, however, means that the maximum signal strength fades more quickly – at around 60 feet – and has more difficulty penetrating obstructions.

Finally, 802.11n due for release in 2008, uses multiple transmitters and receivers which allow it to operate in the 2.4GHz range or the 5GHz range. Data rates per individual data stream for this protocol should exceed 100Mbps per second up to 200 feet. It is prudent that contemporary purchases of wireless equipment be compatible with the 802.11n standard.

Networking equipment operating outside of the 802.11 standard - Bluetooth is a prominent example - clearly is not WLAN compliant. Bluetooth is an industrial specification developed by Ericsson and is intended for communication over very short ranges with very low data transfer rates. No matter what the Bluefuture holds, Bluetooth is not a wireless option for local area networks in the here and now.

SCIENCE AND PRACTICE ARE A TECHNOLOGIST'S BEST FRIEND

The successful deployment of a wireless area network is as much a matter of science as it is of practice. There is no possible way to calculate the effect of radio waves propagated throughout a facility without a site survey and simulation of the anticipated deployment of access points. This is not a problem of having to choose the **correct** standard. Neither is it strictly a mathematical problem as the geometry of even the simplest facility renders the problem intractable.

The recommended approach is threefold: 1) understand the applications that are to run on the network to determine the required bandwidth, 2) work within the parameters of a current 802.11 standard, and 3) conduct a site survey and simulate the performance of the network-to-be. The purpose of the survey and simulation is to accurately identify the location and number of access points. In the end, there is absolutely no way to know how far a signal will travel until it comes face-to-face with wood, concrete, and steel. The survey will also help answer if a particular coverage area has equipment – such as in a hospital – where wireless transmission would cause interference with sensitive electronics. A site survey and simulation are the only effective tools



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available to help answer these questions.

SECURITY CONCERNS: ANOTHER STRAW MAN FOR INACTION

Security precautions are part and parcel of an intelligent wireless local area network deployment strategy. So what is new? The over-the-air medium of wireless transmission requires the same vigorous response to security as does the wired network. At the top of the list of priorities is a comprehensive corporate WLAN security policy outlining the risks of intrusion, the steps necessary to prevent threats, the enforcement mechanisms in place, and the consequences of violating policy. Next on the list, is the conveyance of security best practices across the enterprise as part of a continuing education and training program.

While wireless eavesdropping does present its own set of issues it also avails its own set of solutions:

1. Wireless area coverage needs to be configured to minimize signal leakage. The design of the coverage area and the consequent arrangement of access points are absolutely critical to ensure the signal stops at the perimeter of the desired area.
2. Change default settings for password and network names. The bad guys know all of the default settings.
3. Implement one of a number of available encryption systems. Currently, the most secure of these is WPA2.
4. Install an intrusion detection and prevention system. These systems monitor the coverage area for the presence of unauthorized access and automatically respond if alert settings have been set. If the threat level has not been set then a notification is sent to the network administrator for resolution.

As in the case of standards, tradeoffs with respect to security safeguards will be necessary. For example, the more impenetrable a wireless network is to a rogue perpetrator the more impenetrable the same network will be to those who *need* to access it. There is, therefore, no right answer here either. There is only an answer framed within the context of a particular set of situational business factors.

THE EXECUTIVE'S ROLE IN BREAKING THE LOGJAM

First and foremost, the business executive needs to be confident in the knowledge that neither the presence of multiple WLAN standards nor exaggerated concerns about security, per se, are reasons to foil the deployment of wireless networks. Both sets of issues require the understanding of costs, risks, and benefits and weighing the tradeoffs that are the hallmark of sound decision making.

Secondly, couching the business benefits in terms of increased productivity, convenience, and enhanced services is a worthy, albeit challenging exercise. Of greater import, perhaps, is the organization's competitive stance vis-à-vis its peers. A hotel executive recently bemoaned that at a particular property, 12 to 15 guests a



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week check out early after frustrated attempts to camp on the hotel's hotspot. Question: what is the correct way to measure the impact of these losses on the business? Ultimately, it is a matter of corporate and even personal executive judgment whether the losses posed by these early departures makes most sense when viewed as the forfeiture of guests' wireless access fees, the loss of occupancy, or the negative impact on the hotel's brand. Take your pick and base the cost/benefit analysis on that factor. Also, if the last cost/benefit analysis the organization did is setting on the shelf gathering dust, refresh it: the price of WLAN equipment is decreasing rapidly.

Finally, information technologists have a lot on their plate: back office and desktop hardware and software choices; application system decisions; infrastructure upgrades; wide area network issues; telephony; dealing with the advent of alternate computing platforms, etc. This heavy burden could be the root cause of the slower than expected proliferation of wireless networks. Here, the business executive can help the technologist by prioritizing the deployment of wireless local area networks among the many corporate initiatives.

WHY CAN'T WE WORK TOGETHER?

Wireless local area networks are inevitable and will become ubiquitous. The vision that voice, data, and video will be made available anytime, anywhere is not as long a journey as once thought. The first step on this journey is for the technical organization to engage the corner office as this ultimately is a business issue. The second step, depending on the resources of the technical organization, is to seek outside help by working with a systems integration supplier that is not beholden to any equipment manufacturer and who has no fascination with the latest technology. The choice of a supplier whose metric of success is customer satisfaction and not the performance of technical pyrotechnics rounds out the ideal choice of partner. ***It's time to get started on this journey: the future is now.***