

Taking Control of Your Campus Wireless Spectrum

Albert Einstein once said, “I never think of the future—it comes soon enough.” That idea certainly applies to colleges and universities and the rapid pace at which wireless communication is descending on campuses across the country. Most institutions are rushing madly to implement wireless networks in some form or fashion. And most of these are addressing only technical or at best pedagogical issues, preferring to leave policy issues to stew in their own little pot. In the case of wireless networking, this lack of attention to policy will ultimately return to haunt these institutions.

The problem at hand is that the IEEE 802.11b standard for wireless local area networks (LANs) uses the FCC-licensed 2.4 GHz Industrial/Scientific/Medical (ISM) band—a brazen frontier as far as the spectrum goes. The 2.4 GHz spectrum has been identified globally as an “open” frequency for one and all to use. Cordless phones, microwave ovens, and yes, even wireless karaoke machines use this frequency. Before 802.11b, there wasn’t

much contention for this space on campus. Now, however, campuses are beginning to light up the evening sky by installing hundreds and sometimes even thousands of wireless access points.

For 802.11b wireless LANs to work optimally, the operating frequency of the transmitters, also known as access points, must

be spaced out evenly between the eleven allotted subfrequencies or “channels” in the 2.4 GHz range to prevent signal contention and performance degradation. Thus your already overburdened network staff will work tirelessly to develop elaborate site surveys for optimal coverage. Or, worse yet, you’ll pay a king’s ransom for highly prized and coveted electrical engineering consultants to come in and design a theoretically sound yet practically grounded site survey (in a ritual strikingly similar to that performed by your onsite staff, no less). Irrespective of how you get there, you will covet the end result and protect it like a lioness over her cub.

So the big day comes, and you irradiate your campus with enough spectral energy to signal to even the most remote extraterrestrial civilization that intelligent life may indeed exist on earth. You’ll enjoy a brief period of jubilation as the handful of bravadoes roam around with the latest in wireless gadgetry. And then the inevitable will happen. Someone will have the audacity to go out and buy a \$300 personal wireless access device and interfere with your six- or seven-figure wireless network.

Most written campus policies do not even approach the level of detail or sophistication needed to

provide an appropriate recourse when such a conflict arises. Sure, one might argue that the Patron Saint of Approved Network Attached Devices and Other Lost Causes must bless a device like an access point before it can be added to the network. But what happens if the individual doesn’t connect the rogue access point to the network, preferring to use it as a standalone, private communication channel between his or her computer and laptop? What happens if the culprit is not an access point at all but a faculty member with a 2.4 GHz wireless phone in his or her office or a department with a leaky microwave oven in the common lounge area? Regardless of how the interference comes about, now the question is what to do about it.

The issue is not how to ban offending devices but how to gain control of the spectrum itself. An institution must stake out the 2.4 GHz spectrum (and the 5 GHz spectrum when the 54 Mbit 802.11a standard is implemented) as an “institutional resource” to be governed appropriately. Otherwise, network staff and policy officers will always be on the offensive trying to keep your investment in wireless networking functioning. But conflicts will arise, of course. And in some cases, the offending device will be used in a legitimate instructional or research capacity. In such cases, the network staff will need to work with the individual to reconfigure access points in the affected area to eliminate (or at least minimize) frequency contention.

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Recently, on the EDUCAUSE CIO listserv, I asked whether schools had taken the necessary steps to gain control of their wireless spectrum. With the exception of Carnegie Mellon University, a well-known leader in wireless networking, no schools responded affirmatively. (For CMU's spectrum policy, see <<http://www.cmu.edu/computing/wireless/airspace.html>>.) One school, located in the heart of a large metropolitan city, indicated that although it had recognized the need to do so, a large portion of its spectral interference origi-



nated from outside the campus boundaries, where a campus policy would have no jurisdiction.

It has been known for some time that radio waves travel at the speed of light. Known equally well is that major policy changes in academia move at a speed... well, slightly slower. The time to start the necessary dialogue is early in the wireless implementation cycle—not after you have experienced your first crash.

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