Surveying wireless networks

Wireless networks are a useful complement to a wired network, allowing network connections to be obtained anywhere within an area rather than only at fixed network connection points. However, wireless networks suffer from a number of problems that do not affect wired networks, in particular that the medium they use to transmit packets is a scarce resource subject to physical limits. Whereas the capacity of a wired network can be increased indefinitely by adding more cables, a wired network only has available a finite (and in some cases very small) number of frequencies. Since the frequency band they use is unlicensed, wireless networks must also compete with other users of the same radio band. They may also be subject to interference from accidental generators of radio frequency noise.

Wireless networks therefore need to be even more carefully planned than wired networks. They must take account of the surrounding environment to a much greater degree. Wireless surveys are a vital tool in planning and managing wireless networks: if a wireless installation is not based on a survey and supported by regular re-surveys then it is likely to provide a very unsatisfactory service.

This Technical Guide aims to provide all the information needed to perform wireless surveys and design networks around them. It begins with some basic information about wireless networks and their radio transmissions, then looks at the tools that are needed to perform a survey, and finally the processes of surveying and planning a wireless network.

Various tools, both free and commercial, are used as illustrations in the document. Mention of a particular tool should not be seen as a recommendation: these are merely the tools with which members of Janet's Wireless Advisory Group and their colleagues happen to be familiar. Thanks are due to the members of that group who have contributed to the document and also to the vendors who have provided screenshots and other information. Copyright in those images is held by Cisco® and AirMagnet® respectively.

Wireless Standards

The Guide is concerned with wireless local area network standards in the IEEE 802.11 family. A full list of these standards can be found in Janet's factsheet on Wireless 802.11 Standards [1] . The most commonly used standards, IEEE 802.11b and 802.11g, use the same frequencies in the 2.4GHz band and have the smallest number of separate frequencies available to them, so surveying is most critical when using these technologies. The same principles apply to the IEEE 802.11a standard; however, this uses a different frequency band, 5GHz, with more separate frequencies and, at the time of writing, fewer applications competing for the same frequencies. Surveying is still important for IEEE 802.11a, but the resulting installation plans are likely to be easier to work out.

Links

[1] http://community.ja.net/library/advisory-services/wireless-80211-standards