

# Take the worry out of your wireless network

Setting up a school wireless network isn't as simple as just buying some kit and plugging it in. Expectations are changing and you need to think long term if you want to get it right, writes Lee Suckling.

"In the last five or six years, wireless networking in schools has grown around 70 per cent year-on-year," said Jack Tan, Business Development Manager of Connector Systems. "This year – because of the affordability of netbooks and increasing availability of Wi-Fi capable mobile devices – we expect wireless networks to increase two or three-fold."

Not only is the use of wireless growing but also the way it's being used is changing and this is providing challenges for those charged with maintaining and developing networks. Much of this change has been fuelled by demands of mobility.

"From a teacher's perspective, a lot of flexibility is given with teaching methods when wireless networks are accessible," said Gareth Taylor of Cisco Systems NZ. "A science teacher can be outside with students looking at plants, while displaying information about those plants on Wikipedia at the same time."

Wireless networks have existed in schools for nearly a decade; however, the last two years have seen renewed interest and new possibilities – owing to mainstream in-home integration of wireless networking, and an expectation of wireless solutions by both students and teachers.

"Now, schools can have both staff and students online simultaneously with wireless, and curriculums can be changed to enjoy the benefits of that," added Taylor.

## What are the common forms of wireless networks in schools, and how do they function?

Single Wi-Fi zones or 'access points' (such as a staffroom Wi-Fi zone) function just as home wireless access points do, and are not suitable for wider student use. Their range covers just 20 or 30 metres, and can only handle a handful of logons at a time.

School-wide wireless coverage can be a difficult system to implement, but it's something that's becoming necessary in many educational environments.

"Instead of connecting to individual access points, students and teachers can roam around a campus and remain constantly connected without faulting," said Tan. "Users don't know when they are changing network area names – known as SSIDs – so they never receive 'cannot connect' messages for specific access points."

This is known as 'pervasive wireless', which is a form of ubiquitous computing.

"It moves us away from autonomous access points to a 'managed' environment," said Clive Francis, Educational Account Manager of EdTech. "When pervasive WLAN controllers are implemented, they are used to provide central management of radio signal strength, frequencies, and roaming – giving the best use of available bandwidth."

## What are the problems with increasing existing networks, instead of moving to pervasive systems?

The greatest issue for educational providers with increasing the capacity of their current wireless networks is a lack of controllability.

"When schools simply increase their network to include more access points within a close vicinity, the points start to compete and fault because there is no central management [which requires a central WLAN controller]," said Karthik Subramanyam, of AISCORP.

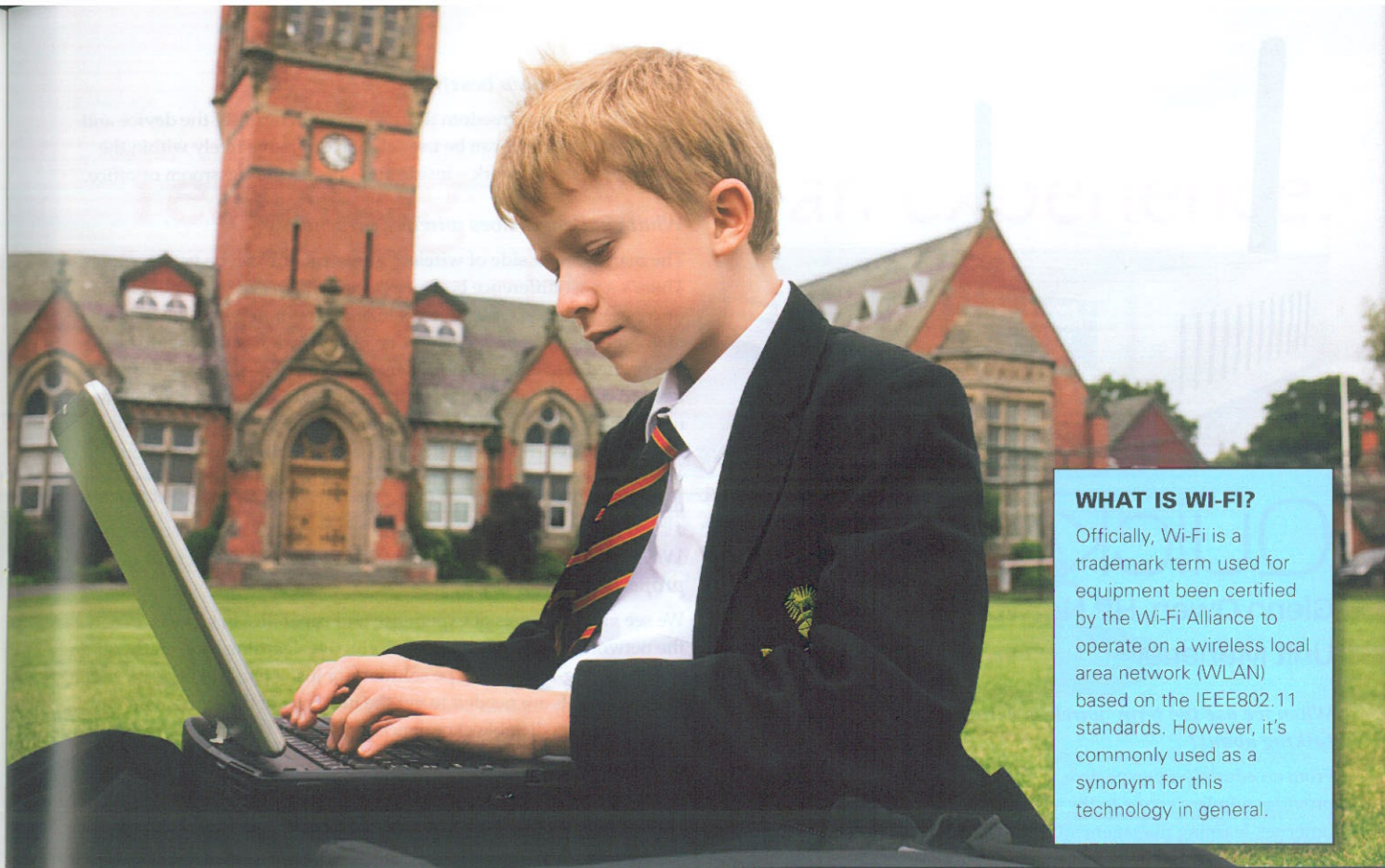
"Increasing wireless networks in this way is also a nightmare for the IT person, who has no visibility of who is on the network, and no way to centrally manage access."

Management of usernames and passwords becomes a large problem when existing networks are increased, as security here is an 'afterthought', adds Tan.

"Pervasive networking systems on the other hand are designed for an environment where security is built-in with implementation," he said. "From one central WLAN controller, the IT person can enable and disable a staff or student account easily and as needed, without needing to configure an individual computer."

The issues with increasing existing networks don't stop at security. A school's physical environment immediately brings problems with it when wireless coverage needs to be improved.

"Understanding your school's situation and predicting the radio frequency interference that it will encounter – be it nearby microwave



### WHAT IS WI-FI?

Officially, Wi-Fi is a trademark term used for equipment been certified by the Wi-Fi Alliance to operate on a wireless local area network (WLAN) based on the IEEE802.11 standards. However, it's commonly used as a synonym for this technology in general.

ovens or the wireless routers from the surrounding residential houses – can be a difficult task," said Taylor. "Not to mention trying to work around all of the concrete, glass and other building characteristics of modern school designs."

## When does ubiquitous wireless become necessary?

Standard wireless networks function on 2.4G technology which has three channels. "When you've got 60 kids trying to get onto three frequencies of Wi-Fi, things start to slow down significantly," said Tan. "So with this number of users, it is necessary to employ a ubiquitous controller (which will have both 2.4G and 5.8G capabilities) as it forces half of the users onto 2.4G and the other half onto 5.8G. This results in optimised traffic flow, reduced latency, and ultra high performance."

Subramanyam added that when any more than five access points are needed and the wireless network is used by more than 30 people at any one time, an 'Active Directory' should be implemented.

"Active Directory domains are used to manage individual usernames and passwords (for both staff and students) from one computer, and authentication can be managed to monitor content usage easily."

The biggest advancement in wireless technology this year has been the standardisation of 802.11N wireless, which allows for a six-time increase in performance. 802.11N sees wider accommodation of wireless connections, and increases bandwidth to allow for better speeds and download capabilities – making ubiquitous wireless networking easily obtainable.

"This has removed the final barrier of adoption for schools," said Taylor. "Now that we've got 802.11N ratified, leveraging the infrastructure of pervasive wireless is as easy as installing the right central controller and keeping the future in mind. Once these foundations are right, the possibilities for the future are limitless."

## What is a wireless audit?

To avoid the problems that come with increasing wireless loads, access administration and radio frequencies, a wireless audit will be promoted by vendors of wireless systems for schools.

"An audit is necessary if schools are looking to provide coverage across a large proportion of a campus," said Francis. "Even when wide coverage isn't needed from day one, a wireless audit will see the big picture and plan backwards."

A wireless audit on a 500-student campus will take roughly half a day. It involves testing of access points and using software to assess signal strength by walking around the grounds. Nearby wireless devices and other interferences (which can include objects like metal filing cabinets) will be detected, and optimal placement of access points will then become apparent.

Cabling and switch gear options will also be assessed - to allow for an increased 'backbone' for the wireless system - and the vendor will then present the best option to the school.

## How should schools seek advice about wireless systems?

"Vendors should recommend enterprise-level components as wireless solutions for schools, not small business 'SME' solutions," said Francis. "They come with a higher cost, but they won't skip a beat in years to come. Schools need to think long term when implementing something this big."

It's also advised that schools make sure the vendor of their chosen wireless system is locally supported.

"When given options for your school's wireless networking needs, find out where else in New Zealand those products have been installed," recommended Tan. "That way, you can find out which other schools have installed that system, how well it functions, and importantly, how good the post-installation support and maintenance is from that vendor. Getting that reference from a site that uses the system in the same way you will is essential." ▲

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