Standards:

IEEE (Institute of Electrical and Electronics Engineers, USA)

802.11ac

The de facto international standard for WLAN (wireless local area network) comes from the IEEE 802.11 family, the fastest version until recently being 802.11n. This is still widely found but is now being replaced by 802.11ac.

Advantages of 802.11ac: Compared with earlier versions it offers the fastest maximum speed and there is scope for this to increase still further in the next few years, up to a theoretical maximum just short of 7Gbps.

802.11ac wireless networking hardware is now similar in cost to 802.11n and you even see a 5-30% improvement in performance when this hardware is handling 802.11n devices.

Meru Networks

For video case studies of Meru technology, search **YouTube** for **Meru Networks UK and Ireland** and **markhowler**.

Primary: Southwark Primary School, Notts

Secondary: Longfield Academy (1400 iPads), Newent Community School and Sixth Form College, etc

IP Performance

IP Performance has been delivering specialised infrastructure solutions and integrating complex network systems since 1994.

They deliver internet/networking services as well as network management and technical support services - 24 hours a day. Their clients range from the largest telecommunication service providers and blue-chip corporates, to the education and local government sectors.

IP Performance is registered with and certified to both ISO 9001:2008 Quality Management Systems and ISO 27001:2005 Security Management Systems compliance.

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WiFi - Notes

Written for the education sector

Talking to installers…

Where do you need WiFi coverage?

What **minimum signal strengths** do you need (typically 67dB for an iPad or mobile phone, it can be as much as 85dB for a desktop PC).

What is the **maximum number of simultaneous users** that you must support?

What is the **maximum login time** that you can tolerate for a given number of users?

What are the most demanding tasks and software that you want the network to be able to support (usually watching or editing video) and for **how many** simultaneous users?

Glossary

BYOD	bring your own device
WAP/AP	wireless access point
WiFi	wireless networking (also WLAN)
WLAN	wireless local area network

ip-performance.co.uk
educationvision.co.uk

Making wireless work...

Hints and tips

Dual stream, dual band wireless cards (**"n" standard**) will massively outperform single stream, single band wireless cards, for only a few pounds more.

Triple stream cards with 80MHz capability are recommended as better value for money with better future proofing, if purchasing **"ac" standard** devices.

Dongles often perform poorly, use internal wireless cards whenever possible.

Many WiFi devices use frequencies around 2.4 GHz while some use 5 GHz. Many 802.11n networks are 5 GHz only!

Turn off WiFi enabled phones as these will act as a drag on wireless performance, especially if the owner walks around.

What makes Meru's technology different?

Meru's architecture is specifically designed to successfully support a high number of users and is well suited to the demands of academic environments.

Meru have produced tools to support the secure implementation of BYOD (bring your own device).

Traditionally, each user's device decides which AP to connect to and when to switch between different APs. With Meru the network decides which AP will provide the best connection and their Air Traffic Control software manages the connections to achieve optimum performance. This is a *virtual cell* architecture.

Meru allocates each device a set period of time, to communicate at its highest available speed (rather than a set amount of data), so slower devices are not allowed to clog up the network.

Summary

Meru's WiFi incorporates five key features:

- Single channel
- Air Traffic Control
- Fair Air Time
- Virtual cell
- Virtual port

Leaflet design © Education Vision Consultancy Ltd 2012-14

Traditional WiFi

Issues

It was originally designed for low numbers of users, either at home or for convenience use in offices. It is not readily scalable to effectively support larger numbers of users.

Connection speeds rapidly reduce as the number of users and the distance from the AP increases.

On a traditional WiFi, the speed of all devices is governed by the slowest one.

Connection speeds reduce with distance from the AP, slowing the speed for all users (**device stickiness** is also a factor here).

"Fair access" is typically controlled by allowing each device to transmit a set number of data packets, regardless of how fast each device is.

Device "stickiness"

Think of a home WiFi user, moving about their home. Once connected to their home hub, they want to stay connected to it.

"Stickiness" can be thought of as a reluctance to move to another AP (eg a neighbour's) after your initial connection.

You may be able to adjust this as part of device configuration.