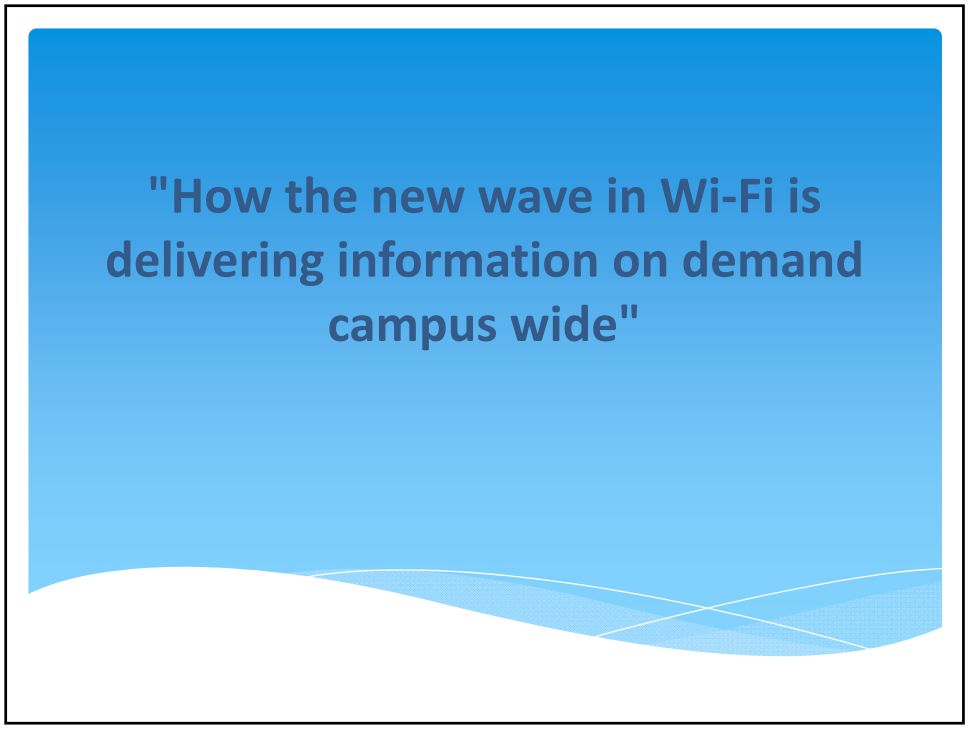
"How the new wave in Wi-Fi is delivering information on demand campus wide"

A Few Things First…

- Our chosen system is hard to talk about
  - It just works
- Very little time is spent working on the wi-fi system
- This is still a work in progress
- What we have achieved (as of yesterday)
  - 100% of our teaching rooms now covered
    - (Agriculture building has just been connected using mesh)

About Chevalier College

- 100 Acre Campus
- Catholic Independent School
- Located in Bowral – Southern Highlands of NSW
- 1180 Students
- 115 Staff - Teaching & Administrative Support

Where we stood in 2009 - Computers

- Admin support staff
  - 25 Windows Desktops
- Teaching Staff
  - 95 iBook Laptops
- Students
  - 120 iBook and MacBook Laptops
  - 130 eMac & iMac Desktops

Where we stood in 2009 - Network

- Two physical networks (Admin and Education)
  - Need to have the two networks talking
- Many areas using unmanaged switches
- Wi-Fi
  - 16 Airport Extreme Access Points
  - Each Individually managed
  - One Unencrypted SSID
  - Only Security was MAC address filtering
  - Took 45 minutes to add a new computer to all APs
  - Power supplies starting to fail

The Initial Challenges

- NSSCF Funding Round 2
  - 130 Computers to be replaced
  - 140 Additional computers to be purchased
  - On-Cost Funding Included
    - *Rare opportunity to update aging equipment*
    - *Future equipment could take advantage of Wi-Fi*
    - *Wi-Fi cheaper per computer than cabling*
    - *Wi-Fi also provided greater flexibility within classrooms*

The First Steps

- Where do we start?
  - Network Infrastructure or Physical Computers?
  - Physical Network
    - *Moving to Managed Switches*
    - *High traffic areas needed larger pipes*
    - *Power over Ethernet for Access Points*
      - *Discovered POE alone was not enough many APs required POE+*

First Wireless System Trial

- Chose Library as the location
- Had all the right specifications
  - Centrally Managed
  - 802.11n
  - Talked to our Radius Server
- Kept dropping out on our older equipment
  - Still had many older machines to support
  - Engineers unable to fix issue

Second Wireless System Trial

- Again had all the right specifications
- Was trialing in IT Area when First trial still conducted
- When first trial was over had new trial system configured and running in the Library
  - Took just over 10 minutes
  - Controller with 3 APs

Wireless Audit

* External company conducted site audit with aim to provide best location for APs taking into account the building types

* Buildings
  * 1940's-1960's Weatherboard
  * 1970's-2000's Double Brick

Roll-out of Wi-Fi System

- Chose Ruckus as Wireless Company
  - Vendor installed additional cabling
    - POE was big advantage in installation costs
  - Central Controller
    - Immediately able to take advantage of RADIUS server
  - Initially 40 Access Points
    - Now over 70

Computer Changes in 2010

- Replaced outdated iBooks with MacBooks
  - Teachers and Students
- Replaced outdated eMacs with iMacs
  - Used existing cabling where possible – Wi-Fi elsewhere
- Replaced myriad of Windows PCs with iMacs
  - Windows 7 with Boot Camp
- Additional 140 student accessible MacBooks
  - School decided to keep laptops on-site as shared resource.

Computer Changes in 2011

- NSSCF Target of 1:1
  - Additional 375 student computers required
- 120 existing leased computers replaced (over 4 years old)

Network Changes in 2010/11

* Moved to 802.1x Authentication
* Moved to VLANS with Separate SSIDs
  * A method to connect the ADMIN network to the EDUCATION network
  * Separate teachers computers from students
  * Greater internet filtering and control
  * Could take advantage of Layer 3 Firewall at Access Points

Some Issues…

- 802.1x Issues
  - OS X required use of generic system username and password
    - Would not pass through login credentials
  - When MacBook battery goes flat the clock resets
    - Does not trust 802.1x certificate
  - Almost all systems and devices have a unique way of supporting 802.1x

More Issues…

- Internet Connection
  - Most staff and students initially thought Wi-Fi network was slow
    - This was due to the internet connection not coping with 100+ users over shared ADSL
  - Joined HHERN network
    - Content Filter was then bottleneck

And More Issues…

- Additional Computers
  - Servers had maximum number of simultaneous network logins
    - Not issue for teaching staff – their accounts were local
    - When limit was reached logins slowed dramatically
    - This required changing logins to a re-directed folder method

Personal Devices

- School allows student to add their device to network with permission from parents
  - SSID and VLAN configured for guest devices
    - Filtered to only allow web traffic and mail connections to school email server
    - MAC address added to RADIUS server for each student device

Where are we heading now?

* Moving to Dynamic PSK system for personal devices
  * Will allow students and staff to self-subscribe to the school network without IT assistance
* Backbone upgrades to allow for greater throughput