

# AAUCHO Conference 2008

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## *Issues and trends in the provision of Internet services in student residences*

Abstract of a paper presented by Neil Thompson,

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## 1.0 TRENDS

### 1.1 'Nice to Have' a decade ago to 'Must Have' now

Less than 10% in 1998 to greater than 85% in 2008 – The growth that we have seen in the numbers of students who subscribe to integrated in room broadband Internet services at student residences.

It's a **right of entry** I am told from my research students now make accommodation decisions based on Internet services.

### 1.2 Hardware

Hardware considerations:

- The hardware you use today may not be available or supported tomorrow
- New hardware will invariably have different versions of embedded operational software – attempts to 'hot swap' a failed device may result in it being incompatible with other hardware or software

Some real-life experiences of such hardware issues:

*The restriction of the creation of a Virtual LAN separating each user from the other. Everyone's system was open to others and it took some swift work around to remedy while we railed the supplier!*

*Equipment failure caused by heat in a communications room after a long hot summer. Ventilation and inadequate storage caused device failure sufficient to bring down 3 student residences. Buying more is only the first part of the remedial pain!*

### 1.3 Software

For residents it should mean ease of registration, on-line payments, immediate and continual access to the Internet 24x7.

From a business level the software should be capable of providing payment and accounting systems, payment management and reports, automated data allowances, speed management, quality of service control, virus control, security, usage reports, support information and support ticketing.

#### **1.4 Backup, storage and disaster recovery**

The 'virtual environment' is a trend worth knowing about, especially for those who contribute to planning in the IT area.

In essence, virtualisation lets you transform hardware into software. It creates fully functional virtual machines that can run their own operating systems and applications on top of a "real" computer. Bottom line is you can contract out the running of a data centre requiring specialist skills, communication links and premises. The virtual centre has your machines floating in the ether and not fixed to any single computer at a single location.

AccessPlus has transferred much of its old data centre operations to the virtual environment and are delighted with it. We're floating between Brisbane and Melbourne, with back up in Singapore! This adds security and reliability, less administration and delivers peace of mind.

#### **1.5 Telephony**

The Pabx has moved from a revenue centre to cost centre.

The trend is to Internet telephony – Skype (casual), Voice over Internet Protocol or VoIP (structured).

These services work best over wired solutions (eg. copper wire and data cabling). Over wireless, the service quality can be likened to a cordless phone – it may work, but it's likely to be patchy. There could be numerous computers sharing the connection and transferring data which means jitters and variable latency.

## 1.6 Educational vs Leisure Internet usage

Considerations:

- Growing popularity of Internet for leisure
- Increased leisure usage = increased bandwidth requirements = increased cost
- Free vs. User pays for students

While the main reason to provide Internet services may have originally been for educational purposes, it is now used more often for recreation and communication. This include gaming, music, movies, Facebook, Myspace, Youtube, TV and more.

Some Universities are questioning the burgeoning Internet demands of residences. They call into question the need for Universities to continue to subsidise what is clearly recreational use when the cost of Internet provision and maintenance is so high.

Should students expect to pay for the non educational part? Most residences seem to think so because they do charge to some degree and most have some form of limitations on use.

Some residences have a determined policy to limit internet use (so despite the capability of the Internet its use can be and is being restricted locally). Limitations come in many forms including, filtering, port blocking, time, speed, cost, acceptable use policies.

The trend seems to lean toward lessening restrictions, or restrictions that are motivated by the practical reasons of available bandwidth and cost of data.

Technical infrastructure, such as packet shaping, can be imposed to ensure fairness to all in the distribution of available bandwidth.

## 1.7 Bandwidth and Data needs

The growth in Internet use for leisure activities and online communication means a trend towards 'more bandwidth and more data please!'

The cost factors are:

- The link
- Speed
- Data

Much is made of the broadband rollout around Australia. Believe it only when you have it. Fibre is not everywhere not even in CBDs including our nation's capital!

For residences of 500 or more or with very high Internet needs forget ADSL – you will probably need a major service (mega link/fibre). This can mean high costs of provisioning (around \$60,000 for the initial provisioning, depending on whether exiting cabling is in place or needs to be laid), high monthly cost for speed and data, long term commitment and relatively inflexible plans.

Your University may have better buying power (or have specialist services such as Aarnet) but they may come with restrictions.

## 2.0 WHAT ARE YOUR OPTIONS: Infrastructure

### 2.1 The Options

Wired

Wireless

A Combination

### 2.2 Some Issues

- Security
- Existing cabling
- Building structure and materials
- Service requirements – eg. Wireless hotspots in common areas
- Cost of installation – this will depend on factors such as existing cabling and building structure and materials

### 2.3 The current situation

- Wireless is generally not, and will not be, the core system for delivery to students in residences
- Most campuses offer some wireless services in common areas in residences
- There is increasing demand for wireless around campuses and in recreation and common areas
- There is increasing demand for it in rooms
- Some are using wireless because there are building logistical issues and cost prevent a cable solution
- Wireless was discontinued in some residences
- Some campuses will not allow wireless , due to reasons such as security or reliability

## 2.4 Overview

### 2.4.1 Wired

Wired solutions use Ethernet (data) cables, or in the absence of data cabling, copper cables like telephone lines.

Ethernet hubs and switches are extremely reliable, and are part of technology that has been continually improving over several decades. LANs have functioned well in educational institutions for decades.

Copper cables require different technology and different equipment. It is more expensive but may be cheaper than running data cable.

BPL (Broadband over Power Lines) is not yet a trend and probably not yet ready to roll out in the student residence environment.

Wired networks are rated higher for reliability and performance than wireless – they are renowned for their stability, reliability, lack of atmospheric interference, no interference caused by spectrum congestion, shadows, problems with mobility and foreign networks, and security.

### 2.4.2 Wireless

Consumers love it – mobility is the primary benefit of wireless.

Wireless networks are convenient when there is insufficient cabling and the cost of cabling high, or building renovations are imminent.

Wireless is often considered because of ease of installation (actual and perceived) and growth capability.

The trend is to considering both then use whatever you can afford! Remember that anything you do with infrastructure or equipment that it was not originally intended to do will be a compromise.

Two of the biggest issues with wireless are performance issues and security concerns.

Performance issues include black spots, poor signal and drop outs. Dead spots occur within buildings depending on their materials of construction. In the line of sight between the access point and the wireless device, each time the radio wave passes through a solid the signal attenuates. Denser materials attenuate more than less dense materials. Metals, particularly steel, used in building construction may absorb or attenuate most of a radio signal, creating a dead spot in its radio shadow. Even vegetation will impact on the signal especially dense vegetation which is even denser after it rains!

Security is touted as one of the biggest issue against wireless. Many institutions will not permit wireless services for potential security reasons.

Wireless is certainly capable of being secured. There are degrees of security like peeling an onion. You have to keep in mind the motivations for security, what you are trying to secure and why, and the consequences of breach.

You will want quality performance with streaming lectures, VOD and streaming TV as well as Internet and VoIP traffic.

### **3.0 WHAT ARE YOUR OPTIONS: Business Models – *Charging models in residencies from Free to User pays***

#### **3.1 The options**

##### **3.1.1 College provided**

University provides

University provides as an ISP – ie. Brings link, bandwidth and data to doorstep of the residences

##### **3.1.2 Students make their own arrangements**

There is no integrated system and students make their own arrangements

An integrated system exists but residents choose alternate service provider

##### **3.1.3 Outsourcing (private outsourcing and outsourcing within University)**

Residence outsources the service entirely

Residences run by private management company (outsourced management) who then looks after a system themselves, either through cooperation with University or through outsourcing

##### **3.1.4 A combination of the above**

This may be with or without revenue share

#### **3.2 Some Issues**

- How much the University is prepared to pay for student leisure use
- Whether revenue is an aim
- The type of link into or available for the college, eg. Whether fibre is available, the distance of the College from the nearest exchange
- Enabling telephony services such as Skypye and VoIP
- Integration with the University Intranet
- Desired service restrictions

### 3.3 Current Situation

- Most residences have some part of the service provided by the University if they are attached to one
- Most of those attached to a University have to pay something to it, from connection fees or from usage revenues
- Independently managed residencies cooperate with IT departments of University to provide free data transfer within the University intranet where possible. There is no set model for independent managed residences as local technical environments vary so greatly.
- Sometimes the revenues are kept as the residency has the responsibility to maintain its own infrastructure and active equipment.

### 3.4 Some examples of business models

*These are models from conference attendees alone, and provide an indication of the myriad of models that exist across the whole of the student residency market.*

#### 1 Provided by University

Free basic, then pay as you go

- Free 180MB month (recently increased)
- If students want more they pay extra
- Restriction on ports used eg ICQ chat, Skype File sharing monitored
- No alternative options – only on site service
- No direct dial phones, dialup or VoIP

#### 2 University provided bandwidth and data – College billed by University

- Fee paying > 1000 residents need to be kept happy
- Charge students \$55 semester x 2 semesters
- College handles billing and payment

#### 3 Common area computers and data ports provided only

- No in room service
- Restrictions on usage times – post lunch to midnight
- Students pay for use
- Trialled wireless and didn't work. Recognise need to cable but cost is issue

4 Provided by University but limited to intranet traffic

- Pay for external Internet @ 2.5c Mb (Was 4c Mb)
- Students pay upfront and admin done in college
- Have IT admin and 2 students who are paid weekly for tech support
- Currently need to improve cabling (Is CAT3 and redoing to CAT 6). Problem with old buildings (40 years) and cost
- Know that more educational services to be delivered through network eg Video streaming
- Looking at wireless but dismissed for in rooms
- Need to make some money as residence runs as independent and must run as a business
- Note loss of phone revenues to stage it is now a cost
- Students have University provided infrastructure to the college
- From a point at the college to the rooms is college responsibility
- 2 payments made – connection and data
- University charges per connection per quarter
- Charges per student per quarter

Limitations expressed

- Students need to go to campus to pay/ No access to payments on line
- Recreation (gaming, Skype etc)
- Conscious filtering program from black listed sites
- Use of more than one device on system
- Students response is too many restrictions eg IT and engineering students
- Problem with wireless reaching rooms
- Connection fee is part of semester fee
- Verifying charges from University records is constant issue for bursars

5 Provided by University

- Students have limited service and can buy more data by going to University
- Pay \$180 year for phone and data
- Very spread out residences
- All fibre optic connected
- Students pay cash at admin
- Used to have big hassles before new infrastructure
- Structure was expensive but spend the money and get the benefits
- Runs on breakeven now may look at business model
- Manager went to US to look at colleges – Surprised that US not streets ahead on how they operate – nothing mind blowing. Some toys eg esuds – tells students when washing machines are available!
- Use VoIP (biggest problem is with power packs) and cable TV

6 University provided service

- Pay connection and download fee @ 2.5c MB
- Prices have come back as University has good buying power
- Cabled
- No restrictions, free internet between colleges (LAN)
- University provided helpdesk Division of Information Resources
- College takes payment and credits account – management system clocks it
- Colleges and IT are part of same organisation makes cooperation for common purpose easy

7 University rolled out wireless

- Covers rooms and general campus
- Some residencies have no cabling infrastructure
- Cost \$2.1 million
- AUP only to students
- Have had problems with disconnections/dropping out, but is in process of being upgraded

8 Wireless installed of February this year

- Multiple buildings, layout issue, age of buildings and cost of cabling contributed to wireless decision
- Spend \$100k about to spend more
- Excited about it and works well
- Students have free access and they happy to have as part of living environment
- Some streaming of lectures
- Computer lab and 12 PCs

9 Have wireless

- Provided by University
- Had quite a few hiccups – goes down quite a bit and dropouts
- Speed frustrates some students but happy to have something

10 Students get charged but it is very cheap

- They run at loss intentionally – Philosophically against charging
- They make surplus but not for profit
- Free GB download per year
- Says minority use over the limit and pay anyway so few limitations
- Have digital TV, but no TV points and no cable except in recreation area
- Conscious of Pastoral issues make students part of a community and not cell like in rooms

11 Considering full outsourcing

- Internet is of absolute concern
- 50% of total capacity of University is in the residences
- Speed shaped to 512Kb
- Buy packages at reasonable cost 10 GB

12 Outsourced management group

- It is now a right of entry
- Focus is culture, environment, skills, resources
- Cost not as important as reliability and speed
- No standard model
- Students regard cost ok as long as reliable
- Example of sense of community when Internet not working when residents check in

Thank you to Indigenous artist from the Sunshine Coast David Williams for his artwork on our new website.

Thank you AACUHO for the invitation to speak at your conference.

**Neil Thompson**

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**AccessPlus Pty Ltd**