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# Communication Services Update 2010



Greg Sawyer  
Manager Communication Services  
IT Infrastructure, IT at UNSW

# Agenda

- Communication Services 2010
- Facts and figures
- Question time

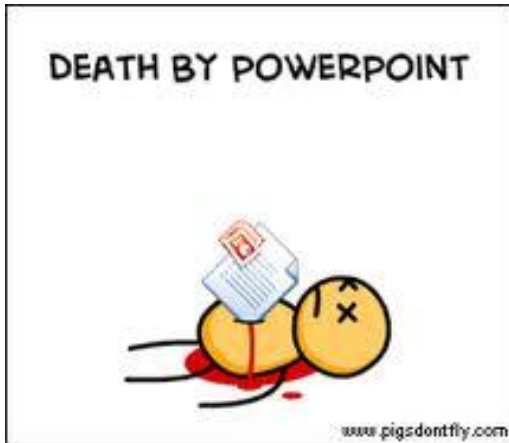


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# Alternate agenda

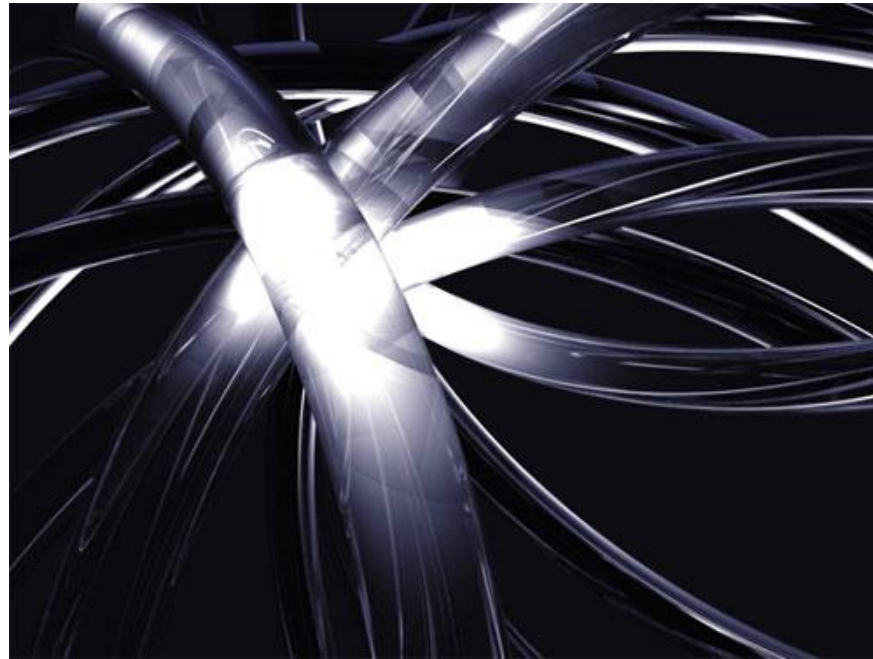


It's a journey, not  
a destination



# UNSW Research Network

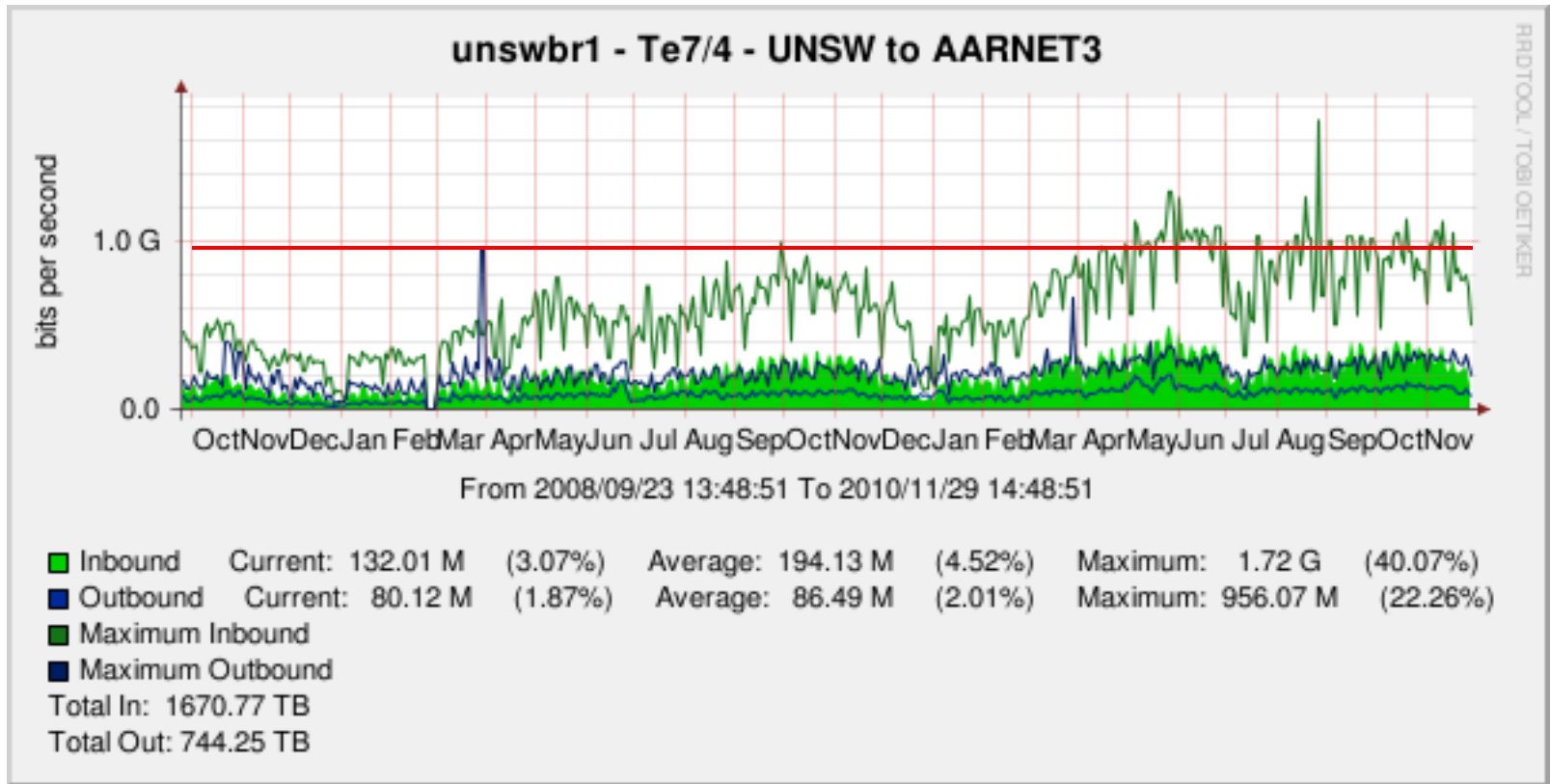
In 2009 IT provided 10Gbps redundant links to aarnet and onto the Internet



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# UNSW Research Network

In 2010 UNSW is using the links

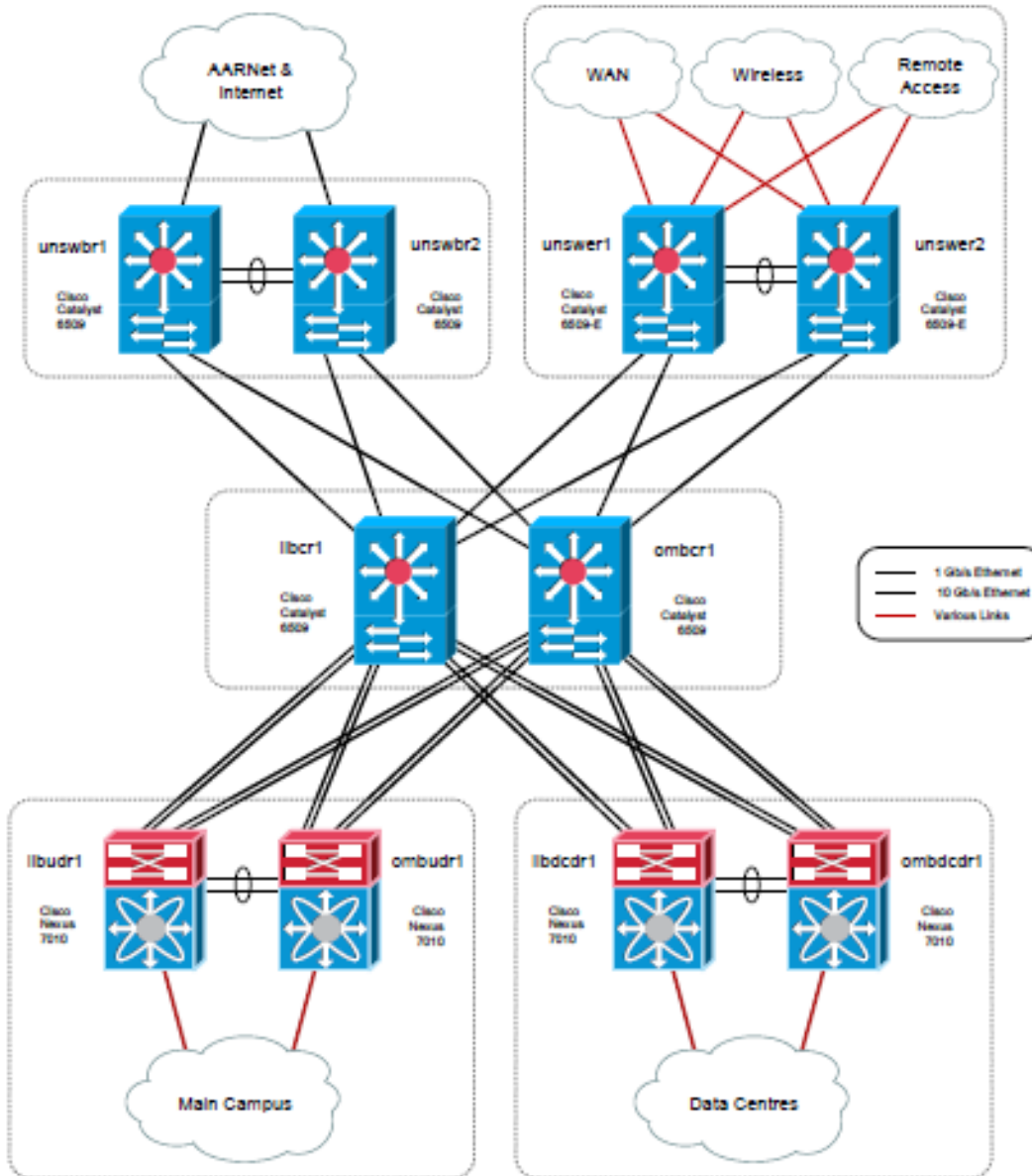


# UNSW Research Network

- Key features
  - UNSW Network 20Gbps Core
  - COFA, St Vincents and Randwick Campus 10Gbps
  - Increased penetration of 10Gbps to key Research Buildings
  - Decreasing cost of high speed connectivity



# UNSW Core Network

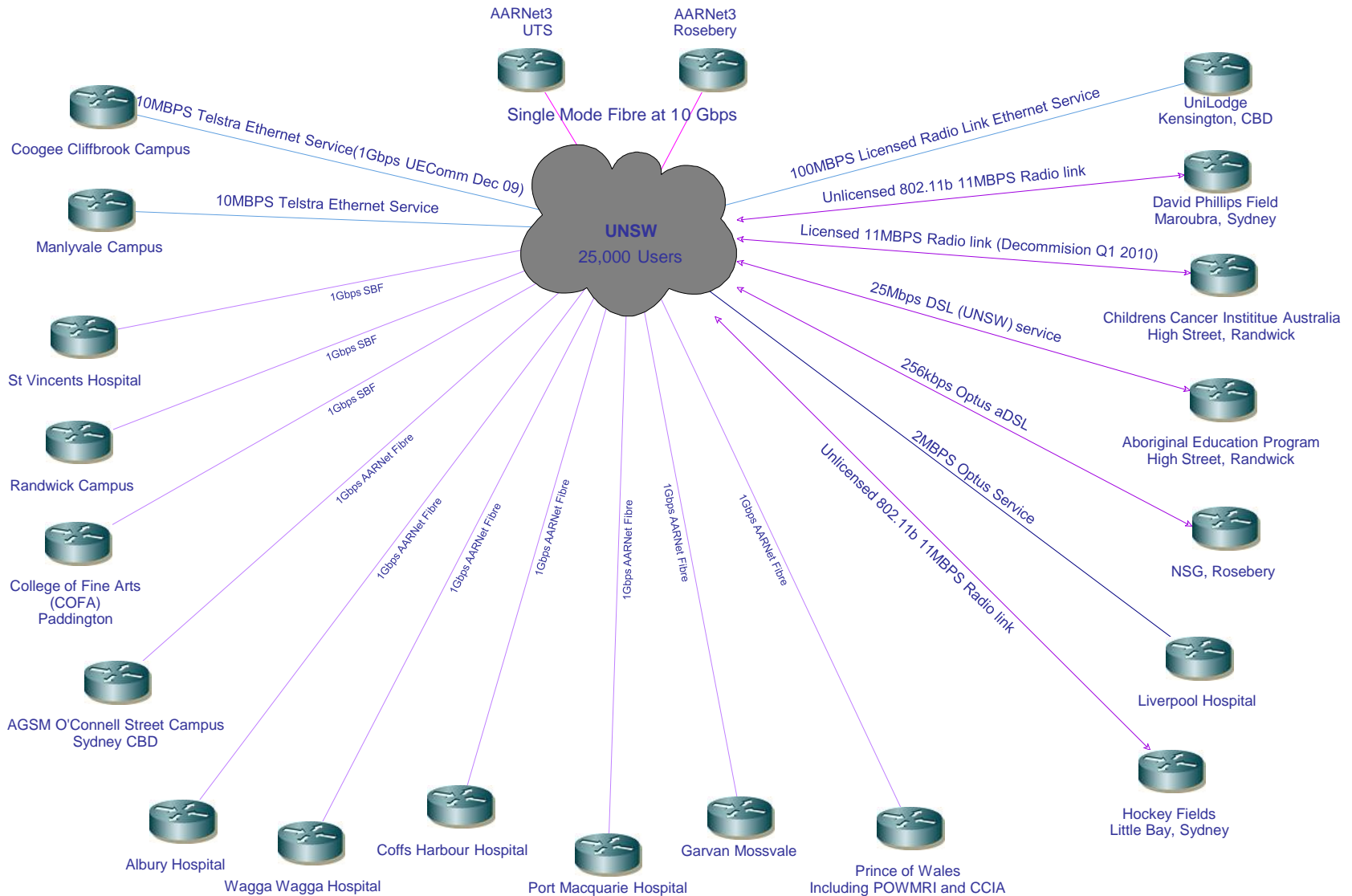


- 20Gbps Core
- Nexus 7K
- 100Gb capable
- Fast switching

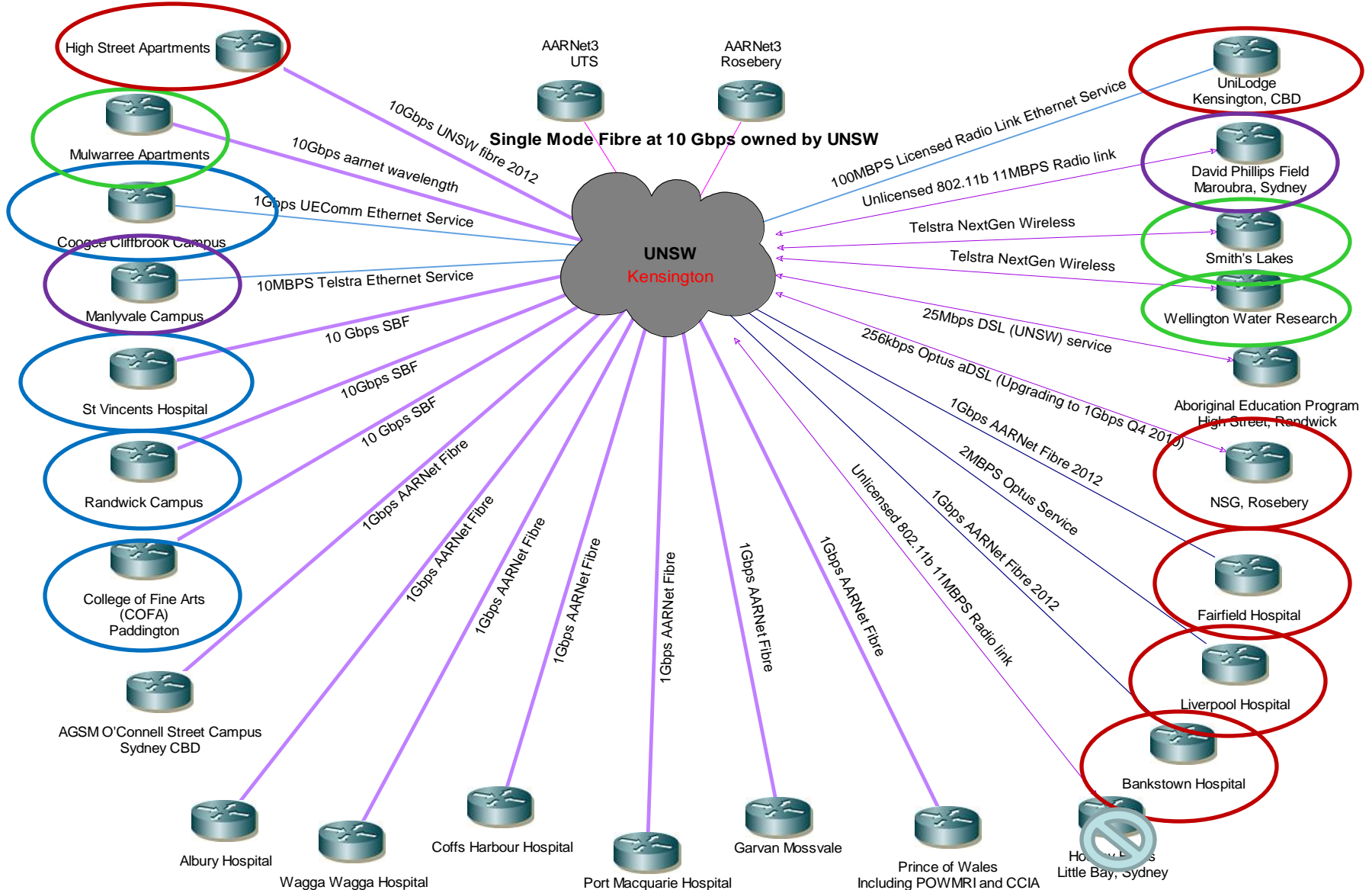




# UNSW WAN Sites 2009



# UNSW WAN Sites 2010



# UNSW Research Network

## 2009 UNSW Buildings connected at 10Gbps

- Bioscience Building
- Samuels Building
- Old Main Building
- Quadrangle Building
- Wallace Wurth Building
- Red Centre
- K17 (CSE) Building
- Mathews Building
- C25 Lowy Cancer Research Building



# UNSW Research Network

## 2010 UNSW Buildings connected at 10Gbps

- **Bioscience Building**
- **Civil Engineering Building**
- **Samuels Building**
- **Scientia**
- **Mechanical Engineering**
- **Chancellery Building**
- **Old Main Building,**
- **Quadrangle Building,**
- **Wallace Wurth Building**
- **Red Centre**
- **K17 (CSE) Building,**
- **Blockhouse**
- **Squarehouse**
- **Botany Street (Arthur Street)**
- **Electrical Engineering**
- **Kensington College**
- **Goodsell Building**
- **Rupert Myers**
- **Mathews Building**
- **C25 Lowy Cancer Research Building**



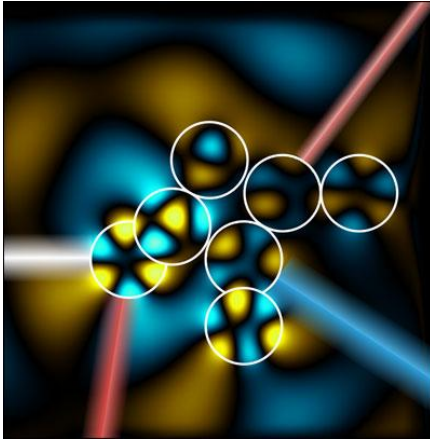
# A guide to downloads

## The Theory of Downloads

	Short video	TV Episode (45 Mins)	Data File	Research Data
Size (Mbytes)	20	500	1,000 (1Gb)	1,000,000 (1Tb)
Broadband (3Mb)	58.7 seconds	24.4 minutes	48.8 minutes	48889 minutes (814 hours or 33 days)
10Mb	17.8 seconds	7.4 minutes	14.8 minutes	14815 minutes (246 hours or 11 days)
50Mb	3.6 seconds	1.4 minutes	2.9 minutes	2963 minutes (49 hours or 2 days)
100Mb	1.8 seconds	0.75 minutes	1.4 minutes	1481 minutes (24 hours)
1Gb	0.3 seconds	0.07 minutes	0.14 minutes	148 minutes (2.5 hours)



# 2009 Network Connectivity



- **UNSW standard connections are:**
  - 10/100Mb to the desktop
  - 1G connection from the edge switch
  - 1G Building connection (10Gb connections for 8 buildings Q4 2009)
  - 20G Core Network (20Gb Q4 2009)

- **Network switch pricing (guide only):**
  - 48 Ports 10/100 with 1Gbps uplink \$1,700
  - 48 Ports 10/100/1000 with 1Gbps uplink \$4,750
  - 48 Ports 10/100/1000 with 10Gbps uplink \$14,000 with \$10,000 additional cost for first switch in a cabinet (blade required on Building switch – supports up to 6 switches for 10Gig enabled buildings)
  - Building switch 10 Gig connectivity \$50,000
- **Costed upgrades are available to the business unit**



# 2010 Network Connectivity



## UNSW standard connections are:

- 10/100Mb to the desktop
- 1G connection from the edge switch
- 20 Buildings x 10Gig connected
- Remaining 1Gig Building connections
- 20G Core Network

- **Network switch pricing (guide only):**

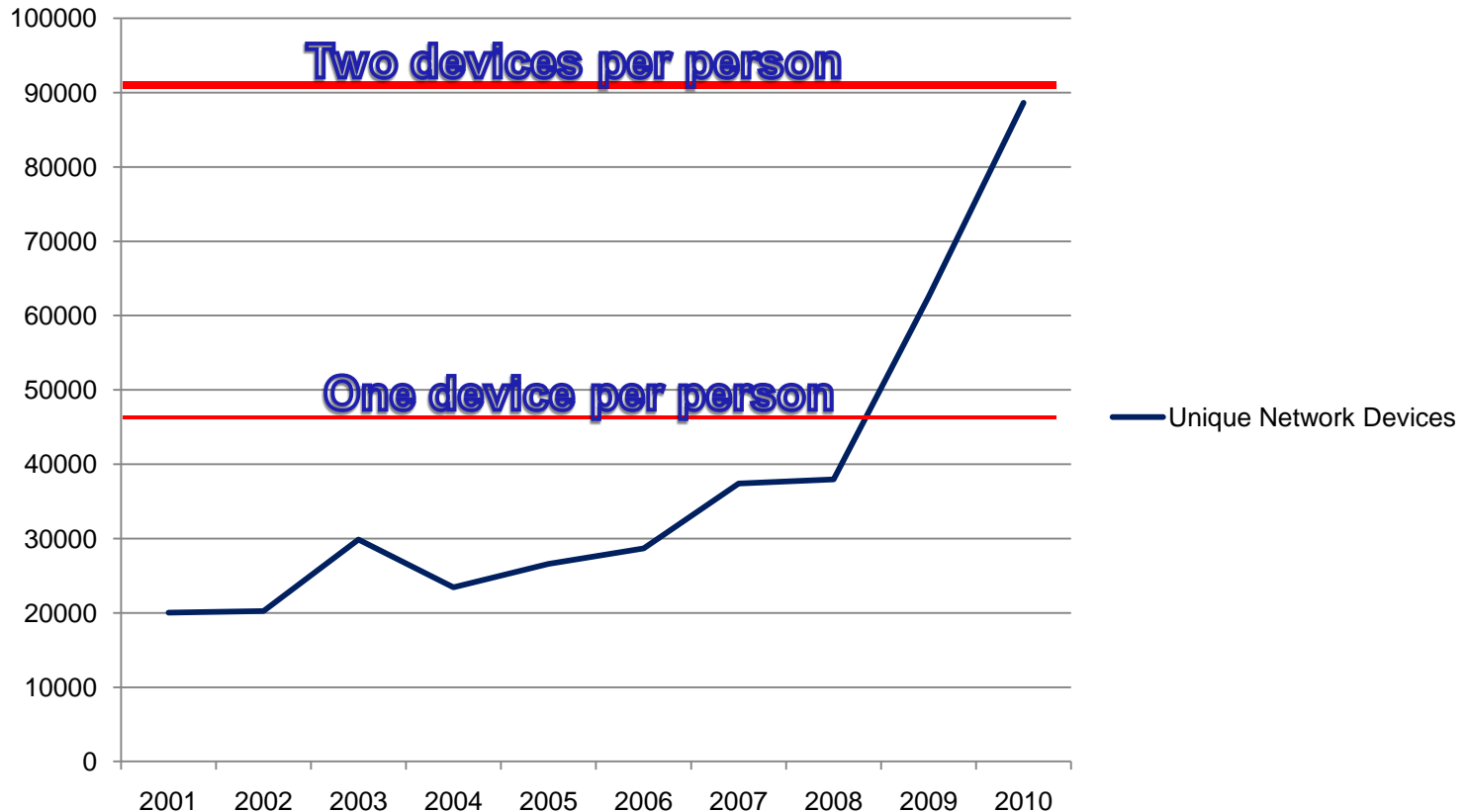
- 48 Ports 10/100 with 1Gbps uplink \$1,500
- 48 Ports 10/100/1000 with 1Gbps uplink \$4500
- 48 Ports 10/100/1000 with 10Gbps uplink \$5,000 with \$8,000 additional cost for first switch in a cabinet for 10Gig blade plus fibre, if require (blade required on Building switch – supports up to 6 switches for 10Gig enabled buildings)
- Building switch 10 Gig connectivity \$30,000

- **Costed upgrades are available to the business unit**



# 2010 Network Connectivity

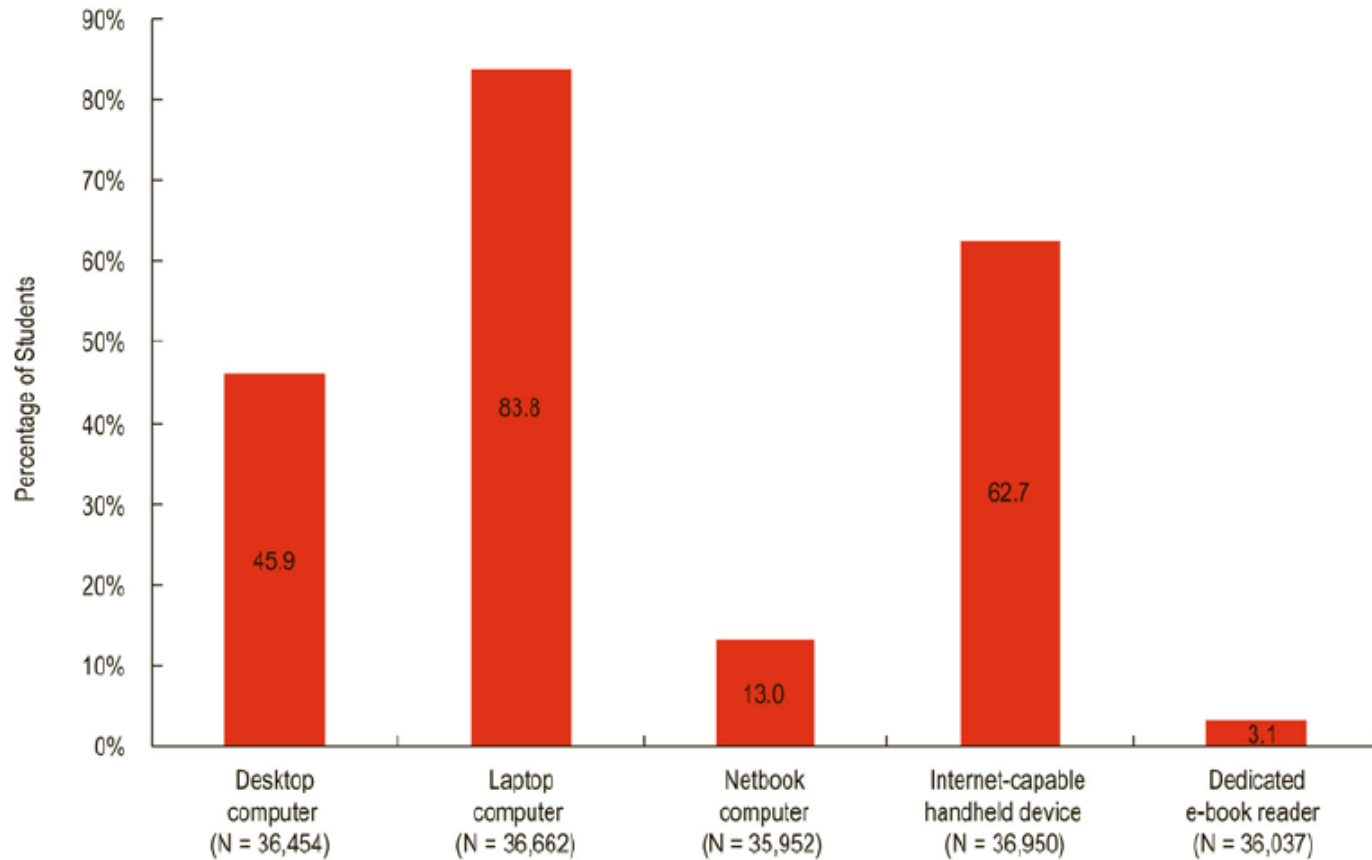
## Unique Network Devices





# 2010 Network Connectivity

Figure 1. Overview of Technology Ownership

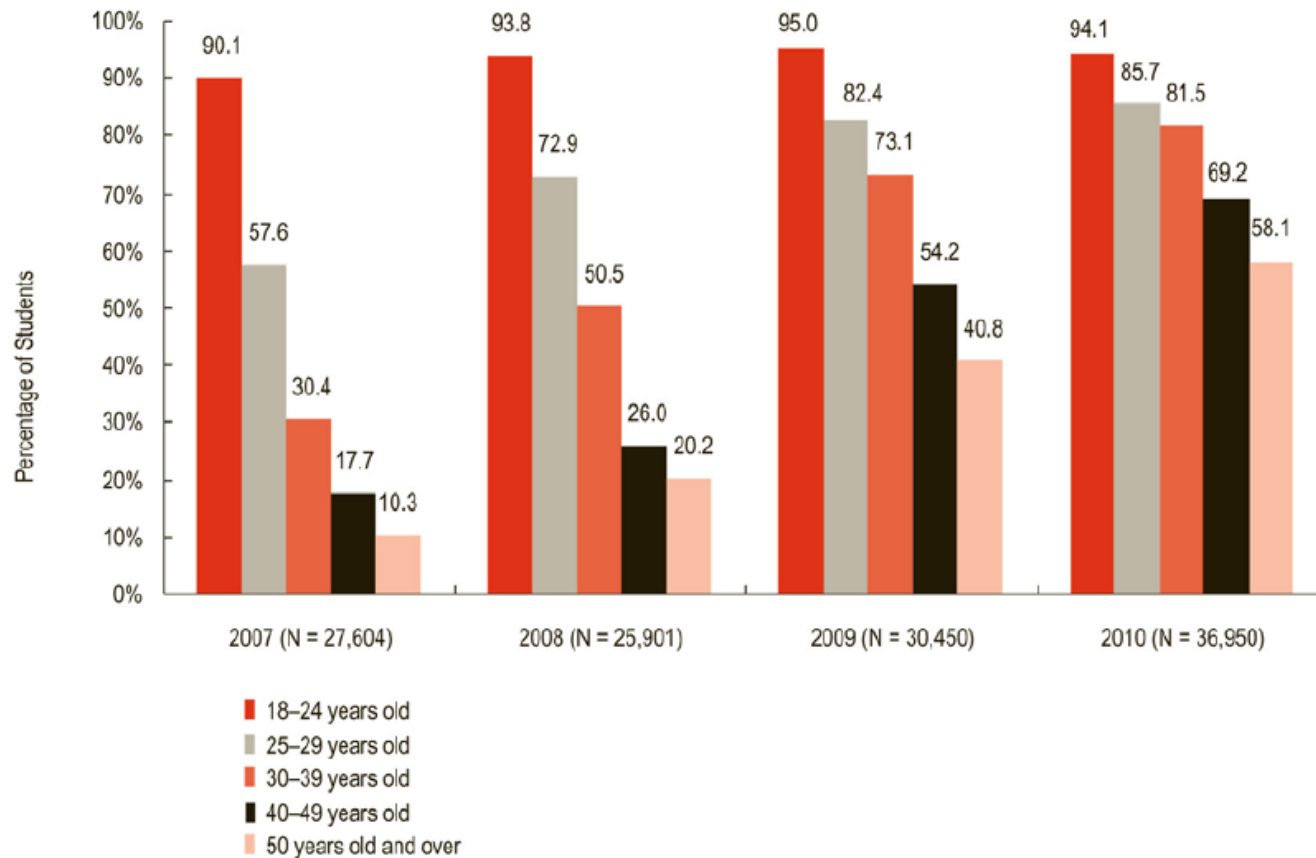


Source: ECAR Higher Education Study 2010



# 2010 Network Connectivity

Figure 3. Percentage of Students Who Have Used Social Networking Websites, by Age, 2007 to 2010



Source: ECAR Higher Education Study 2010



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# 2010 Network Connectivity

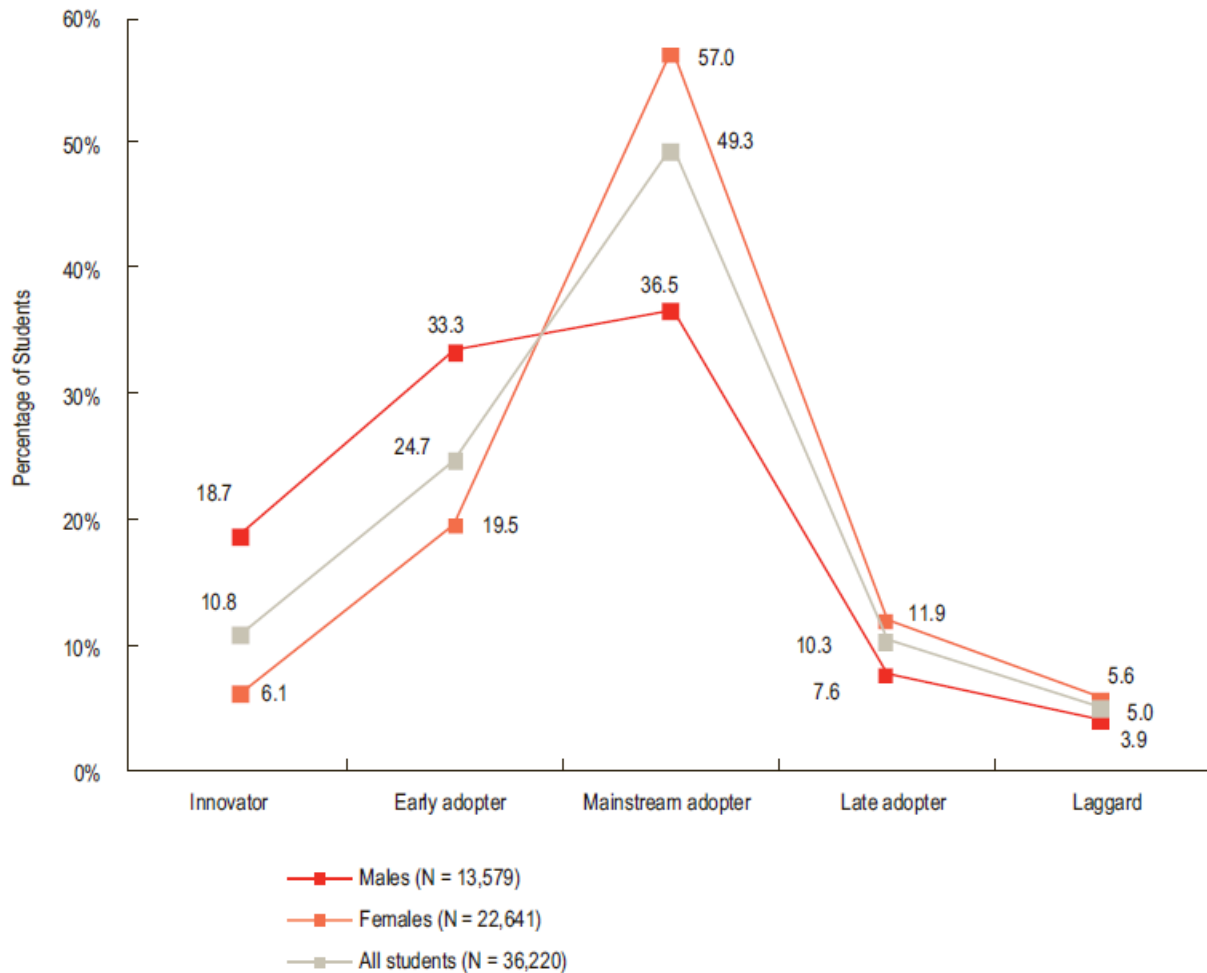


Figure 4-1.  
Respondent  
Technology  
Adoption, by  
Gender and  
Overall

Source: ECAR Higher Education Study 2010



# 2010 Network Connectivity

Table 5-1. Student Computer and Internet Activities (N = 36,950)

	Students Engaged	Median Frequency of Use*	Associated Demographic Factors
<b>Almost All Students Engaged</b>			
College/university library website	94.2%	Weekly	N/A
Presentation software (PowerPoint, etc.)	92.9%	Monthly	N/A
Text message	92.3%	Daily	Age (younger)
Social networking websites (Facebook, MySpace, Bebo, LinkedIn, etc.)	90.4%	Daily	Age (younger)
Course or learning management system	90.3%	Several times/week	N/A
<b>Most Students Engaged</b>			
Spreadsheets (Excel, etc.)	85.7%	Monthly	Business majors/seniors
Instant message	70.6%	Several times/week	N/A
Graphics software (Photoshop, Flash, etc.)	67.4%	Monthly	Fine arts
<b>Some Students Engaged</b>			
Use the Internet from handheld device (iPhone, Treo, BlackBerry, other Internet-capable cell phone, iPod touch, PDA, Pocket PC, etc.)	49.5%	Daily	N/A
Voice over Internet Protocol (VoIP) from your computer (Skype, etc.)	47.2%	Monthly	N/A
Follow or update microblogs (Twitter, etc.)	43.3%	Several times/week	N/A
Contribute videos to video-sharing websites (YouTube, etc.)	42.4%	Monthly	N/A
Contribute content to wikis (Wikipedia, course wiki, etc.)	39.7%	Monthly	N/A
Video-creation software (MovieMaker, iMovie, etc.)	39.5%	Once per quarter/semester	N/A
Contribute content to blogs	36.1%	Monthly	N/A
Audio-creation software (Audacity, GarageBand, etc.)	34.0%	Once per quarter/semester	Male
Online multi-user computer games (World of Warcraft, RuneScape, Lineage, poker, etc.)	26.9%	Monthly	Male
Social bookmarking/tagging (Delicious, Digg, Newsvine, Twine, etc.)	25.1%	Weekly	N/A
Online virtual worlds (Second Life, Forterra, etc.)	8.7%	Once per quarter/semester	N/A

Source: ECAR  
Higher Education  
Study 2010



# 2010 Network Connectivity

Table 5-2. Internet Activities Performed from Handheld Device\*

Internet Activities Performed from Handheld Device	Percentage of Internet-Using Device Owners Who Perform Activity (N = 17,867)
Check information (news, weather, sports, specific facts, etc.)	85.0%
E-mail	81.7%
Use social networking websites (Facebook, MySpace, Bebo, LinkedIn, etc.)	76.9%
Use maps (find places, get directions, or plan routes)	68.6%
Instant message	38.3%
Conduct personal business (banking, shopping, etc.)	38.1%
Download/stream music	34.5%
Download or watch videos online	30.2%
Download or play games online	25.5%
Follow or update micro-blogs (Twitter, etc.)	21.0%
Use photo-sharing websites (Flickr, Snapfish, Picasa, etc.)	18.1%
Read or contribute to blogs	15.0%
Watch mobile TV	11.7%

\* Includes only respondents who own an Internet-capable handheld device and access the Internet from the device

Source: ECAR Higher Education Study 2010



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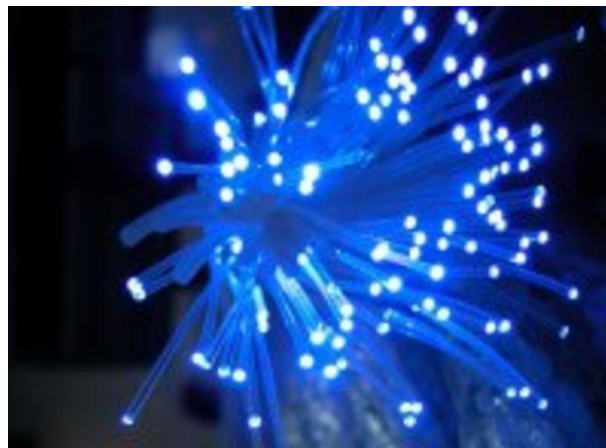
# Tall tales but true

- True tall tales –
  - The March 2010 Distribution outage was the result of a looped third party network device on the network
  - Connected at 4.30pm on the Friday, but took until mid morning on the Saturday for traffic to build to an extent it affected the network
  - CPU Utilisation reached 100% on core routers
  - By the time we had blocked the area affected, the device was gone (associated with conference which concluded on the Saturday)
  - We can protect the network from them – by applying data connection policy with port security – one device, one port



# Tall tales but true

- Data connection policy is enforced but not yet retrospective
- One port – one device
- Available from:-
  - [http://www.it.unsw.edu.au/policies/policies\\_home.html](http://www.it.unsw.edu.au/policies/policies_home.html)



# COMMUNICATIONS CABINET

**Communication Services Staff  
Access Only.  
Strictly no exceptions.**

Any unauthorised changes will be removed without notice.

Please contact the Service Centre on ext 51333, 02 9385 1333 or  
[itservicecentre@unsw.edu.au](mailto:itservicecentre@unsw.edu.au) with any queries.



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# COMMUNICATIONS CABINET

**1metre x 1metre clearance on all sides  
of the cabinets required for OH&S.**

**Failure to ensure this will result in no work until safe  
work conditions are restored.**

Please contact the Service Centre on ext 51333, 02 9385 1333 or  
[itservicecentre@unsw.edu.au](mailto:itservicecentre@unsw.edu.au) with any queries.



# UNSW UniWide Wireless 2009



- 600 Base stations
- Support 802.11a/b/g/n
- 4,000 maximum concurrent connections
- Peak concurrent usage: 4,000
- Centrally controlled guest access
- Is not a replacement for wired
- Is not designed to be blanket coverage
- Is targeted at UNSW Students



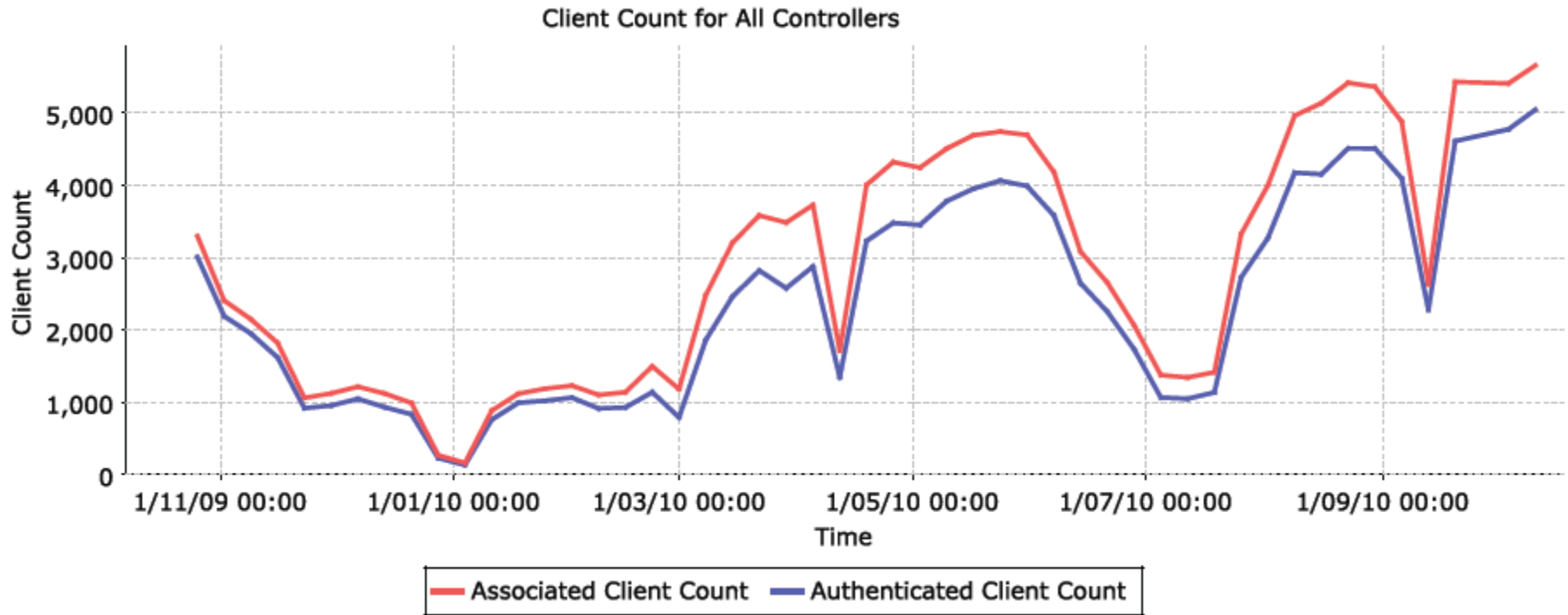
# UNSW UniWide Wireless 2010



- 685 Base stations
- Support 802.11a/b/g/n
- 11,000 maximum concurrent connections
- Peak concurrent usage: 5,500
- Delegated controlled guest access
- Is not a replacement for wired
- Is not designed to be blanket coverage
- Is targeted at UNSW Students



# UNSW UniWide Wireless



# UNSW UniWide Wireless 2010

## Use it, don't abuse it

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UNSW IT at UNSW

**ILLEGAL DOWNLOADING IS A CRIME!**



Downloading and/or distributing copies of copyrighted movies, videos, music or software without the permission of the copyright owner is **ILLEGAL** and can result in criminal conviction.

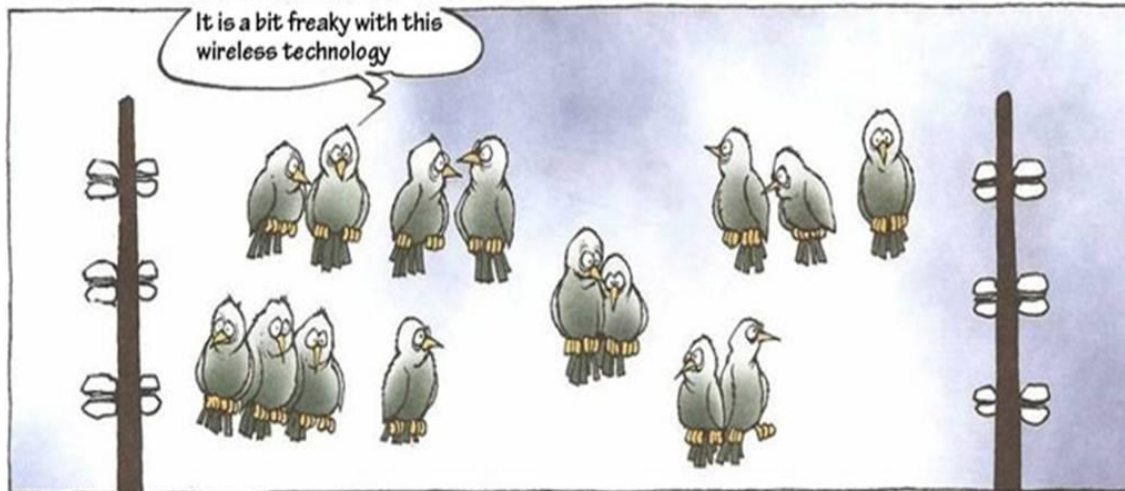
If you infringe copyright through the use of UNSW's IT network you may be fined, denied access to UNSW's IT network or be subject to disciplinary action in accordance with UNSW's [Acceptable Use of UNSW IT Resources - Policy](#) and [Student Misconduct Rules](#).

[Continue - link will go here](#)

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"I've noticed that I haven't seen you use your computer since they shut Napster down."



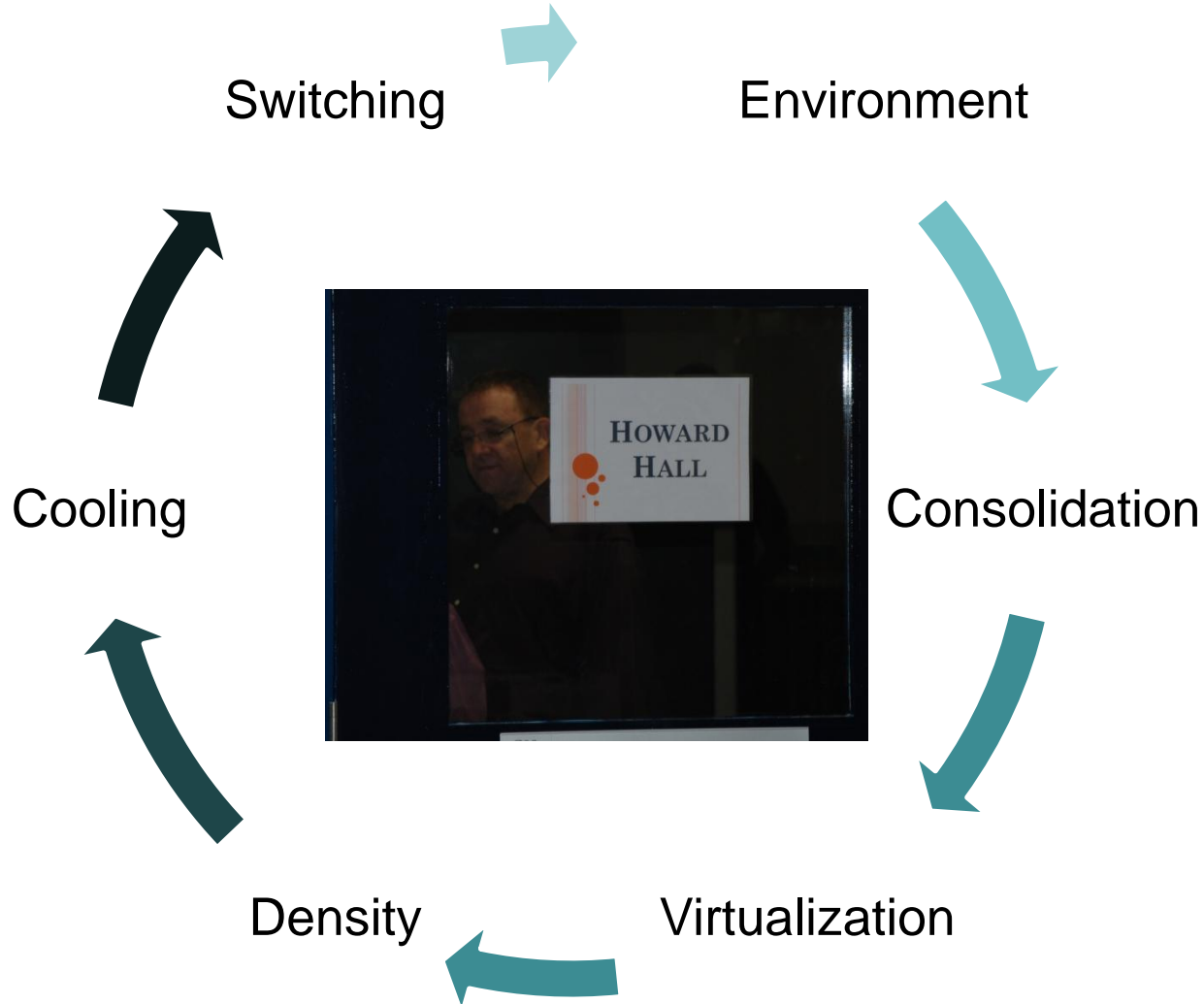
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# R1 Data Centre



# Green Initiatives

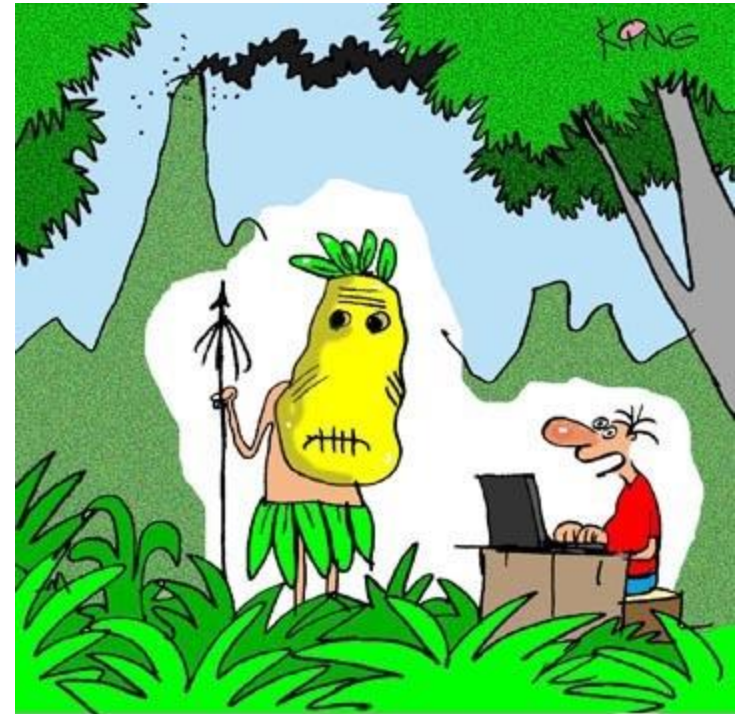
## Concern, Consideration, Design, Implementation, Management

- Re-use of existing building
- Minimise building works – no false floors
- Responsible building methods
- Higher utilisation of processor farms
- Greater utilisation of shared storage
- No water wasted on cooling
- Cooling equipment directly – not entire rooms
- Insulated rooms without windows
- Balanced cooling across PODs
- Hot-aisle containment no mixing of hot & cold air
- Shorter paths to cooling
- Less temperature range between hot and cold air
- Higher density efficient servers
- Less power usage overall
- More efficient ratio of electrical load to IT load
- Energy efficient UPS systems



# UNSW VPN

- UNSW Enterprise Remote Access VPN Service available now
- Secure connection from off campus
- Groups allocated at Faculty/Division level
- Limit to 100Mb throughput

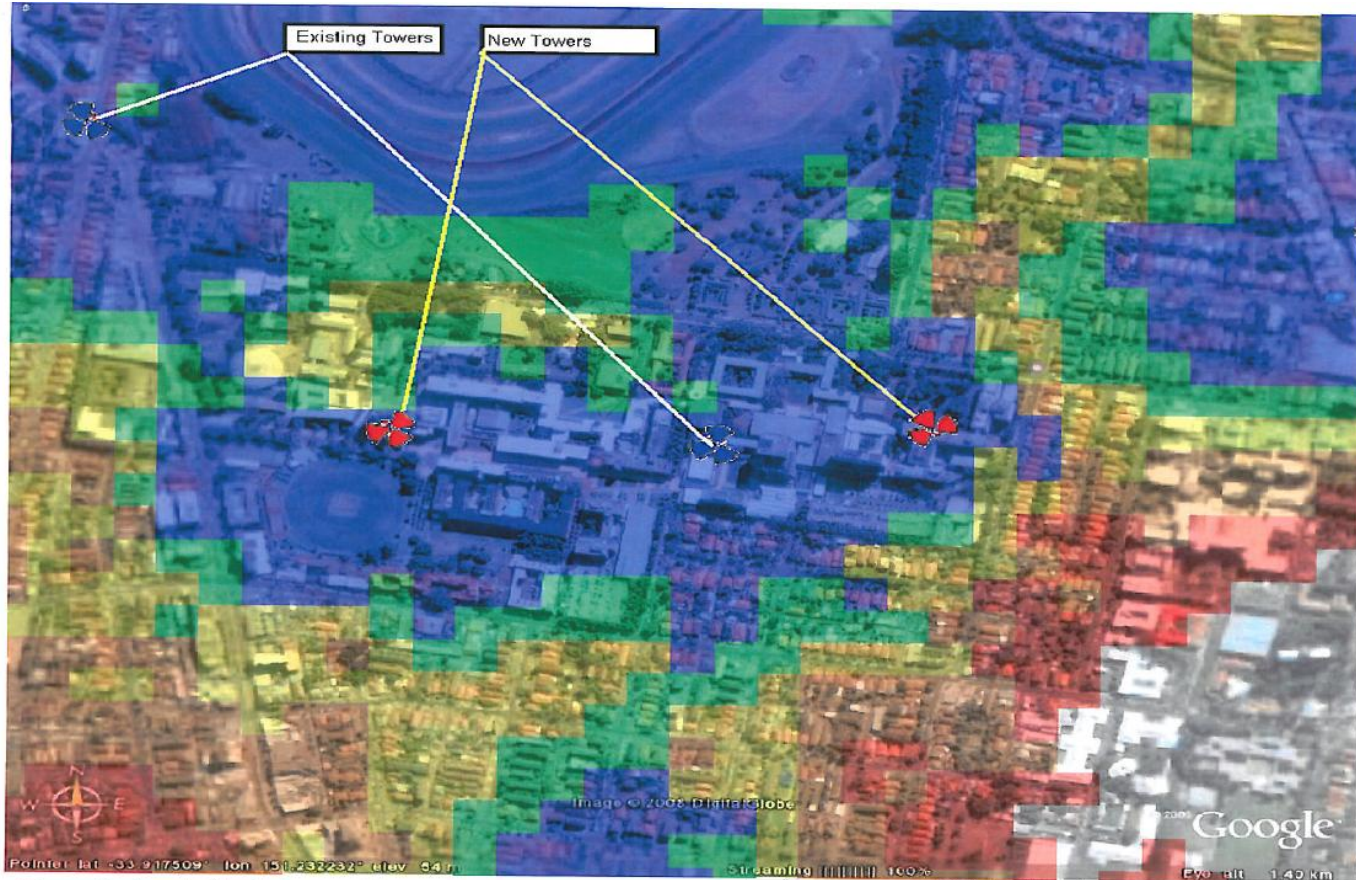


*"One day I just woke up and said to myself-- hey, thanks to the computer, I can work anywhere."*





# UNSW Mobility



## Predicted Outdoor Coverage

For indoor coverage, please allow for extra 10 to 20 dB degradation

Rating	Equivalent Bars on Mobile (Est)	Coverage Type	Coverage Scale
-70 <= X < 0 dBm	4	CBD Metro	Best coverage
-75 <= X < -70 dBm	3-4	Metro H/HCS	
-80 <= X < -75 dBm	3	M/HHS / R/HHS	
-85 <= X < -80 dBm	2	Car kit / Rural	
-90 <= X < -85 dBm	1-2		
-120 <= X < -90 dBm	0-1		No or limited Coverage



# UNSW Conference Calling

- Limited number of conference phones available at no cost (analog port)
- Bookings through the service desk
- Minimum 5 day notice (best effort outside this notice)
- Call costs only charged (moderated conference)



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# UNSW Conference Calling

- 3 Party Conference Call
  - Normal extension capability
- 8 Party Un-moderated conference service
  - Simple dial-in service
- 8 Party Moderated conference service
  - Dial-in/dial-out, prevent unwanted attendees
- 16 Party Un-moderated conference service
  - Simple dial-in service



# UNSW VOIP Remote Shelf

- Capability for NEC VOIP remote shelf
- Same capabilities as on Campus remotely
- No charge UNSW calls
- Lower cost of ownership
- Centrally supported



# UNSW Digital Signage

- Centrally supported Digital Signage
- Deployment over the network
- Content controlled and deployed locally
- Lower cost of ownership



# UNSW Digital Signage

- **Local:**

- Project Management
- Electrical
- Screen purchase and installation
- Content management on local content server



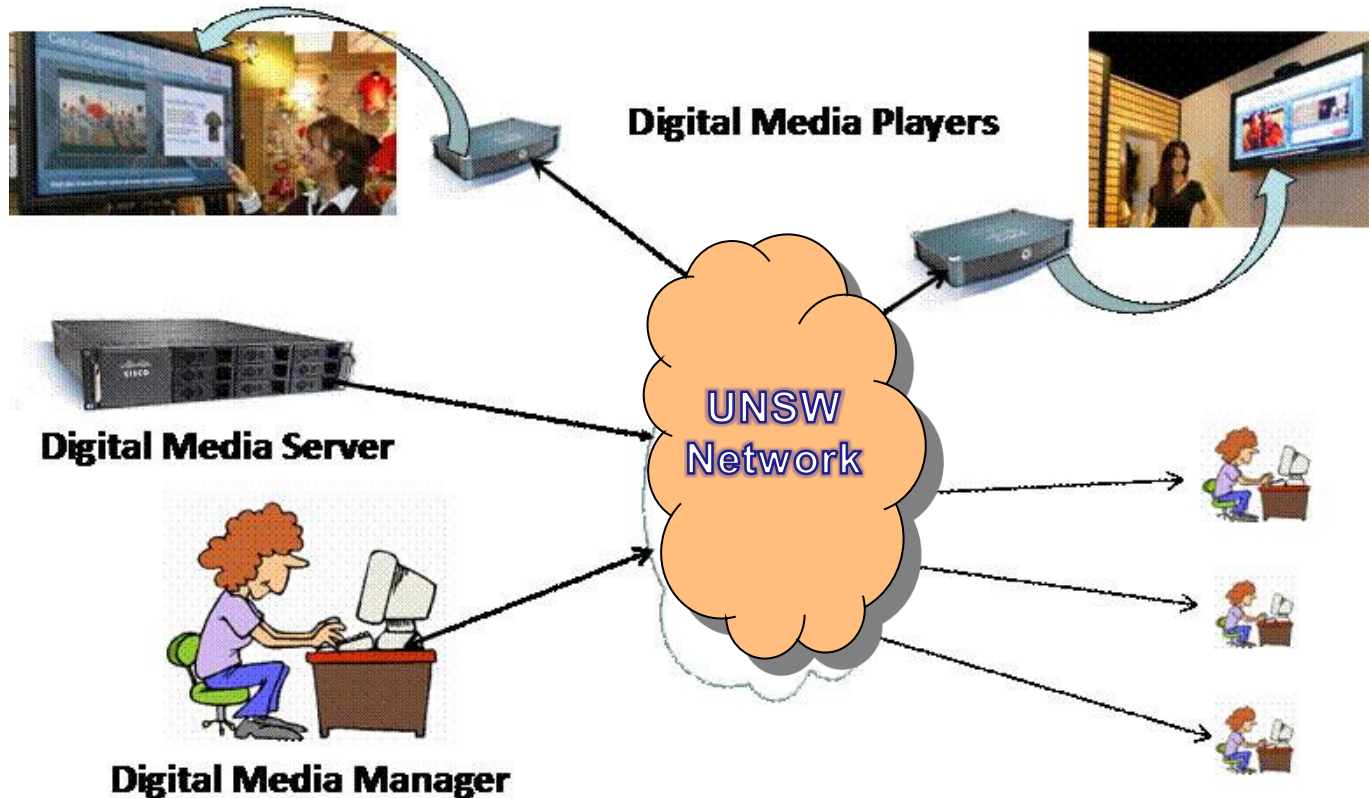
- **Central**

- DMP supply (installation can be arranged or completed with screens)
- Network installation and activation
- Support for DMP player and central services



# UNSW Digital Signage

## Cisco Digital Media System



*Prepare Content / Distribute / Schedule / Display*



# Sydney Basin Fibre (SBF)

- Existing SBF lease expires Q3 2012
- Supports 10 Gig in diverse and redundant paths
- Will grow with UNSW needs for 20-40 years
- Will support 40Gig and 100Gig
- Part of the larger AARNet research network

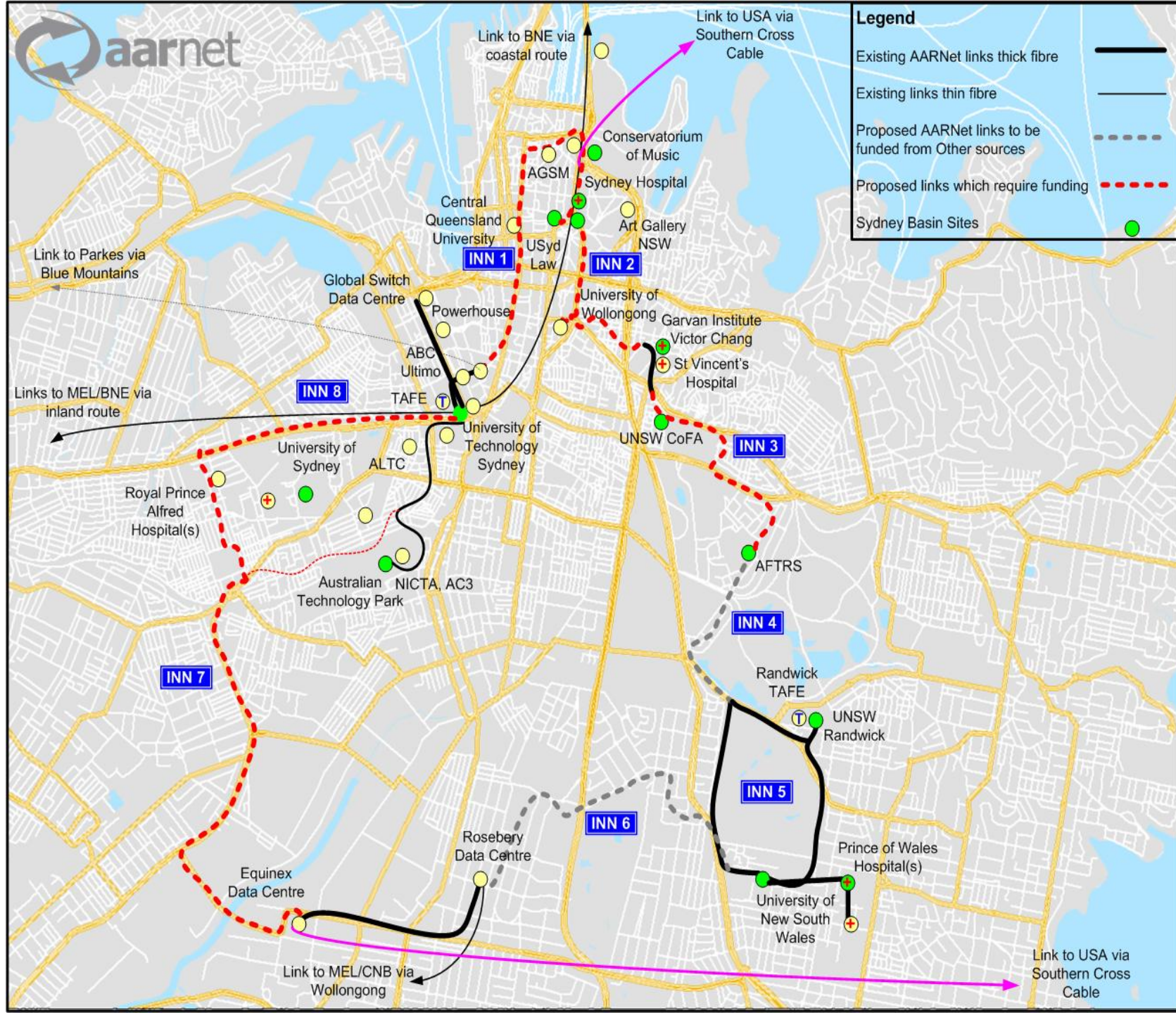


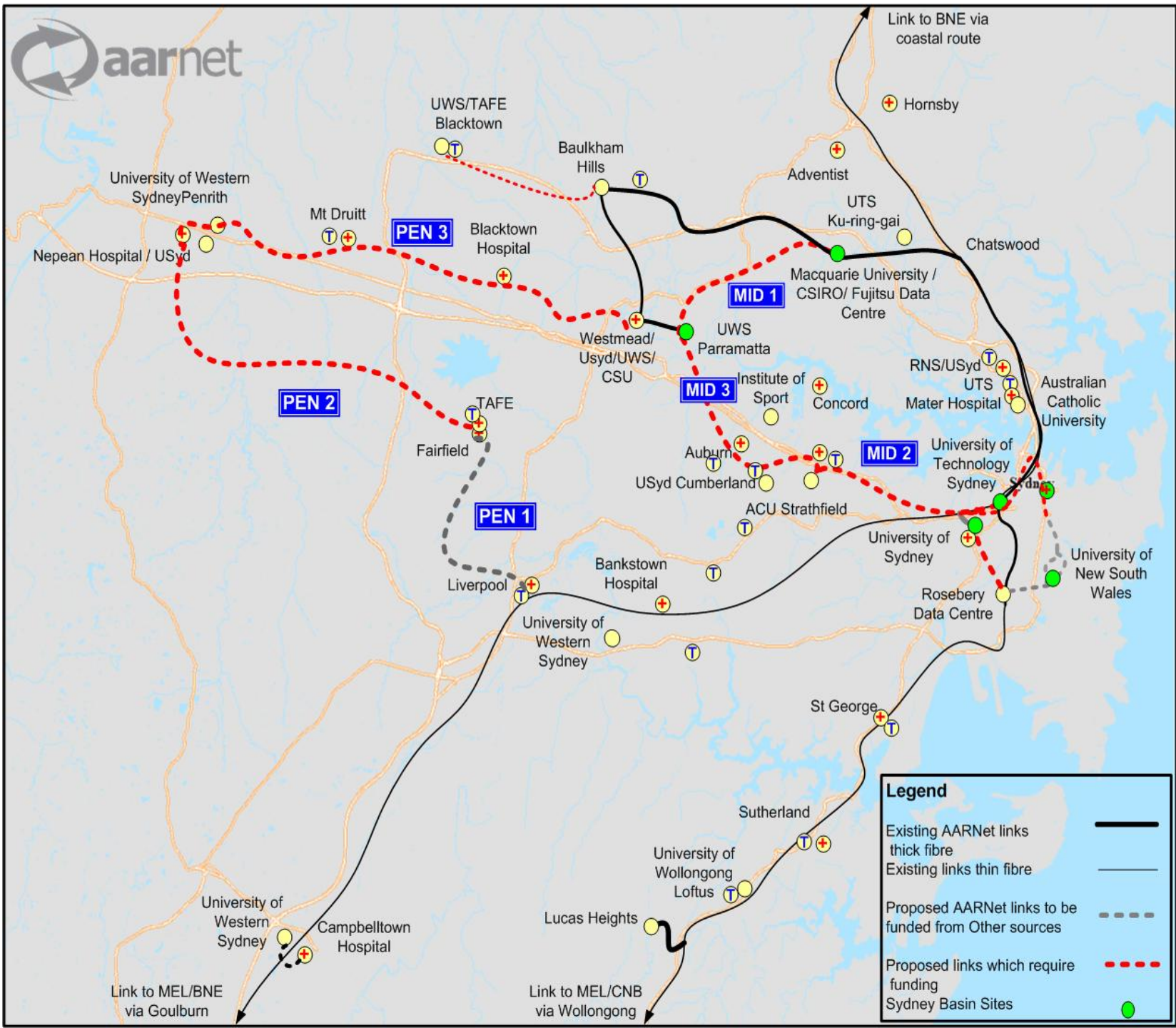




**Legend**

- Existing AARNet links thick fibre
- Existing links thin fibre
- Proposed AARNet links to be funded from Other sources
- Proposed links which require funding
- Sydney Basin Sites





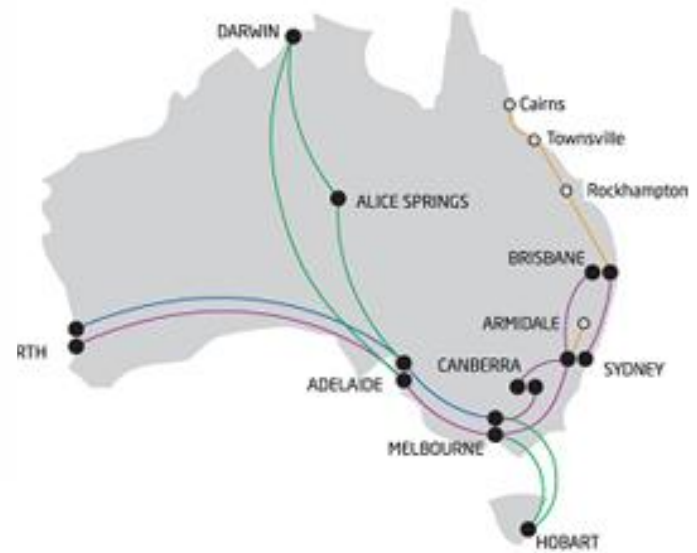
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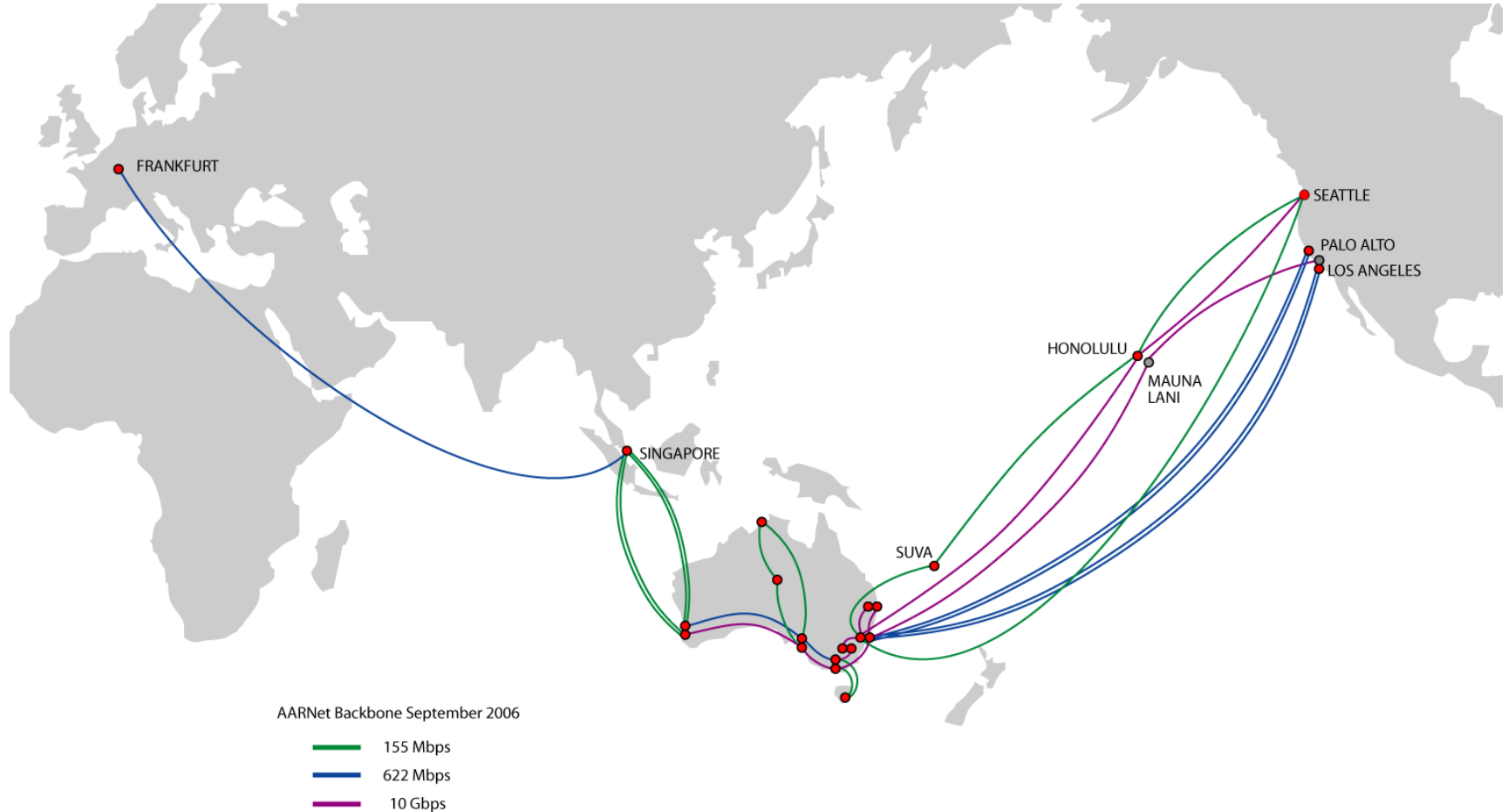
# Sydney Bason Fibre (SBF)



- AARNet POP
- < 155 Mbps
- < 622 Mbps
- < 2.5 Gbps
- < 10 Gbps



# Sydney Bason Fibre (SBF)



# Sydney Bason Fibre (SBF)



# 2009 - New Buildings, Major Capital works and relocations

- C25 Lowy Cancer Research Building
- POW Medical Research Institute (Partial demolition and new wing construction)
- Student Housing Precinct
- COFA Gateway Project
- Garvan/ St Vincent's Campus Cancer Centre
- Coogee Campus Upgrade
- CFI Building at St Vincent's
- Tyree Energy Technology Building
- SIRF Building - PV Photoline Building
- R1 Data Centre
- Sydney Basin Fibre Replacement Project



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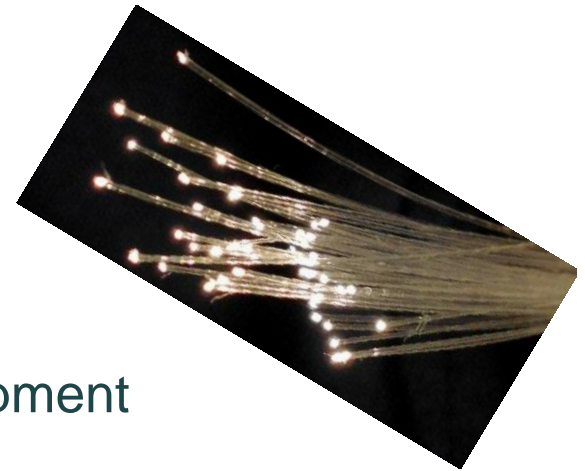
# 2010 - New Buildings, Major Capital works and relocations

- POW Medical Research Institute (Partial demolition and new wing construction)
- COFA Gateway Project
- The Kinghorne Cancer Centre – (Garvan/ St Vincents Campus Cancer Centre )
- Tyree Energy Technology Building
- SIRF Building - PV Photoline Building
- R1 Data Centre
- Sydney Basin Fibre Replacement Project
- Wallace Wurth Wing and building redevelopment
- Biological Science Major upgrade
- Faculty of Medicine Medical and Nursing Education Network for South Western Sydney project
- G2 Fire Damage rectification works
- Mulwaree apartments networkification
- Substantial Refurbishment works to over 20 buildings across Kensington and WAN Sites



# 2011 - New Buildings, Major Capital works and relocations

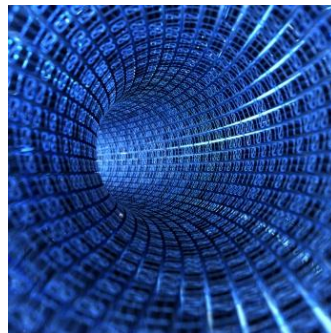
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- Wallace Wurth Wing and building redevelopment
- Biological Science Major upgrade
- Faculty of Medicine Medical and Nursing Education Network for South Western Sydney project





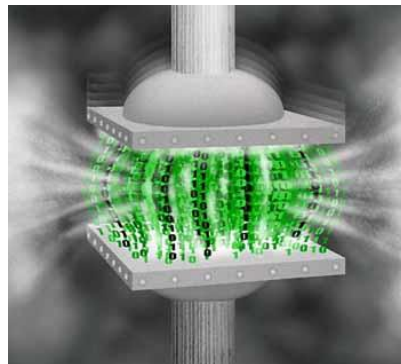
# IP addresses 2009

- UNSW has 2 x Class B IPv4 pools
- Provides enough capacity for 128,000 connected devices
- 62,000 unique machines seen at UNSW
- Approximately 60% allocated
- No /22 or larger allocations left



# IP addresses 2010

- UNSW has 2 x Class B IPv4 pools
- Provides enough capacity for 128,000 connected devices
- 88,000 unique machines seen at UNSW
- Approximately 90% plus allocated
- Very limited large allocations left



# IP addresses 2011

- Reclamation program
- Any vlans with inappropriately sized allocations (under 40% utilised) will be re-sized
- 128,000 should allow for up to 100,000 concurrent usage
- UNSW concurrent usage approximately 40k – the problem is of our doing
- DHCP should be implemented and without static allocations



# RWS vs Servicedesk

Guiding principal – Any Communication Services service that has a cost, or may have a cost (Quote, Pricing or Estimate) or requires authorisation to make changes (Firewall/ ACL's) will require a RWS. The website for RWS is:

<https://www.works.it.unsw.edu.au/>



# RWS vs Service Centre

## Example of requests requiring a RWS:

- Request from customer for pricing on a service, be it query, quote or estimate.
- Firewall or ACL changes.
- New infrastructure or upgrades – be it telephone, mobile, switch or cabling.
- Telephone moves – This requires the telephony contractor to complete the work, and therefore is a cost.
- Changes to IVR's
- Physical damage to infrastructure/repairs – for example ports kicked off a wall. This is not covered under warranty.



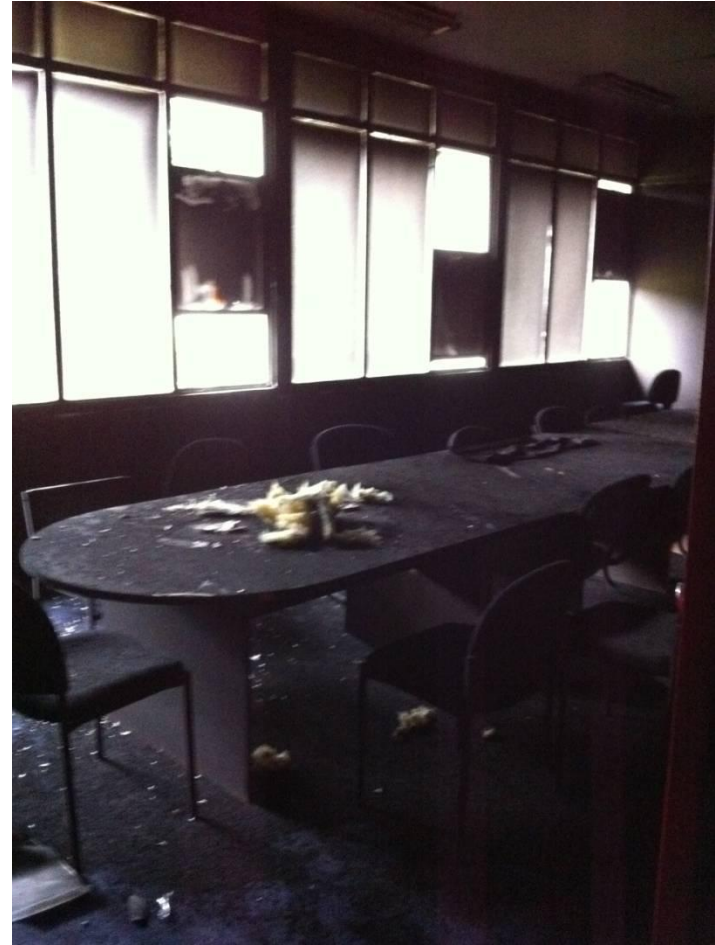
# Support Services

- For everything else, first point of contact is the Service Centre by either:
  - Telephone 02 9385 1333 or ext 51333
  - Email [ITServiceCentre@unsw.edu.au](mailto:ITServiceCentre@unsw.edu.au)
  - Self service  
<https://www.servicedesk.unsw.edu.au>
- Ensures tracking, visibility and a repeatable support model





# G2 Western Grounds Fire





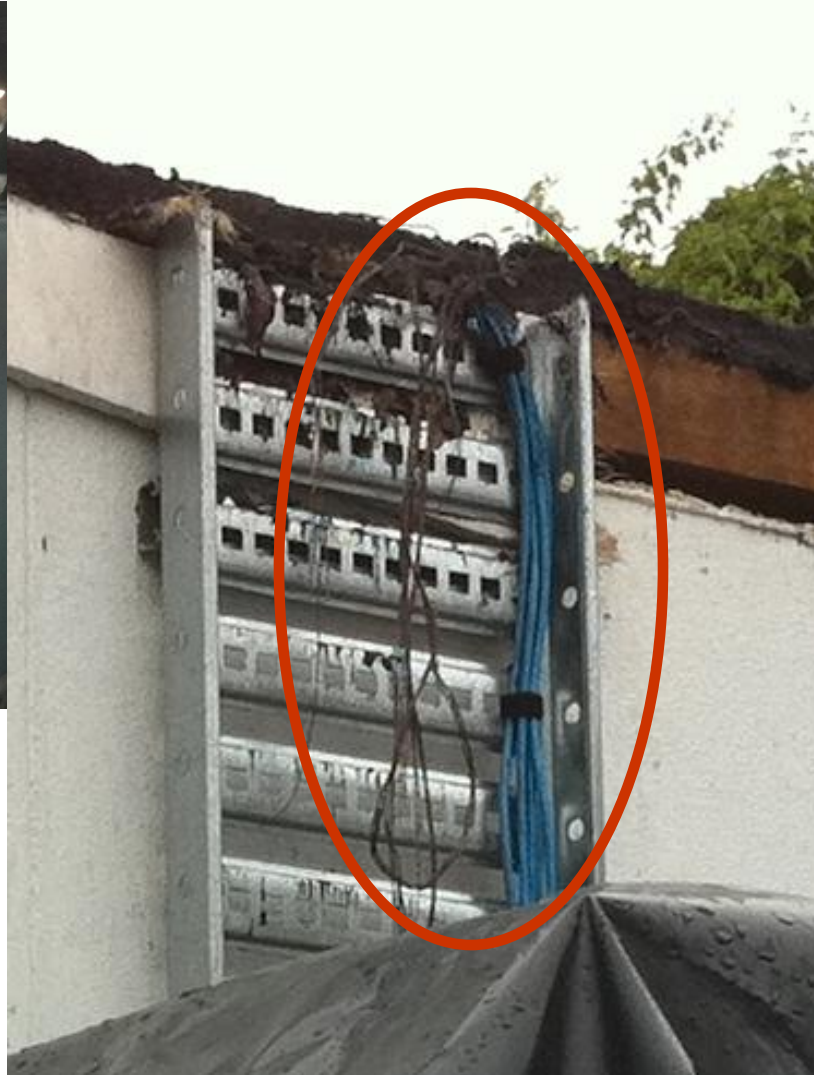
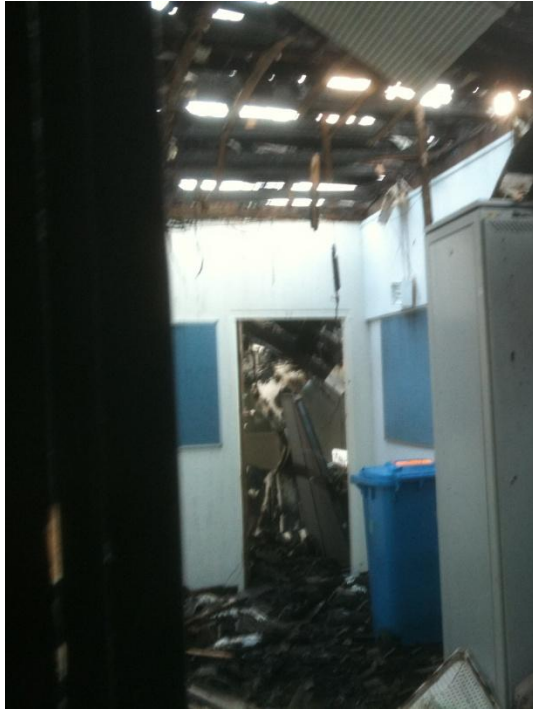
# G2 Western Grounds Fire







# G2 Western Grounds Fire





# Achievements in 2010



- Bryan Quigley celebrates 20 years at UNSW
- Peter McEwan celebrates 20 years at UNSW
- Venkata Kola achieved Cisco Certified Network Associate certification
- Chris Brown achieved Prince 2 Project Manager Professional certification
- Yumin Zhang achieved Prince 2 Project Manager Professional certification
- Jithin Kesavan achieved Cisco Certified Security Specialist
- Bernie Li achieved Cisco Certified Network Associate - Wireless certification

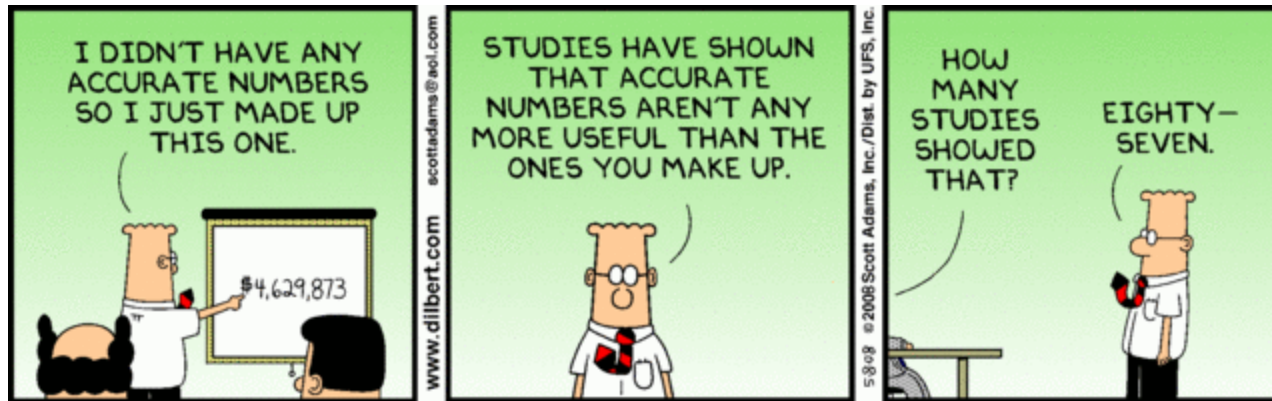


# Did you know?

## Network connections

(Defined as connected to the network for greater than 80 hours in a quarter)

In Q3 2009 **36,053** – In Q3 2010 **39,975**



# Did you know?

Unique devices connecting to the UNSW  
Network

(Unique MAC addresses)

In Q3 2009 **62,568** – In Q3 2010 **88,654**



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# Did you know?

## Wireless connections

(Defined as connected to the network for greater than 80 hours in a quarter)

In Q3 2009 11,174 – In Q3 2010 14,383



- Attached with cable
- Friends make fun of you when you jerk the controller upward every time you jump



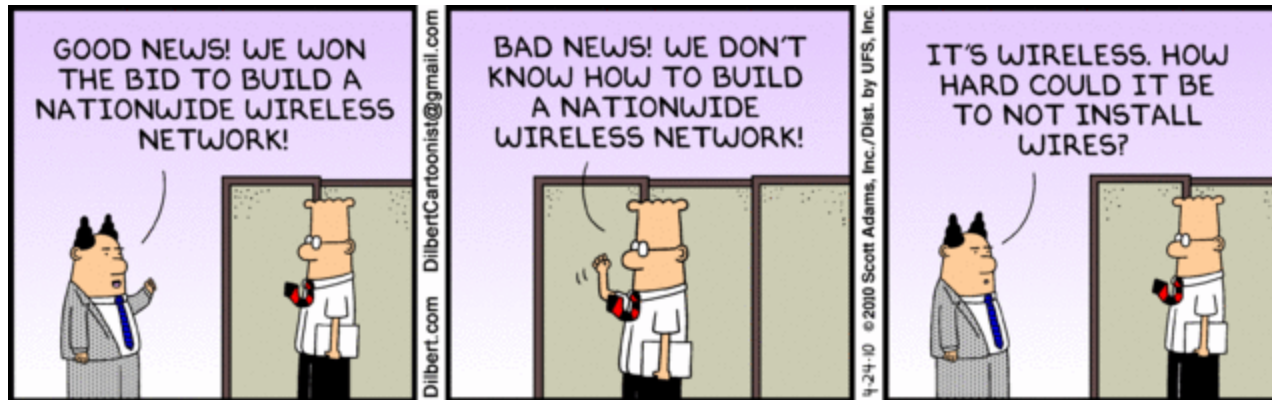
- Wireless
- Friends make fun of you when you are unable to jerk controller upwards the right way to make your guy jump



# Did you know?

Peak concurrent wireless connections  
(Connected devices on the network at one point –  
maximum load)

In Q3 2009 **4,000** – In Q3 2010 **5,500**



# Did you know?

Enough copper and fibre cable to run to the moon if laid end to end (285,000km) and starting the return journey



# Did you know?

Copper cable installed 2009 **84,680** metres

Copper cable installed 2010 (Sep YTD) **42,003** metres

Outlets install 2009 **3,096** - Outlets install 2010 **1,730**

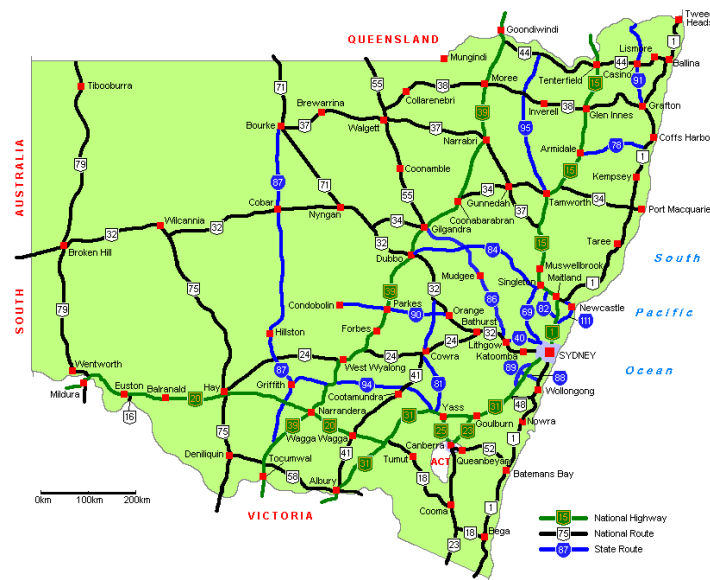




# Did you know?

450 plus Communication locations around all Campus locations

21 WAN Sites north to Coffs Harbour, West to Wellington and south to Albury



# Did you know?

## Telephones

In 2009 **9,500** – In 2010 **9,631**



# Did you know?

## New Telephones

In 2009 **395 analogue** and **170 digital**

In 2010 **562 analogue** and **35 digital**



# Did you know?

Centrally support Mobility devices:

In 2009 **1,250** – In 2010 **1,500**



# Did you know?

Internal telephone calls  
(one day snapshot)

In 2009 **17,500** – in 2010 **17,800**



# Did you know?

Service desk call per month  
(Average)

2009 average **450** – 2010 average **558**(to Sep)



# Did you know?

RWS (Request for Works and Service) per month  
(Average per month)

In 2009 **260** – In 2010 **270**



# Did you know?

External telephone calls  
(one day snapshot)

In 2009 **8,600** – in 2010 **8,900**





# Did you know?

Communication Services projects run each year:

In 2009 **2,578** – In 2010 **2,358** (YTD Oct)



How the customer explained it



How the project leader understood it



How the analyst designed it



How the programmer wrote it



What the beta testers received



How the business consultant described it



How the project was documented



What operations installed



How the customer was billed



How it was supported



What marketing advertised



What the customer really needed



# Did you know?

Peak internet usage:

On 28 Sep 09 **1Gbps** – On 26 Aug 10 **1.72Gbps**



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# Did you know?

## UNSW Downloads

In 2009 **646Tb** – In 2010 **916Tb** (YTD Nov)



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# Did you know?

## UNSW Uploads

In 2009 **296Tb** – In 2010 **393Tb** (YTD Nov)



# Crystal Ball





# Question time



Questions?

What would you like to see on the network?

What improvements/changes would you suggest?



# Thank You



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