

Swansea University

An aerial photograph of Swansea University. The university's main campus is a cluster of modern, multi-story buildings with various roof colors, situated on a green hillside. To the left of the campus is a long, sandy beach that curves along the edge of a large bay. The water in the bay is a deep blue, and the surrounding area is filled with lush green trees and grass. In the background, a residential area with many houses is visible, extending to the horizon under a clear blue sky.

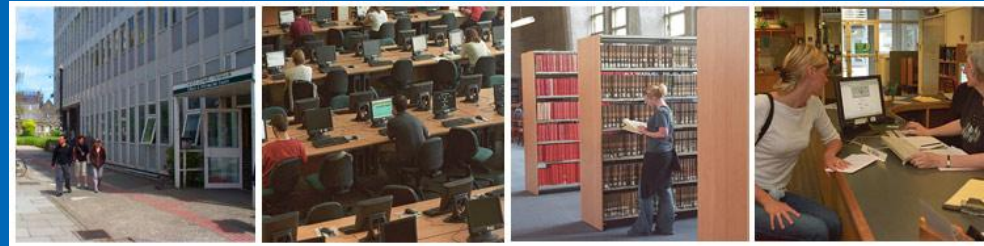
Library and Information Services

SWANSEA UNIVERSITY
PRIFYSGOL ABERTAWE

www.swan.ac.uk/lis

802.1X Deployment with SU1X

By Gareth Ayres



Agenda

- 1.0 Quick Introduction
- 2.0 Wireless and Eduroam at Swansea
- 3.0 The Problems
- 4.0 The Solutions
- 5.0 Our solution: SU1X
- 6.0 SU1X Demo?

1.0 Quick Introduction

Gareth Ayres

- Wireless Network Officer, Swansea University
 - Development of wireless network and other networking stuff
 - Part of the original LIN JRS trials
 - Member supplicant group
 - Member 802.1x SIG group
- PhD Student (unrelated)
- FIFA Assistant Referee (sorry!)

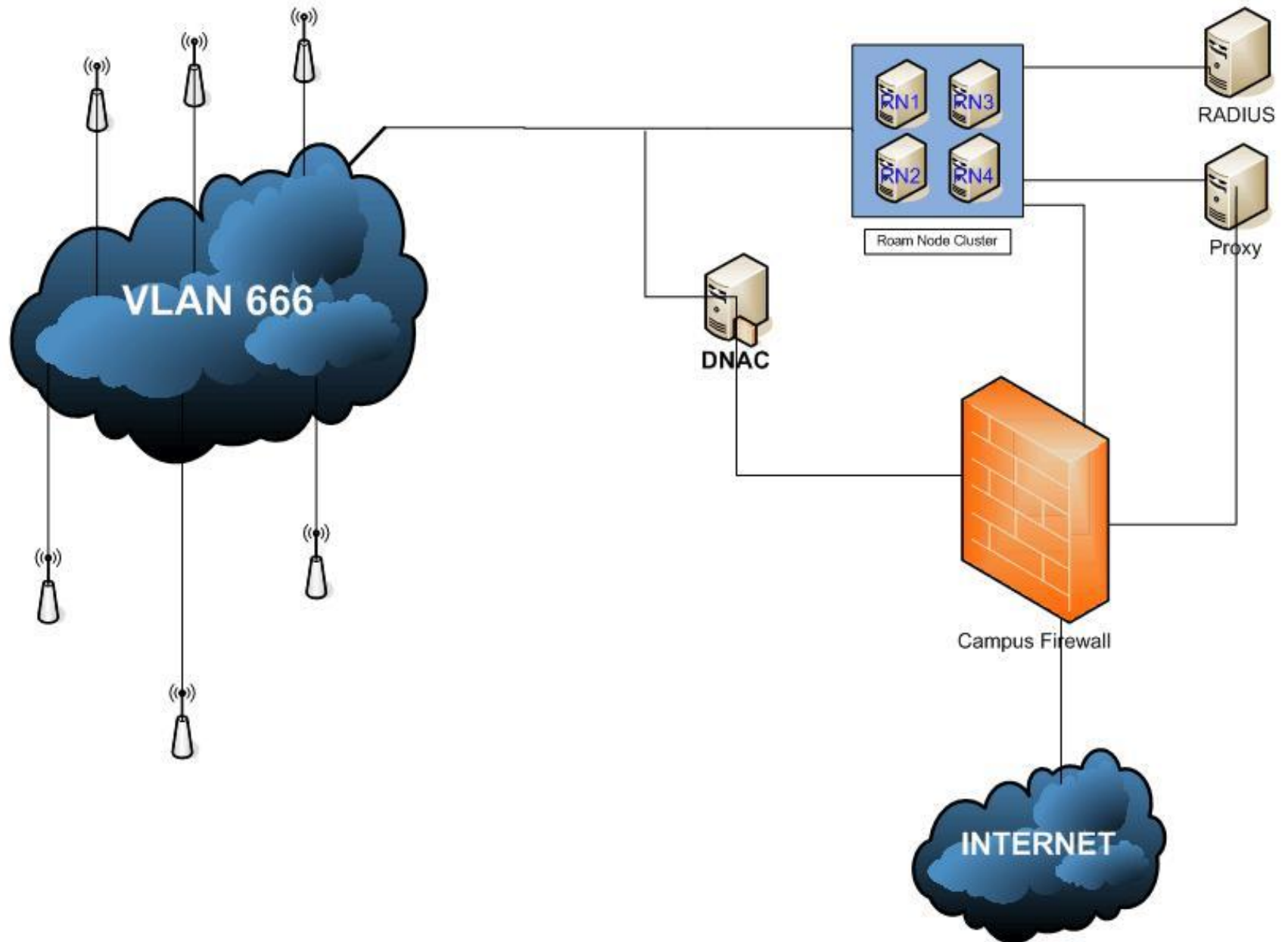
2.0 Wireless at Swansea: 2004

2004-2005

- 4 RoamNode Servers (VPN & PPPOE)
- 250 Autonomous access points
- ~800 unique users / day

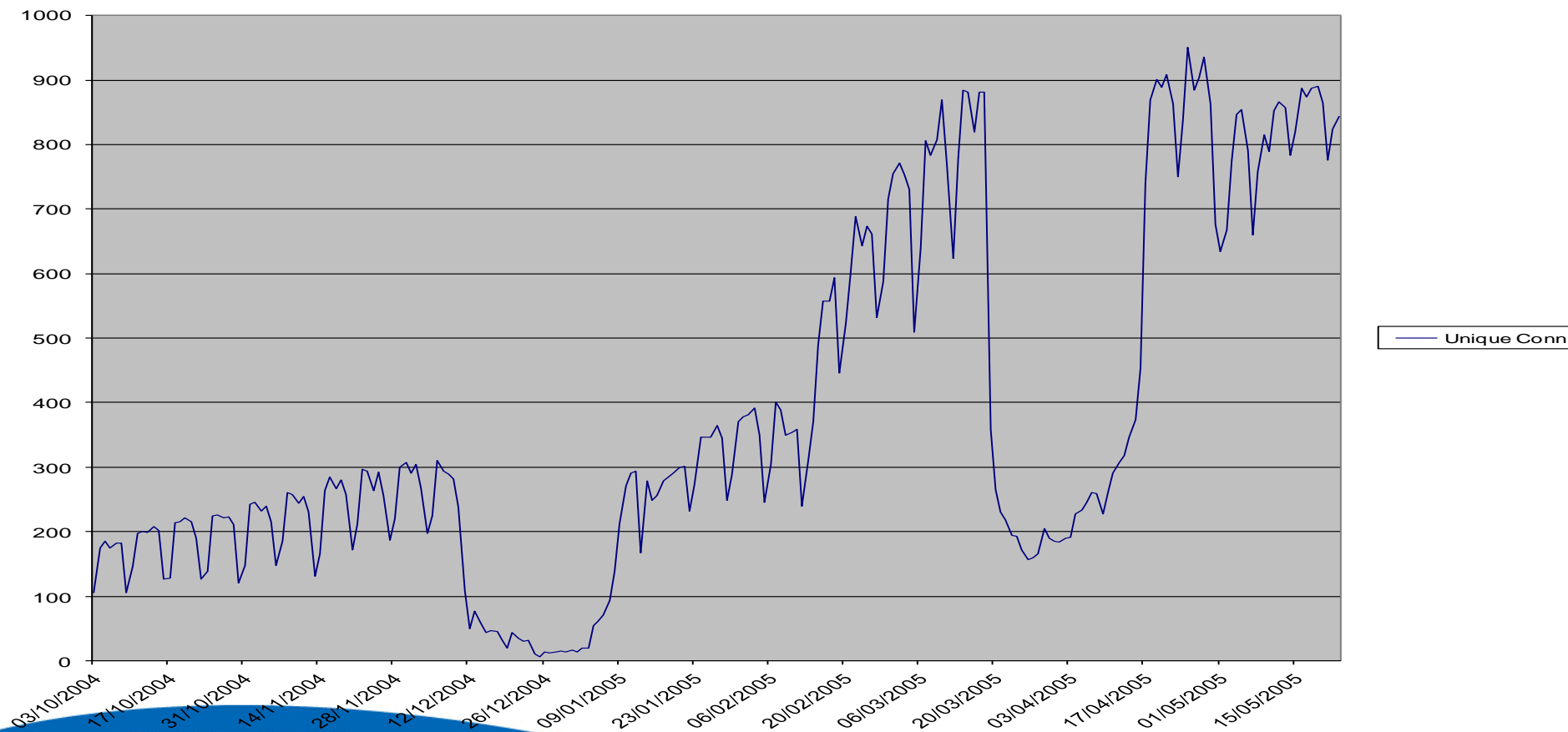


2.0 Wireless at Swansea: 2004



2.0 Wireless at Swansea: 2004

Unique Connections



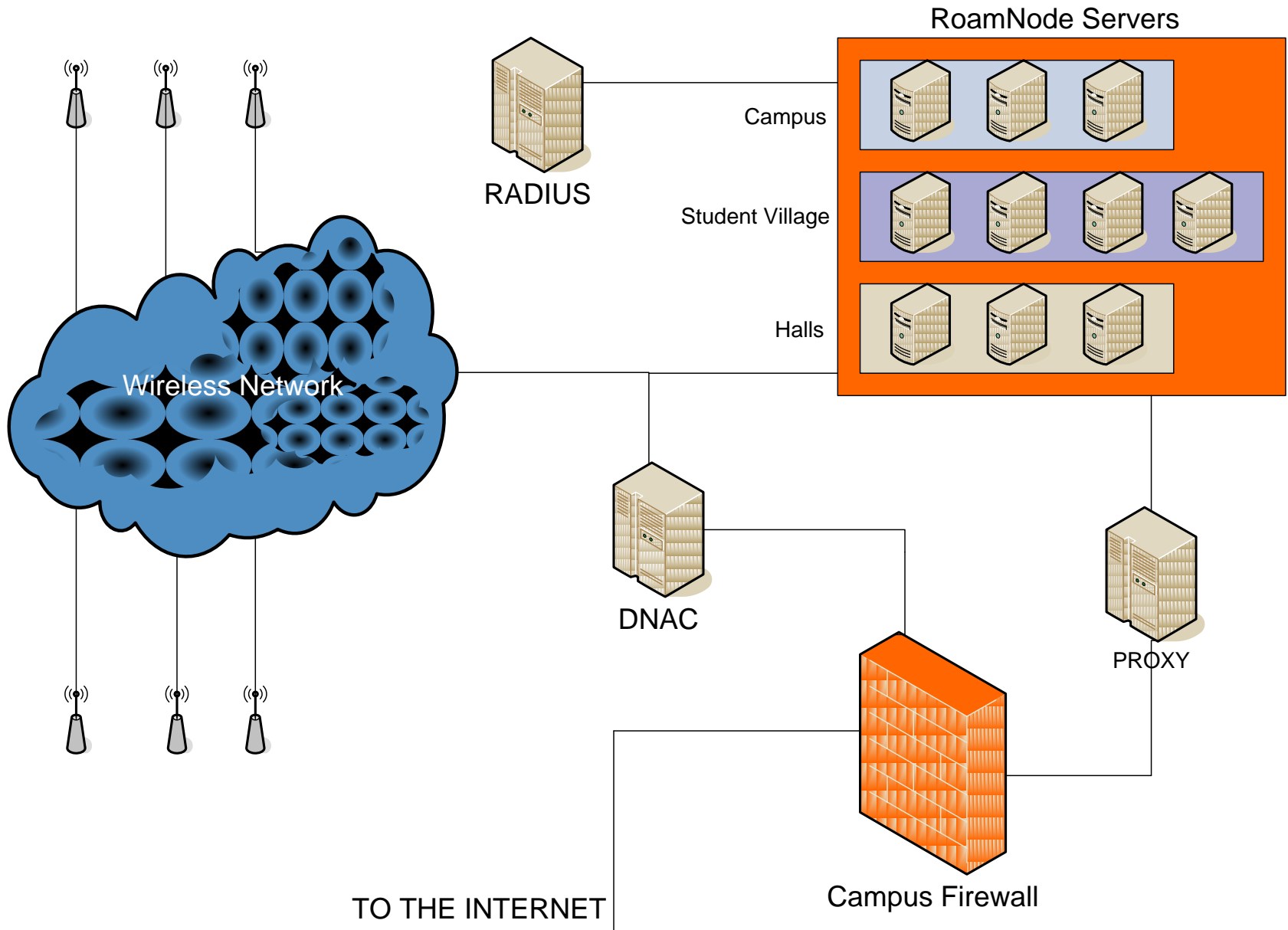
2.1 Wireless at Swansea: 2007

2007-2008

- 10 RoamNode Servers (VPN servers)
- 700 Autonomous access points
- Setup Wireless Network
- ~2300 unique users / day

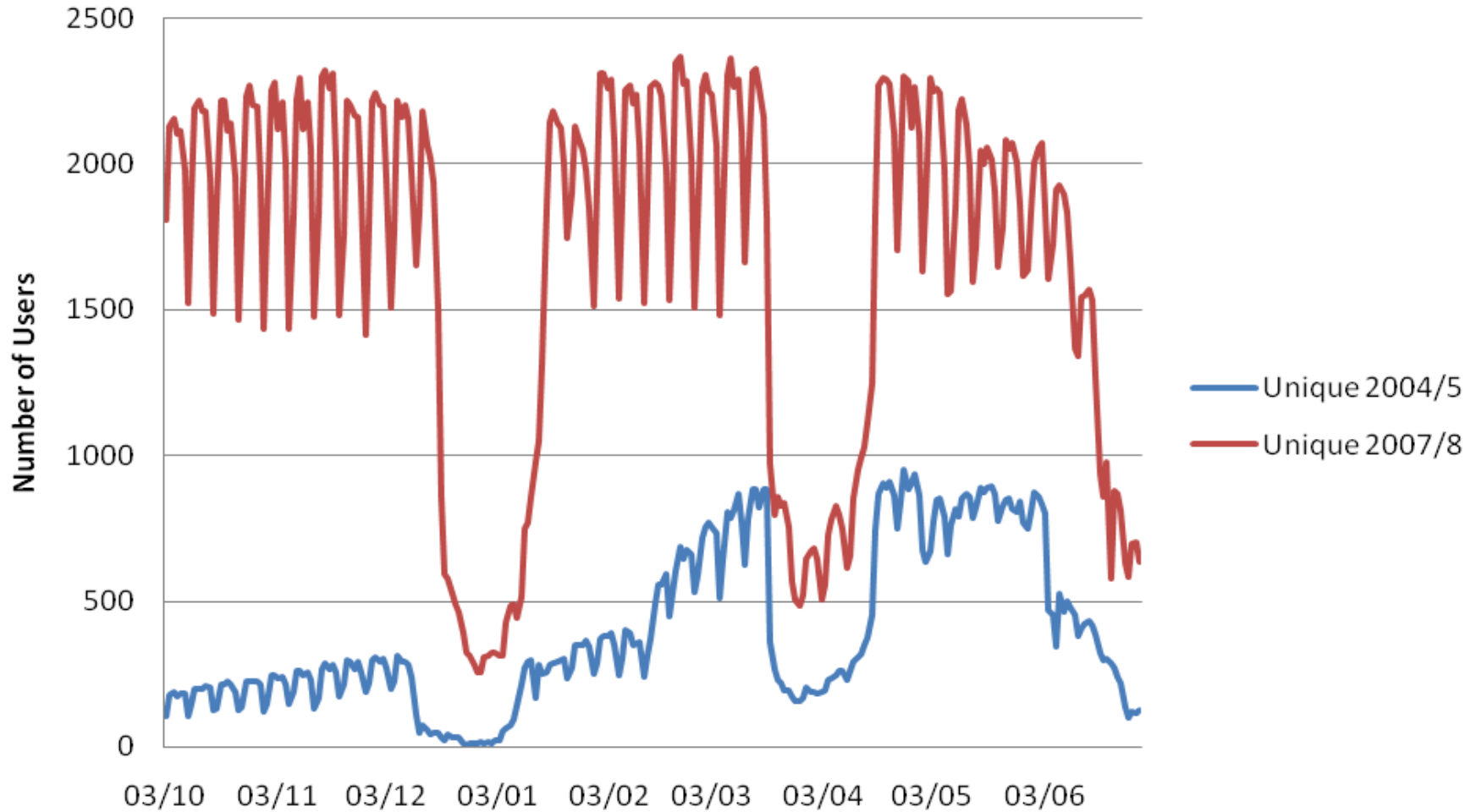


2.1 Wireless at Swansea: 2007

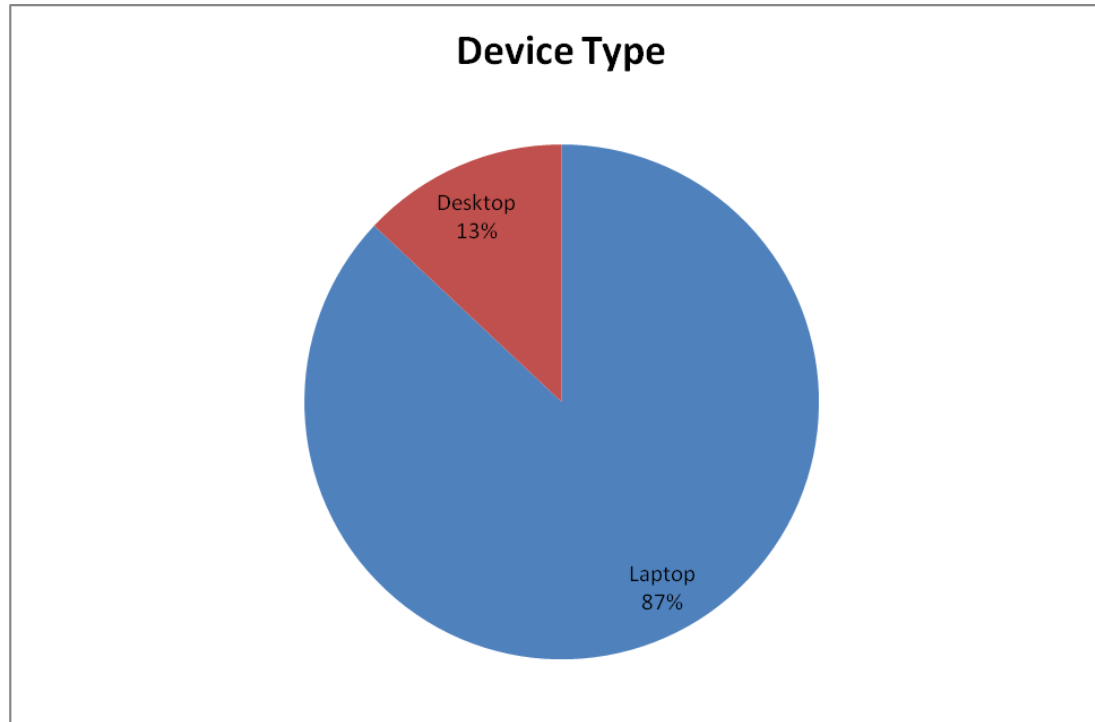


2.1 Wireless at Swansea: 2007

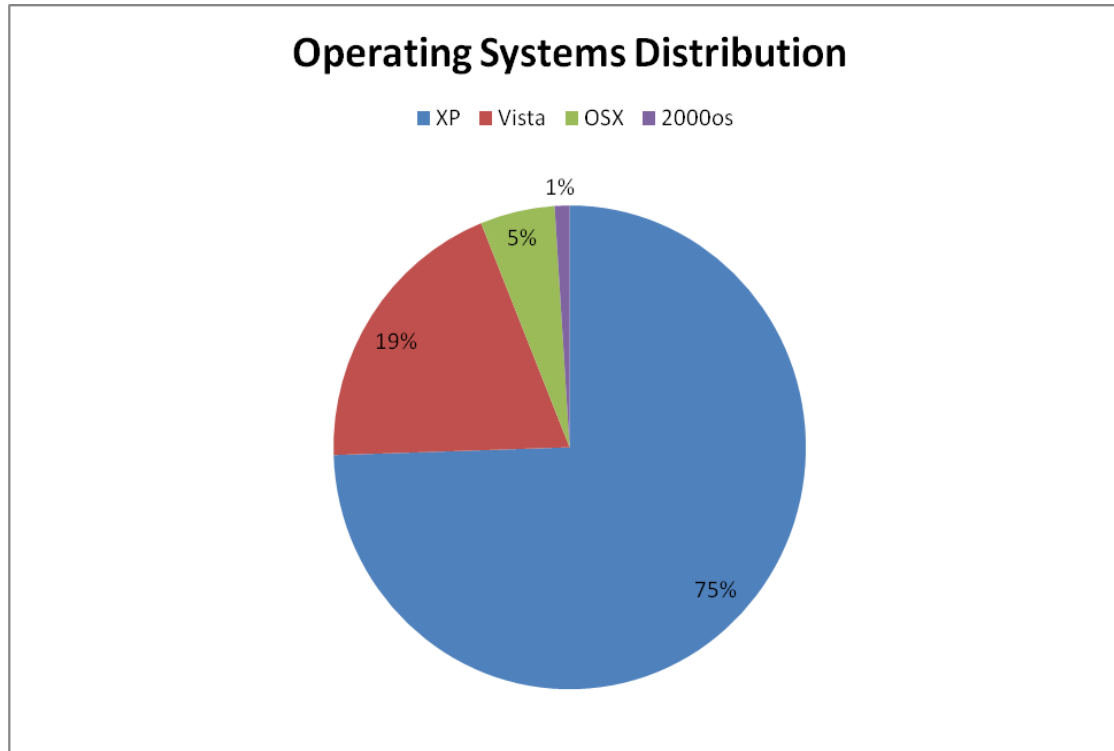
Unique Authenticated Connections Comparison



2.1 Wireless at Swansea: 2007



2.1 Wireless at Swansea: 2007



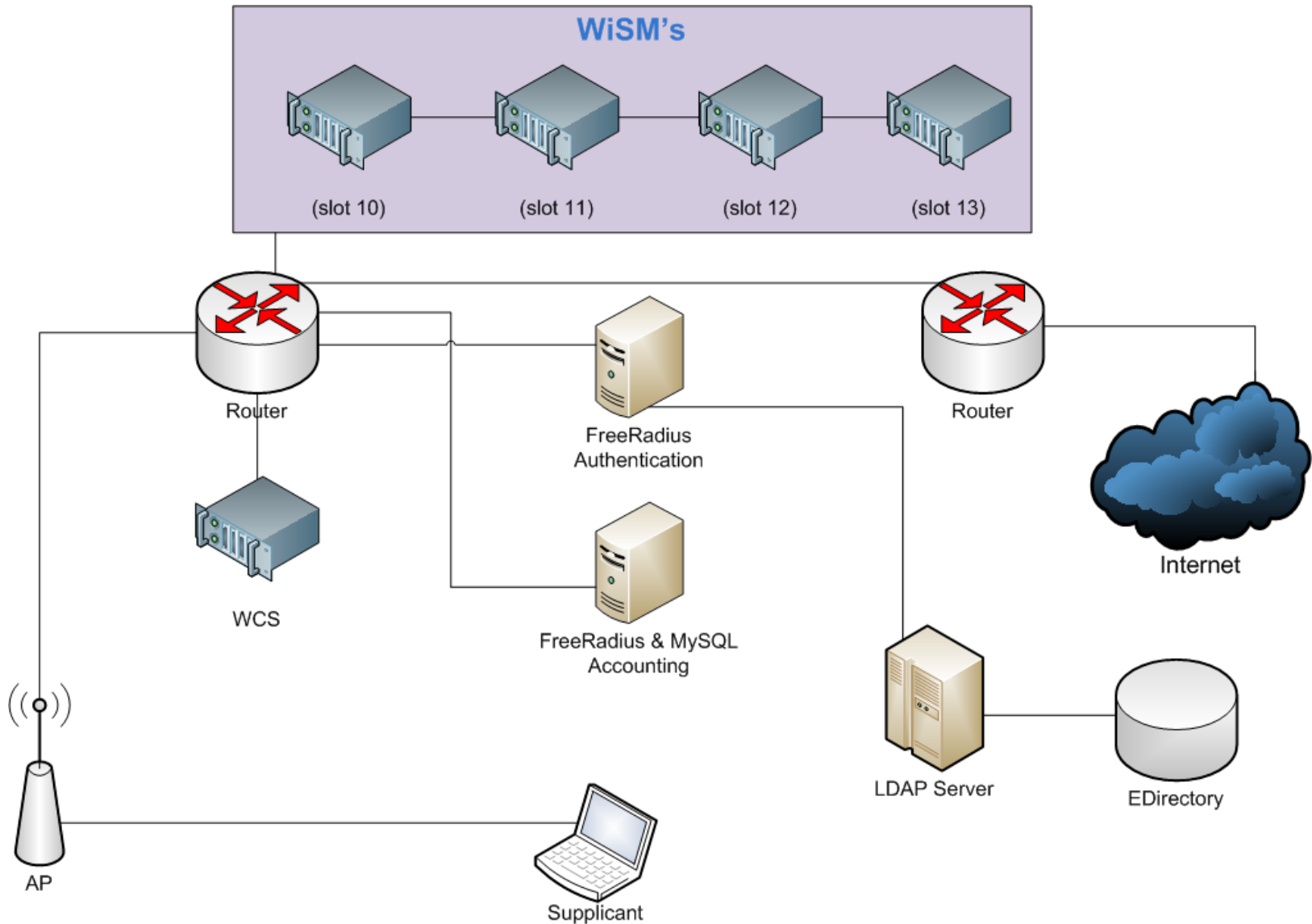
2.2 Wireless at Swansea: 2009

2009-2010

- 0 RoamNode Servers
- ~850 Lightweight access points
- 4 Cisco WiSM's
- ~3000 unique users / day
- 1 WPA eduroam SSID, 1 open setup SSID

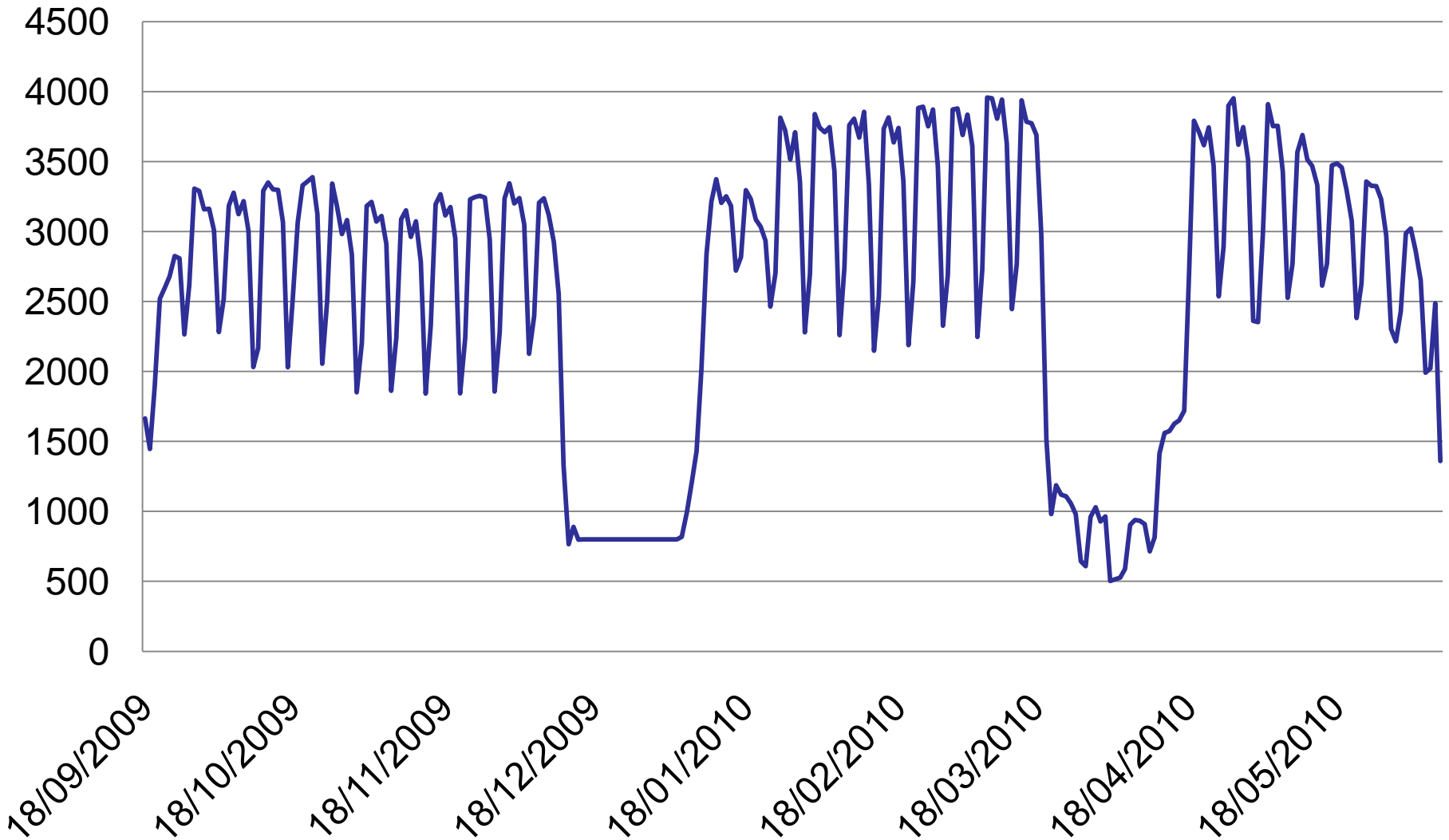


2.2 Wireless at Swansea: 2009



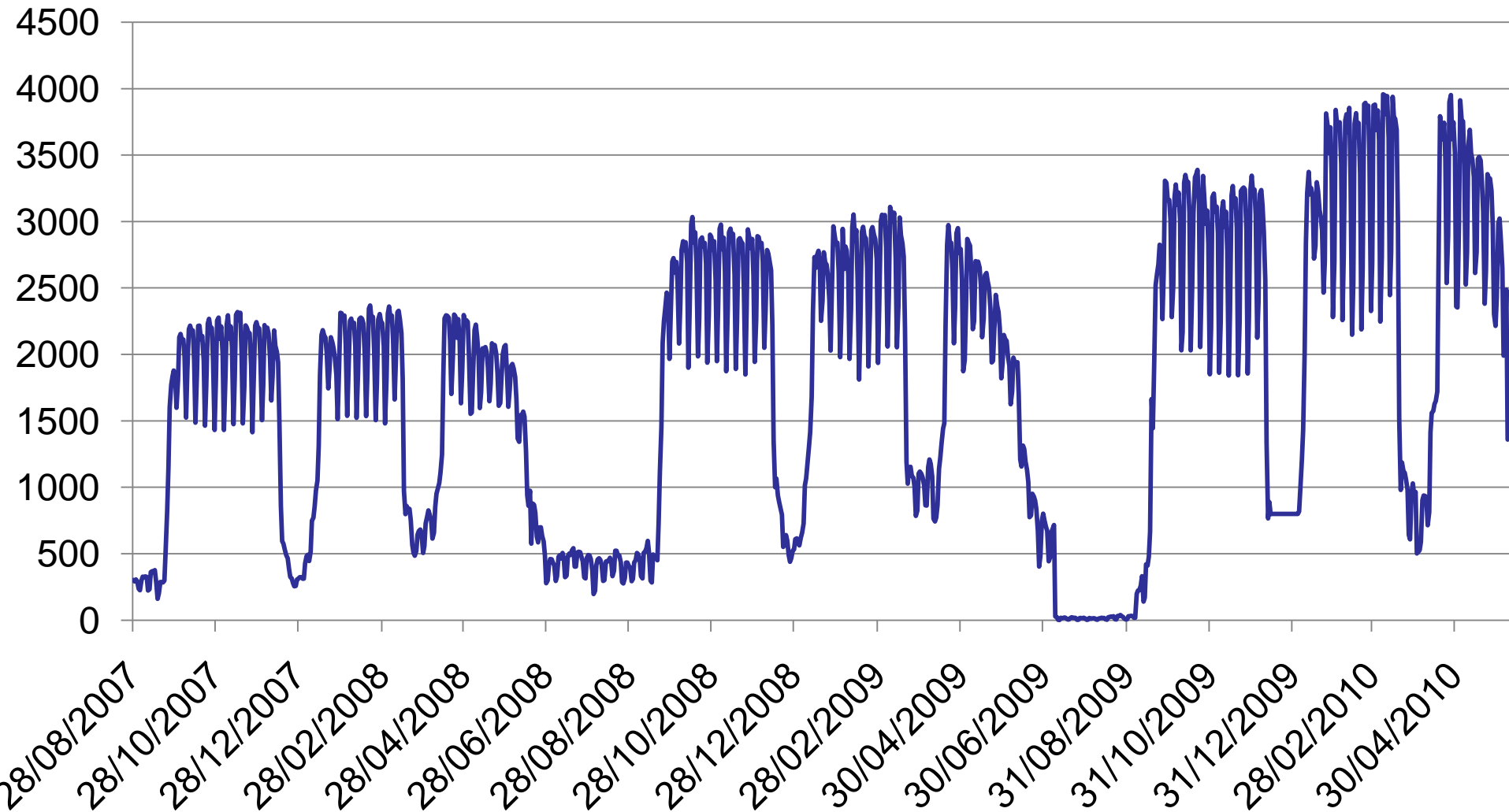
2.2 Wireless at Swansea: 2009

Unique Ussers 2009-2010

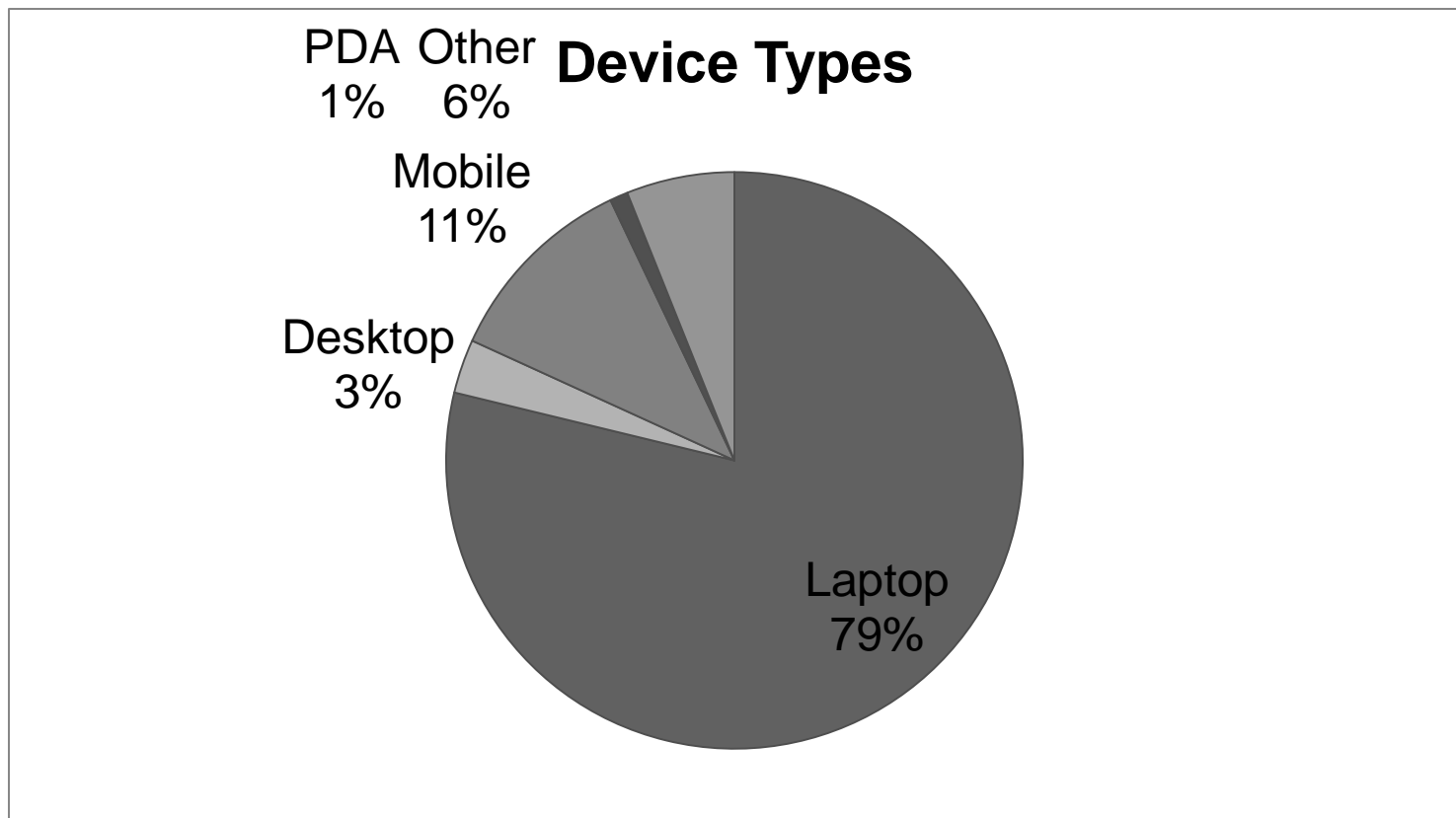


2.2 Wireless at Swansea: 2009

Unique Users 2007 - 2010

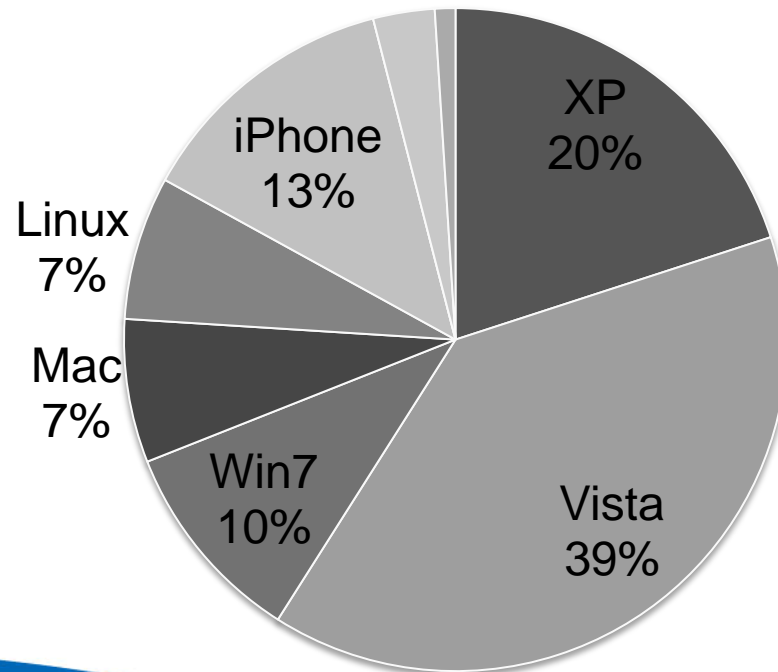


2.2 Wireless at Swansea: 2009



2.2 Wireless at Swansea: 2009

WinMobile 0% Mobile 3% **OS Distribution** Other 1%



3.0 The Problems

Problems with a 802.1X Wireless Networks:

1. Design Problems (Initial problem)
2. Support Problems (Everlasting problem)

3.1 The Problems: Design

Is 802.1X wireless complicated?

WPA or WPA2 + EAP (PEAP [with EAP-MS-CHAPv2 or EAP-TLS] or TTLS [with MSCHAPv2 or TLS or PAP]) with certificates + back end authentication (LDAP or AD or Novel e-directory) + RADIUS (FreeRadius or Cisco ACS or Radiator or IAS) * Different client implementations = **Confusion**

Yes it is...

3.1 The Problems: Design

But... Its not that complicated when you get used to the acronyms and understand the fundamentals.

Design directly affects future support needs.

Design... Beyond the scope of this presentation

Swansea = WPA/WPA2+PEAP/TTLS+FreeRadius+LDAP/e-dir

3.3 The Problem: Support

This time, it really is Microsoft's fault!

Well, all OS developers, Cisco and Juniper's fault. A little bit...

- Supplicant is the biggest support issue
 - Microsoft = PEAP = 69% of clients
 - OSX = PEAP or TTLS = 7%
 - Linux = PEAP or TTLS = 7%

4.0 The Solutions: Supplicants

Supplicants:

- Microsoft = free with OS
- OSX = free with OS
- WPA_Supplicant (Linux) = Open Source
- Cisco / AEGIS = Closed shop
- Juniper / Odyssey = \$\$\$
- SecureW2 = \$\$\$

4.1 The Solutions: Supplicants

IEEE 802.1X = Open Architecture

- Any EAP type should work
- Supplicant **should be free**, easily **configurable** and **deployable**
- Big companies owning supplicants with their own agendas
- OS developers should provide good supplicants.
- Shouldn't have to pay to configure OS supplicants

4.2 The Solutions: OpenSEA



IEEE 802.1X
Open Source
Implementation

-OPEN1X-



OpenSEA – JANET UK Supplicant Group

Were hoping to use Open1X for all OS's in 2009.

OpenSEA not ready.

Either pay for XpressConnect or SecureW2 or deal with native OS supplicants.

4.3 The Solutions: Manual Configuration

Faced with **Manual Configuration**:

- 4000 users need to be set up in a few days
- Takes ~4 mins for IT Staff to do manual configuration
- Too complicated for users

- $4000 * 4 = 16000$ mins = 266 hours = tired IT Support Staff



5.0 Our Solution: SU1X

Windows XP (SP3), Vista and Win7 Supplicants are OK.

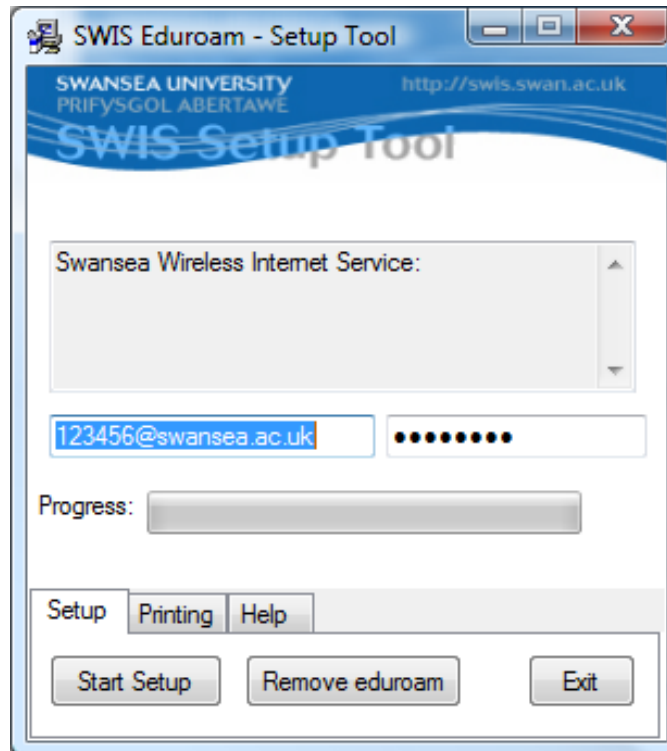
- Some issues, but not show stopping.
- Configuration and certificate distribution difficult
- WLANAPI allows for wireless control and configuration
- **Deployed** from open setup SSID upon registration
- **SU1X** = Tool that uses wlanapi to configure Microsoft supplicants

5.1 Our Solution: SU1X Features

SU1X Features:

- **Automation** of configuration of a PEAP wireless connection
- XP(SP3), Vita and Win 7
- EAP **credentials** without additional user interaction
- Installation of a **certificate** (silent)
- Checks for WPA2 compatibility
- Third party supplicant check
- SSID removal and priority

5.1 Our Solution: SU1X Features



5.2 Our Solution: SU1X Support

Additional Features:

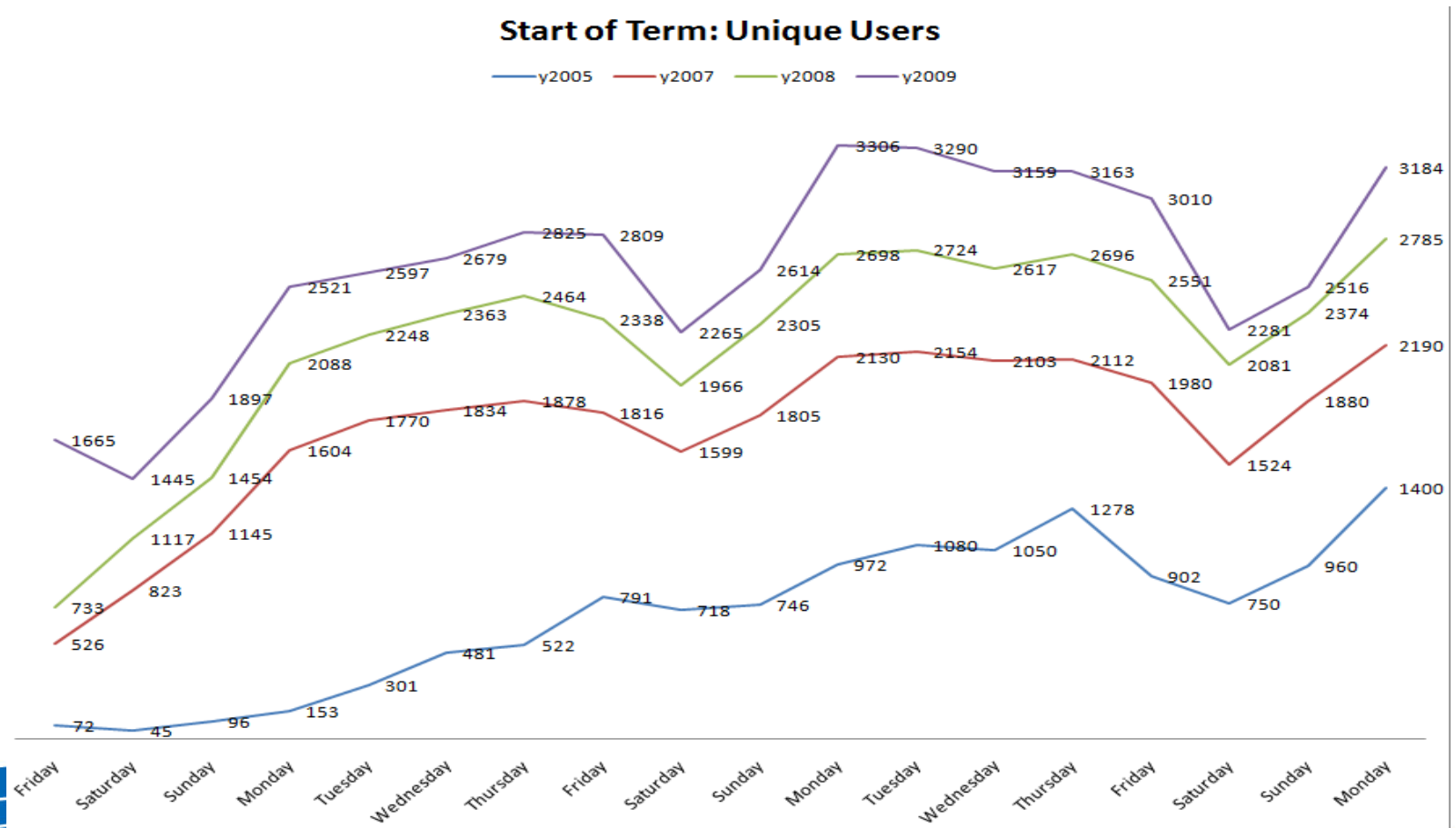
- **Support tab:** Checks: adapter, wzc service, profile presence, IP
- **Outputs check results** to user with tooltip bubble
- and/or to **file**
- **Printer** tab to add/remove networked printer
 - Wireless Printing = Income

5.3 Our Solution: SU1X Future

Possible Future Features:

- Remove capture tool and use config file only
- Send problem report emails
- LDAP credential checks via HTTPS to PHP

5.4 Our Solution: Did it work?



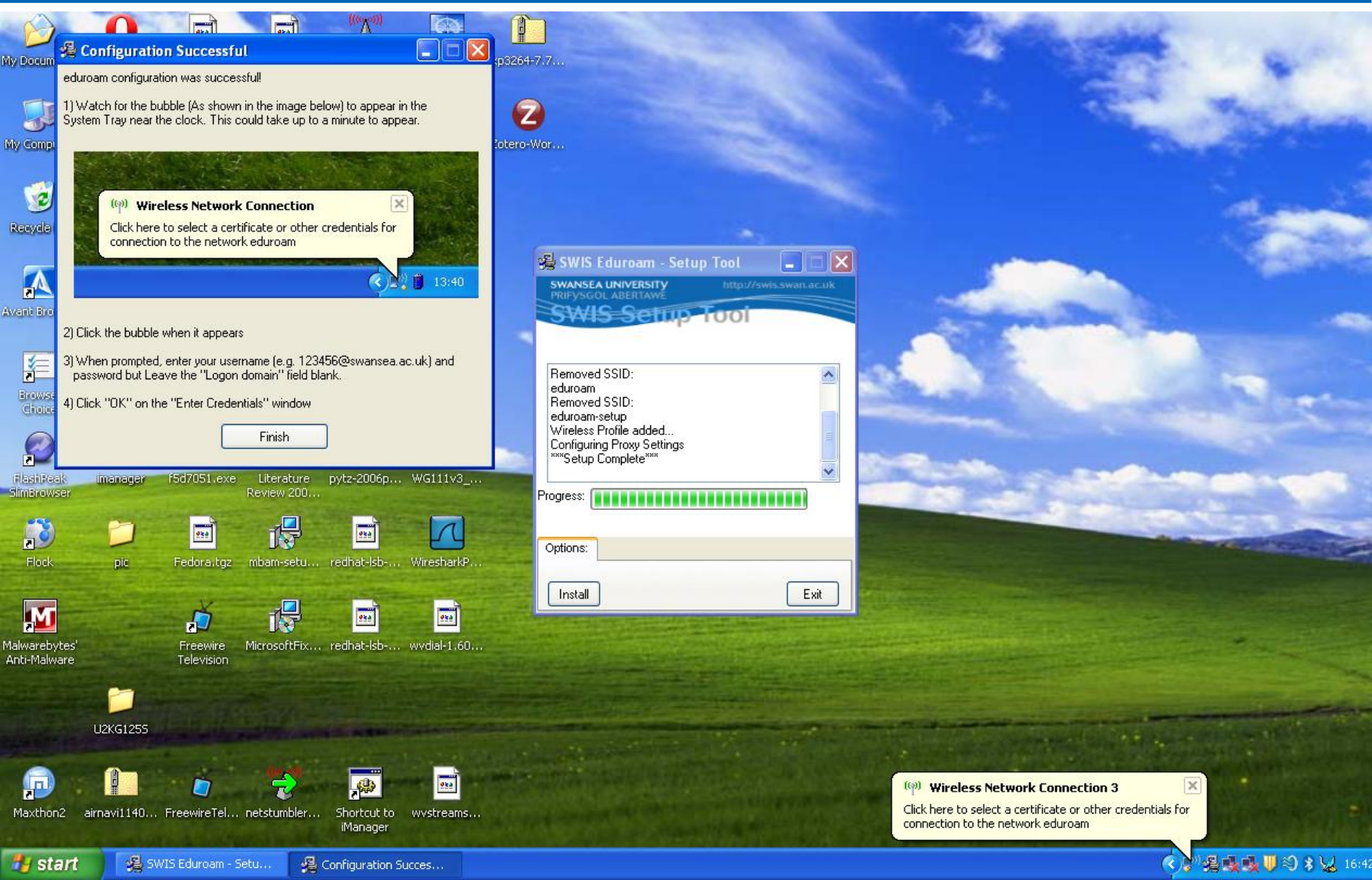
5.6 Our Solution: JANET UK

- In collaboration with JANET UK and Loughborough
- Grateful for help with certificate installation, testing and documentation from Loughborough
- SU1X is Open Source
- <http://su1x.sourceforge.net/>
- <http://www.ja.net/services/authentication-and-authorisation/janet-roaming/su1x.html>

6.0 Demo?

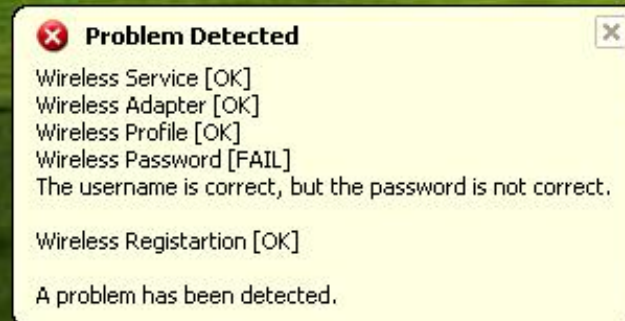
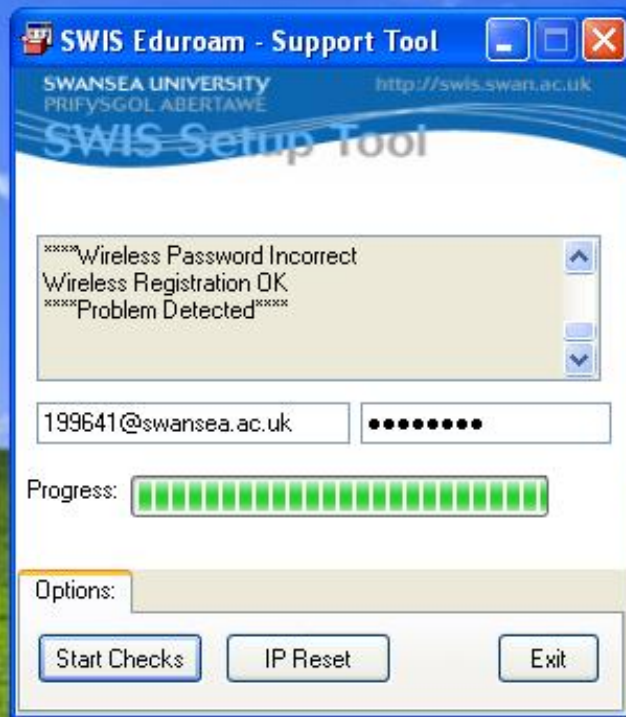
Demo or Screen Shots?

SU1X - Setup Tool



Wireless Network Connection 3
Click here to select a certificate or other credentials for connection to the network eduroam

SU1X - Support Tool



Thank You – Any Questions?

Gareth Ayres

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