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| University of wales, aberystwyth |
| Industrial Year Report |
| Information Services, U.W.A. |
|  |
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| **2006 - 2007** |

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# Introduction

While out on my industrial year, I worked for the University of Wales, Aberystwyth in the Department of Information Services. To quote from their website,

*“The University of Wales Aberystwyth has an integrated approach to the management and delivery of information services. Information Services, the directorate responsible, oversees the provision of Library Services for research and teaching, IT Services for Academic purposes, Management Information Services and Media Services...”* (Information Services)

So Information Services supplies, supports and maintains the University’s computing facilities and libraries.

# Organisational Environment

## Departmental Setup

There are five main subdivisions in the department:

* *Desktop Services*

Desktop Services are responsible for maintaining the vast amount of public service workstations and Windows-based servers, as well as supporting staff and students on their office or personal computers. It is also the division in charge of procurement as well as harbouring the Learning Technology team.

* *Central IT Services*

Central IT Services (or C.I.T.S.) are generally responsible for the university network and UNIX servers. They are also sub-divided into five teams: *Network Operations, Network Development, System Support, Operations* and *Data Preparation*. Operations are the hub of the university’s fault-tracking system. All new jobs go through them and are then assigned to the appropriate team. The Data Preparation team are in charge of selling software, stationary and computer accessories to staff and students.

* *Library & Advisory Services*

The Advisory Services team are generally the first point of call for students with computer, email or university system problems. They also handle training and run several different courses throughout the year for both staff and students. The other teams are *'Lending Services', 'Subject Support'* and the sectional libraries. Lending Services are responsible for stock management in the libraries – ensuring the correct books are in stock in sufficient quantities etc. Subject Support deal with the *Voyager* software, which allows students to electronically browse the library catalogue. Lastly, the sectional library teams deal with the day to day running in each of the three smaller libraries around the campus.

* *Library Support Services*

This division deals with ordering new stock, putting it out in the correct areas and marking it up correctly in the online system. It also contains the *Library Systems Team* who work with Desktop Services to maintain the computers of all the staff in the various libraries.

* *Management Information Services*

Management Information Services (M.I.S.) are responsible for the various university database systems. They also troubleshoot staff problems accessing the databases and make changes as requested by departments.

*(I have attached a copy of the Information Services Organisational Chart to the last page for clarity).*

Each year, Information Services offer seven vacancies for Industrial Year students – two in the Advisory team, two in the Web team, one in M.I.S. (Management Information Services) and two in the Desktop Services team.

## Team Setup

Along with fellow student Adam Rollings, I successfully applied for the Desktop Services position. The team is quite small and consists of two full-time Desktop Systems Support Officers, our team leader and our manager. We also work quite closely with the Technical Support team (*also known as “the Workshop”*), which has nine members who mainly concentrate on hardware problems and are under the same manager as us.

Previously, the Industrial Years have been kept quite separate from the rest of the team and spent all their time working on problems that get passed to them through the job management system (which I shall elaborate on later).

However, this year our Team Leader suggested a change – Adam and I would also take it in turns helping the rest of the team with their major projects. This has two advantages – they get an extra pair of hands working with them on tasks and we get some experience of working as part of a larger team to meet deadlines.

We decided the best way to achieve this would be to swap roles every week. However, it was stressed to us that our priority should be fixing the problems assigned to us and if the backlog ever got too large, we would leave the project and work together to bring the number of calls in the system back down.

# Technical and Application Environments

## Our Office

In terms of the working environment, we each were assigned our own computers in the office with the rest of the team and were set up with administrator rights to do with as we pleased.

In our section of the office, we also had a workbench with a *KVM* switch, which allowed up to plug up to four machines in at once, sharing the same keyboard, mouse and monitor. We used this when we had to fix users’ computers or re-build machines from out of Public Service (which I’ll hereafter refer to as *PSV,* which is the shorthand used in Information Services).

We also had a network line for each which went through a router in our office. This meant we would be able to connect to the internet with machines that had not been registered for network use, in order to obtain updates and fixes. This was very handy, since computer registration can take up to an hour to be applied, which is not good during busy periods.

## Public Service Computers

The university itself has thirty-one workstation rooms, with approximately 550 PC workstations running Windows XP and 166 “thin-client” terminals running off a Citrix Metaframe (which consists of ten servers set up with load-balancing capabilities).

At the start of the year, these machines were all quite old by modern standards – most were PIII-650MHz with 256MB of RAM, although some rooms did have P4-1.8GHz machines. However, over this previous summer a huge upgrade was performed, in which we replaced every single Public Service machine with a new, Vista-capable Dell computer. The new machines also enabled us to replace the old 14”-17” CRT monitors with new 19”-20” TFT screens, something which makes a huge difference to a user’s perception of the workstation rooms.

All of the PCs had two network drives mapped. A “central” store (the M: drive) which was mapped to each user’s own section on our central filestore (every user was allocated 500MB to use) and an E: drive. The E: drive was mapped to a DFS (*Distributed File System*) where a large proportion of the installed programs were actually stored, mainly due to the small size of the local hard disks.

The computers were also a member of the Public Service (or PSV) domain. (I describe the domain system more fully in the next section). As such, users would log on using a domain-created account as opposed to a local one, which enabled various extra features. For example, it meant that they could take their internet favourites between computers, it would automatically connect them to their personal M: drive and it would store various other settings. There were also two versions of the Desktop and Start Menu – English and Welsh. On login, it would check for a flag on the user’s M: drive then load the appropriate one.

# The Nature of our Work

As previously mentioned, our job this year was split between the two main tasks – working ‘on calls’ and working ‘on projects’, as we named them. I’ll now go into further detail about both aspects.

## Working ‘on calls’

Working ‘on calls’ was our primary responsibility and this aspect of the job mainly involved fixing problems and clearing viruses and spyware off student, staff or PSV computers and laptops. However, two other ongoing jobs also came under this area, which I will describe further on in this document.

We had two programs at our disposal to help manage and fix issues.

The first was a contact management system called Sunrise. When new jobs were requested (normally to the Operations team, as mentioned in the first section), they would create a new call in Sunrise, enter the person’s contact details and the job information then pass it to the correct team. In our case, it would be passed to the head of the Workshop, who would then pass it on either to us or one of his own team, as appropriate.

Sunrise would then keep a history of the job – who it was assigned to and when, any notes people made about it as it went, any contact with the customer etc. This meant that if, for example, a customer called to complain about a job not being fixed, the person answering the phone could call up the job and look at the history and say, “Well, they have tried to call you eight times in the past week with no reply”.

The other program was called Interzone. It essentially gave us write access to the DHCP server. For security reasons, only machines which had their MAC addresses registered with the owner’s university ID were allowed to obtain an IP address on the network. With this access, if we changed a network card in a PSV computer, or had finished building a new computer for a member of staff, we could create or edit a record for that machine so it would connect properly.

We also had a vast list of guides on our internal webpage, called Micros Internal. All the most common tasks had entries there – things like building a new computer, putting it onto staff domain, formatting and re-building a PSV computer etc.

### Virus/Spyware Removal

Both Adam and I had a lot of previous experience in this area, having fixed numerous computers for friends and family. We also both regularly posted on a tech support forum, helping people with similar issues. This gave us an advantage, as we both already had good knowledge of what programs we should use in different situations and in what order. I am proud to be able to say that we managed to fix each and every virus/spyware problem that was assigned to us over the year and not one managed to beat the pair of us.

The most common issue we saw was with browser hijackers – programs which would run in the back ground and reset your homepage and create lots of popup adverts all over your screen. These were generally simple enough to fix – they just needed us to scan with a freely available anti-spyware program such as *Ad-aware* or *Spybot Search & Destroy* and then tick the appropriate boxes. Others, however, were trickier and resulted in us having to manually hack entries out of the system registry and force files to delete using programs like *Killbox*.

I particularly enjoyed this aspect of the job, as it always felt good to be able to help fellow students who were panicking about losing their work or other files.

### Converting Machines to the Staff Domain

The task of moving computers onto our Staff Domain also fell into the purview of the person ‘on calls’. This was a constantly ongoing project and new calls would come in all the time, either from individuals who had heard about the system or sometimes from a Head of Department requesting that we upgrade their whole department.

The Staff domain is one of four that the university runs on its network. The main domain is *aber.ac.uk*. The other three are then sub-domains in the forest, under *aber.ac.uk*. They are:

* *Staff.aber.ac.uk* – The domain used for staff computers and library issue desks.
* *Psv.aber.ac.uk* – The domain used for public workstations and teaching stations.
* *Igs.aber.ac.uk* – The domain used by the Institute of Geographical and Earth Sciences for their Post-Graduate computers.

In the past, all staff computers were completely standalone. When the machine was delivered to the customer, they were set up with a local administrator account and basically left to it. This started to cause no end of problems – no other member of staff could use their computer if they were off sick or had left, their admin accounts meant that many fell prey to viruses and spyware bundled with that new screensaver they really liked, or from that email ‘from a friend’ with an executable attachment.

It also meant that we had no really accurate account of how many PCs we had in different places. Finally, it also made fixing problems more difficult than it should have been, especially when members of staff lost their passwords (which we weren’t allowed to keep copies of due to the Data Protection Act).

Thankfully, the staff domain changes all that. Any PCs on the domain now behave basically like workstations and all staff members can log in with their standard university email address and password. *(It is important to point out however, that this did not enable them to get at other staff members’ work or documents, only their own).*

Letting staff log in with their standard details also meant that even if someone did manage to somehow forget their password, it’s easy enough for us to change it centrally after we see proof of their identity, plus it is one less password for them to have to memorise anyway.

Most members of staff were given standard *User* level accounts, which meant that they could log in and customise their working environment as they wished, but they were not able to install programs, viruses and spyware. Some departments that needed it for their software were given *Power User* rights, which gave them slightly more privileges, but still reduced the number of problems they encountered.

However, the two key features that we tried to emphasise when talking about the staff domain with potential converts were the following:

* *Central Administration of Anti-Virus tasks*

The university uses an enterprise antivirus package called *Sophos*, which works with an *Enterprise Management Console* on one of our servers. This could talk to every copy of Sophos on machines that were members of the staff domain.

This meant that if someone managed to catch a virus, it would be flagged up on the console and the Support Officer that was in charge of viruses and updates could then fix the problem 95% of the time by simply right-clicking the infected computer’s name and clicking “Cleanup Virus”. It also enabled him to pinpoint computers whose antivirus was not responding or was otherwise working incorrectly. We could then call those people and pop by to correct it before it became an issue.

* *Windows Remote Assistance*

Encouraging use of this actually became a ‘pet project’ for me and Adam over the year. We did numerous presentations on its use to departments, our bosses and our colleagues in the workshop, to demonstrate its power and use. In essence, it enabled us to connect to any computer on the staff domain and share control of the keyboard and mouse with that person.

I will go into more detail about this tool in the ‘projects’ section of the report, further on.

Moving someone across onto the staff domain involved following a procedure from Micros Internal. We had to start off by changing the computer details in Interzone so that it was listed as a staff domain machine and allocated a new machine name. (The previous name would have been something like *infpc0110.inf.aber.ac.uk.* The new name might then be *iswsstaff009.staff.aber.ac.uk*).

We would then change the computer name to match what Interzone suggested and create an administrator account that they were given the password to. We would then restart, join it to the domain, restart again and ask them to sign in on the domain. Next, we would sign back in as the administrator and copy all their files and settings from the old account to the new.

### Microsoft Exchange

The other major task was moving users across to Microsoft Exchange. Exchange is quite a new system for the university and should eventually replace the current IMAP system, as it offers several benefits over IMAP.

For a start, it has a much nicer web interface – the current “Squirrel Mail” system (used by most ISPs and a lot of email providers) is very simple with few advanced features. The Outlook Web Access system given by Exchange is, as implied by the name, basically Microsoft Outlook in your web browser. This means you can easily drag and drop emails between folders, preview messages without opening them, set up mail rules etc very easily.

Also, Exchange does not store messages locally, it keeps them all on the server and so no matter where someone accessed their mail from, they would see exactly the same emails and folders, unlike IMAP which utilised Personal Folders which were local to the machine.

The main reason most departments wanted to move to Exchange was for the shared calendar facility. This allowed you to share your calendar with any other Exchange user you wanted, as well as set what permissions they had (read, write, edit). This would allow departments to see what members of staff were free on a certain day, which helped arrange meetings. Departments could also set up public calendars – mainly used for room bookings, so everyone could see when a room was free without having to call up and ask.

Moving staff members to Exchange was very simple – we had to ask one of the Officers to create them an account on the server (although by Christmas, we were able to do this ourselves) and add them to a group on the central server so the system knew to forward their mail to an Exchange box. We would then visit the user, setup the newly created account and drag and drop their email to the new account.

I found this whole side of the job very interesting and, in some cases, challenging. I think that Adam and I made a very good team and our areas of knowledge overlapped perfectly. We were both well-versed in most of the tasks and if it came to an area where I ran out of ideas, I’d ask Adam and he would know what to do and vice-versa.

I believe that my area of expertise in this case was removing very troublesome viruses or spyware and Adam’s was with some of the more advanced Microsoft Office features that I had trouble with, such as setting up Public Calendars in Exchange.

## Working ‘on projects’

Every fortnight the team would have a meeting with our manager. We would go over tasks that needed to be completed and their deadlines, explain and delegate any new tasks and report on the progress of current tasks. Some things we would be delegated, while others we volunteered to take responsibility for. They tended to fall into a few different areas, which I shall now describe.

### Software Rollouts

During the first few months (up until Christmas), almost all of our project work was directed into rolling out new software to our Public Service network. Since new software is normally purchased by departments over the summer period, most of these rollouts consisted of either updating existing software or completely removing old versions and installing the new versions from scratch.

Our first step would be to make the installer perform completely unattended. We could do this in one of three ways.

* Anything which installed using the Microsoft Installer (.msi files) could simply be called with a simple batch script which passed the appropriate arguments. An example of this might be:

*Msiexec /i /qn /norestart \\<servername>\admin\install\xp2006\program\program.msi*

That line would tell it to install *(/i)* the file *program.msi* in the default location with no user interface or interaction *(/qn)* and to prevent it from automatically restarting afterward *(/norestart).* That last bit is particularly important, as some things might be installed in the background while a user is logged on and so the computer suddenly rebooting with no warning would not be good!

* The second method we used is for non-Microsoft Installer applications. The method is very similar to the previous one (using a batch file to call the installer file again), but since they are not standardised, we would have to research the necessary parameters for each application.

Most of them would tell you the parameters if you ran the file from the command prompt with a /? Switch. For example:

*C:\Development\Program2>setup.exe /?*

For the applications which did not show this information, we would turn to the internet for advice. The most commonly used site was called *Appdeploy.com*. The site was created to let people share information they had learned about the best way to install various programs remotely.

* The third method was mainly used by the Support Officer and while I was shown how it was done, it was used so infrequently that I never actually used it myself.

This technique involved using various tools to hack the .msi or installer file itself. This was used for programs which had to be installed onto the E: drive.

Since the computers did not have write access to the E: drive (nor would we want 550+ computers all trying to write to the same place at the same time!), we would manually remove the actual files from the installer and point it at the correct place on the E: drive (where we would have previously placed the files). Essentially, this method tricked the installer into believing it had copied all the files to the E: drive, which meant that the program would then correctly look for its files and resources there.

We would then run the installer in a similar method to the first.

Whichever method we chose, the next step would be to copy the various shortcuts to the correct places, delete unneeded ones and also create Welsh versions for the alternative desktop, mentioned in a previous section.

Once the installation script had been completed, we would pass it to the Support Officer who would roll it out remotely to the domain using Microsoft’s Systems Management Server (*S.M.S.*). He would create an ‘advertisement’ which the remote machines would then pick up on and run when they were free.

It would normally be ‘advertised’ to install between midnight and 7am, only when no one was logged on, although this could be altered if a patch was more urgent.

After Christmas, although we did a lot less of this aspect, we were able to perform the S.M.S. side ourselves as we were given Domain Administrator accounts.

### Remote Assistance

Something else we worked on developing during our project weeks was the use of the Remote Assistance feature. This tied in with the ‘on call’ work, obviously, but this time was spent more on making it user friendly and testing.

I mentioned this in passing in a previous section but I will now describe it in more detail.

*“The Remote Assistance feature in Windows XP lets you share control of your computer with someone else over a network or the Internet. With your permission, a colleague or technical support person who is also running Windows XP can access your computer to help you fix a technical problem. If you are a technical expert, you can use Remote Assistance to help others.”*

There are of course numerous safeguards built-in to the system. Only user accounts who had been put into a certain group on the Staff domain could *offer* assistance to users and even then, before we could connect, the user would get a popup box asking for their permission to let us and another if we wanted to share control.

There were many benefits to using this built-in-to-Windows Remote Assistance. It meant we could greatly reduce response times to customers’ issues, it saved on petrol for the university vans, was more efficient and meant we could easily “dual-box” *(have the user’s screen up on one monitor and an internet browser on the other for guides and suggestions on how to fix any problem that was giving us trouble).*

Also, perhaps most importantly, it presented a very good image of our service to the customer. When fixing a problem with Remote Assistance, every user was greatly impressed with how well and quickly it worked. In fact, I clearly remember the response given to me by one elderly member of staff after I fixed his problem when I called him to let him know I’d finished – “Wow. That was very cool, wasn’t it? Scary that technology has advanced that far, but cool.”

There were two ways of providing Remote Assistance. The easiest was for us to *offer* assistance. This could only be performed if the customer’s computer was a member of the staff domain and was as easy as starting the tool, entering their machine name and clicking “Offer”.

The second way was slightly trickier. If their computer was *not* a member of the staff domain then it meant that we had no authority over it and so it would not recognise an attempt to offer assistance. In this scenario, the customer would have to *request* assistance by sending us an invitation file. Since the steps to achieve this could be tricky, especially for someone not at home with computers, we created a webpage we could send them with step-by-step instructions and illustrations.

In accordance with the university’s bilingual policy, we also created a Welsh version. The webpage would also automatically detect if the user was using Windows XP or Windows Vista and forward them to the appropriate page.

(I have attached a copy of both the XP and Vista versions in Appendix B. However, the live version can be found at *http://www.inf.aber.ac.uk/remote*).

### Microsoft Certifications

Something else worth mentioning in this section is that Information Services also gave me and Adam both the training and the funding to complete two Microsoft Certified exams. Thanks to this, we are both now MCPs (Microsoft Certified Professionals) and MCDSTs (Microsoft Certified Desktop Systems Technicians).

These are obviously a very nice bonus for us to have, to help distinguish us from other graduates when applying for jobs after our courses have finished.

### Miscellaneous Tasks

We would also be handed various other tasks at different times. For example, one week we might receive reports that the “Message of the Day” feature was showing messages from 2005, so we would investigate the issue then develop and deploy a fix. Other tasks we might be given included the Anti-Virus Officer giving us a list of machines whose Anti-Virus was not responding and asking us to check them out.

For a while before Christmas, we were also given our own room with three brand new computers and asked to learn about Windows Vista. We had to investigate how currently applied policies would work on Vista as well as which applications would and would not work and report back.

From time to time, we would also be asked to perform jobs completely unrelated to our normal day-to-day work. My favourite of these was at student graduation time. This year, the university had decided to have the whole ceremony professionally filmed and someone suggested also streaming it live over the internet, so people who could not make it would still be able to watch.

To this end, myself and Adam were given a laptop in the studio with Windows Media Encoder installed and connected to a virtual server. We connected it up to the live feed by plugging it into a digital camera, which handled the bulk of the video conversion. We then configured Media Encoder with the desired quality settings and started our server.

We also had the ability to switch between two feeds, so we inserted one of the University’s promotional CDs into the server. We could then switch to streaming the CD after the ceremony had finished, rather than the web page merely showing a dead link.

Overall, the service was quite a big success – at our peak I believe we had about 105 users connected simultaneously and we suggested many improvements for the service for next year.

# Critical Evaluation

Overall, I enjoyed my Year in Industry immensely. I derived great satisfaction from helping students and colleagues alike solve any problems they were having. I also greatly appreciated the amount of trust and faith that was placed in us by our team. We had all heard stories from other students about how industrial year students at large companies are often handed all the jobs that no one else wants to do and aren’t treated very well.

Here, however, not only did we really feel like we were part of the team and making a difference, we were actually given Domain Administrator rights shortly before Christmas. This meant that we both had completely unrestricted access across all of the university’s computers and servers. We did find that these new responsibilities enabled us to learn a lot more about what our other team members did. We rolled out new advertisements from SMS, restored customer’s email backups, managed and tidied up the domain and more.

I found the year particularly invaluable as, to be honest, I was feeling a tad lost beforehand – I was not really enjoying all the intense software engineering in the course and was not looking forward to the prospect of having to do it for a living. Now however, having loved this job, I have decided that I would greatly enjoy a job as a Systems Administrator or similar. This also influenced my choice of modules for the next year of the course – I have taken the two Internet modules offered – Internet Architecture and Internet Systems Administration, both of which I had not really considered before.

Added to this, I also now have my Microsoft Certifications, thanks to Information Services, which I intend to build on in the future.

It is also worth mentioning that Information Services have also asked Adam and I to stay on, working part-time with the Advisory Department – an offer which we have both gladly taken them up on.

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# APPENDIX A: Information Services – Organisational Chart

organisational-chart

# APPENDIX B: The “Request Remote Assistance” WebPages