A Case Study

Aside from my work as a streaming advisor for VTAS, I am also project manager on the Coalfield Web Materials project (http://www.agor.org.uk/cwm) based at Library and Information Services (LIS), University of Wales Swansea; where I have been heavily involved in setting up a typical streaming service to support the project. A main focus of the project is to make available online clips of video and audio material selected from the archives of the South Wales Coalfield Collection at University of Wales Swansea, available online at:
http://www.swan.ac.uk/swcc

I chose to base the streaming service on Windows Streaming Services using a Windows 2000 server model. This was an easy decision to make for the following reasons. LIS shares its server resources between Microsoft Windows NT/Windows 2000 and Sun Solaris servers. I wanted to ensure that the widest possible audience could access the streamed material whilst at the same time providing a cost-effective solution for the project. I therefore decided to base the service on a Windows 2000 server for the following reasons:

- Windows Media Streaming Services software is already an integrated part of the operating system on Windows 2000 server and so is in effect free
- Quick setup and administration via Windows Explorer control interface
- Large newsgroup and user group support base
- Streams compatible with Windows Media Player – one of the most widely used players of streamed content
- The size of the expected user base did not warrant scaling up the service to use dedicated server hardware
- I had more experience in setting up streamed services on the Windows platform

I could have set up the streaming service using the Sun Solaris platform, as I am already familiar with Sun's 'StoreEdge Media Central Streaming Server' software (http://www.sun.com/wireless/streaming/). However, this would have meant a significant increase in cost to provide the same level of features that the Microsoft solution could already supply for free. As the project would be creating Windows Media Audio (WMA) and Windows Media Video (WMV) files it made sense to use Windows Streaming Services. Had I needed to be able to stream Apple QuickTime or Real format files then my choice of server software would have been made more difficult as the choice is much wider – then I may have considered the Sun solution with its support for the Sorenson codec used in Apple® Quicktime® Movies.

The streaming server comprises two clustered Windows 2000 servers each using 250GB of space each. These communicate with the outside world via a SAN (Storage Area Network), which employs an optical network - ensuring fastest possible throughput and transfer speeds.

At the same time as deciding on the server software I was also responsible for specifying the encoding software that would create the streamed content. I decided on using the

latest version of Adobe® Premiere to carry out the encoding. A major part of the project, in addition to creating clips for streaming, was the creation of archive and DVD movie versions of the archived audio and videocassettes. This process entailed a significant amount of editing of source material, including inserting title sequences and applying fades. Once edited the material would be converted into MP2 format for archiving onto blank DVD-R media. MP2 is also the native format for creating DVD movies.

Our MP2 creation process involves encoding in hardware and a separate encoding board was purchased along with Premiere. We use the DC1000 from Pinnacle, a development partner of Adobe. In addition to the standard composite, S-Video and audio inputs provided via a breakout box, the board also allows direct DV input via a bundled IEEE-1394 port on the card. Although we are only working with S-Video sources the inclusion of the DV input is a valuable feature for future use as it allows best quality capture and DV device control.

As we are encoding around seventy hours of video and around five hundred hours of audio it was obvious that this amount of material required a full time digitising assistant working on a dedicated workstation. I chose a vendor that specialises in supplying non-linear editing solutions to the industry to supply the editing workstation. After discussing our requirements the vendor was able to specify the following system:

Typical Encoding Station

Dual AMD Athlon MP 1800 CPUs
Tyan Dual Athlon Motherboard
4x 256MB DDR Memory (1024Mb)
1 x 20GB UDMA 7200 rpm Hard Drive for system files
1 x 80GB UDMA 7200 rpm Hard Drive for video files
3.5” 1.44MB Floppy Drive
Pioneer DVR-A03 DVD-R/RW Drive
Pinnacle Systems DC1000 DV (including Premiere 6 and other software)
Nvidia Geoforce II AGP Graphics Card
Creative Soundblaster Sound Card
K105 Key Windows 95 UK Keyboard
Microsoft Intellimouse & Mat
ATX miditower Case
Microsoft Windows 2000 Pro (c/w disks and manuals)
3 year RTB Warranty (1st year parts & labour, 2nd & 3rd labour only)
Delivery, setup and introductory training

Although we started out with 1024Mb (1GB) of RAM for various reasons we ended up reducing the system memory down to 256MB without any noticeable effects on the editing/encoding process. This is probably due to use of DDR memory coupled with the dual Athlon processors, a feature Adobe Premiere is designed to utilise.

The clips that we create are saved to the server and the server software takes care of serving out the files. For user statistics we use 'WebTrends Analysis Suite' from NetIQ Corporation to provide clear bar charts with the minimum of fuss. http://www.netiq.com/products/was/default.asp

Users access the streamed material via the project website at http://www.agor.org.uk/cwm

Once users log on they are presented with a number of different options, one of which is the facility to search the archive. Once they enter a search term the web server passes the information to the SQL Server 2000 that provides our database backend. The way that the database is constructed involves storing IDs of digital objects in the catalogue against catalogue search terms. URLs for streamed media clips are also stored against object IDs.

When the database finds a search term match, the URL of the matching streamed media is passed to the Windows Media Player on the client machine and the stream begins to play. Users of the site are also given the opportunity of viewing/listening to streamed clips through the use of virtual tours through the archive, some involving map based applications, where a short explanatory text invites the user to click on the streamed clip. A further discussion of this database design can be found under the title 'Creating an in-house content management system' in VINE, Volume 32 Number 2, Issue No. 127, published by LITC at South Bank University.

The next stage in the process will be the setting up of a secure distribution facility to protect the material from being downloaded to client computers. Although the material, once it has been encoded, is not exactly of the highest image/sound quality – after all, sacrifices have to be made when it comes to using compression – we are keen to limit the potential misuse of any of our archive material. Windows Media Rights Manager will fill the role of 'gatekeeper' with its Digital Rights Management capabilities. (http://www.microsoft.com/windows/windowsmedia/distribute/secure.asp)