



THE TAPELESS PROJECT

BBC RADIO'S FILE-BASED REVOLUTION

KEVIN HILTON tells the story of a tapeless dream turning to reality at BBC Radio.

Radio is changing around us, shifting very slowly from analogue transmission to digital through DAB receivers, televisions, computers and over the internet, although the good old tranny and tuner will be around for some time. That's something every listener sees and hears but arguably the biggest change for the venerable medium is unseen and not obviously heard. The way pre-recorded material has been delivered for transmission has gone from disc to quarter-inch tape but the biggest transition is to do away with physical media altogether.

Audio CDs and automation systems changed the way radio stations worked on air during the 1980s, with tape, both quarter-inch and newer comer DAT, hanging in there but now its end does seem nigh, as the BBC updates the iconic Broadcasting House in London, marking the full implementation across its national radio networks of the Tapeless Project.

Scores on the DAWs

The aim of the Project was to build an integrated, tapeless system for production and play-out of material, including interviews, promotions, jingles, and complete programmes. The integration is between the digital audio editing workstation used by producers at their desks and in craft editing suites, and the automated storage and play-out system. During the 1990s BBC Radio began a project to evaluate the DAWs on the market at the time for its different departments.

While some units were favoured for certain applications, there was wide scale adoption of the SADiE DAW, of which there were many units around BBC Radio. The DAW for production and preparation of material then became a component of the larger Digital Production and Playout Programme, which encompasses a series of projects to implement new technology at different sites around the BBC.

Among these are the News play-out project at BBC Television Centre in West London, covering production and

play-out of news material, and the Hard Disk Play-out project in the BBC's Radio & Music Division. In parallel the BBC has also undertaken to re-engineer its entire W1 property portfolio, the high profile 'BBC Broadcasting House Project', which has seen the rebuilding and refurbishment of Broadcasting House, known almost universally as BH. The Broadcasting House Project takes in other buildings situated around BH (which was first opened in 1932) at the top of Regent Street in London's West End. The BBC's W1 'campus' accommodates the BBC's terrestrial and digital national stations, all of which cannot be accommodated in the main building.

Within the Hard-Disk Play-out Project the aim was to streamline the production and play-out operations of music stations BBC Radio 1, and its digital sister 1Xtra, and BBC Radio 2, with its digital counterpart 6Music. In parallel the play-out of classical music service Radio 3, paired with the Euroclassic service, which is syndicated both in the UK and over some EBU partner networks, and speech and news station Radio 4, with the digital comedy and drama station BBC7, has also been centralised on servers.

The News Playout Project provided the BBC's W12 radio operations with their second generation digital production and playout solutions, for 5 Live and the News and Sports services into all the other BBC national radio networks.

The media asset management and playout system selected, initially for Radio & Music and then for Radio News and Sport is the German-built VCS dira! In the BBC's on-air radio and production studios dira! has all but replaced turntables and quarter-inch tape and to a lesser extent CD players, DAT and MiniDisc; at Radio News and Sport it superseded Dcart, a digital mainframe computer system. The VCS system is organised into separate server networks for each grouping of radio services, using the manufacturer's LO designation prefix: LO1, Radio 1 and 1Xtra; LO2, Radio 2 and 6Music; LO3, Radio 3 and Euroclassic; LO4, Radio 4 and BBC7; and LO5 and LO6, Radio 5 Live, Five Live Sports Extra and the overall radio news operation, which supplies news material

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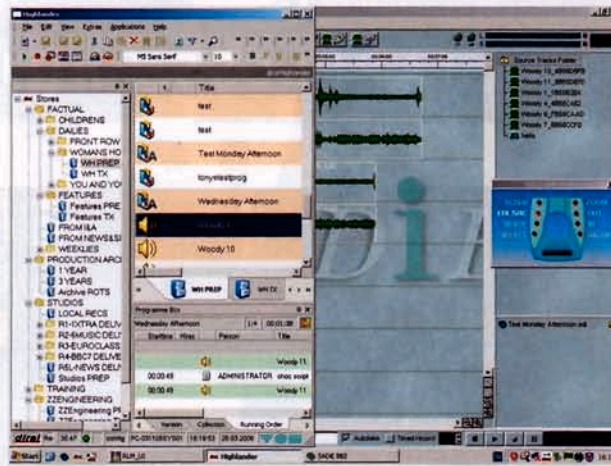
to the networks.

Following the Radio & Music Hard Disk Playout and the News Playout Projects, the BBC then pushed digital production and playout techniques out to the production departments that support the playout operations. First was Radio 3 production with an expansion of the LO3 VCS dira! playout system to support their production community. Next to be rolled out was digital production and playout tools to Radio and Music Factual, the department which provides live and pre-recorded programmes for all the BBC's Radio networks, but predominantly for Radio 4. This project was the first to integrate SADiE editors into VCS tool sets. As this was the last major project of the digital production and playout initiative, and would replace the remaining examples of quarter-inch tape and DAT the BBC called the project 'Tapeless Production', with the VCS system ID of LO7.

This ties in with the central philosophy of the BBC Broadcasting House Project; to replace all the technology within BH and consolidate on a few key products. SADiE was the editing workstation chosen as the production tool but Geoff Woolf, Programme Manager for Digital Production and Play-out at the Radio and Music Technology Group, says that during the planning stages it became apparent that the full-blown version of the SADiE V5 software on the PCM4 and PCMB platforms, was probably over-specified for what was required in many situations.

Out With The Old

In radio production Producers and Reporters have edited their raw material and assembled a rough version of a programme, traditionally on quarter-inch tape machines in their offices, more recently on stand-alone DAWs before going into a studio or recording



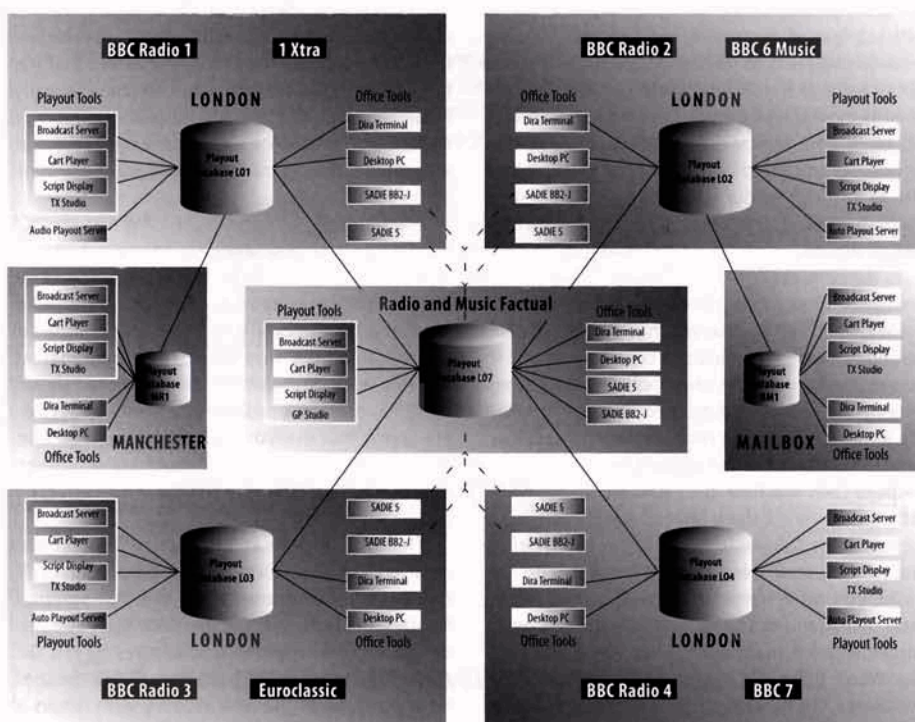
Integration of SADiE and VCS was a major step forward for the project.

channel where a Craft Operator, (Studio Manager) would fine edit and perform any mixing that was necessary. Woolf says that what was required was a digital equivalent of the office reel-to-reel so that the programme makers could get on with constructing the programme.

SADiE responded to the BBC's requirements by producing new desktop and portable editing systems, the BB2 and BB2-J. "The refurbished BH is smaller in terms of office space, there's a lot of hot-desking that goes on, and there are fewer dedicated editing positions than there were with quarter-inch," says Woolf. "There's still a need for craft editing but we wanted to concentrate on getting the functions correct by giving the programme makers the BB2 so they can get the story right and then take the material in its right order to a Craft Operator who can use a SADiE V.5 to make it sound great."

The versatility of standard PCs, combined with cheap, high-capacity hard disk and memory has brought flexibility and power to desktop working. Supporting customised editing stations around the production offices would have been impractical but Woolf observes that basic modern technology allows for good quality editing functions on ordinary office PCs. Any specialist work, including

A block diagram of the BBC Radio & Music digital production and play-out system.



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> digital signal processing, can be undertaken using outboard boxes, transferring back and forth using USB ports. "The office PC platform now has oodles of processing power," Woolf explains. "And the office IT network can provide 100Base T switched to every desk top, and bandwidth can be upgraded to a Gigabit/sec where necessary, whereas even five years ago we were talking in terms of 10Base-T."

SADiE V.5 editors, on the PCM4 or PCM8 workstations, are installed in dedicated acoustic spaces for the finishing process, carried out by specialist craft operators. There is an analogy with video editing, which divides into offline editing – the assembly of material into a narrative or creative order – and online editing, the tightening up of the material and addition of effects and graphics; although in radio the edges are blurred as more creative cutting can be done by the Producer before collaborating with the Craft Operator in the final stages.

As digital audio material is of relatively low file size, particularly in comparison to video, there is the possibility for more than one copy of raw material to be stored on the system. In the days of analogue, quarter-inch tape reporters and producers were advised by the training manuals to first make a copy of their tapes and edit that. Given time constraints and the human psyche, that almost never happened; but today producers are able to work on the master without fear of destroying the precious original material or having to go rooting around in a waste bin to retrieve a now vital piece of tape that had been removed and thoughtlessly discarded. This has been achieved by the non-destructive editing techniques employed by the SADiE product set, and also by the VCS media asset management system creating additional copies of the edit project on the central servers.

In the current climate the Corporation has to be seen to be responsible in how and where it spends money. Geoff Woolf observes that the cost of each editing station has come down considerably due to new technology and the philosophy of the Tapeless Project: "We've provided more editing positions but the emphasis is on the reduced function editors, which are installed in the production offices, with a bespoke DAW machine in an acoustic space." Woolf estimates there are three BB2s to one SADiE V.5.

Before the full implementation of the Tapeless Project BBC staff were already familiar with the SADiE editing systems, and the VCS dira! media asset management and playout solution was being implemented in many areas. From that experience, says Woolf, there was confidence in the dira! playout device, On Air Control, as a stable and reliable

tool, particularly on the open VMS operating system rather than Windows. "There's no known viruses for open VMS," he notes.

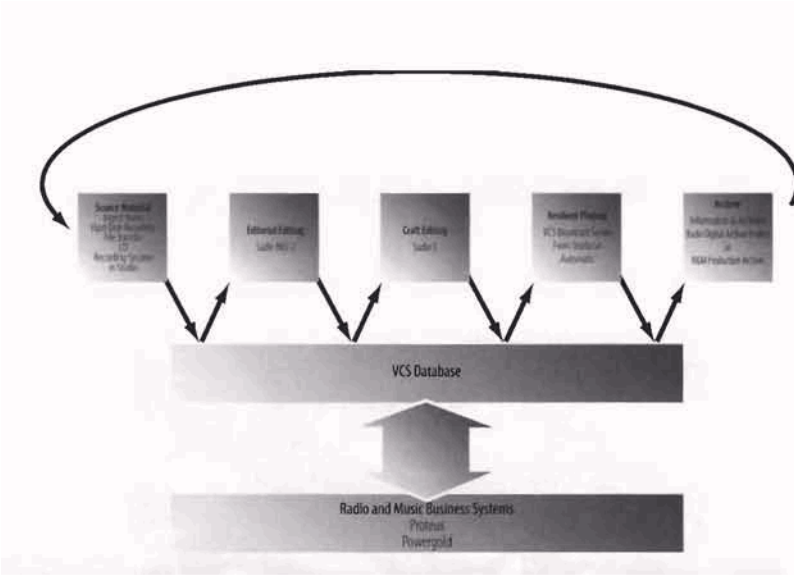
What the BBC had to decide was whether to start from scratch with the full installation of dira!, using the system's integral editing tools, StarTrack, alongside On Air Control. "We considered that we were going to have to train umpteen hundred staff in On Air Control," says Woolf, "but the prospect of migrating them all from SADiE editing tools to the VCS StarTrack on-board editor was too onerous. Also, there were concerns about whether it was suitable for craft purposes. We concluded that we should integrate the existing editing system into the media asset system we already knew."

In anticipation of the BBC's decision to use both systems, SADiE and VCS announced that they would work together to produce integrated tools. "That was fantastic news for us," Woolf comments. "SADiE realised that the BBC is a key market and that VCS is becoming the main media play-out and scheduling system in BBC Radio & Music." Under the joint collaboration agreement SADiE and VCS began to work together to integrate their respective systems, for the network exchange of projects, including all relevant metadata and associated with a particular project.

A mixed working environment of Star Track and SADiE was considered but there were concerns about compatibility with EDLs. Woolf explains that the priority was to provide a user interface that was familiar and similar to what was being used already. Familiarity with the VCS solutions also influenced the decision for the BBC to place a contract for an automation, asset management and playout systems with VCS.

The integration of the SADiE DAW and the VCS dira! media asset management products began in earnest, with VCS as the principal supplier and the DAW manufacturer as a sub-contractor. "The reason for that is it's the best way to get two companies to work together," says Woolf. "As a customer we did not want to be in the position that should there have been a problem the various suppliers are saying that everything is okay from their end." By appointing a principal contractor the business relationship and the responsibility for delivery is clear.

The BBC Broadcasting House Project has involved the demolition of a fair proportion of BH but leaving the famous "stone liner run aground" frontage of Lieutenant-Colonel G Val Myer's original design and the celebrated sculptures by Eric Gill. A modern structure has been built within the shell, housing some of the new studios, with others at



> nearby buildings. In the meantime the BH extension has been housing BBC Radio's operations but in due course will itself be demolished.

Proof of Concept

Proof of the integrated editing and play-out concept was given by its implementation on the Radio 4 consumer affairs programme *You and Yours* during a six-month pilot scheme. "Using the system on the programme proved that editing projects could be moved from desk to desk, with files transferred using standard Windows Explorer into the VCS directory for playback," says Woolf. "That influenced a lot of our design thinking."

"One thing it proved was how easy it is to lose material," says Woolf. "But it also proved the concept of the two functionalities of the different audio editing applications, SADiE 5 in the studios, SADiE BB2 in the office." Two old basement studios, B6 and B16, were used as part of this initial project, with edited material dragged and dropped into the VCS playback system as finished stereo WAV files.

This provided a form of semi-automation, a move on from the time when the DAWs were stand-alone devices and material was transferred around using removable hard drives or even on DAT or CD-Rs. From that and through the drag and drop technique the system has developed into a series of media asset management tools.

The user interface of the media asset management tool has colour codes and icons to identify the media assets easily. The basic icon is modelled on the programme box that was once common around BH for carrying scripts and tapes. Four variations on this are used: an empty programme box; a programme box with SADiE project attached; a box with finished stereo audio and the project elements; and a box with just the finished audio, signifying the programme is finished and that the SADiE project files have been purged.

A "resilience strategy" has been developed to ensure that material is not lost or inadvertently deleted. Projects are transferred to the desktop from the central servers and the user works on the project from their local drive. Whilst the user is working, the local PC copies all changes made back to the central servers as a background process that the user is not aware of. The main storage server has a total capacity of 6TB and is provided by the BBC's commodity IT supplier, Siemens Business Services. When a programme is coming up to its transmission date the material involved is moved to a safe server. The component material remains on the local drive just in case it is required in the event of the server going down. Housekeeping is maintained through an automated purge and delete program both on the local copies on the client PC and the central servers.

From the first roll-out at Radio and Music Factual the Tapeless Project will continue until around mid-August as departments move back into BH from the extension building. Some physical media survives in the form of CD and DAT; Radios 1 and 2 have approximately a 75/25 split between VCS and outboard systems but Radio 4 play out is now fully file based. And quarter-inch tape, once as common at BH as a BBC mug, is now no more.