

Tapeless workflows at S4C

— putting an end to the battle for the master copy

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S4C

Tapeless workflows are now the goal of many broadcasters but the road to “tapelessness” is not always smooth and straight. Some of the biggest obstacles are cultural rather than practical. However the benefits of ending the battle for the master tape are well worth having. S4C has embarked on a programme of editing, creating and transmitting its content in a totally file-based environment and is beginning to see the benefits of this way of working.

This article explains our rationale and shows the way in which the various systems integrate.

S4C is a public service broadcaster, based in Wales, serving a population of 3 million people of which approximately 500,000 are Welsh speakers. Established in 1982, S4C broadcasts one analogue and two digital services – providing 35 hours per week of Welsh-language programming on the analogue service and 85 hours per week on the digital services.

The channel has been broadcasting on the UK’s DTT and DSAT platforms since 1998 and has provided coverage of the proceedings of the Welsh Assembly since 1999.

S4C’s revenue comes in the form of a government grant, topped up with a small percentage of revenue from commercial adverts. The bulk of the channel’s programmes are commissioned from independent producers within Wales, with a further ten hours per week coming from the BBC.

Like most other terrestrial broadcasters in the UK, S4C will have to deal with analogue switch-off in 2009 / 2010.

Yesterday

S4C first introduced station automation in 1990 and was the first UK broadcaster to run unattended for extended periods thereafter. In 1999, Grass Valley Profiles were introduced to the playout promos, trailers and other short-form items. This concept was first introduced on the analogue service, followed by the two digital services. Implementation was provided by our automation suppliers, IBIS / Avocet.

In 2001, S4C brought the playout of commercials in-house, purchasing a mirrored pair of Profile XP servers. Again, IBIS / Avocet provided automation solutions for the playout of commercials on our analogue and digital services. At this time, the same servers and automation platforms were being used to provide 3rd party playout for YOU TV.

Today

We are now moving forward with our server implementation, having purchased a mirrored pair of Omneon servers to facilitate the playout of programmes and short-form items alike. This has been pulled together by the installation of a Media Asset Management (MAM) solution from Dalet.

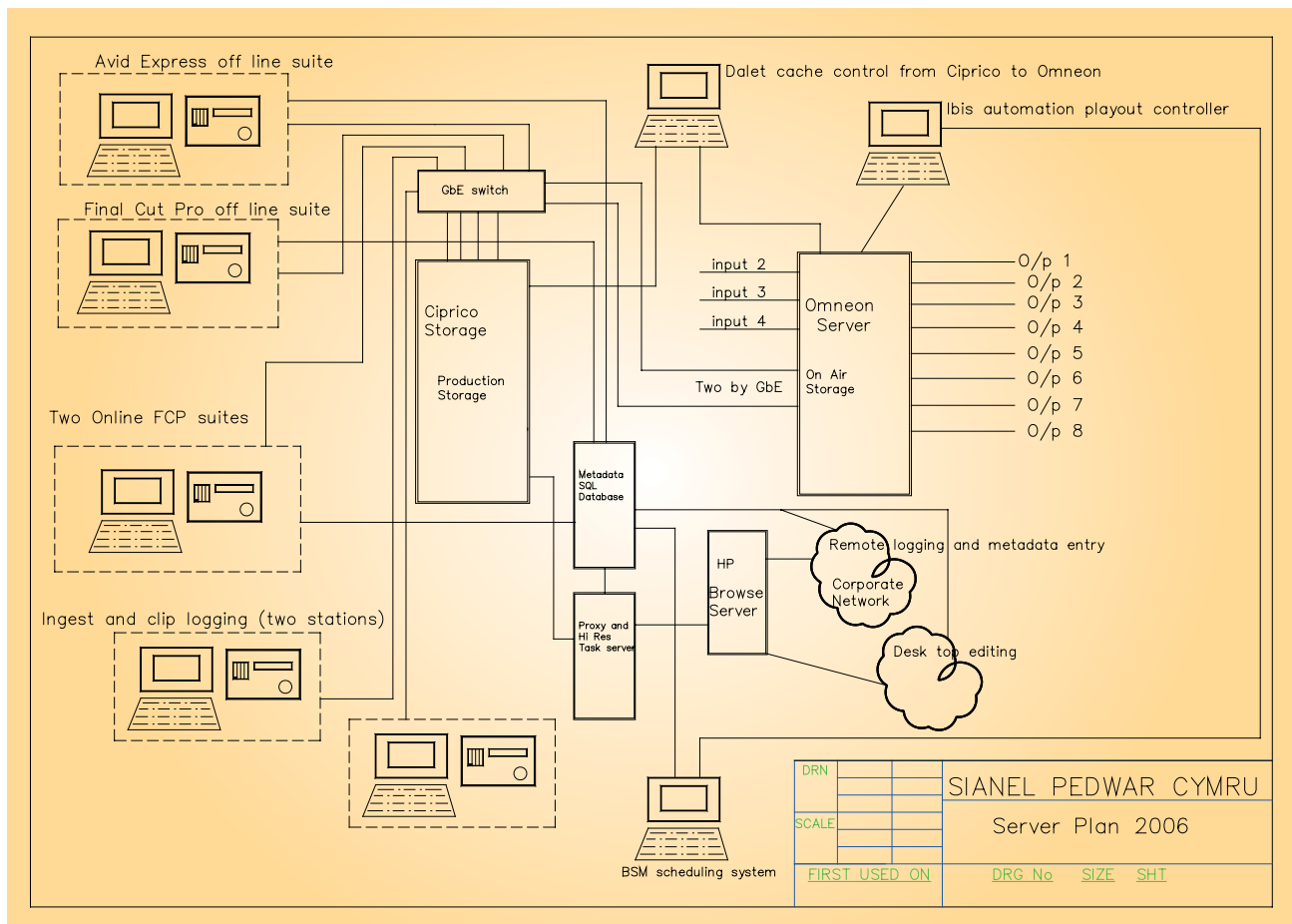
As the title of this article suggests, we have seen a battle developing for possession of programme tapes as they arrive in the building. Not only does the Library wish to register a new tape arrival into its scheduling and commissioning system ... all areas of Production want a hand on it as well.

- The Promotions department wants the tape to produce trailers.
- The Graphics department wants to create place holders and print images from the tape for listings magazines.
- The Subtitling department wants the tape to produce subtitles in two languages.
- The Presentation department wants to view the programme and send a copy off to have audio description added ... Oh! and did we mention signing?
- The format transfer area wants to create VHS copies of the incoming tape.
- ... and finally it has to arrive in the VT area for transmission!

All this tape traffic prompted us to look into the way we should handle incoming media in the future. This led us to conclude that **tapeless workflows** were the way ahead.

We made the conscious decision to have two distinct areas of storage, namely Production storage and Playout storage. The different performance requirements for the two storage areas led us to choose the Omneon for playout and a Ciprico Dimedia 1724, with 8 TB of storage, for the Production storage. The Ciprico, being more cost-effective for storage, would not be required to play out video in real time.

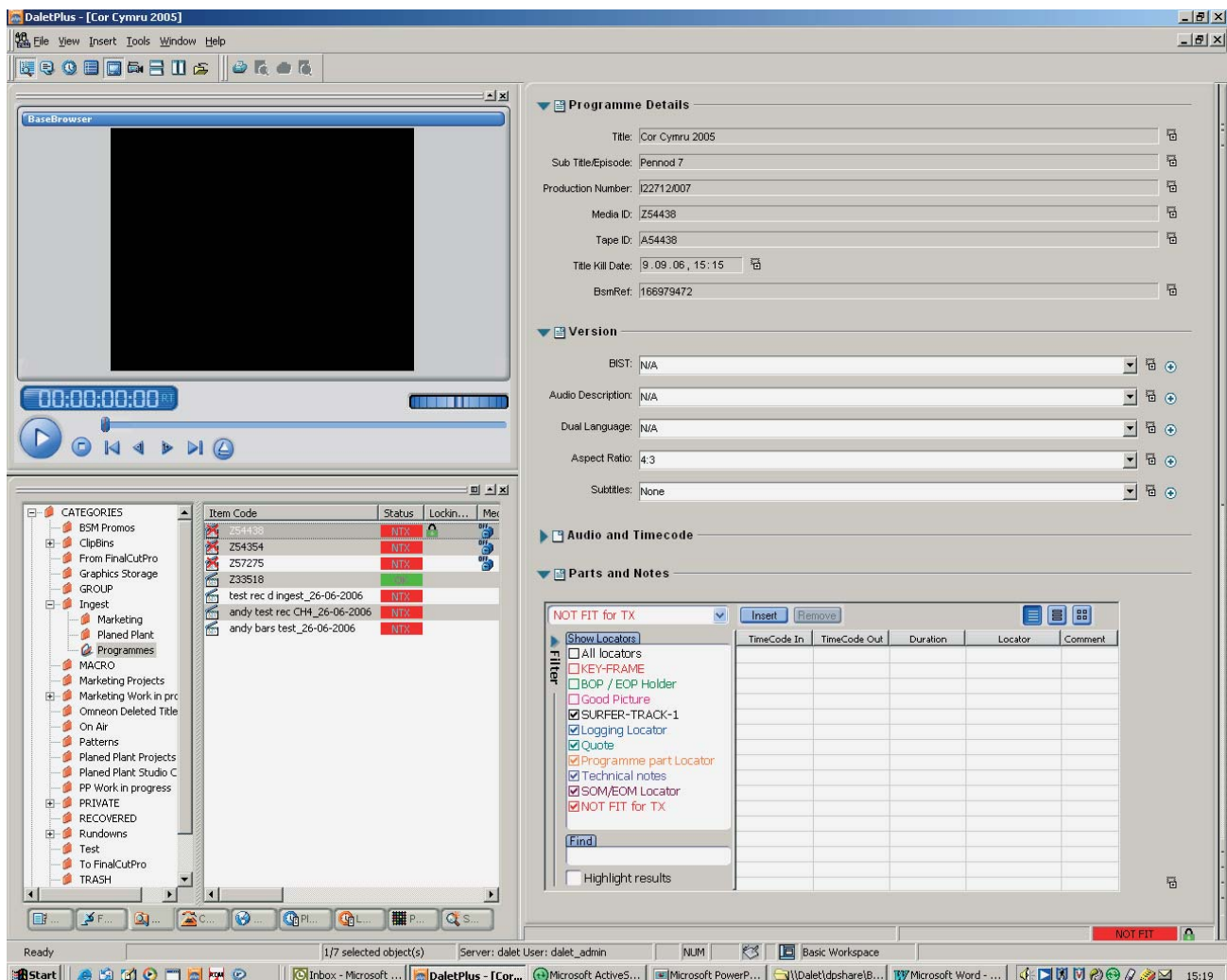
A conceptual diagram is shown below.

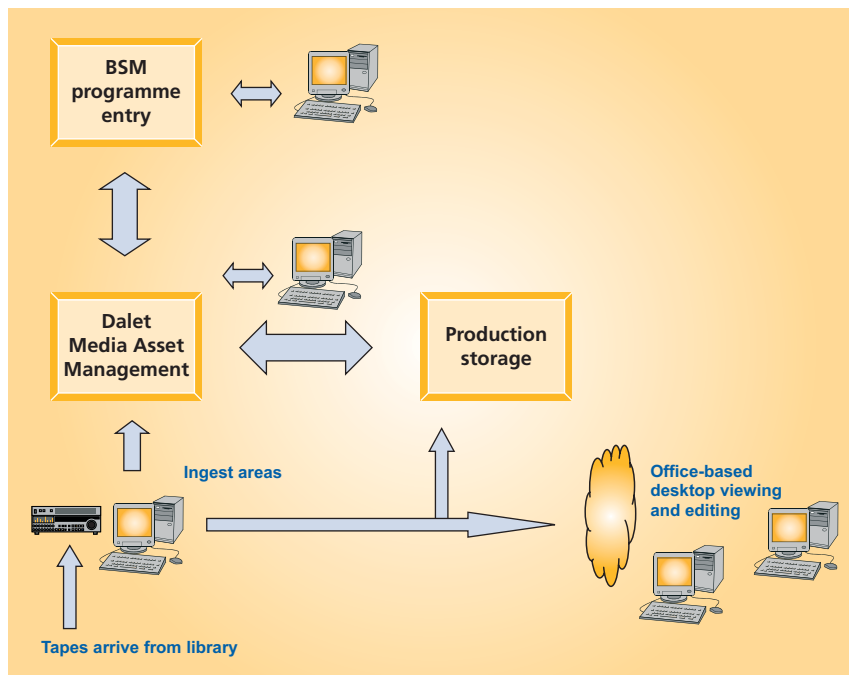


Linked to the Production storage are two off-line edit suites, an Avid and a Final Cut Pro (FCP), as well as two on-line suites, both FCPs. There are currently two PC-based ingest stations with an HP server providing low-resolution proxy storage.

Ingest workflows

- Programmes are delivered to the Library.
- Delivery details are added to the Programmes database in the BSM scheduling system.
- The ingest job is exported to the Dalet asset management system; this is where the metadata in the asset management system kicks into life.
- Data can be viewed from within the asset management system using asset manager forms such as the one shown in the screenshot below.
- The data is stored in the form of an offline media asset and, at this point, has no content associated with it.
- Tapes are sent to the ingest areas from the Library.
- They are immediately ingested in to workstations which use Dalet ingest software, and then a DV25 or DV50 file set is created. Quality control is performed at this point.
- Once the entire programme has been ingested, it is automatically transferred to the Production storage by FTP transfer.
- The ingested content automatically finds the offline metadata and becomes an online media asset.





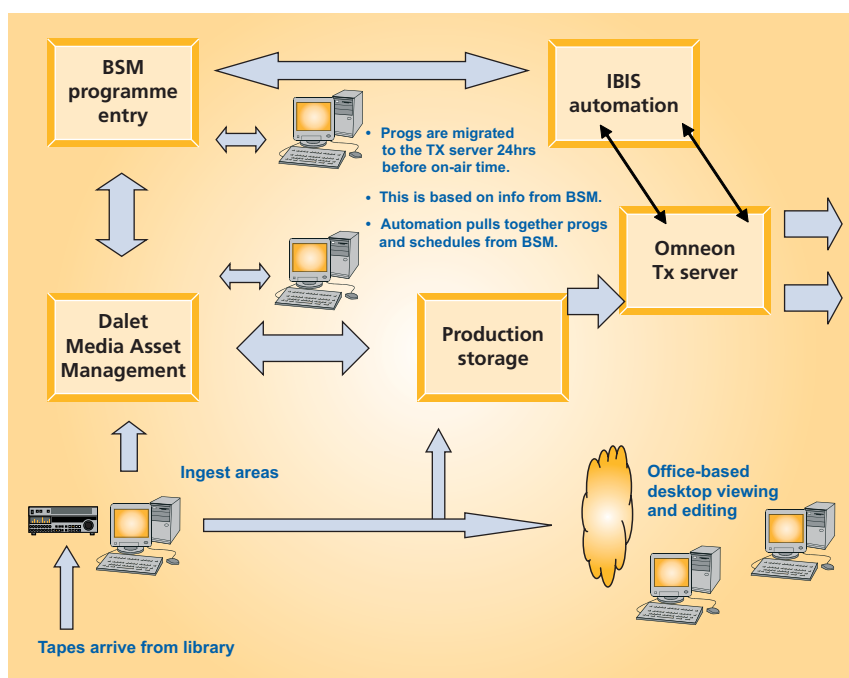
- The arrival of the DV files in the Dalet cluster triggers the generation of a low-resolution proxy file for desktop viewing and editing. This is typically a 400 kbit/s WMV (Windows Media) file.

A block diagram is shown above.

Once within the asset management system, programmes can be viewed in the office environment. Desktop editing tools are used to create EDLs and send high-resolution clips from programmes direct to the FCP suites.

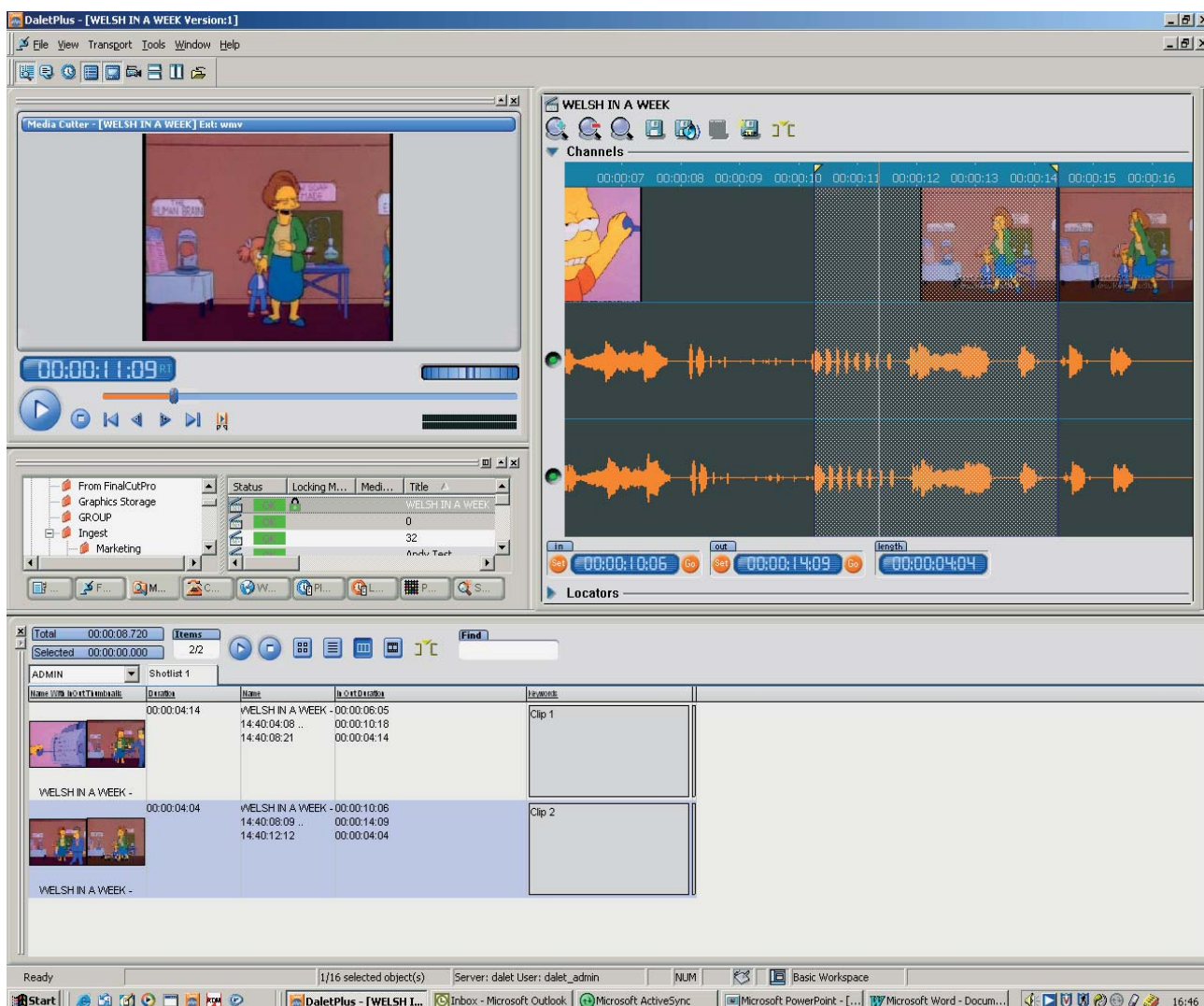
Schedules from the BSM system trigger the migration of programmes from Production storage to the Omneon servers for transmission. The arrival of content on the TX servers causes the automation to receive metadata from Scheduling about newly-arrived clips.

The complete cycle is shown below.



Editing workflows

Ingested programmes can be opened using desktop editing tools; clips are then extracted in order to make promotions and trailers. These are saved into a clip bin.



Clips selected in this way can be exported to the FCP suites directly from the client interface. This causes editing decisions made using low-resolution material to be mirrored in the high resolution part of the storage.

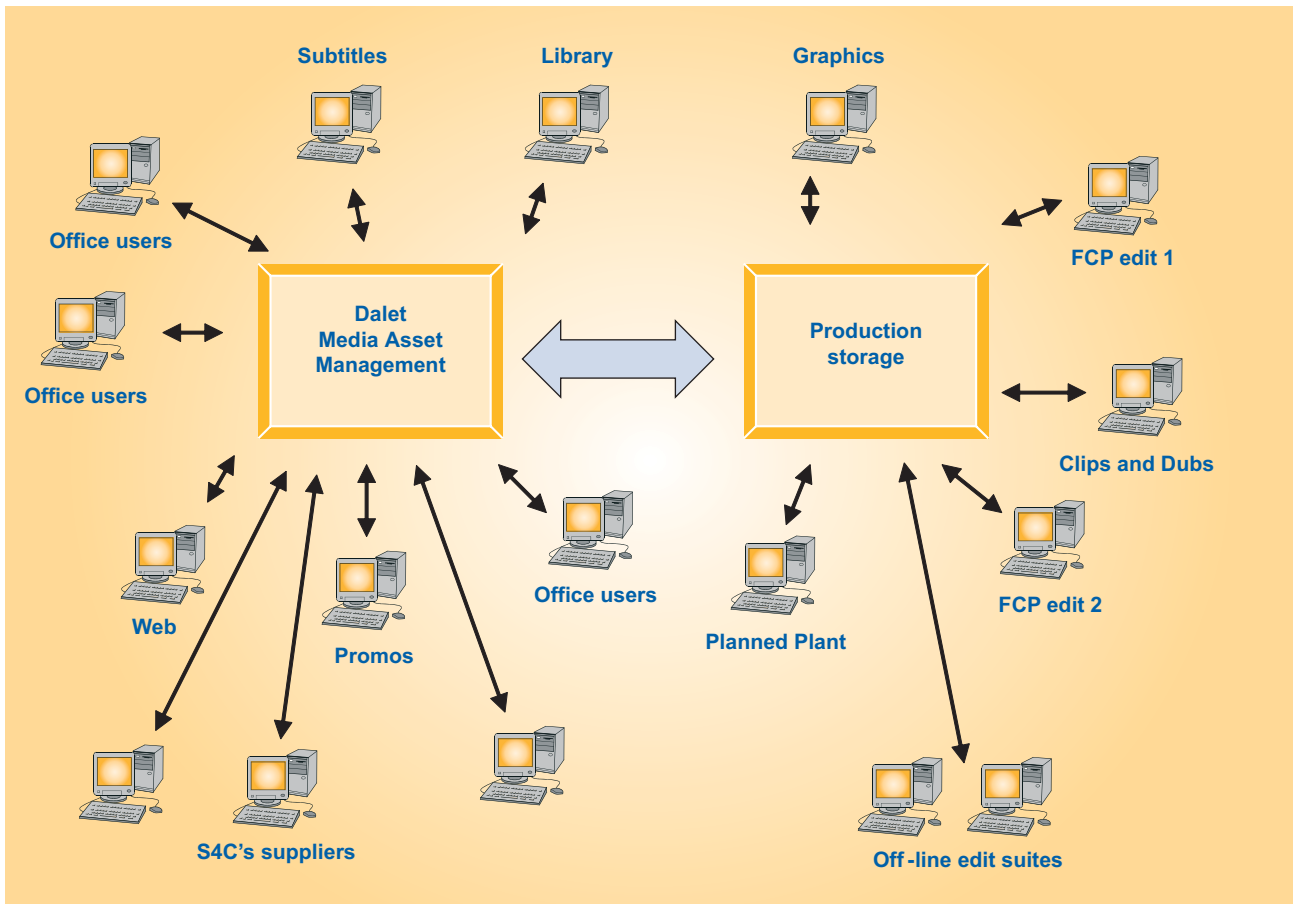
Once the clips have been rendered out, they can be found by the FCP suites in the shared Production storage.

The items are finished in the online suites and then re-imported back into the Dalet database where metadata is added before they are manually migrated to the Omneon servers for transmission.

The tapeless workflow environment allows multiple access for many departments within S4C (see the schematic diagram on the next page) – from just one pass of the master tape at ingest.

Abbreviations

BSM	Broadcast Schedule Manager	FTP	File Transfer Protocol
DSAT	Digital Satellite	MAM	Media Asset Management
DTT	Digital Terrestrial Television	TX	Transmission
EDL	Edit Decision List	VT	Video Tape
FCP	(Apple) Final Cut Pro	WMV	(Microsoft) Windows Media Video



Tomorrow

In 2007, we intend to add secure web access to allow working from remote sites and to allow suppliers access to the programme archive, along with a file-based archiving system to preserve our ingested assets.

It is also intended to provide mirroring for the Production and Proxy storage to protect against failure.

Conclusions

The benefits of tapeless workflows are clear but perhaps what is not so clear is the perceptual and cultural changes that are needed to achieve them. Not everyone is immediately comfortable with having no physical media to carry around the building with them. Sending a file and walking out of



Formerly with the BBC, **Andy Palmer** is currently Head of Technical Operations at S4C, the Welsh-language public service broadcaster. He is responsible for the operational and engineering staff, and oversees the engineering and operational integrity of S4C's analogue and digital services, spanning the digital terrestrial and satellite platforms, Transmission, Studios, Maintenance, Archives, Editing and Graphics.

Mr Palmer is the instigator and manager of engineering and operational projects and practises at S4C, including the design and specification of transmission systems and the general broadcast architecture. Previously, he project-managed and implemented S4C's two digital services.

Having recently finished a three-year post-graduate MA, researching into Organisational Culture, he now manages the Tapeless Workflow project at S4C.

the room empty-handed does take some getting used to. It has similarities to the early days of e-mail when pressing the “Send” button surely did not have the gravitas and satisfaction of printing out a hard copy and placing it in a buff-coloured envelope.

So implementation of tapeless workflows may be a longer and more arduous process than at first imagined. It takes a while to realise that, for some people, “file sharing” is the last thing they want to do with “their” precious edit material.

S4C has found that developing comprehensive workflow patterns and communicating these to the suppliers – especially when dealing with several different systems, all of which have to integrate with each other – was key to the success.
