

Content Delivery Networks in 'Share it!' TV Systems

Introduction of a Complementary Distribution Chain to Television Broadcast by Internetworking Personal Video Recorders – The Share it! Project View

(Abstract)

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Powerful signal processing, cheap mass storage and the increasing availability of always-on broadband networks are set to radically change models and habits of TV viewing. The Share-it! project examines how these changes may develop and how these technical factors interact with the world of digital rights management.

Powerful signal processing and cheap mass storage discs, now costing around 1 Euro/Gigabyte, have led to the development of Personal Video Recorders (PVRs). PVRs are digital video recorders that allow much easier programming, instant access to recorded programmes, and methods of automating the capture of TV programmes. Early PVRs have been deployed in several markets (USA, UK, Japan) and have been met with both fear and enthusiasm by broadcasters and viewers. The experience of existing users is that broadcast times and schedules become much less relevant as the PVR can give easy access to the programmes you want to watch at the time you want to watch them. Often this is reported as leading to people watching more television, but at times of their choice. From a broadcaster's perspective, it is important to understand how PVRs create new ways to attract and keep viewers. For instance, PVRs automatically select and store TV programmes according to viewers' preferences by analysing content descriptions ('metadata') broadcast along with TV programmes and comparing these to the preference profile of the user. Well-authored metadata can facilitate this, and for instance help viewers to record all the programmes in a series with a single action, or allow them to book a recording when the trailer is broadcast. Properly used, these tools can strengthen the branding of a channel.

Open standards, as being developed by the TV-Anytime forum, are essential for a strong development of this new business. TV-Anytime is a global standardisation forum consisting of organisations covering the entire broadcast chain (content creators, broadcasters, service providers, telecommunications companies and manufacturers of consumer devices). It is developing standards for the end-to-end signalling necessary to enable PVRs. This will enable consumers to explore and acquire a much wider range of TV content from a variety of sources – "what you want, when you want to watch it!" Further, DVB-MHP will be extended to allow TV Anytime PVRs to download and execute MHP applications that can access Internet servers, other devices and locally stored content. This combination has the potential to deliver a range of new options for the future of television.

The rapidly increasing availability to consumers of always-on *broadband networks* is another key factor that, in parallel with the evolution of the interactive television, will change television usage patterns. Access to a network is changing the habits and expectations of users. Besides being in control of when and what is watched, there is a trend towards people taking a more active role in content creation and distribution. By turning from a passive content consumer (a couch potato) to a content producer, the user is challenging the traditional uni-directional broadcast model of distribution of TV.

As a consequence, a new content distribution model is evolving as a complementary distribution chain to the broadcast network. Enabled by broadband infrastructure availability and recent developments in peer-to-peer networking mechanisms, PVRs with massive local and network storage can be organized

into a distributed content repository in which broadcast content as well as user provided content can be stored and accessed.

The Share it! project (IST-2000-28703), funded by IST, is working actively to explore solutions and drive standards in this area. Share it! will build a system that enables content access/consumption scenarios similar but not limited to the following:

- An end-user can search for content regardless of its source (broadcast or network storage). If a programme has been pre-stored in the network the user can access it even if he missed the original broadcast.
- An end user connects to the system remotely and can view and manipulate stored content.
- An end user grants access to a limited set of his own content to another user of the Share it! system, possibly in another home.
- Personalized virtual channels can be created mixing broadcast local and network stored content
- Groups of users share content based on their interests.

In all of these scenarios a system of digital rights management is vital. The establishment of the connection is based on users' access and viewing rights to specific content, which may include (non-copyrighted) audio-visual data, different sets of metadata and other user-provided data. The networking of PVRs is capable of complementing and enhancing the traditional broadcast chain. The scenarios envisage peer-to-peer communication, where of course a central question is user authentication, access rights, control of the rights of content owners.

The aim of the Share it! project is to develop solutions that enable the parties involved to benefit from these significant changes in the world of TV:

- End users will benefit from a very rich audio-visual experience and may become content creators, either by putting audio-visual material up for sharing or by adding context to content.
- Service providers and broadcasters will benefit from the extended capabilities of a system using both on-line and broadcast content, enabling them to deliver new innovative revenue generating services and involve their consumers in the actual service creation process.
- Network operators, content creators, equipment manufacturers and other players in the chain will benefit from the increased demand for their products and services generated by the enhanced system capabilities.