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## **SURFnet Video Portal**

The next generation of streaming video for research and higher education

## **Paper submission**

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## Title

SURFnet Video Portal  
The next generation of streaming video for research and higher education

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## Keywords

1. Streaming video
2. MPEG (MPEG-1, MPEG-2, MPEG-4)
3. Search facilities for streaming files (metadata)
4. On-line video transcoding
5. Web based video editing tool

This paper submission is for the area 'Sharing'.

## Abstract

### SURFnet Video Portal

#### The next generation of streaming video for research and higher education

The use of streaming video material within higher education and research in The Netherlands is rapidly increasing. There is great demand for high quality video in IP based environments. SURFnet, the NREN in the Netherlands, provides streaming services to their users and initiates, coordinates and supports streaming projects. Together with the SURF foundation, SURFnet hosts the 'Webstream group'. This assembly of ICT professionals, AV specialists and learning experts from higher education and research institutions, researches the use of streaming video in educational settings and collaborates in projects. By adopting the same formats, tools and metadata standards, the reuse and interoperability of streaming material is ensured. The SURFnet Video Portal combines the results of projects and other initiatives in a 'next generation streaming environment'. The portal provides a number of features for the play-out and management of on-demand streaming files.

#### MPEG streaming and access to streaming files

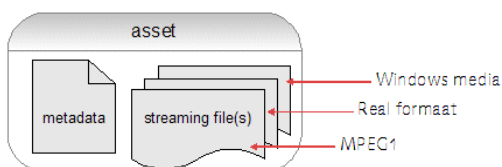
The SURFnet Video Portal makes use of MPEG-1, MPEG-2 and MPEG-4 formats. SURFnet opted for the MPEG formats as they are a non-proprietary, widely adopted solution that offers both advanced compression and high-quality audio and video. Apart from this recent MPEG streaming system, SURFnet already offers Real, Quicktime and Windows Media servers for some years.

Files stored on the SURFnet Video Portal can be made exclusively available to a limited user group. Selected files can only be viewed by one or more organizations that are part of the SURFnet community. The Video Portal uses a hostname based authentication system to check whether the user requesting a stream falls into the range of allowed organizations. This approach offers a controlled play-out, without the need for supplying usernames and passwords to all end-users.

#### Searching en browsing (metadata)

Although there are numerous on-line search engines available that allow users to search for web pages, specialized systems that are dedicated to retrieving streaming media files are still hard to find. Within the Video Portal, SURFnet includes a system for locating streaming media files. The search engine allows retrieval of files stored on the SURFnet Video Portal as well as external streaming files located on servers within the institutions connected to SURFnet.

To make searching for streaming video possible, streaming media entries are tagged with a metadata label that describes the file's (content) characteristics. This descriptive information allows end-users to search with keywords and to browse through collections. In the SURFnet Video Portal, a choice was made for Qualified Dublin Core as metadata model.

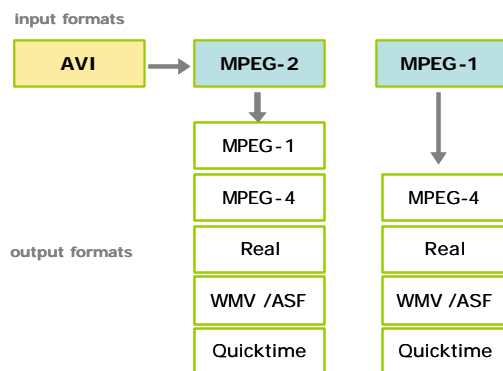


Not all end-users have the same connection speed at their disposal. The SURFnet Video Portal takes this into account and offers end-users the possibility of choosing a streaming rate that matches their connection best. Therefore, information providers will have to offer a video fragment in several bandwidths

and formats, all captured under the same metadata label. A SURFnet Video Portal entry therefore contains one or more streaming files with metadata labeling. This combination is called an asset.

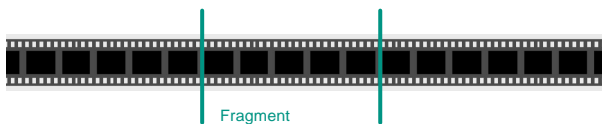
### Online transcoding

To facilitate different streaming formats, the SURFnet Video Portal includes an online transcoding tool that enables the conversion of MPEG-1, MPEG-2 and AVI files to a number of different formats (MPEG-1, MPEG-2, MPEG-4, Real, WMV / ASF and Quicktime). With the availability of this tool, video files can be created at the highest possible resolution. Only towards the end of the production process when the files are distributed to the web, a conversion to other (dedicated streaming) formats takes place.



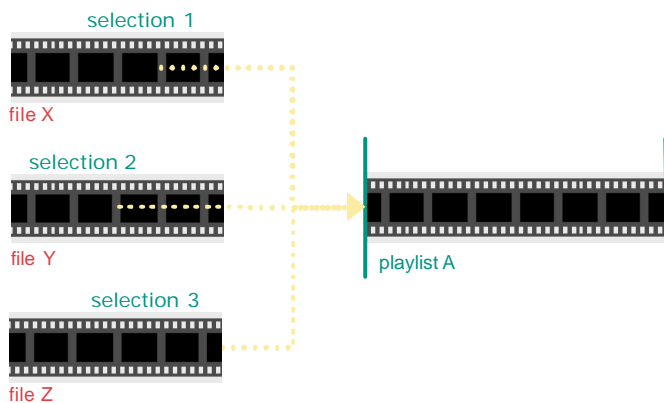
### Tools for selecting and combining video fragments

Another element in the SURFnet Video Portal is the web based editing tool for video files. This editing tool does not generate a new media file but simply creates a hyperlink with a reference to the selection in the original file. Also, the html code required to embed the selection into an html-document is automatically created. The fragment can also be made available to other applications that can handle hyperlinks (such as Word, Powerpoint and Electronic Learning Environments).



The playlist tool extension provides an interface for compiling a continuous video stream consisting of different files.

Several streaming fragments can be combined into one stream. Thus by activating a single url or file, the user watches a stream that seems to be one whole, but is being compiled dynamically from several assets in the background.



### Next steps

SURFnet continues to further develop the SURFnet Video Portal and to integrate more tools that facilitate the use of streaming video. In the future, SURFnet hopes to be able to work together with other research networks on the development and content distribution of streaming video in Europe.

## References

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## Author Biographies / Vitae

Andres Steijaert is product manager for SURFnet and project leader for the SURFnet Video Portal. Previously he worked at the University of Amsterdam where he was responsible for the webserver infrastructure as well as web development activities. Also, he taught Information management and Information technology courses at Utrecht University for the Computer and Arts department.

dr. R.B. Rexwinkel is head of the department Product Management SURFnet and during the period 2000-2001 project-leader for the SURFnet Video Portal.

dr.ir. Egon M. Verharen is innovation manager at SURFnet where he is responsible for innovation projects on digital video. He was chair of TF-STREAM, is a member of the ViDe steering committee, the Internet2 Digital Video initiative steering committee, the Internet2 Commons management team and is chair of Vidmid-vc the Internet2 Middleware initiative/ViDe workgroup on videoconferencing middleware. Egon joined SURFnet in 1997 where he has been working on the development of advanced internet applications and services.

Frans Ward is as product manager for SURFnet responsible for the webserver infrastructure as well as web development activities. Previously he worked at the University of Rotterdam at the Networking Department.

Henny Bekker is a technical consultant at SURFnet in the field of search engines, metadata, directories and ADSL.

Peter Hinrich is Product Manager for SURFnet and responsible for a number of operational services (such as audio- and video hosting, videoconferencing and dial-in) and for the operationalisation and introduction of new services such as multicast and IPv6.

Roland Staring is an innovation manager for SURFnet, involved in projects on streaming, videoconferencing, VoIP, security and mobility. Previous to his job at SURFnet he worked as a knowledge manager at Unilever Research.