CASE STUDY

RTV Slovenia Archive Digitization Project: Preserving a National Treasure

Radiotelevizija Slovenija, or RTVSLO for short, is Slovenia's national public broadcasting organization. Headquartered in Ljubljana, RTVSLO launched a first radio service in 1928 and started television operations in 1958. It now operates three national and two regional television services and eight national and regional radio networks, symphony and jazz orchestra. And because of RTVSLO's long history, it has the largest audio-visual archive in Slovenia.

In today's digital world, RTVSLO's television and radio operations use file-based workflows and content is archived as files. But back when the radio and television services were launched, everything was analog. Radio content was archived on magnetic tape and early television video was shot on film and converted to analog playout using telecine equipment. As technology advanced, RTVSLO then moved from film to using analog video tape and later digital video tape before switching to file-based operations.

In 2008, RTVSLO started to undertake an ambitious project of national importance: to convert all analog audio recordings and all film and video tape archives to digital. By carefully indexing and managing the converted content in an archive asset management system, the archiving team at RTVSLO is not only preserving this national treasure but making it searchable and accessible.

This massive digitization, cataloguing and archiving project is termed Mediateka and is being undertaken by a dedicated team at RTVSLO, headed by Bojan Kosi.

Audio Conversion Completed All 250,000 Tape Reels

The sheer size of RTVSLO's analog audio archive was intimidating; it consisted mainly of 250,000 reels of magnetic tape. With a team of 15, it took six years to digitize and re-catalog this huge collection of radio content. Today, everything is easily accessible and searchable using a mediArc archive asset management system from NOA. All content is cached on a large RAID and copies of each audio file are stored on highly stable LTO data tape cartridges.

One of 250,000 audio magnetic tape reels

The audio archive continues to be kept up to date as new daily production from the RTVSLO radio channels is ingested, catalogued and made available immediately to the RTVSLO internal users.

Videotape Conversion Well Underway

100,000 Tapes in Total

In 2013, with the audio digitization project coming to an end, the Mediateka team turned to preparing for digitization of RTVSLO's videotape archive. This mainly consists of MGS 1 inch tapes, U-matic, Betacam (SP+), MPEG IMX, DVC Pro and DV CAM tapes. The videotapes are cleaned, ingested in real-time and checked for quality both automatically and manually; metadata is added via the NOA mediARC archive asset management system, making the content searchable.

Choice of video file format for the digitized videotapes was an important decision for the Mediateka team. They chose FFV1 mainly because it provides lossless encoding for multiple resolutions including SD, HD and 2K and for multiple picture formats including 4:3 and 16:9 aspect ratios; it supports mapping of all current color spaces, including subsampling options; and there are open source tools for decoding.

With about 100,000 tapes to process, the intensive digitization phase of the videotape project started in 2016 and is well underway.

RTI Videotape Cleaning Station

Videotape Ingest Machines

NOA FrameLector Videotape Digitization Workstations

Film Conversion

A 20 year Undertaking

RTVSLO's early TV programme was recorded on film and the RTVSLO archive has a lot of it, estimated at 20 million meters! This represents about 30,000 hours of content. The intensive digitization phase started in 2016 and it is estimated that it will take about 25 years to complete.

The film is first prepared for digitization. This includes checking the material, replacing splices, repairing damage and adding new leaders. The film is analyzed for pH to determine how much 'vinegar' is present. Most news clips were originally stored as short lengths of film which are not suitable for mounting on a scanner and, in these cases, they are spliced together to create a larger reel, termed a jumbo reel. The reels are cleaned using an ultrasonic cleaner and then scanned.

Each frame of the film is stored as a DPX file and all the DPX files for a news clip are then stored in a TAR container file, and a separated digitized audio track.

Film Preparation Station

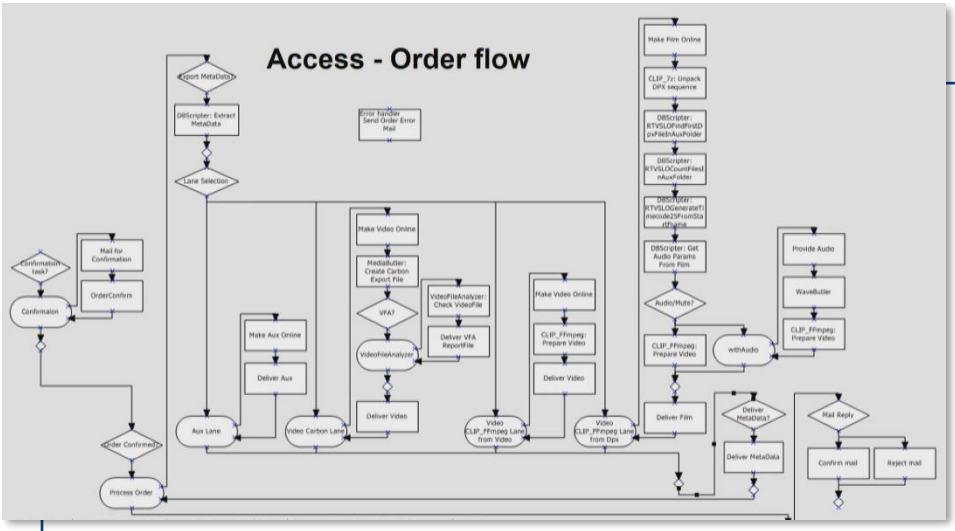
Lipsner&Smith Ultrasonic Film Cleaner

DFT Scanity Film Scanner

Continuously Seeking Improvement

Throughout the project, the biggest challenges for the Mediateka team are how to manage media, how to manage metadata with related documents and how to optimize the associated workflows. The team is continuously seeking improvements to the workflows: making the process as automated as possible, as simple as possible, repeatable, while minimizing the possibilities of human error.

As part of the continuous improvement, the NOA mediARC archive asset management is a powerful tool which manages the very large number of workflows that have been created by the Mediateka team.



One of the many Mediateka workflows, driven by NOA mediARC system

LTO Data Tapes for Long-Term File Storage

RTVSLO chose LTO data tape cartridges as the preferred storage medium for the Mediateka archive project. They provide highly stable, long-term storage at a reasonable cost.

LTO cartridges within a Qualstar XLS robotic library provide near-line instances of all the archived files. The library and a large RAID cache are managed by XenData Archive Series software.

Bojan Kosi, Head of the Mediateka team, standing next to the Qualstar XLS robotic LTO library, managed by XenData.

The total storage requirement for the project is estimated at around 25 PB. The chosen storage solution easily scales to meet that requirement. The XenData software presents all the archive files in a single file system, i.e. in a single file-folder structure, which integrates seamlessly with the NOA mediARC archive asset management system. The XenData software runs on a Windows Server and the entire archive is accessed as a standard Windows network share via SMB.

LTO data integrity is assured by XenData's end-to-end logical block protection which compares a checksum for every block of data which is written to every LTO cartridge. The XenData software is configured to automatically generate either one or two additional replica copies of each LTO cartridges for offsite retention for data protection purposes. The replica cartridges are typically scheduled for update overnight.

Links

RTV Slovenia: www.rtvslo.si
NOA, developer of the Archive Asset Management software: www.noa-archive.com
Qualstar, manufacturer of the LTO library: www.qualstar.com
XenData, developer of the LTO archive management software: www.xendata.com
Xenya, system integrator for the archive system: www.xenya.si

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