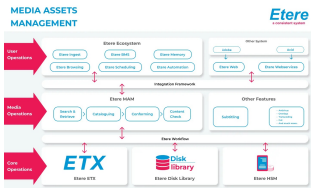


TPI Project: Tapeless Workflow and Media Asset Management System

For more information on Etere for TPI project, tapeless workflow and media asset system, please refer to the attachment.



Media Asset Management diagram

Introduction

TPI (Indonesian Education Television) is an Indonesian private television station based in East Jakarta, it began broadcasting on 23rd January 1991 and since 2009 transmits mainly educational programs and –as other Indonesian TV stations- also entertainment shows including quizzes, soap operas, reality TV, sport, and lately, music programs.

TPI not only was the first privately owned television station to go to air nationally in Indonesia, but it is also a pioneer in the presentation of dangdut music and educational programs, the TPI production is aware that content must be accomplished with present technology and a proper application to achieve their market objectives, that's the reason why TPI aims to deploy a tapeless and file-based workflow system that will permit the station to professionally manage its entire media content with the maximum of flexibility under a powerful digital environment.

This paper describes how Etere's proposed solution can satisfy all TPI's specifications by implementing a distributed MAM system provided with all the functional advantages and benefits of a tapeless system completely based on file-based workflows, characteristics that will ensure the improvement of each single TPI's broadcasting area with a wide set of cutting edge applications that goes from an accurate contents management to an automatic delivery of contents.

Requirements

TPI has requested a consistent project for the digital management of media content under a tapeless and file-based workflow environment, to digitally capture their content and subsequently catalogue it including all content-related metadata to facilitate their future search and query through a comprehensive browsing application. In these terms, TPI's technology department has summarized the characteristics that the solution must include in the following key points:

- Complete network integration under a digital environment, where workflow-based operations manages content from acquisition to post production,
- Development of today's broadcasting technology for a reliable digital management,
- Real-time monitoring of all workflow operations,
- Added assets value due to the generation of frame-accurate metadata,
- Ability to manage media equipment for ingest, preview, storage and playout

Overall Solution

An Etere MAM system is able to interface existing sub-systems and encompass future expansions while maintaining the consistent set of characteristics that makes of it the right solution for an enterprise management of digital content under a file-based workflow environment, TPI will be mainly provided with the following key features:

- A patented distributed architecture which avoids any single point of failure,
- Best flexibility on capturing media content from multiple sources in different formats,
- Seamless integration with existing and co-existing systems
- Safe and fully-tracked access to the content archive
- Capability of NLE stations for uploading/downloading contents
- Intelligent and customized workflow management
- Fast and efficient transferring connection between departments

Etere Architecture

Etere is based on a distributed architecture which allows different modules to run on different workstations interconnected via a local area network. All system configuration parameters, security roles, user data, and pre-defined rules are stored in a reliable SQL database supporting backup and redundancy operations.

Etere allows achieving a greater availability and reliability in the playout process thanks to its ability to manage two parallel automation systems able to manage independent resources (main and clone) that in case of failure can recover from any hardware or software failure by simply switching to the clone automation.

A Distributed System

ETERE is a distributed, modular and fully integrated broadcasting system composed by a set of applications specifically oriented to efficiently perform each complex phase of the broadcasting chain synchronously within the same database environment, being all managed by suitable userdefined workflows that ensure an efficient overall system controlling.

Tape Library Management

Etere allows TPI to carry out the management of tapes (i.e.: video tapes, data tapes, discs, etc) by providing them with a set of modules specifically designed to improve the most important tasks involved in the logical management of tapes.

Etere provides full support for managing tape libraries within the system, being possible to check monitor its status in real-time:

Moreover, a list of all media contained in a certain Library can be easily accessed:

Media Asset Management

Etere offers an integrated and comprehensive search, browse and cataloguing features to not only manage media content but enrich them with accurate metadata. Etere MAM counts with a very intuitive interface that establishes a bridge between MAM and both Automation and Ingest, allowing contents to be browsed simultaneously from various workstations thus enabling low-res proxy browsing over the network.

Etere MAM allows creating either high or low resolution video files excluding all video/audio segments described on the source video EDL, it is important to note that as usual on Etere's operations, the conforming of video files is fully performed via workflow. It is also possible to perform the conforming of video segments from different sources, to create a single final video file containing all scenes selected by the operator, use this function to for example perform the dubbing of video contents.

Multi-level File Access Hierarchy

Etere offers a hierarchical storage management by organizing in user-specific access levels an unlimited number of content versions offering 'instant access' (from video servers), 5 minutes access (from NLE) and 15 min access (from archives), being all these levels available to the operator under a simple and user-friendly interface.

MEDIA MANAGEMENT VIA WORKFLOW

Etere's solution features an integrated and professional workflow management to optimize the entire broadcasting system, reduce operating costs and facilitate overall process control. Etere Workflow permits modules to for example, seek confirmation for sensitive process, follow specific rules, enhance the efficiency and reliability of process, and manage multiple workflows to perform different tasks simultaneously and independently.

Multiple Storage Management

Etere reduce the complexity of managing storage devices by arranging physical

storage devices

present across the system into metadevices (logical devices), the use of metadevices improve the

overall media management by offering the following features:

- Automated management via workflow of logical devices including archiving, restoring, transcoding

- Monitored storage space owing to the set of restrictions

- Increased storage and better performance since metadevices acts as a virtual device representing several

- Distributed storage according to specific requirements without the need of creating partitions, just associate individual disk volumes to different: logical disks or disk systems

Custom Design Workflow

All workflows can be customized to fit the real needs of the station and thus give complete control

over the overall system management which offers:

- Clear definition of each complex step of the broadcasting process,

- Visual representation of each step mapped out on a PC not in a paper document,

- Set of instructions and authorizations that must be followed in order to move forward,

- Complete log of all steps carried out, operations denied etc

A comprehensive and user-friendly workspace allows creating suitable workflows based on custom

actions just by dragging and dropping the necessary elements into it:

Video Files Quality check Workflow

An Etere quality check workflow is able to automatically ask operators to assign a quality value to a

certain asset(s) after browsing its video content.

Video Files Content Check via Workflow

Etere counts with a workflow action called content check, that once inserted into a workflow and

attached to an asset, searches on its related proxy video file for defective video issues to

subsequently mark (into their EDL list) all encountered defective segments

including black scenes,

scene changes and freeze video:

Video Files Restore Workflow

Create a workflow to automatically restore any scheduled asset for its playout by searching for them amongst a group of devices arranged on basis of their priority.

Video Files Checksum MD5 Verification

Etere offers an enterprise control of video files integrity; it keeps a log of the hash md5 of video

files such in a way that it is possible to verify at any time if they have been modified after their

approval. All video files registered on the Etere's database can be verified through an md5

checksum, this control is performed via workflow, each time that a video file is moved from one

device to another, its initial hash md5 is calculated to allow a future checking.

The workflow editor allows creating custom Checksum workflows to either generate or check the

MD5 hash of a video file.

Video Files Conversion including NTSC-PAL

Etere's integration with Rhozet's Carbon Coder software handles a wide array of critical operations including SD/HD and PAL/NTSC conversions, workflow operations that can be launched for example, immediately after a content capture.

DETAILED FUNCTIONALITIES

ETERE is an integrated broadcasting solution that implements a modular system formed by a set of modules specifically oriented to cover each complex phase of a broadcasting system, focusing to efficiently carry out specific operations such as ingestion, scheduling, automation, media management, etc. All these operations are synchronously performed within the same database environment and managed by suitable user-defined workflows that ensure an efficient overall system control; these are some of the main features that make of ETERE a solution that can easily fit TPI's broadcasting workflow.

All modules that make part of the Etere's proposed solution will be treated throughout this chapter, explaining how its distributed architecture and integrated complementation are key parts of the success of the global system where a top-level performance and reliability is reached.

ETEREWEB: Post-Production Integration

Etere Web is the web service seamlessly integrated with the playout and media management system to permit arriving contents to be managed digitally, resulting into a faster and more efficient delivery process which also includes digital signing features for any delivered content.

EtereWeb integrates the latest streaming technologies for video distribution and a comprehensive rights management system that gives to authorized users the possibility to access via web to a user-friendly interface: Etere Web works perfectly behind a DMZ router so remote access and ftp transfers are drastically improved. NLE systems can deliver contents via Etere Web as a digital equivalent of physical reception, where selected people can deliver video and metadata to the station, but owing to its digital nature, operations are perfectly organized, performed and logged, avoiding loss of any content information.

ETERE TAPELESS RECEPTION: External Integration

Etere Tapeless Reception is a custom web service designed with the purpose of offering an efficient solution for multimedia content transfer between external agencies and stations. Etere Tapeless Reception takes full advantage of a tapeless environment to eliminate the need of creating physical copies, trusting valuable material to private couriers, risking of excessive waiting times, etc, thus by enabling contents to be sent digitally (i.e. without using magnetic tapes) via internet, bringing a shorter delivery time than this required by a common consignment of magnetic tapes.

Etere's tapeless approach contributes to increase the level of security of the overall TPI system since file-based operations can be performed only by authorized users, being their access completely tracked by the system.

VACP SERVER: Playback Integration

Etere brings full support for Video Archive Control Protocol, one of the market standards for controlling large digital archives, by establishing a network layer between VACP devices and the Etere system.

Etere VACP Server will provide TPI with a great flexibility to carry out the migration of data between subsystems over a VACP protocol, Etere VACP Server is easy to implement and provides a versatile connectivity solution, it supports both serial (RS-422) and standard network connections (TCP/IP), allowing to get the maximum of the functionalities that reside within physical devices.

Etere VACP Server interfaces with the Etere API Server through a XML protocol to interact with the various Etere components (i.e.: asset management, workflow control, etc). Etere API allows Etere VACP Server to track the content stored on

media devices, and provides a web-accessible view and control of related material.

Etere F90: Playlist Acquisition

Etere F90 provides the system with the ability to import/export the daily playlist between Etere and other automation systems, including associated rights, alternative schedules and as-run logs, thus allowing to keep both traffic and automation systems always reconciled. The entire system will be improved with a highly efficient and reliable connection between TPI's system and external departments, guarantees the maximum accuracy in the process of exporting or importing information through a fully automated, paperless data flow application.

The benefits of the automation of this process are evident, as human mistakes which could cause the interruption of the work processes are completely avoided. The application is particularly helpful when the periodical export or import of this data becomes a part of the natural workflow of a station.

Etere F90 is able to carry out continuously the import schedules to the main DB from a PC by setting a UNC path, as well as export data from the main DB either to a PC by setting a UNC path or to an FTP Server. Contributing to take the overall programming process to a paperless management.

ETERE INGEST & ETERE MTX: An Enterprise Capturing System

Etere Ingest is a versatile set of modular applications that significantly improves the capture process of a broadcasting system, this software covers any particular requirement of the entire process such as automatic and scheduled ingest. Etere Ingest supports multiple parallel ingest streams, managed automatically either on a single workstation or across various workstations, allowing also to schedule the video files to be ingested:

Once ingested, video files are transcoded into the specific format of the destination device on which they will be stored, in the same way; video files are transcoded each time they are moved from one device to another. The image below illustrates how Etere allows setting the workflow to be launched at the start and end of an ingest process to for example, create a low resolution version or normalize the audio of captured contents.

Etere MTX is the application offered by Etere to drive the most popular HD/SD Matrox digital video editing platforms, it combines the professional effects technology of a wide range of industry standard codecs with an Etere system, allowing to capture in both high and standard definition formats over digital inputs, mix in real-time all types of footage on a timeline with more layers and/or effects, as well as parallel multi-format ingestions:

Etere MTX will provide TIP with a more tight integration between playout devices at a lower cost, offering a cutting-edge product with an outstanding performance, a complete support and most important, an unbeatable relation between quality and price.

ETERE MEDIA MANAGER: File-based Data Transfer

The Media Management solution proposed to encompass TPI's content transfer and archiving goes beyond of a simple copy concept by moving video files based on custom policies, transcoding video files when required and offering a full track of all operations.

TPI's video contents will be transferred from/to the required devices by Etere Media Manager; this migration process also includes rewrapping and transcoding capabilities. Etere's approach is oriented to "virtualize" the entire media

management process, improving it with flexibility, customization and most important cost-effectiveness. Etere manages (logical) metadevices instead of (physical) devices, this approach results in a wide range of possibilities for the media management, for example, it is possible to control with one click the available space of all metadevices.

Etere Data Mover is the application used to perform the physical storage and retrieval of video files, a typical Data Mover operation would be to move a video clip from a video server to an archive based on custom actions which are defined and executed via workflow.

Additionally, the crucial logging function is available for all Etere applications, log files are written by the software each time it performs a task so it will be possible to trace their execution status, interaction level, and final result. Log files can be very helpful to understand and solve software and devices problems.

OPTIONAL FEATURES

ETERE HSM: Integrated Long Term Archiving

Etere HSM is the cost-effective solution to radically streamline the management of expensive tape libraries; allowing stations to optimize the migration of contents including high and low versions as well as associated metadata. Etere HSM improves the management of libraries by controlling their mechanical movements through the HSM Robotics Control and HSM Data Pump applications, which are able to run several data pumps on different machines to boost their throughput, while offering access to real-time logs, reports and statistics.

Etere HSM distinguish four different archiving levels into a broadcasting workflow, these levels required distinct access times which vary from 0 minutes (video server) to 15 minutes (standard video tapes). All these levels are managed "virtually", that is, you can use logical devices (metadevices) based on physical devices to free design your storage layout, enriching in this way the entire system with the benefits derived from the use of metadevices.

Carry out loan-balanced movements on an intelligent multi-volume scenario,
■ Extend your storage space by joining physical devices into one metadevice, without altering the archiving workflow,

■ Categorize your storage devices by dividing them into metadevices with no partitioning required,

■ Space limits and storage distribution are defined by the user and not by devices itself,

■ Classify metadevices in media pools in order to automate their management,

■ Background defragmentation and online/offline tape management,

■ Scheduled archiving of devices, media contents and entire databases

Etere HSM forms a tandem with Etere Data Mover to be the only solution in the market with an embedded multi-level and multi-rule cache that offers an intelligent management which ensures the best performances with low investments. Owing to Etere's comprehensive character, these applications are perfectly integrated with other modules such as Automation, MAM and News, allowing all these modules to use shared resources and have unlimited communication.

MOS Gateway: Newsroom Integration

Etere MOS is the perfect interface between Etere and Newsrooms; it connects to the Newsroom Computer Systems through the MOS protocol. It will provide TPI with a robust set of features based on key characteristics such as fault tolerance and user-friendly.

■ Simple browsing integration to record and view high and low resolution synchronized events. Journalists can readily make their own EDL straight from their PCs

- Media Asset Management (MAM) provides metadata indexing which lets you retrieve a video or any part of it from the database
- A Metadata module analyses video and automatically makes metadata entries based on scene changes, black images, no-sounds parts, subtitles, and MXF metadata. Metadata can be edited for any part of the video
- ActiveX MOS integration allows to preview low quality video directly from the News interface
- Direct feedback status for events that are cued, ready, playing or missing

ETERE AIR SALES & ETERE SCHEDULING: Commercial Traffic Management

Etere Air Sales is a complete, modular and scalable traffic system for the management of the planning and commercial processes of a broadcaster. From planning to playout, it provides specialist application modules to manage sales, planning, presentation, scheduling and invoicing of commercial contents. Etere Air Sales optimized commercial broadcasting thanks to its flexibility to fit any-broadcaster needs, all in the most cost effective and modular manner.

Etere Scheduling takes care of one of the most delicate process of the broadcast chain, it offers a fully integrated management of daily schedules, and this application is greatly composed by various simple applications that those who draw up the daily schedule will appreciate.

Etere Scheduling also provides operators with a simple graphical module to view, analyze and approve changes (i.e.: traffic, imported, and corrected programs) between the current schedules and any imported schedule. When the current schedule has incoming changes, the operator is advised through a prompt-message which announces that new changes to be approved are available: This simple interface allows the operator to easily identify the source from which changes have arrived and then decide to either approve or reject them through a simple selection process.

ETERE AUTOMATION: Playout System

Etere Automation is the powerful, reliable and modular playout system able to enhance TPI's potential in terms of functions and workflow design, it is based on a unique approach which combines in a single product real-time device control and media asset management, offering a powerful mix of solutions and capabilities under a graphical user-friendly interface displaying for each event its source, type, description, properties, live status, secondary events, time code, GPI status, scheduled and real times, etc:

Secondary Events Management

Etere Automation manages all the secondary events intended to be transmitted by dedicated devices (e.g.: Logo Generators, Crawl Generators, Subtitlers, etc) with a simple graphical tool, allowing previewing secondary events in low res before their playout through a browsing application:

Live Events Management

Etere Automation offers complete support for live events present on the daily schedule, being possible to manage various different live inputs that can be switched at any time, few minutes before the event broadcasting or even during its transmission:

Additionally, Etere allows managing one video router per automation, being possible to create links between routers so when a channel is switched in the Main Router; the equivalent channel is also switched in the Backup Router.

As-Run Logging

Moreover, the ability to export As-Run logs containing the schedule "actually" transmitted allows an easy reconciliation between planned and real playout, being possible to send to multiple (UNC and FTP) destinations a frame-accurate log in any of the available formats.

Conclusions

This paper has described how the development and deployment of a comprehensive Etere MAM system offers a large number of operational benefits and advantages derived from the correct use of tapeless technology; Etere will entirely support TPI on its migration to a tapeless environment by providing them with the following key features:

- Efficiency, reduced need for repetitive manual operations, allowing to define them in advance and then include them in the automation workflow, thus increasing productivity
- Flexibility, on meeting all requirements by proving a versatile media management system tightly integrated with all capturing and storage devices present on the station,
- Scalability, for increasing the number of capturing channels and devices without altering the system workflow complexity, thus minimizing operational overheads and reducing overall costs,
- Workflow Reliability, all operations automatically generates fully customizable As-Run logs to track both the overall and individual functioning of the entire system
- Accuracy, from the media management to the final playout, reducing the risk of mistakes during on-air since the precision of archived content related information is continuously checked.

About Etere

Since its beginnings in 1987, Etere has been preparing users to be ready for the future. Etere is a worldwide provider of broadcast and media software solutions backed by its mark of excellence in system design, flexibility and reliability. Engineered in Singapore, the revolutionary concept of Etere Ecosystem promotes real-time collaborations and enhances operational efficiency across the entire enterprise. Etere Ecosystem software solutions including Media Asset Management, Channel-in-a-Box, Newsroom, Ad Insertion, Airsales, Automation, Broadcast Management System, Censorship, HSM Archive, Logging, OTT/VOD Delivery, Radio-Live, Subtitling and Captioning software are built with an integrative Web and Windows architecture that are customisable to fit perfectly in any system. Etere system is developed by 4 different groups in different countries to ensure reliability and quality. Etere delivers on its service excellence commitment with its dedicated team and a 24/7 worldwide support. Its portfolio of digital technologies and market-proven remote/on-site solutions including consultancy, training, installation and demonstrations are ready to run with your business no matter where you are. Etere enhances your adaptability for the future and empowers you with the software tools to drive your business to greater heights.