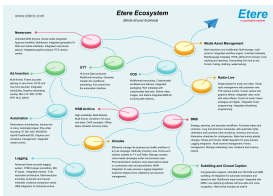


## TVB: A file-Based Workflow for Multilingual Media Management

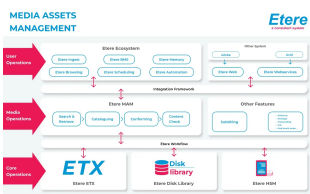
This paper is aimed to describe how the solution proposed by ETERE is able to fulfill all the specifications required by TVB, making a special focus on the Etere's MERP technology.



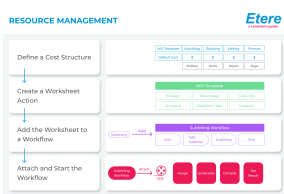
TVB Hong Kong



Etere Ecosystem



Media Asset Management diagram



media enterprise resource planning

### Introduction

Television Broadcasts Limited, commonly known as TVB, is the first free-to-air (FTA) television broadcaster in Hong Kong that commenced broadcasting on 19 November 1967 with only about 200 staff to reach a current size of over 4,600. TVB is headquartered in Hong Kong's TVB City, the Asia's largest commercial television production center that includes two outdoor shooting locations and 22 production studios empowered with a well-equipped and fully digitized production able to provide high quality television services to the public.

The major activities of TVB are television broadcasting, programme production and other broadcasting related activities such as programme licensing, video distribution and satellite broadcasting etc. TVB now operates 5 television channels, providing free and diversified television entertainment to 2.37 million homes in Hong Kong round the clock. TVB Jade (Cantonese) and TVB Pearl (English) are TVB's flagship television channels, other channels include HD Jade, J2 and iNews digital channels.

In order to continue delivering excellence in programming and cutting-edge broadcasting technology to the people of Hong Kong and to Chinese communities around the world, TVB has requested a system able to acquire, manage and transmit multilingual content. Etere's proposed solution consist of a "file-based workflow for multilingual media management" intended to efficiently acquire, control and playout multilingual tracks of each content while keeping the system cost-effective thanks to the use of file-based workflow framework.

Etere's file-based workflow technology will provide TVB with an efficient media management system able to handle multiple audio tracks for single video files; this key feature will enable TVB to take a step forward towards a fully digital management of assets that will eliminate the costly and time-consuming need to produce new tapes every time a language is added to an asset (proxy files are sent to dubbing houses and dubbed files are received through a tapeless reception service); being also possible to leverage the in house dubbing and conforming capabilities of the Etere workflow.

This paper is aimed to describe how the solution proposed by ETERE is able to fulfill all the specifications required by TVB, making a special focus on the Etere's MERP technology.

### 2. PROPOSAL OVERVIEW

TVB has requested a consistent project for the digital management of media content under a file-based workflow environment. Etere's solution consists of a media archive system with acquisition, management and delivery capabilities of multilingual media. Here below are listed the features required by TVB and the solutions proposed by Etere to fulfill them:

#### MEDIA ACQUISITION

Etere Ingest is the flexible solution for capturing SD/HD from a wide range of sources including VTR (analog) and Video Servers (digital) equipment. Automatic and scheduled acquisition will be available as well as a workflow integration for pre and post capturing tasks.

#### CONTENT RECEPTION

The tapeless reception extension of EtereWeb give the station a secure and robust

threshold allow post-production agencies to deliver dubbed audio through a web-based interface streamlined with the latest technologies for video streaming and access security. The integration of post-delivery workflows enables triggering transfers, transformations, approvals, notifications, etc.

Additionally, an Etere ActiveSync server will bring drop folder capabilities for the automatic acquisition of digital content received on a specific location (e.g. network directory, shared ftp, etc.).'

#### **CONTENT APPROVAL**

Workflow-based worksheets for checking media content including audio recognition and tagging capabilities to compile file metadata entering language information on audio tracks.

#### **AUDIO MANAGEMENT**

The enhanced audio management capabilities of Etere allows improving the quality control of audio content including automatic leveling actions based on custom workflows.

#### **MEDIA TRANSCODING**

Etere Data Mover is the solution that goes beyond efficient media transferring to also provide a reliable transformation of media content. It provides a workflow-based transcoding management empowered with a performance-based scheduling for a load balanced execution of jobs.

#### **TRIMMING AND SEGMENTING**

The Resource Management provided by Etere will allow designing custom workflows containing the worksheets to be assigned to operators for the performance of trimming and segmenting tasks under a user-friendly interface empowered with preview and EDL features.

#### **HARRIS INTEGRATION**

The tight integration capability of Etere will enable the station to not only transfer media in the Harris system but also to automatically update the Harris database every time an asset metadata (e.g. EDL) is changed in the Etere Media Library, this, thanks to the use of workflow actions.

#### **AUDIO PLAYOUT**

The MTX playout system will be capable to play content based on its audio tags, deciding for each track the language to be played (e.g. "Track1-2: ita-eng"; "Track3-4: fr-eng"; "Track5-6: eng").

The Etere-based system will comprise media ingest, archive, management and distribution solution combining powerful modules with an easy to use interfaces, this solution will permit to straightly connect content captured by Etere Ingest with Etere MAM to view and catalog video assets before delivering them via workflow, in either standard definition or high definition. Etere MAM (Media Asset Management) will be the core of the overall system, providing workflow management, production project management and content management features; thus ensuring a streamlined tapeless environment able to capture, edit, catalog and deliver contents, fast and efficiently, supporting multiple languages per file.

With Etere, TVB will get a rock-solid distributed system able to integrate into a single solution the key features of a Media Asset Management. Operations related to station media are cemented on a file-based framework featuring a wide range of workflows for ingest, production and playout. The station will be mainly provided with the following key features:

- A distributed architecture managed via workflow to avoid any single point of failure
- Seamless integration with existing and co-existing systems
- Safe and fully-tracked access to the content archive
- Reliable playout of multilingual assets based on metadata tags
- Enterprise transport and transformation of media between storage devices
- Quality control to ensure the reliability of archived assets over short and long

terms

- High preservation and high availability of archived and catalogued media content
- Editing interface with preview, slow-motion, timecode, bookmarking and metadata
- Full integration support for NLE systems (Avid, FCP, etc.), including content delivery
- Fast and efficient transferring connection between internal –and external– systems
- Reliable monitoring of the modules and equipment integrated within the global system

### **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. A greater availability and reliability is achieved thanks to the ability to manage main and backup systems able to manage independent resources so in case of failure the station can recover from any hardware or software failure by simply switching to the backup system.

### **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 user-defined workflows.

Etere's distributed architecture allows achieving a top-level availability of resources and reliability of operations across the entire broadcast workflow thanks to its redundant capabilities to improve the fault resilience on any hardware or software failure. Etere provides free-of-charge periodical updates for all customers with a valid support service.

### **Multi-level storage hierarchy**

Etere systems improves the media management by introducing a multi-level storage management consisting in the use of different storage levels based on the frequency of use of the files stored on them. For example, data files which are frequently used will be stored on video servers (i.e. online servers) whereas those which are not used for a certain period of time (e.g. typically a few months) will be eventually archived in tapes (or any other long-term storage mean) and then automatically restored -to video servers- every time they are required by the broadcast playlist.

Etere offers a hierarchical storage management of media content, it allows organizing in user-specific levels an unlimited number of content versions with different access times (e.g. video servers, near-line servers, archive servers); all levels are available to operators under a user-friendly interface:

Moreover, media holders (i.e. asset forms) can be organized –along with their related information– under a hierarchical structure based on Parent-Children relationships, thus allowing, for example, handling different versions of a same asset and all the assets derived from them:

### **3.3 Access Levels**

Etere provides stations with a “Rights Management Tool” to control and track access to its various modules and functions, with it, stations will be able to freely assign (grant or deny) access to specific user groups (i.e. roles to which one or more users belongs to), thus allowing to set different mixtures of access levels for each group.

Etere allows managing different –and fully customizable– access levels for users which form part of the system, with Etere; set specific access rights not only for different users, but also for different stations.

### 3.4 Rights-based operations

All the functions provided by an Etere system (e.g. quality control, event scheduling, program playback, etc.) falls under different categories according to their nature (e.g. data mover, ingest, etc.), the availability of these functions is determined by the "Rights Management Tool".

Thanks to this tool, stations will be allowed to reflect into the Etere system the actual way in which rights are managed within the station facility, for example, scheduling operators will be allowed to use only those modules to which they are authorized to use, including (or excluding) some sensitive functions intended to be managed by system administrators.

### 3.5 Active Directory Integration

Etere allows creating a new rights structure importing groups and users from your organization's MS Active Directory. Once opened, this tool will display all groups and users present in the Etere Rights structure, allowing to update the Etere Rights structure by synchronizing it against the MS Active Directory.

### 3.6 Look and feel

In Etere, the GUI experience gives you a professional interface with less distractions and more focus. The high contrast will help working on any light condition from dark master control rooms to enlightened editing rooms:

Moreover, main menus now follow the Windows 8 GUI to be simple, intuitive and easy to use:

### 3.7. Reporting services

Etere Reporting Services provides an intuitive report environment to enable users to have an enterprise reporting environment enhanced with an unlimited number of custom reports; it permits reports to be easily designed and accurately managed through a reporting engine that allows to preview, print and export any report under a user-friendly user interface.

Etere Reporting Services integrates a dedicated reports database with the main system database, thus improving the reliability and performance of the system since all reports (and their settings and snapshots) are stored in a dedicated server.

Etere Reporting Services is based on the ultimate SQL Server Reporting Services technology that permits to leverage all key features of a web-based reporting server focused on simplifying the process of creating and editing reports.

### 3.8. Documents Management

The Document Management (Do.Ma.) feature is a big deal for many enterprises especially when the amount of documents raises the cost of ownership to high levels. Reducing paper documents and cataloguing by digitizing and saving in a SQL database, allows an integrated enterprise information system. Information is easily available to the several production sectors, and they may be found in a very simple and efficient way by anyone looking for them:

Etere Document Management allows you to associate many files to one "virtual document", in this way you can refer a group of documents to a user. A "virtual document" is a container that collects several documents, so you can associate a group of physical documents to a unique container, moreover the same document may be associated to several containers. Containers are connected to digital objects (e.g. contract scheduling details, scheduled events, personal data, account invoices, existing assets, receipt faxes, etc.), either acquired by a scanner or directly inserted, which will be stored into in the Etere's SQL database.

### MEDIA FUNCTIONALITIES

Etere's solution features an integrated and professional approach based on a workflow management to optimize the station's 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.

#### 4.1. 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, etc.,
- Monitored storage space owing to the set of restrictions
- Increased storage and better performance since metadevices acts as a virtual device representing several logical disks or disk systems
- Distributed storage according to specific requirements without the need of creating partitions, just associate individual disk volumes to different

#### 4.2. Custom Workflows

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:

##### KEY CUSTOMIZATION FEATURES

- 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:

#### 4.3. Integration between workflows

Etere allows calling workflows from others just by inserting an action that can perform a specific task (i.e.: attach, attach and start, start, abort, reset, restart, detach, etc.) on a certain workflow:

The diagram below illustrates how Etere maintains the system consistency by avoiding loops between workflows (a message is displayed indicating action incompatibilities between workflows):

As shown above, for example, if 'workflow A' calls 'workflow B' and the 'workflow B' calls 'workflow C', the 'workflow C' will not be able to call the 'Workflow A'.

#### 4.4 File-based processing

Etere provides a wide range of templates for creating workflow actions regarding the most common file-based media operations, allowing customizing them and also using completely user-defined actions.

##### 4.4.1 Content Check

Etere CMS, which stands for Content Management Server, an integrated file-based module for performing Quality Controls (QC) via workflow. Etere CMS is the best solution for checking audio/video either prior (e.g. playout, repurpose, archiving) or after (e.g. encoding, ingest, editing, transcoding, archiving) a media operation.

CMS will speed up, automate and streamline the operational efficiency of file-based quality controls performed via workflow across the entire content life cycle.

CMS is based on a workflow action which, once included into a workflow that will automatically analyze the asset's proxy video to detect and log (into its EDL) the following audio/video issues:

##### KEY QC FEATURES



- Scene changes: Video stream segment containing brightness differences between consecutive frames
- Black frames: Video stream segment containing black frames and an audio volume lower than a reference level
- Freeze frames: Video stream segment containing a single frame image repeated -as a frozen like a snapshot- for a period of time
- Audio silence: Video stream segment containing silent frames (i.e. frames matching a certain silent audio level and a black video level)
- Audio level: Video stream segment presenting "noisy audio signals" which are greater than a given maximum threshold
- Anti-phase audio: Video stream segment containing audio waves with "anti-phase signals", that is, opposite channels which mutually cancel each other out
- Audio loudness: Measurement performed based on the ITU-R BS.1770 loudness metering algorithm widely used as loudness-compliant standard

#### 4.4.2. Quality Check

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:

#### 4.4.3. Archiving

Etere allows you to design a workflow for archiving your assets on LTO tapes, including a quality and content check, a proxy copy generation and a final email indicating the result of the process:

#### 4.4.4. Restore

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:

#### 4.4.5. Transcoding

Etere's integration with Rhozet's Carbon Coder software handles a wide array of critical operations including format conversions, workflow operations that can be launched for example, immediately after a content capture:

#### 4.4.6. 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.

#### 4.4.7. Video Cut

Etere offers 'Cut actions' that permits to take only a portion of a certain video file, using a given time code SOM and EOM. Defining and using a Memory Cut operation is as easy as shown below:

#### 4.4.8. Audio Normalization

Etere provides a file-based loudness control, allowing stations not only to check the loudness level of media contents but also to normalize them to meet specific limitations. As shown in the sample above, "loudness normalization" workflows can be launched automatically for specific assets, for example, after their ingestion or tapeless reception (i.e. web upload).

#### 4.4.9. Antivirus scan

Etere includes, as a part of its enterprise media management, the capability of integrating antivirus protection within workflows, allowing stations to improve their media workflows (e.g.: post-upload workflows) by giving them the capability of automatically scanning transferred files for virus and thus end their work with a flourish.

As shown in the figure above, the automatic virus scan capability can be easily

integrated within any workflow at any stage just by inserting an action block configured to perform the virus checking; stations can insert them, for example, within the default workflow to be launched after an EtereWeb upload.

#### 4.4.10 External synchronization

A workflow action enables Etere to automatically update external system (e.g. Harris, Gen21, etc.) every time an asset metadata (e.g. EDL, title, type, etc.) is changed in the Etere Media Library, thus consolidating the tight integration between Etere and existing systems while preventing wasteful insertions and data discrepancies:

#### 4.5. Metadata Organization

SMPTE (Society of Motion Picture and Television Engineers) Metadata is a key part of the media management, that's why Etere provides a dedicated module for defining eventually useful metadata (e.g.: 'technical comments', 'descriptive names', 'intellectual rights') and store them into a robust SMPTE dictionary:

In Etere, all assets contain user-defined SMPTE metadata fields, these fields can be either manually compiled or automatically compiled (retrieved from specific asset properties):

SMPTE metadata can be used also for cataloguing media content, allowing operators to quickly add specific information to a video segment.

#### 4.6. Multilingual Audio

Etere supports the management of multiple languages from its acquisition to their playout including production, tagging and control capabilities:

- Acquisition: After media enter the core system, audio-track tags can be manually described into the system to detail the association between tracks and languages.

Audio metadata will allow, for example, to select the correct languages for playout or to check the audio validity to prevent running events with incorrect or missing audio.

- Proxy: Low-resolution proxies are automatically generated after a content ingest/receipt, thus improving the creation of additional audio tracks either externally (send proxy for dubbing) or internally (in house voice over).

- QC: Audio checks can be integrated in the workflow to automatically perform QC on ingested/received files to, for example, accomplish loudness rules and perform on-demand leveling (e.g. before moving content to archive or playout).

- Approval: A tailored workflow enables to manage all the tasks involved in the management of multilingual assets, abstracting all operations as "worksheets" assigned to specific persons. The use of worksheets allows checking existing audio files, requesting dubbing for missing languages, tagging new audio, trimming/segmenting media, etc.

All dubbing worksheets are tracked so when a new audio track is received (e.g. via tapeless reception), it will be associated with the original asset and its media metadata will be updated with standardized track tagging information.

It's worth mentioning that worksheets are empowered with preview capabilities to allow browsing low-resolution proxy video along with multiple audio tracks and enable an accurate marking of timecode points for each language.

- Playout: The playout system is capable to play content based on its audio tags, deciding for each track the language to be played (e.g. "Track1-2: Italian-English"; "Track3-4: French-English"; "Track5-6: English").

Etere allows interfacing external devices such as master controls enabled for audio shuffling to shuffle audio tracks (based on asset-specific criteria) and thus ensuring that the correct combination of audio tracks on the final output.

## **ETERE COMPONENTS**

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 ingest, archiving, transferring, browsing, 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 any media management workflow. All modules that make part of the Etere's proposed solution will be treated throughout this chapter, explaining their roles in the global distributed and integrated system.

### **5.1. Ingest: A versatile acquisition system**

Etere ingest is a versatile set of modular applications that significantly improves the digitization process inside a broadcasting system:

#### **5.1.1. Wide range of acquisition modes**

Ingest covers any particular requirement of the entire process such as automatic and scheduled ingests:

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:

#### **5.1.2. Automatic workflow actions**

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 (e.g.: archiving, playout, etc.):

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:

### **5.2. MAM: Browsing, editing and more**

MAM will allow operators to store information, search media EDL, and transfer EDL-based media to the playout server and the editing systems:

#### **5.2.1. Resources management**

Resources Management is the flexible solution that permits to virtually manage all operations actually involved in the media asset management, such as for example, subtitles generation, promo creation, tape copying, media editing, audio dubbing, etc. Etere integrates the management of worksheets, from their creation and compilation to their tracking and invoicing.

Worksheets are based on a custom structure and are fully integrated into the workflow management, being possible to create user-defined worksheets and include them in automated workflows which current status can be consulted at any time in real-time from either a desktop or web interface:

Worksheets related to media tasks (e.g. censorship, trimming, segmenting, subtitling, etc.) are greatly improved with the inclusion on key features such as proxy preview, slow-motion playback, EDL timecode marking, bookmarking navigation and metadata insertion:

#### **5.2.2. Subtitles tool**

Etere includes, as a part of its enterprise media management, the capability of managing subtitles, subtitles can be generated whether using the WMP synchronized lyrics tool or any other external tool, in all cases Etere will import them automatically:

As shown above, subtitles are stored in a repository, ready to be moved to the subtitle engine when either the broadcast playlist will require it or a proxy preview will be performed (e.g. for quality check purposes). Additionally, multiple language



subtitle files are supported, allowing stations to specify so many subtitling languages as needed (including their storage paths):

#### **5.2.3. Media cataloguing and Metadata insertion**

Etere enables search, browse and cataloguing of rich media, a very intuitive interface establishes a bridge between the ingest department and the production department, allowing low-res proxy browsing over the network (contents to be browsed simultaneously from various workstations):

#### **5.2.4. Video conforming and audio over**

MAM permits to join cut segments from different sources, to create a single final video file containing all scenes selected by the operator:

Use this function to, for example, dubbing contents by overlaying audio tracks over a video(s):

The image above illustrates the user-friendly interface on which operators creates new video sequences of MAM captions which includes all relevant metadata associated to the inserted scenes.

#### **5.2.5. Partial media restore**

Etere also allows restoring only a part of video files by creating either high or low resolution video files including specific 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:

#### **5.2.6. Search engine**

Etere media management applications are enabled with a complete, versatile and powerful search engine which allows users to search for assets and interact with them. The user is able to search assets based on their information stored in the database. Results are displayed according to custom properties. Summarizing, Etere provides a robust search engine, which ensures you to instantly find the results that meet his criteria. Among the several searching features which are available in this section, we can mention the following ones:

- Search for assets based on keywords related to database fields,
- A Full-text search can be carried out across the various fields of the assets,
- Full-text results are sorted based on their degree of relevance,
- Users can search for keyword synonyms to extend the range of results,
- Searches can be saved as profiles,
- Batch modification functionality, allows user to modify several assets at the same time,
- Customizable tabs and fields, drag & drop enabled,
- The last arrangement of tabs and fields is stored,
- Results can also be grouped by their types, genres or artists,
- Allows the user to add, launch and view workflows on-the-fly,
- Custom configuration depending on the place from which the Media Library is launched,
- Possibility of filtering results by their SMPTE metadata or Metadevice allocation.

#### **5.2.7. Logged Operations**

Further reporting integration is also provided:

#### **5.2.8. Integration between MAM and Ingest**

MAM can be used along with Etere Ingest to enrich captured media contents and thus leverage all benefits of a file-based production including easy research and efficient delivery capabilities

### **5.3. DataMover: Intelligent archiving and delivery**

The Media Management solution proposed to encompass station'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.

#### **5.3.1. Simple and user-friendly interface**

Video contents will be transferred between the various departments (e.g.: near-line storage, archive, post-production, playout, browsing, and even non-Etere systems) by Etere DataMover; this migration process also includes rewrapping and transcoding capabilities.

### 5.3.2. Logical management of data

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:

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.

### 5.3.3. Distributed parallel jobs

Data Mover is capable to provide both, distributed processing for using an independent agent per data transfer and parallel processing for simultaneously performing different instances of one data transfer; these features will allow stations to exploit high computing resources to use a single workstation to perform multiple transfers, thus enhancing the flexibility, scalability and fault-tolerance of the entire Etere system.

## 5.4. MTX: Digital capture based on Matrox technology

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.

The highly integrated, end-to-end workflow streamlines all the core processes, MTX forms part of global Etere MAM solutions, thus allowing it to use the same metadata and interface available for ingest, content management, transmission control, traffic, archiving, and monitoring.

### 5.4.1. Robust IT solution

The multi-format ingest allows to use any codec and wrapper on the market, whereas for playout it can mix in real-time all types of footage on a timeline with more layers and/or effects, as well as parallel multi-format ingestions, all these under a user-friendly interface. Besides the common preset and preview bars, available on a friendly touch-screen graphic interface, MTX includes most graphics and audio functions such as:

- 8 logo layers with unlimited sizes
- 1 Crawl /CG
- Audio shuffling
- Audio control
- Dolby E Pass-through
- Video transitions

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- 8 logo layers with unlimited sizes
- 1 Crawl /CG
- Audio shuffling
- Audio control
- Dolby E Pass-through
- Video transitions

#### 5.4.2. Master Control Panel

The MTX Master Panel is a standalone user graphical interface to allow operators to manually switch a master control, it combines the management of the inputs/outputs of a master control with its preset and take functions, allowing also to customize the various on-screen descriptions.

The MTX Master Panel requires only a card with 1 input and 2 outputs to deliver full Master Control functionalities, with a really cost effective system, and the possibility of working in SD and HD without any additional cost. The MTX Master Panel will provide all the standard functions of a master control with just a touch of the monitor.

#### 5.5. EtereWeb: Post-production integration

Etere's NLE integration will allow stations to achieve a tight integration with NLE systems, without using insecure "hot folders" or "ftp open sites" but including full tracked uploads (i.e. digital receipt of files) and immediate workflow triggering. EtereWeb is best solution for integrating NLE systems (e.g. FCP, Avid, Edius) with the station's broadcast workflow; it provides non-linear editors with an authentication web portal for managing media contents through a user-friendly interface:

EtereWeb web service supports all major browsers including Microsoft Internet Explorer, Mozilla Firefox and Apple Safari; thus ensuring the reliability and quality of the service. 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:

##### 5.5.1. Authenticated access and rights

In order to ensure that only authorized persons access the web service, EtereWeb counts with an encrypted authentication method on which users must count with a username and password in order to enter the web portal:

##### 5.5.2. Tapeless reception

Tapeless Reception is an extension of EtereWeb designed with the purpose of offering an efficient solution for digital content delivery between external agencies and stations, it 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 provides Tapeless Reception to allow remote clients to deliver digital content into the library, this web portal will permit other station's areas (e.g. Post-production houses, NLE systems, News providers, MAM systems) to easily and safely upload content (e.g. dubbed audio, conformed video, subtitles, etc.) and related metadata into a web server; once content is delivered (i.e. uploaded), a post-upload workflow (e.g. nearline archiving) is automatically triggered and a confirmation email is sent to the deliverer (attaching a proxy video) and the station operator.

Additionally, a customizable security policy will allow the station to determine different levels for accessing the files delivered through the web portal, thus making possible, for example, to dictate that a certain web user (e.g. NLE system) will be allowed to retrieve only its own delivered files whereas another web user (e.g. MAM system) to retrieve its own delivered files and also other user's files.

##### 5.5.3. Search, retrieval and preview

The Quick and robust search engine of EtereWeb allows users to easily search and preview assets, even during the search:

The Media tab holds information regarding the media associated to the asset, time code details and EDL configuration. By double clicking on any media item, if available, it will be available the preview and download of the asset.

##### 5.5.4. Selective upload interface

EtereWeb allows uploading media files into the server through a simple and

intuitive wizard procedure. Depending on the upload interface set in the system, it will be possible to upload the media file using either a java-applet or an active-x interface:

- Java-Applet: This interface allows dragging and dropping the media file(s) to be uploaded from the file explorer into the web browser:
- Active-X control: This interface allows browsing for the media file(s) to be uploaded, being also possible to create a zip file for uploading an entire directory

#### **5.5.5. Pre/Post upload processing**

EtereWeb allows setting different workflows to be launched at different stages of the web management, for example, it is possible to configure the following workflows:

- Pre-upload workflow
- Post-upload workflows

#### **5.5.6. Multi-file upload support**

EtereWeb supports not only uploading multiple files with a simple drag and drop action, but also manage them as a single metafile:

This feature allows NLE systems to, for example, upload into the station's server all the files which make part of a project (e.g. production of promos, conforming of separate scenes, editing of source material, etc.) and deliver them to the related department with a single click and with the reliability of a workflow management.

#### **5.5.7. Workflow integration with NLE systems**

Thanks to the file-based approach of its media management, EtereWeb supports interfacing centralized NLE systems (Avid Transfer manager, Final cut pro server) via workflow. With Etere, it will be possible to transfer video files from and to NLE systems automatically via workflow, these workflows can be attached, for example, to assets which requires editing.

#### **5.5.8. Centralized monitoring interface**

EtereWeb provides administrators with two key sections from which they will be able to consult:

- Login Report : Detailed information about user-specific accesses
- User Statistics : Overall information about daily and weekly accesses

#### **5.5.9. Remote archive consultation**

EtereWeb allows web users to check and also control the digital archive remotely via web. Web users will be provided with a fully-tracked access to the most relevant Asset Management operations through a robust search engine and including a wide set of function-specific sections (i.e. general information, media, properties, metadata, rights, technical data, workflows and much more).

Specially, a section dedicated to the media management will provide information regarding all media files associated to the asset, indicating for all of them the timecode details and EDL configuration with further preview/cut/download/upload capabilities.

#### **5.5.10. User Permissions**

EtereWeb allow stations not only to share the right files to the right persons but it also allows sharing contents with the right permission levels; this capability is based on granting/denying function-specific permissions through Etere Worksheets, the module that allows web users to request temporary permission for specific functions (e.g. download a file linked to a certain asset):

Web requests are managed via workflow to allow a custom and automatic launch of worksheets:

Supervisors count with a dedicated interface for viewing pending requests and accept/deny them:

Once the requested is evaluated, web-users will automatically receive an email notification containing the information (e.g. ID, codec, fixed note and an evaluation note) about the asset for which the request has been performed. The email notification will be sent to the email specified in the personal data of the web-user

who performed the request, this, depending on the entity type:

Finally, in case the request is accepted, the web-user will be now allowed to download the requested file(s) through EtereWeb.

#### **5.5.11. Security integration**

EtereWeb works perfectly behind routers 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. Moreover, as a further security level, Etere provides direct authentication of web users through the station's active directory domain.

#### **5.6. ActiveSync: Automatic media acquisition**

Etere ActiveSync is the easy-to-use application that verifies with just one click if all archived contents (both high and low qualities) matches with data present in the database. The image below illustrates how Etere is able to perform an automatic synchronization of video files:

Etere ActiveSync is able to automatically scan all video files stored on a certain location to create or update asset's files information into the Etere Media Library, thus avoiding the presence of unassociated media or inconsistent asset forms:

#### **5.7. Tape Manager: An enterprise management of tapes**

Etere allows stations to manage their tape archives (video tapes, data tapes, discs) through a set of modules specifically designed to perform the most important tape-related operations; these modules are illustrated in the figure below and described all throughout the current chapter:

It's worth mentioning that the tapes management provided by Etere can be greatly complemented with the remote tapeless capabilities described in the chapter dedicated to the EtereWeb module.

##### **5.7.1. Tape Library**

The Tape Library module is the inventory where all tapes managed within the system are inserted and defined, being possible to search them through a robust search engine (loaned tapes are highlighted to point out their unavailability):

Retrieved tapes can be consulted by viewing their main information (i.e. ID, code, description, type, format, barcode, media pool, rack location):

Moreover, it will be also possible to perform various operations such as tape creations, tape loans, tape copies and status consultations (e.g. empty tapes, loaned tapes, etc.):

##### **5.7.2. Racks**

The Racks module provides a simple user-interface for locating tapes inside specific racks and libraries and consult some of their more important storage properties (e.g. free space, used space, etc.). As shown in the figure below, the user interface is mainly composed by the Content List (i.e. where contents of each single library/cart can be consulted) and a Toolbar (holding the functions supported for their management).

All tapes contained into a library can be consulted through a very useful "Tape Info" form which details some important information such as its code, type, barcode, title and contained assets:

A "Container Management" form displays an array-view of the slots contained within Racks and provides visual information on their space status (e.g. green=empty, yellow=used, red=full):

A "Library Summary" provides an overview of the management of each library in



the system:

### 5.7.3. Tape Loan

Tape Loan is the module that allows managing all information related to the borrowing and return of tapes. Loans are recorded in the database detailing the loaner (company and person), the loan and return responsible, the actual loan data, the expected return data, the loaned media (tapes), being also possible to print a loan receipt document for each loan operation:

Stations will be allowed to search due-for-return tapes and consult pending loans, settle loan returns and print loan reports:

### 5.7.4. Tape Manager

Tape Manager allows assigning new or existing tapes to assets, detailing the information required for their subsequent recording (e.g. SOM, EOM, EDL instructions, split parts):

## 5.8. Monitoring Console: A complete SNMP monitoring

The Monitoring Console is a tool developed to help supervisors to have a global overview of the system, permitting them to monitor any Etere module which collects and stores its management information (errors, warnings, etc.) through the locally installed SNMP Agent which sends messages containing this information to a remote console which in this way monitors all the modules; through this console the operator can decide about the receiving policies (content, validity, filters, etc.).

The Monitoring Console is a key part of the broadcasting process because it permits to have a complete report of the way the Etere modules are working, allowing to catch errors, store them in a database for a further analysis and also forward them to another console (forward the message to the pertinent operator who is intended to solve it) and thus saving time and resources on real-time which are invaluable assets in the broadcasting business.

### 5.8.1. SNMP monitoring support

In order to improve monitoring of devices, modules and workflows all Etere components are automatically subscribed to an SNMP Service, so it will monitor the periodic heartbeats sent via SNMP by the components. The Monitoring Console detects missing heartbeats and sends both a visual-alarm and an e-mail notification to the operations department. Owing to the use of this feature, the general health of the Etere system can be further examined to isolate raised faults.

### 5.8.2. Visual real-time monitoring

In order to improve monitoring of modules and devices, all Etere components are automatically subscribed to the Etere SNMP Service, so it will monitor the periodic heartbeats sent via SNMP by the components.

### 5.8.3. Robust monitoring features

The Monitoring Console is smartly divided across different panels to allow a quick monitoring of specific functions. Tools included in this module are listed below:

- Module - SPACE MONITOR, Description - Visualize the storage space of all devices for which metadevices are defined (e.g. video servers, workstations, servers, etc.).
- Module - RESOURCE MAP, Description - View and allocate resources (e.g. workstations) across the system, thus allowing to, for example, indicate the rack position of the workstation on which an error has occurred
- Module - WORKFLOW MONITOR, Description - Consult all workflows (transfers, checks, requests and much more) executed on the certain station, allowing also to view and manage them each one of them.
- Module - RESOURCE VIEWER, Description - Show a map of all resources configured in the system, showing in real-time their connection status and SNMP messages
- Module - STATUS BAR, Description - Display the real-time status of monitoring background tasks such as "SNMP real-time checking", "Processes monitor", "Check pingable devices from this console", "Collect and check PC counters" and

"GPI signals"

### 5.9. Automation: Reliable playout system

Automation is the powerful, reliable and modular playout system able to enhance the station 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, etc.:

#### 5.9.1. Live events management

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:

#### 5.9.2. Secondary events manager

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:

#### 5.9.3. As-Run Logging

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:

#### 5.9.4. Synchronized broadcast

Aligner is the application that maintains the published schedule constantly synchronized, it aligns the independent automation schedule with the Etere stored schedule, this operation is very important for the broadcast process since published on-air timings may vary and will need to be updated:

Etere Aligner provides stations with the following key features on managing broadcast schedules:

- Automatic publishing of the schedule by Executive Editor
- Ensure consistency of the published schedule by updating it with last changes
- Launch workflows automatically to restore video clips scheduled to go on-air

In the Parameters it's possible to specify that the system also carries out publication of the schedule at each Etere F90 request.

Moreover, Etere Aligner allows restoring via workflow all those video files associated to scheduled events and which are missing in the remote archive, either manually or automatically:

### Key Benefits

With the new ETERE system, TVB will benefit from all the advantages derived from Etere MERP, present and future operational benefits are following mentioned:

- **Flexibility**, on meeting all requirements by proving a versatile media management system tightly integrated with all the metadata and equipment
- **Scalability**, to increase the capturing/playing channels as well as asset languages without altering the workflow complexity, minimizing operational overheads overall costs
- **Efficiency**, achieved by reducing repetitive manual operations, allowing to define and include in advance in automatic preset workflows
- **Reliability**, derived from the use of streamlined workflows provided with detailed logs for tracking the overall and individual functioning of the system
- **Accuracy**, due to a continuous data monitoring to reduce the risk on mistakes on

archived media and played content

■ **Integration**, of automation systems and external users to allow direct access to archive through a web interface empowered with the highest security standards

■ **Security**, across all operations based on specific user permissions depending on the structure of the customer's Active Directory domain

■ **Usability**, a sophisticated interface guarantees a smooth use and intuitive management of media content, from ingest to delivery