PROJECT

Etere
a consistent system

MEDIA NUSANTARA CITRA

A Full Enterprise Wide Media Asset Management System

MNC
PT Media Nusantara Citra Tbk

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Media Nusantara Citra (MNC) MNC is the largest Indonesian media company, founded in 1997 and 70% owned by PT Global Mediacom TBK group. **MNC**'s significant content library is the largest in Indonesia comprising entertainment and news content accumulated –with an increasing rate of more than 10,000 hours per year- from in-house produced content (movies, series, realities, comedies and films), third-party acquired content and multi-platform generated content.

▼ 1.   CHALLENGE

To consolidate the position of **MNC** as major media company in Indonesia, ETERE has provided a **full enterprise wide media asset management system** to convert and manage digital content for multi-platform delivery including nationwide networks, television channels, newspaper, tabloids, and radio.
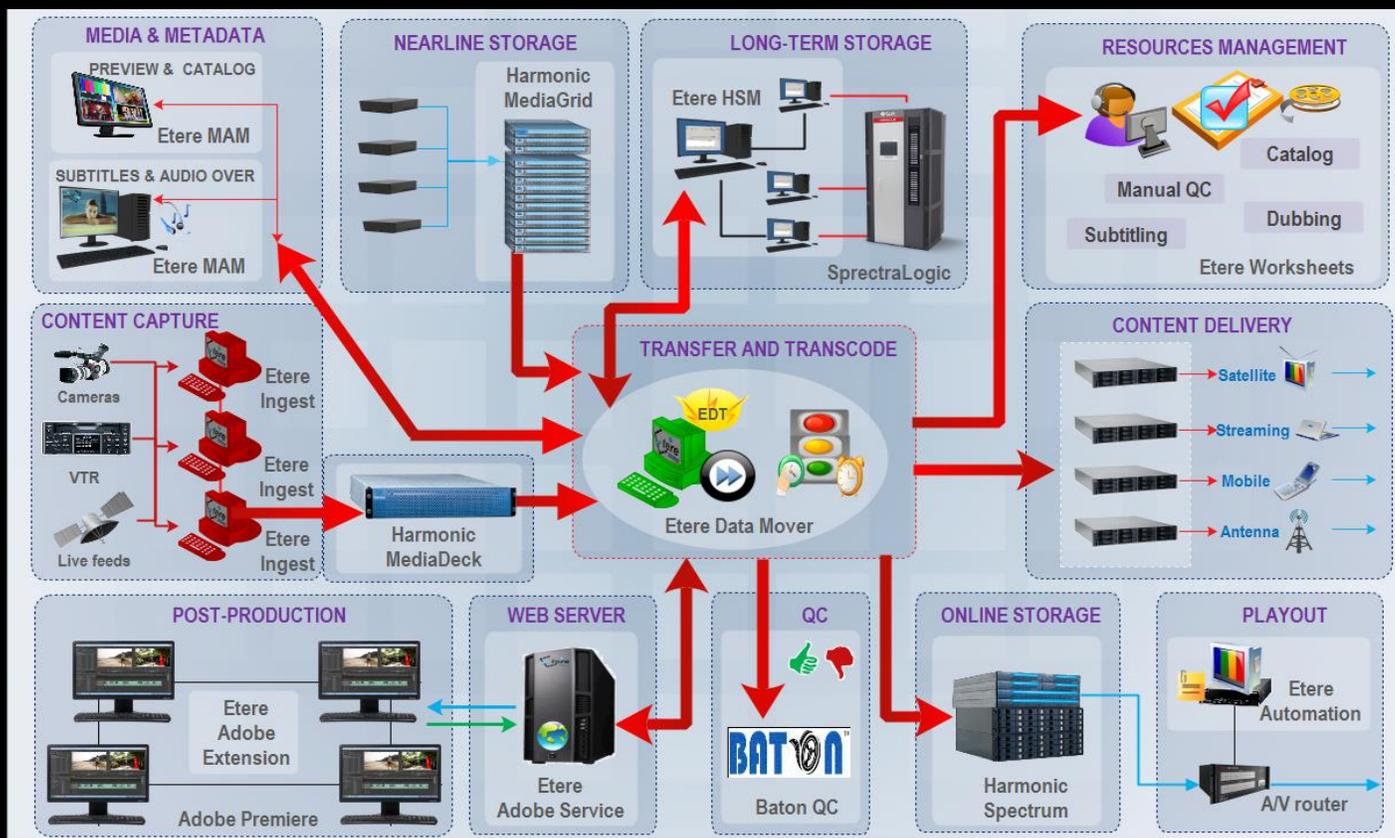
This paper illustrates a workflow-based approach that align processes and resources under a **ETERE MERP** approach, an **"enterprise wide"** strategy that removes the divisional and departmental barriers of the traditional system, unifying into one process-oriented and future-focused framework all **MNC key operations** to reduce time consuming and repetitive activities while maximizing the value of stored assets.

▼ 2.   SOLUTION

Etere will implement a **"Full Enterprise Wide Media Asset Management System"** able to capture, store and transparently manage MNC's archived content over long term, our solution combines rock-solid reliability and high availability with increased bandwidth and storage, allowing operators to easily search, retrieve and browse media from the digital archive thanks to the following key features:

KEY FEATURES

- **Distributed** architecture managed via **workflow** to avoid any single point of failure
- Enterprise management of digital content under a **file-based** environment
- Seamless **integration** with existing and co-existing systems
- Fast, safe and fully-tracked local/remote **access** to the content archive
- Enterprise management and **transport** of media between storage devices
- On-demand media **transcoding** to always deliver the correct media format
- **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
- Browsing features including **preview**, slow-motion, time code, bookmarking and metadata
- Robust **editing functions** including video cut, merge, overlay and restore
- Best flexibility on **digitizing media** content from multiple sources
- Full integration support for **NLE systems** including archive upload/download
- Reliable **monitoring** of the modules and equipment integrated within the global system

According to the requests of **MNC's engineering division**, the solution will act as a centralized, comprehensive and web-enabled archive able to cover the following workflow processes:

	MNC WORKFLOWS		
Req.	**Process name**	**Brief description**	**Chapter**
9.1.1	**Ingest**	Etere Ingest will acquire content in a Harmonic MediaDeck (MOV-DV and MPG-2) from all required sources (tapes, HDD, etc.).	**3.1**
9.1.2	**Transcription**	Etere MAM will provide a tool to import or create subtitles for content in foreign languages	**3.2**
9.1.3	**Playout**	Etere Automation will control the transmission of scheduled content with the maximum of reliability	**3.3**
9.1.4	**QC**	External QC systems (e.g. baton) will be integrated in the workflow for automatic verification, including a manual QC for double-check.	**3.4**
9.1.5	**Archiving**	Etere HSM will archive two LTO6 copies for long term storage of requested content and quickly restore them whenever it's required.	**3.5**
9.1.6	**Transformation**	Etere DataMover will transfer and transcode all content to different devices in different formats	**3.6**
9.1.7	**Editing/Post-production**	Etere Adobe's extension will allow Adobe Premiere stations to directly download/upload material whereas FCP stations will use EtereWeb to do so through a robust web interface.	**3.7**

▼ 3.   MODULES

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.

The modules upon which this project is cemented are listed below:

ETERE MODULES

 ➢ **Etere Workflow,** automated management of assets and resources

 ➢ **Etere Ingest,** flexible media acquisition from a wide range of sources including live feeds

 ➢ **Etere MAM**, resource management of tasks (e.g. QC, censorship, etc.) with preview and EDL features

 ➢ **Etere Automation**, redundant playout system supporting real-time device control

 ➢ **Etere HSM**, automatic tape-based storage system for long-term management archive,

 ➢ **Etere DataMover**, intelligent and fast transfers between devices (SAS, NAS, etc.), enabled with EDT protocol

 ➢ **EtereWeb**, web-based interface to exchange media with NLE systems (e.g. Premiere, FCP, Avid, Edius, etc.)

▼ 3.1.   Ingest: A versatile acquisition system

Etere ingest is a versatile set of modular applications that significantly improves the digitization process inside a broadcasting system:
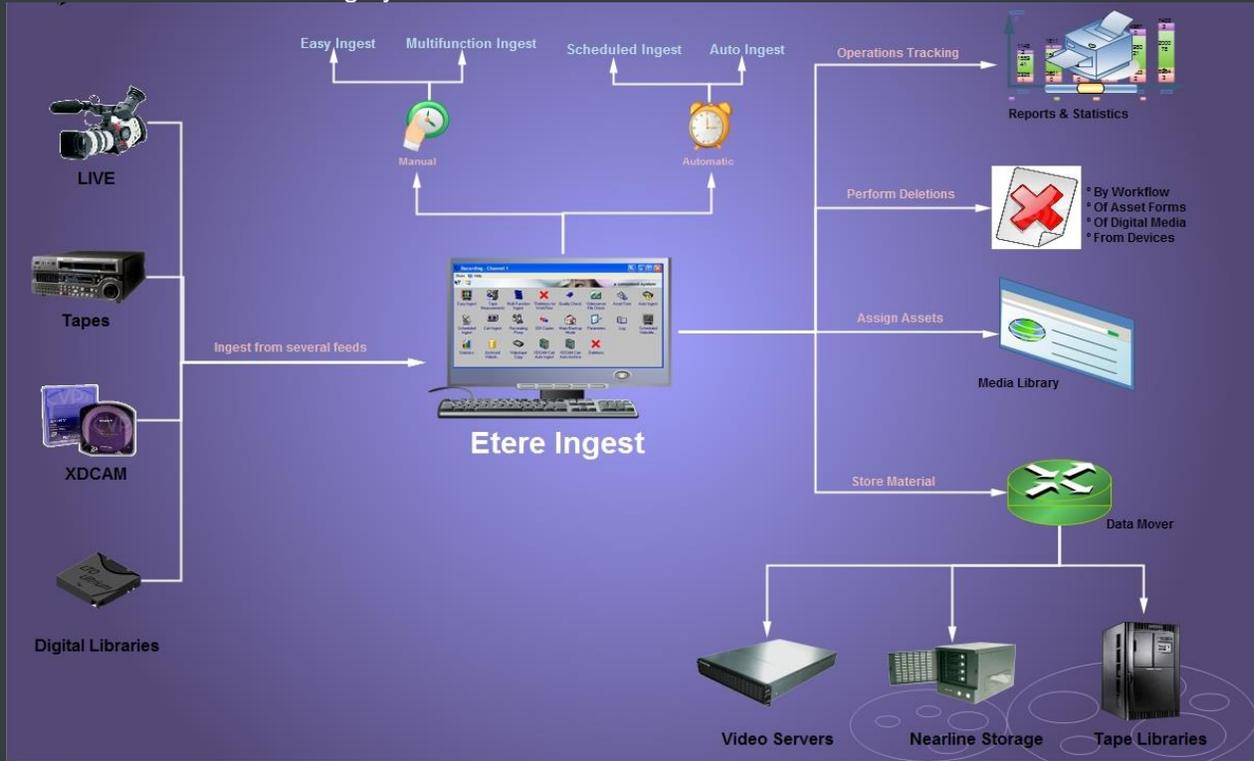
▼ 3.1.1. Wide range of acquisition modes

Ingest covers any particular requirement of the entire process, automatic and scheduled captures:


Automatic ingest

Schedule 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:
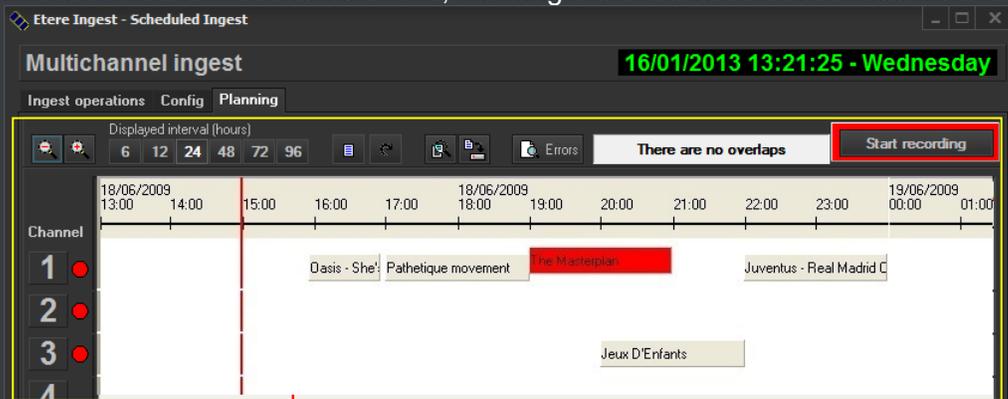

Planning View

▼ 3.1.2.   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.):
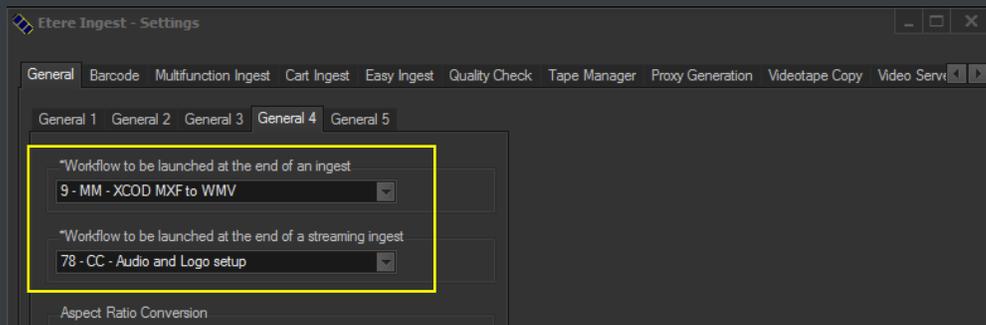
The image below illustrates how Etere allows setting the workflow to be launched at the start and end of an ingest process to for example, create a low resolution version or normalize the audio of captured contents:
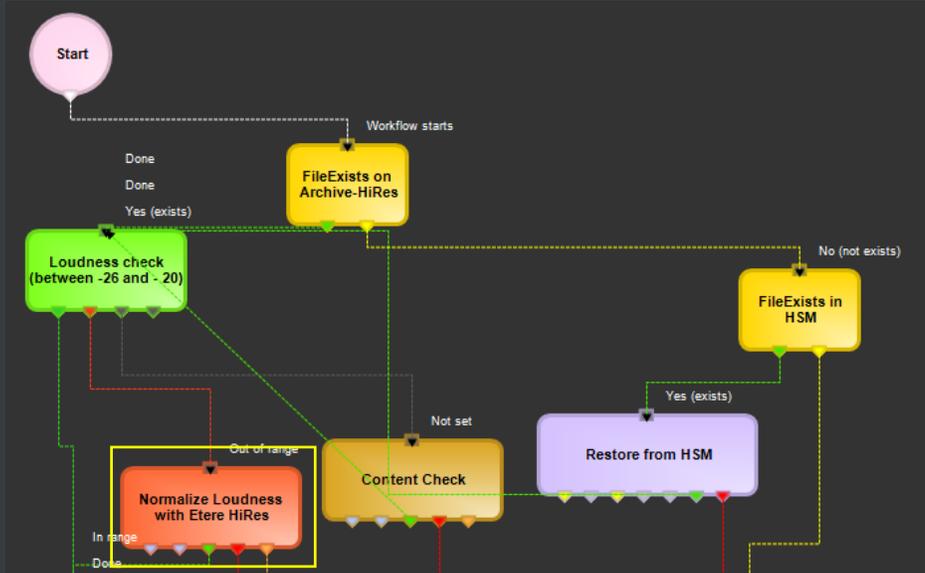
▼ 3.2.   MAM: Browsing, editing and more

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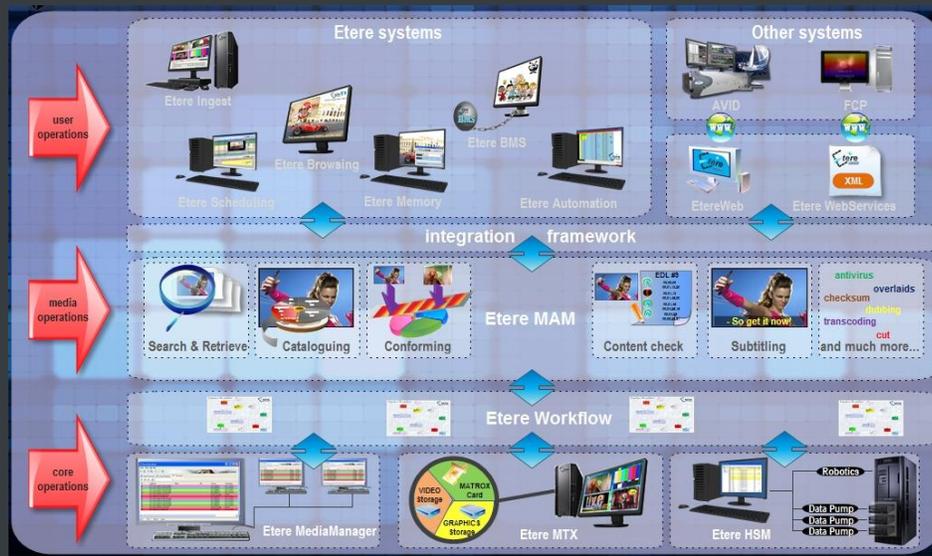

### ▼ 3.2.1. Resources management

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.
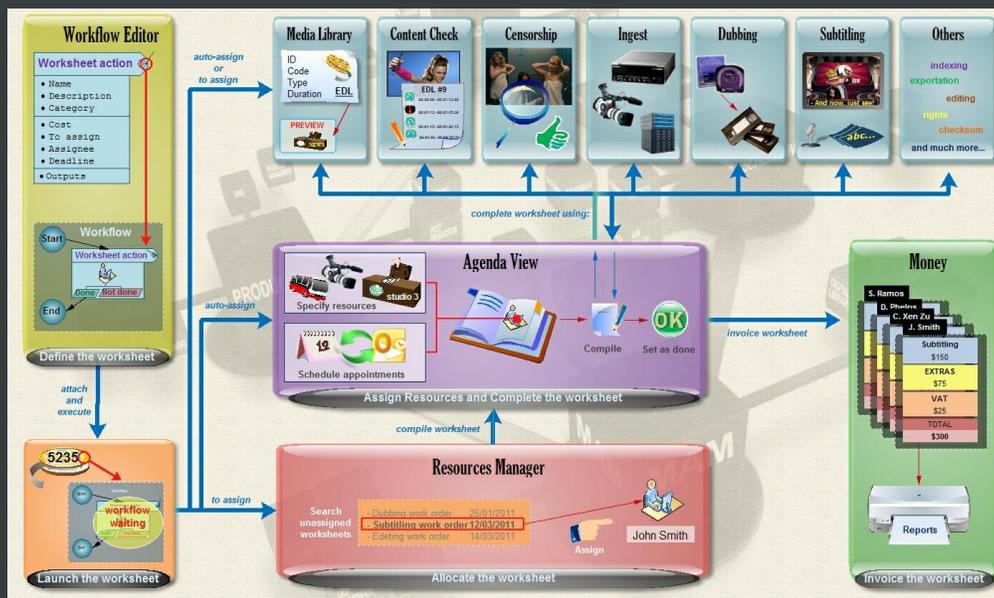
Worksheets are based on a custom structure and are fully integrated into the workflow management, being possible to create user-defined worksheets and include them in automated workflows which current status can be consulted at any time in real-time from either a desktop or web interface:
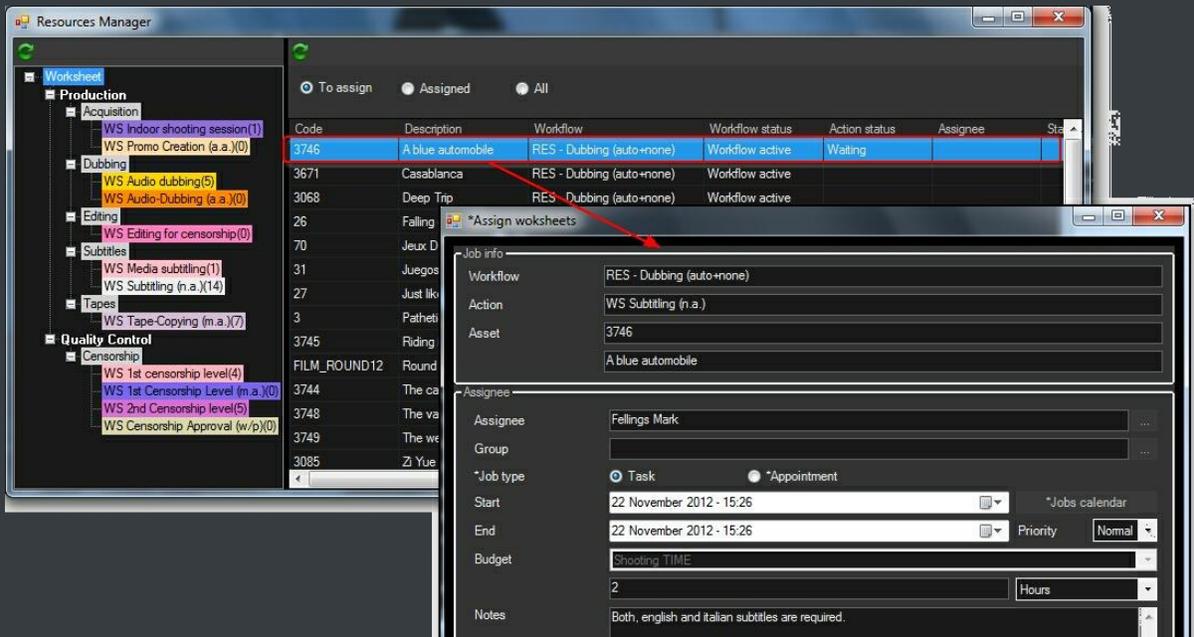
Worksheets related to media tasks (e.g. censorship, trimming, segmenting, subtitling, etc.) are greatly improved with the inclusion on key features such as proxy preview, slow-motion playback, EDL timecode marking, bookmarking navigation and metadata insertion:
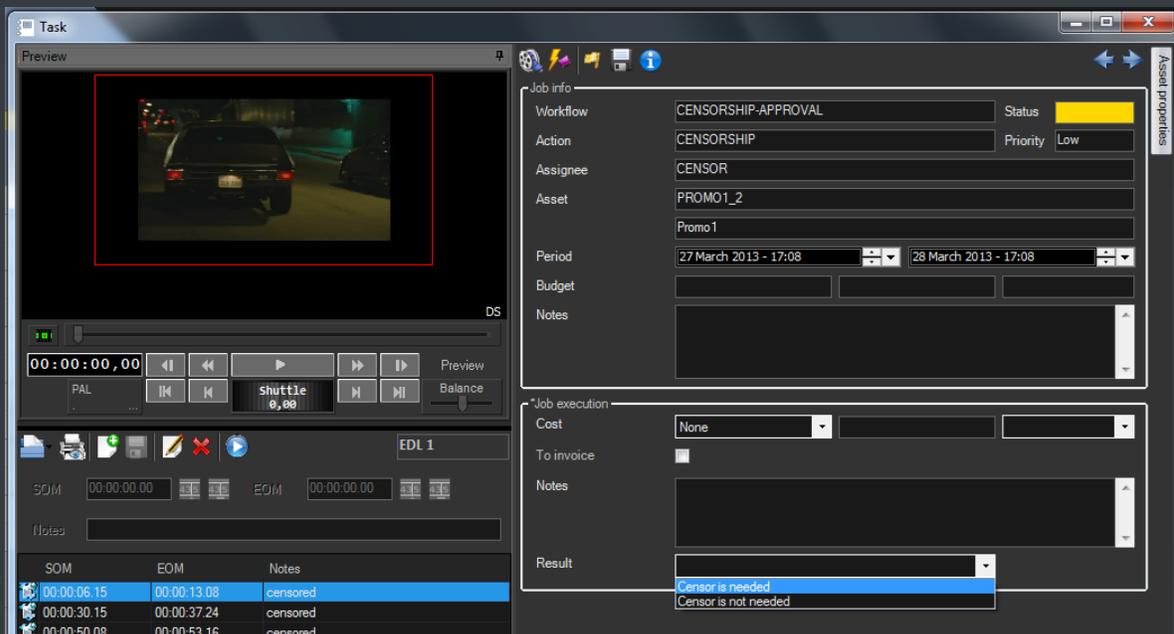
▼ 3.2.2. Subtitles tool

The **"Subtitles Tool"** is the solution developed by Etere to give stations the ability of producing their own in-house subtitles *(e.g. subtitled movies, captioned news, etc)*, providing all the tools required for an enterprise-class acquisition of subtitles:
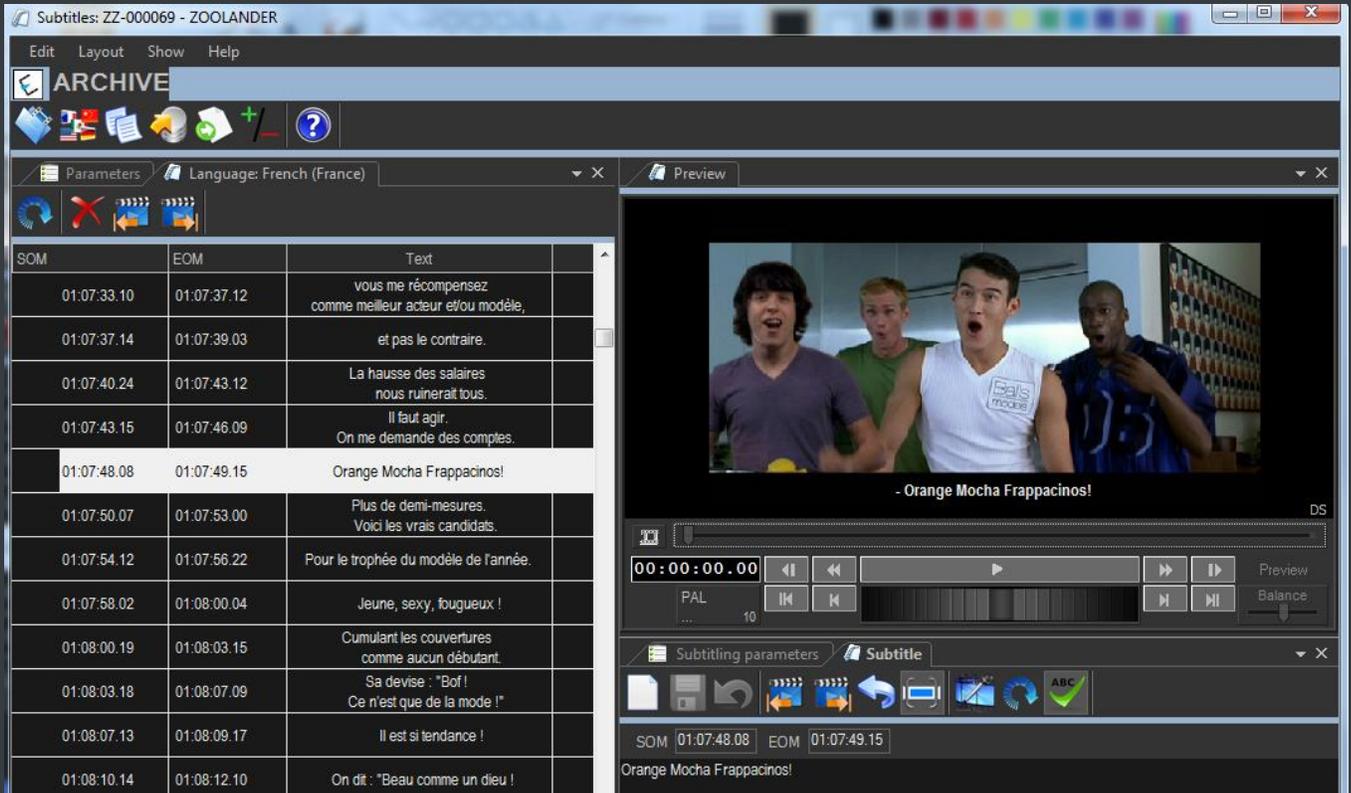

➢ **Import from file**: Import subtitles from up to 10 different standard formats.

➢ **Speech to text**: Directly dictate subtitles through an automatic speech recognition

➢ **Manual typing**: Enter subtitles in the classic way, useful when translating content

Subtitled media can be easily previewed from the "Media Library", which also allows importing and exporting subtitles as well as manually editing.

▼ 3.2.3. 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):
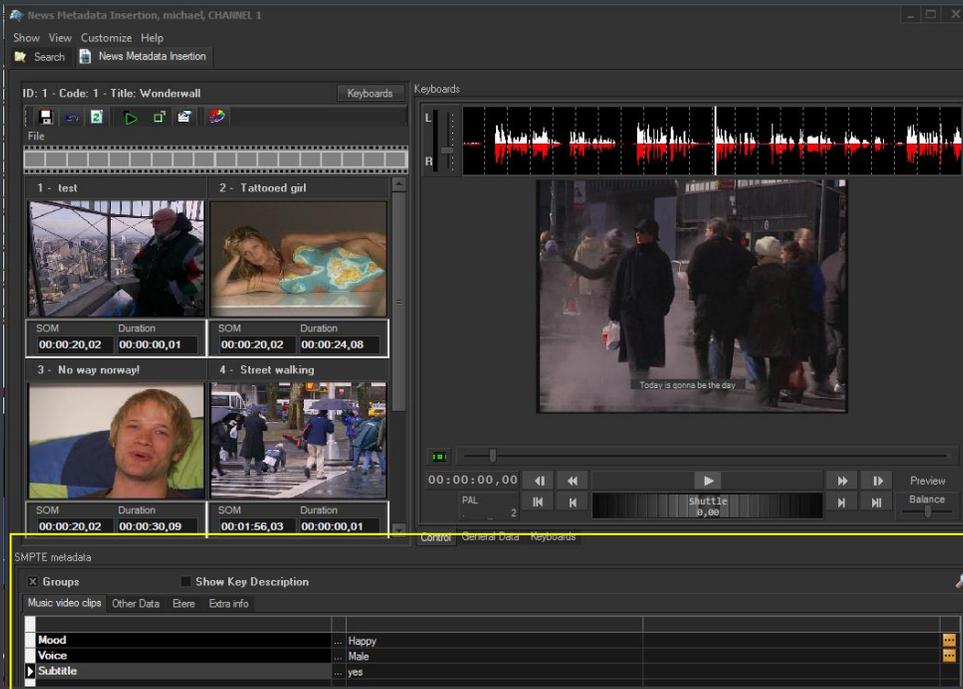

▼ 3.2.4. Video conforming and audio over

MAM permits to join cut segments from different sources, to create a single final video file containing all scenes selected by the operator:
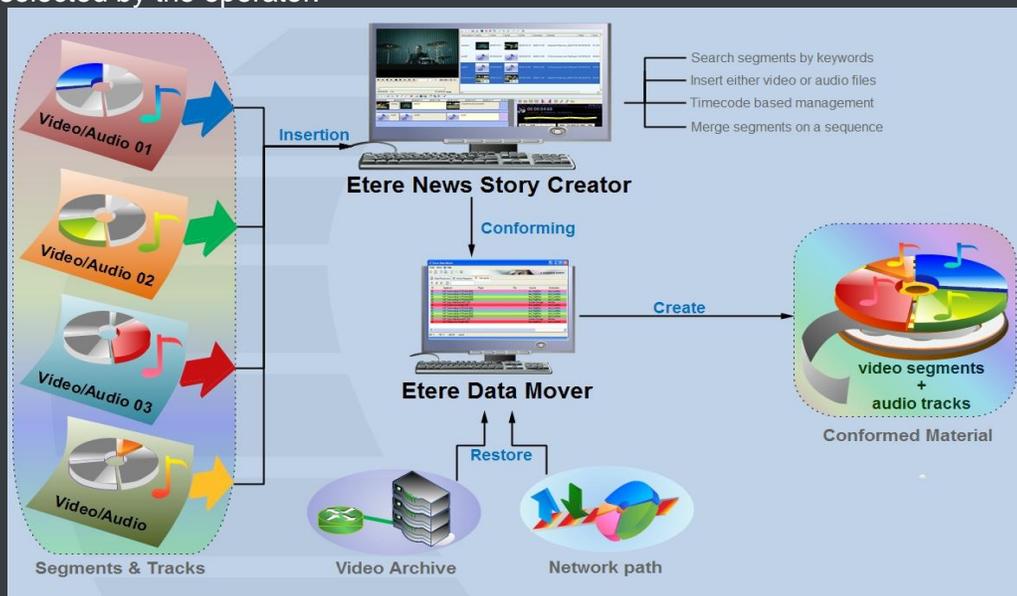
Use this function to, for example, dubbing contents by overlaying audio tracks over a video(s):
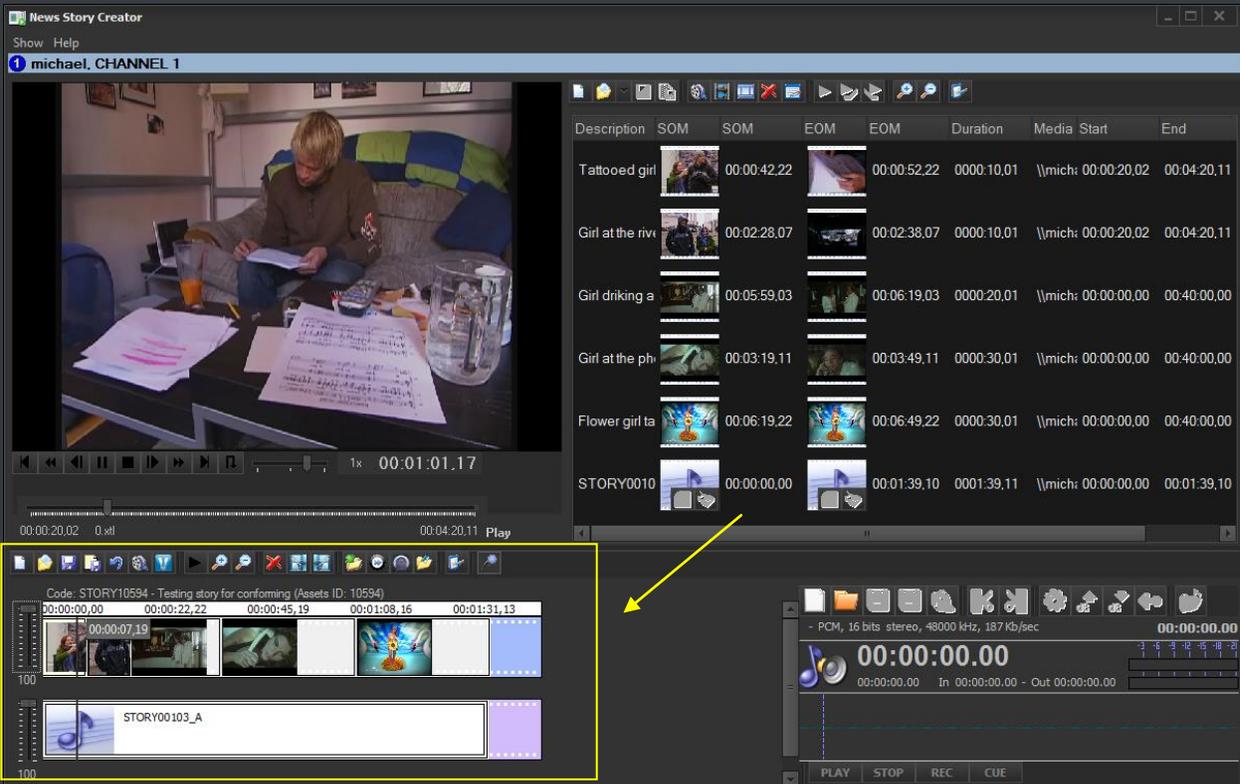

The image above illustrates the user-friendly interface on which operators creates new video sequences of MAM captions which includes all relevant metadata associated to the inserted scenes.


▼ 3.2.5. 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:
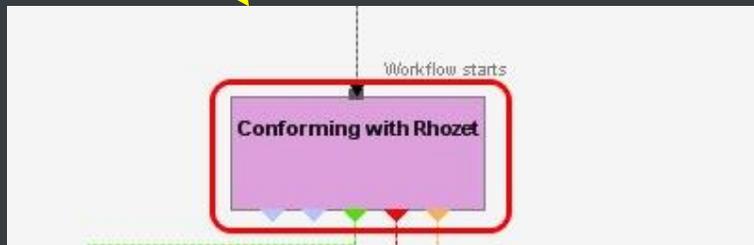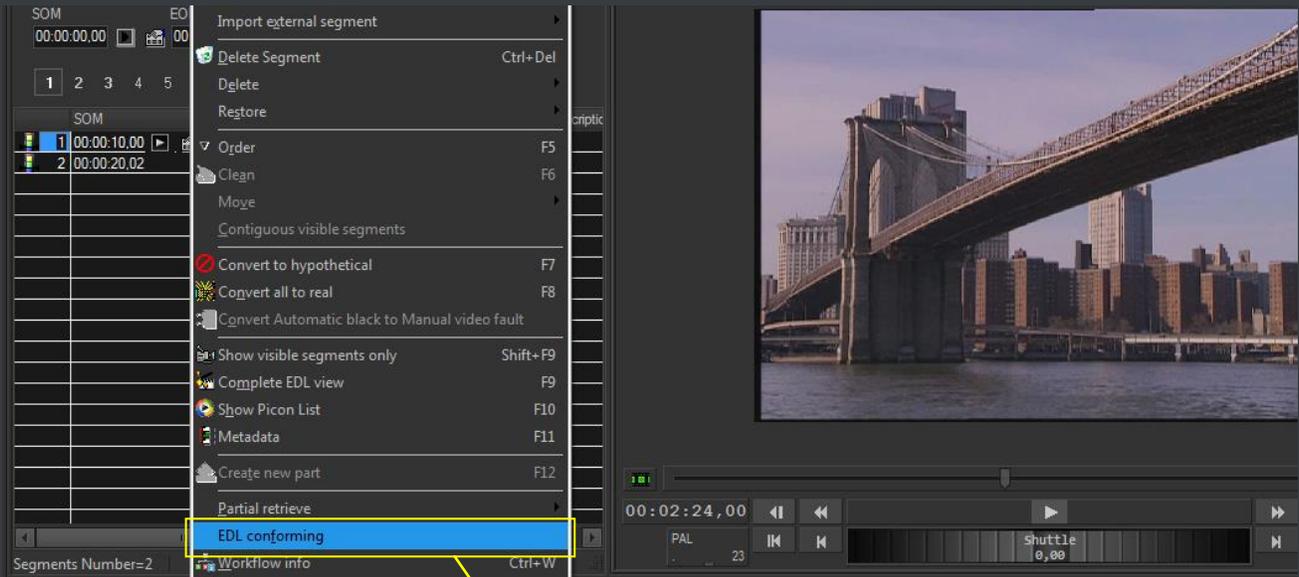
▼ 3.2.6.   Search engine

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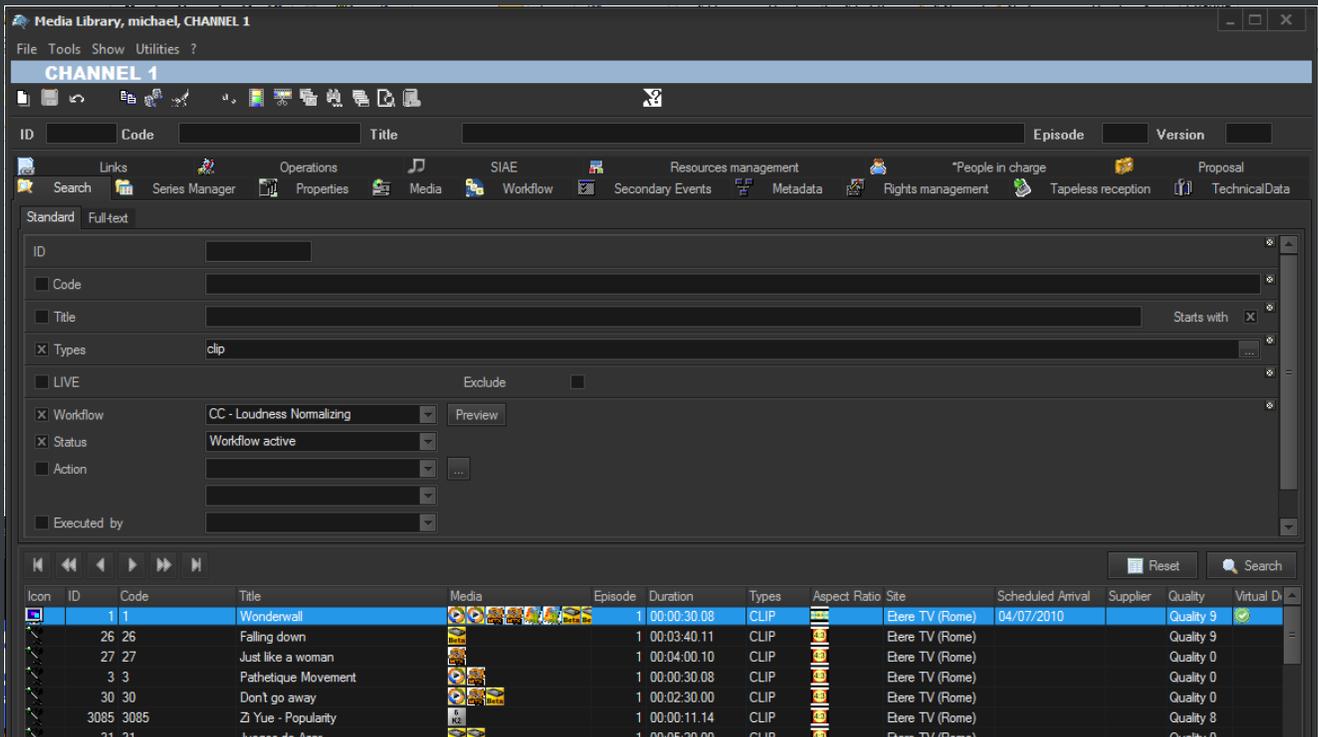
- o   Search for assets based on keywords related to database fields,
- o   A Full-text search can be carried out across the various fields of the assets,
- o   Full-text results are sorted based on their degree of relevance,
- o   Users can search for keyword synonyms to extend the range of results,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

▼ 3.2.7.   Logged operations

A dedicated section offers a list of all the operations performed on any asset (e.g. media linked, secondary event modified, metadata inserted, etc.):

▼ 3.2.8.   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:
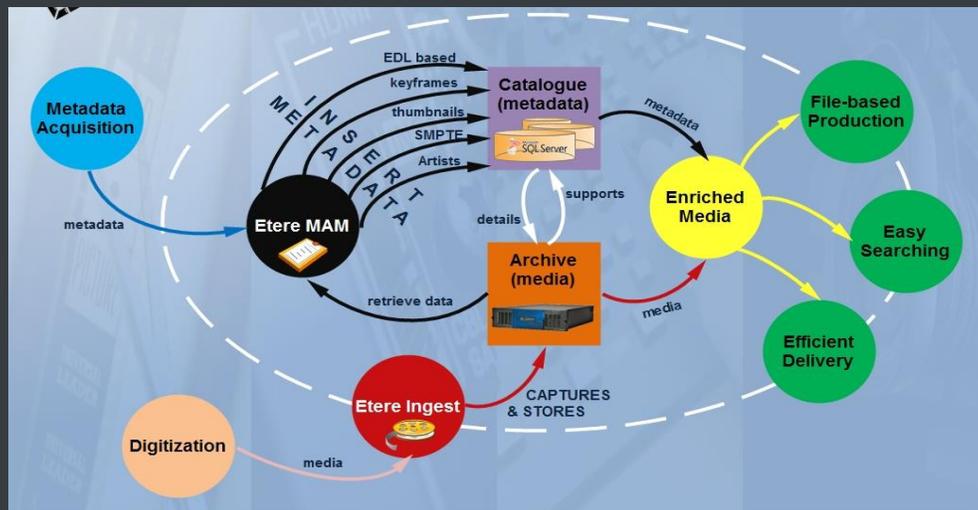
▼ 3.3. Automation: Reliable playout system

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.:
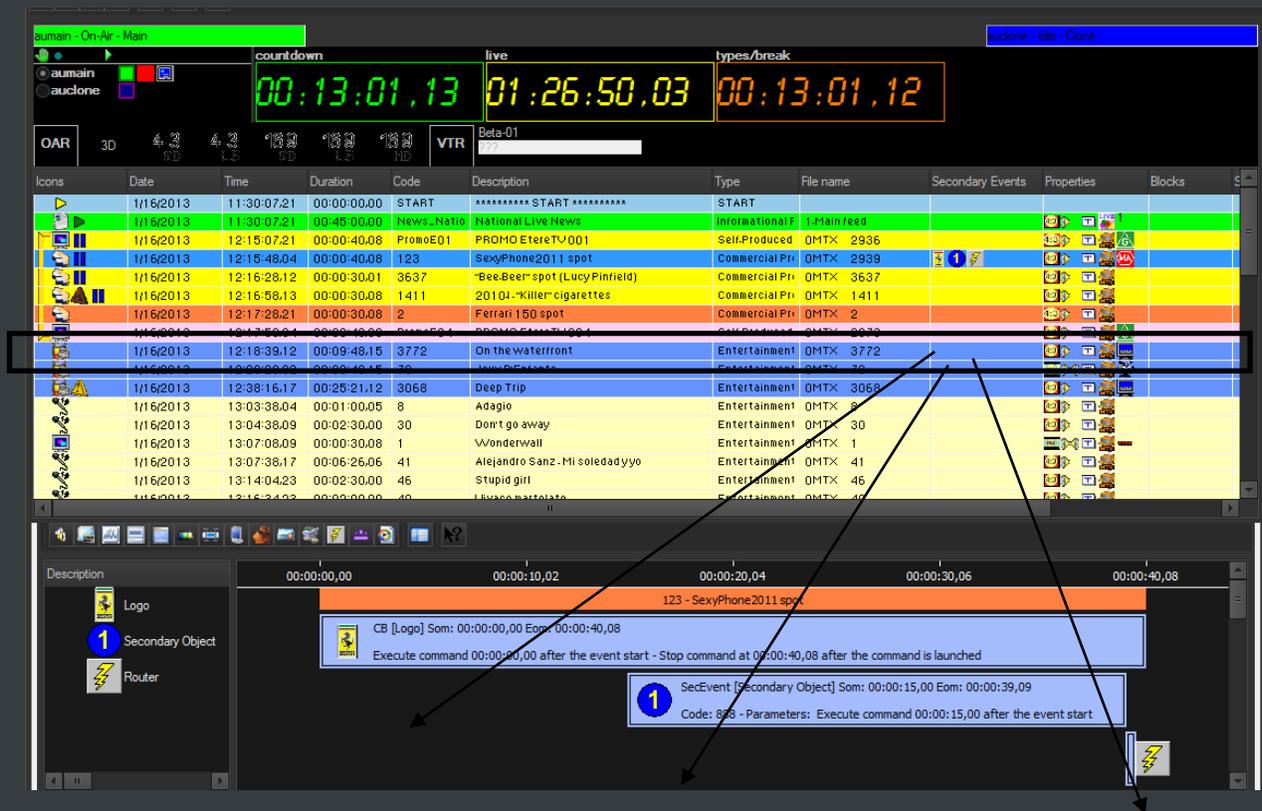
▼ 3.3.1. Live events management

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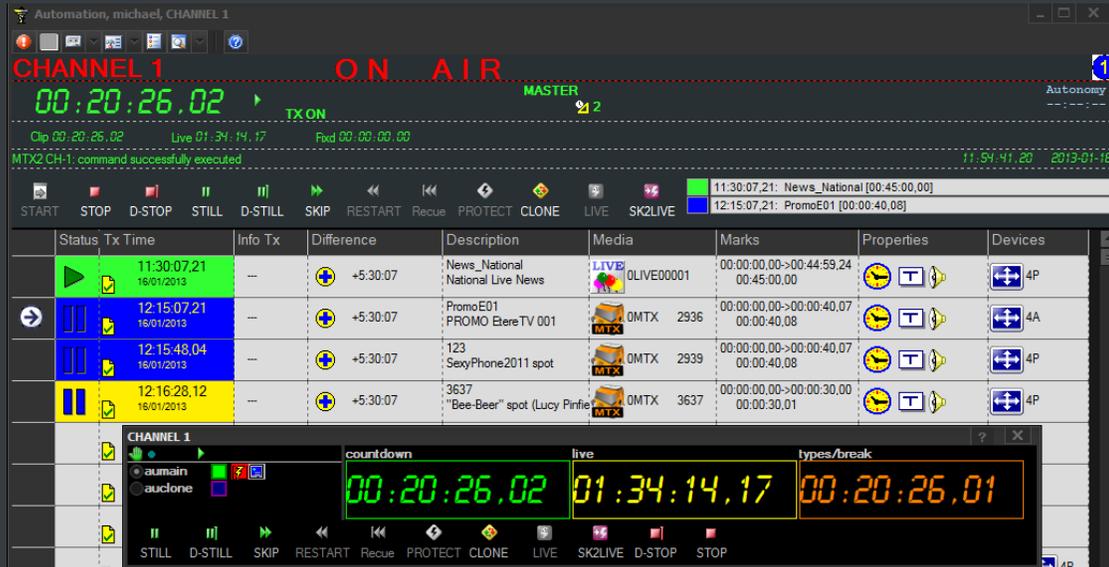
Additionally, Etere allows managing one video router per automation, being possible to create links between routers so when a channel is switched in the Main Router; the equivalent channel is also switched in the Backup Router:
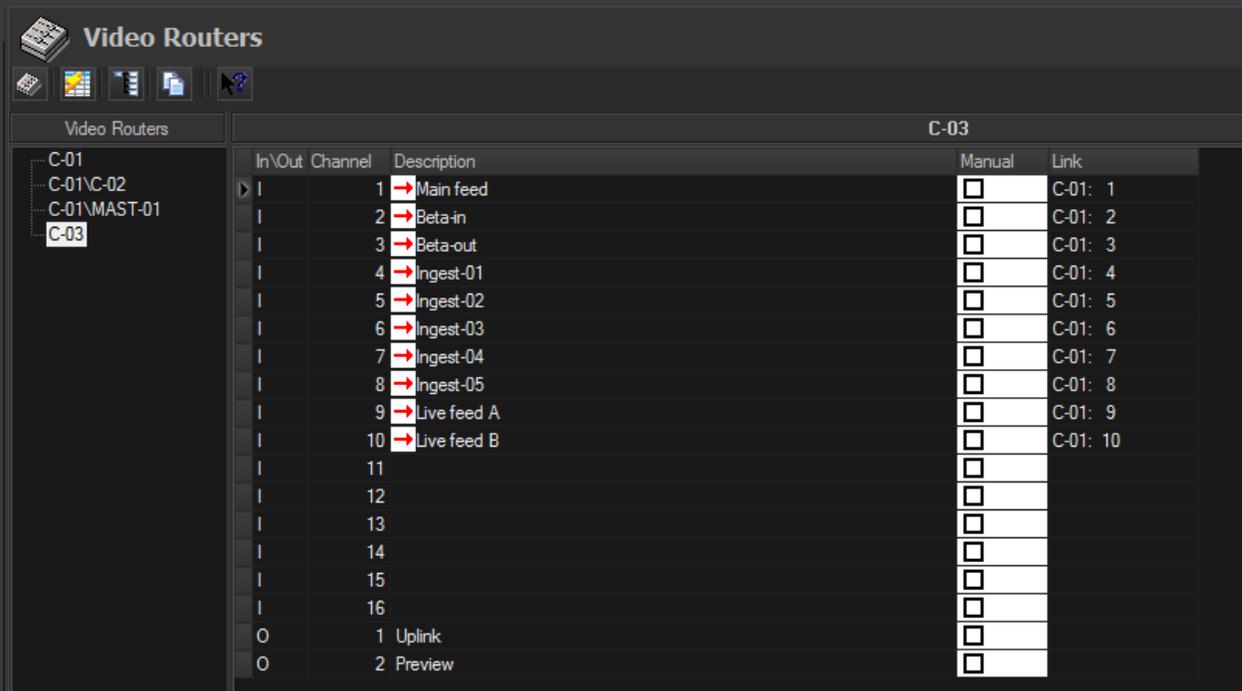
▼ 3.3.2.　　Secondary events manager

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:
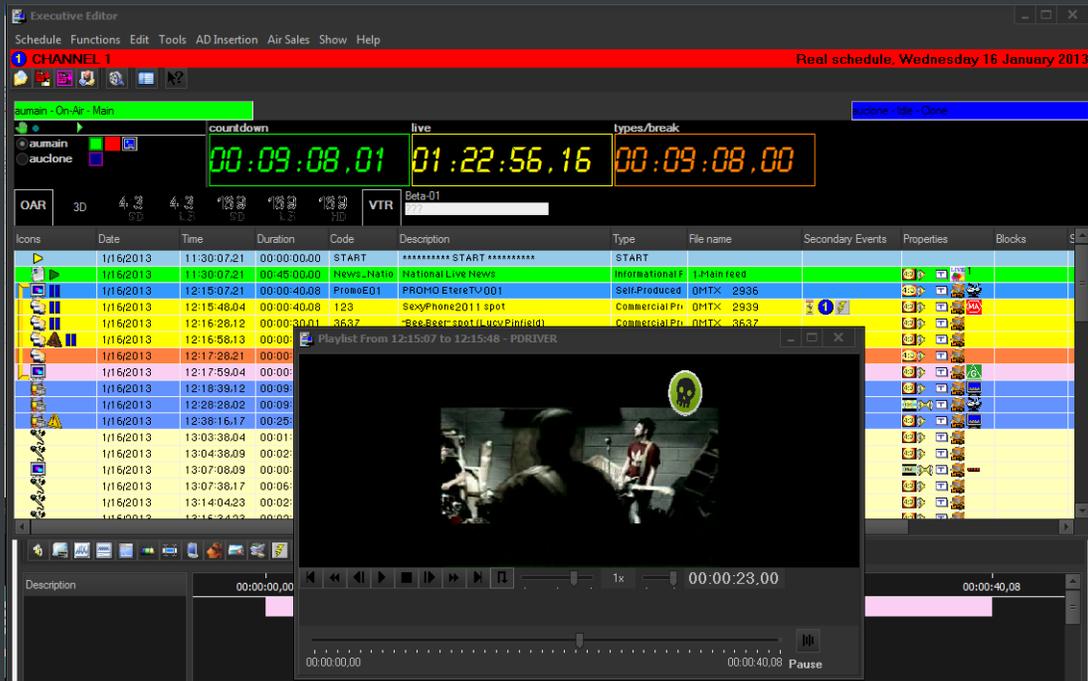
▼ 3.3.3.　　As-Run Logging

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:

```
[-  ] 04/28 15:09:20.593 |          |Log Started
[  APP  ] [2010-04-28 15:09:20.21 AUTOMATION RESET
[  APP  ] [2010-04-28 15:10:31.05 AUTOMATION IS ONAIR
[  CLIP ] [2010-04-28 15:10:30.17 Y, 210136785149, 22 , 0LIVE00000   , Live News , F, 00:00:00.00, 00:59:59.24, 01:00:00.00
[  CLIP ] [2010-04-28 16:10:01.19 Y, 210135546001, 28 , 0MCL  CBBot   , B-Bottles , F, 00:00:00.00, 00:00:08.18, 00:00:08.19
[  CLIP ] [2010-04-28 16:17:03.21 Y, 210136107001, 70 , 0MCL  JeuxD   , Jeux D'E , T, 00:00:00.00, 00:30:00.00, 00:30:00.01
[  CLIP ] [2010-04-28 16:47:08.02 Y, 100000008996, 3   , 0MCL  PathMov, PathMov  , T, 00:00:00.00, 00:08:12.24, 00:08:13.00
[  APP  ] [2010-04-28 16.48.13.20 PLAYOUT COMMAND: STILL
[  APP  ] [2010-04-28 16.48.14.19 PLAYOUT COMMAND: RESTART_FROM_CURRENT
[  APP  ] [2010-04-28 16.48.20.07 PLAYOUT COMMAND: STILL
[  APP  ] [2010-04-28 16.48.23.01 PLAYOUT COMMAND: RESTART_FROM_NEXT
[  CLIP ] [2010-04-28 16:48:23.01 Y, 100000008998, 32 , 0MCL  Minuet  , Minuet    , T, 00:00:00.00, 00:11:10.24, 00:11:11.00
[  CLIP ] [2010-04-28 16:52:12.06 Y, 100000009000, 33 , 0MCL  Prima   , Primavera , T, 00:00:00.00, 00:09:19.24, 00:09:20.00
[  CLIP ] [2010-04-28 16:54:13.12 Y, 100000009003, 49 , 0MCL  Vivace  , Vivace    , T, 00:00:00.00, 00:04:59.24, 00:05:00.00
[  APP  ] [2010-04-28 16:55:16.11 PLAYOUT COMMAND: SKIP
[  CLIP ] [2010-04-28 16:55:16.11 Y, 100000009005, 51 , 0MCL  OdeJ    , Ode Joy   , T, 00:00:00.00, 00:04:59.24, 00:05:00.00
[  CLIP ] [2010-04-28 16.57.46.19 Y, 100000018164, 12 , 0LIVE00001    , Meloldy01 , T, 00.00.00.00, 00.00.14.24, 00.00.14.15
[  APP  ] [2010-04-28 16.59.53.01 PLAYOUT COMMAND: EMERGENCY_LIVE_START
[  APP  ] [2010-04-28 17.05.57.05 PLAYOUT COMMAND: EMERGENCY_LIVE_END
[  APP  ] [2010-04-28 17:15:35.06 AUTOMATION STOP
Log Closed
```

▼ 3.3.4.   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:
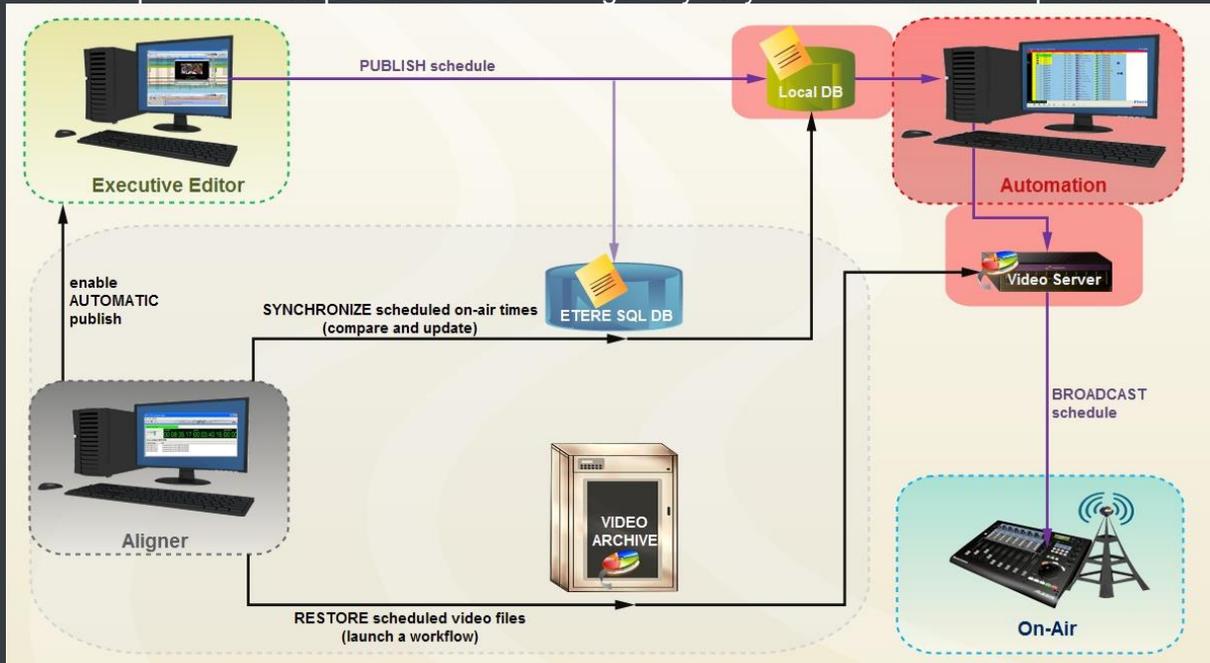
Etere Aligner provides stations with the following key features on managing broadcast schedules:

• 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.
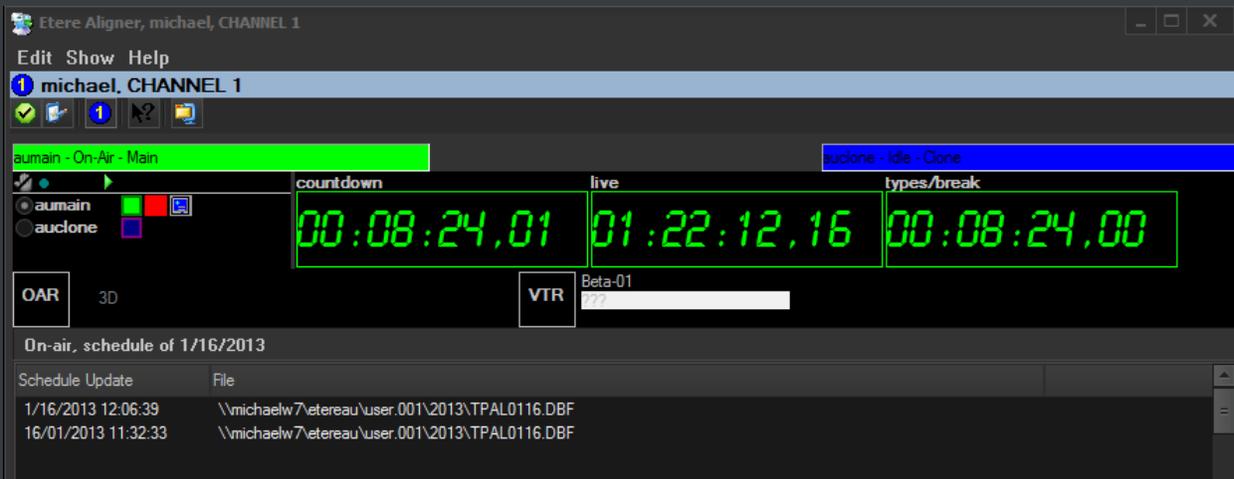
Moreover, **Etere Aligner** allows restoring via workflow all those video files associated to scheduled events and which are missing in the remote archive, either manually or automatically:
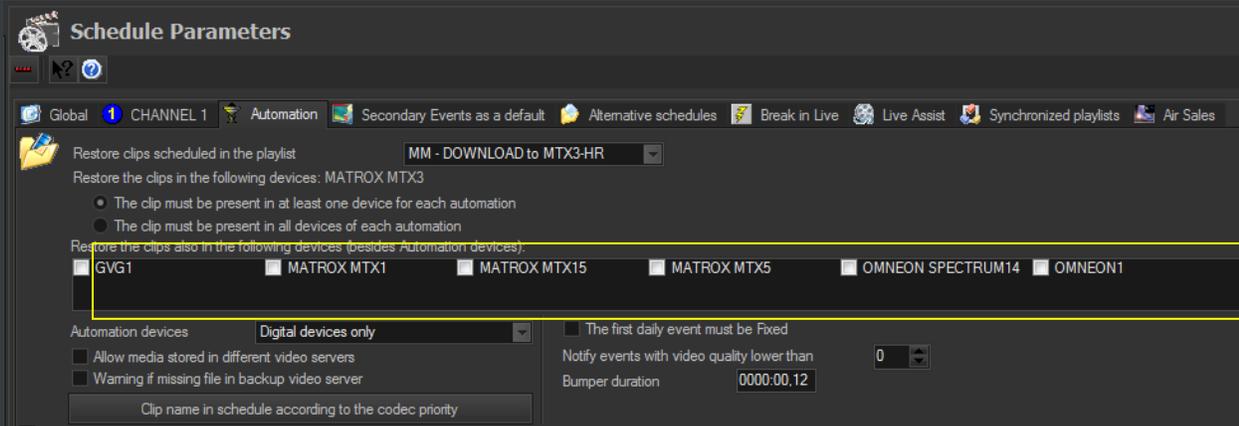
▼ 3.4. QC: automatic file-based quality check

Besides **Etere CMS** (see chapter 4.10.1), the software solution developed by Etere to provide file-based detection of audio/video issues *(e.g. freeze frames, black frames, scene changes, audio loss, loudness, etc.)*, Etere also allows integrating third party QC systems into its workflow environment.

▼ 3.4.1. Baton QC

Etere Workflow provides the ability to integrate **Baton systems** and automatically request the execution of verification tasks based on Baton test plans for media files stored on **Etere MAM**:
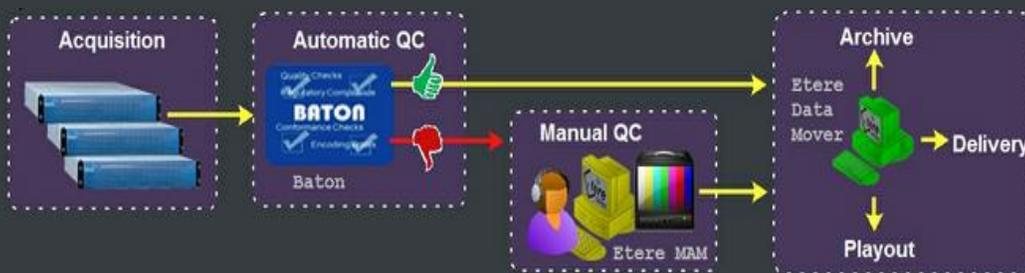
Combine automatic control with manual control to ensure the quality of your valuable content:

Results are saved as **PDF/XML reports** stored in the database, and linked to verified assets.

▼ 3.5.   HSM: intelligent long-term storage

LTO tape libraries present in the station will be managed by **Etere HSM**, 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.
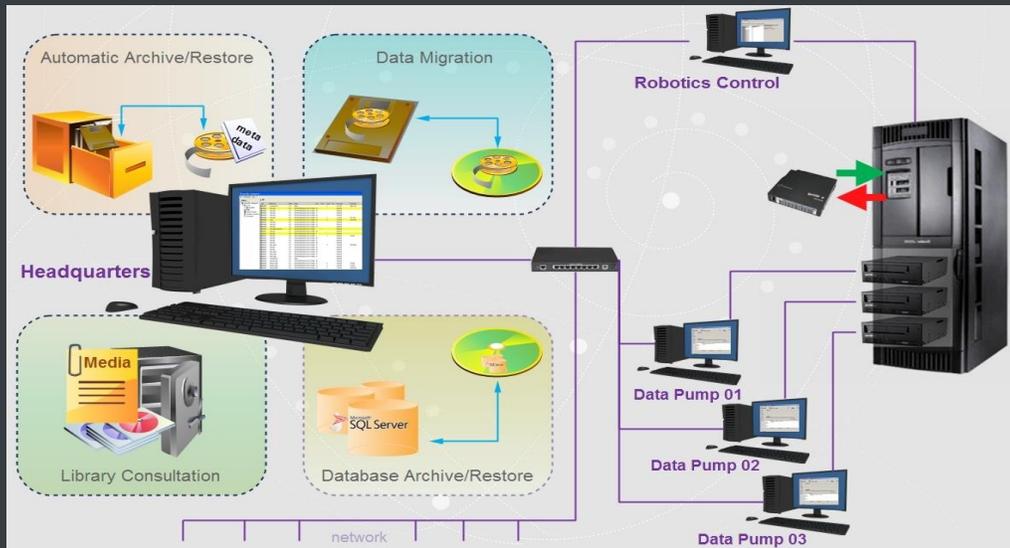
HSM improves the management of libraries by controlling their mechanical movements through the HSM Robotics Control and HSM Data Pump applications, which are able to run several data pumps on different machines to boost their throughput, while offering access to real-time logs, reports and statistics.

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:
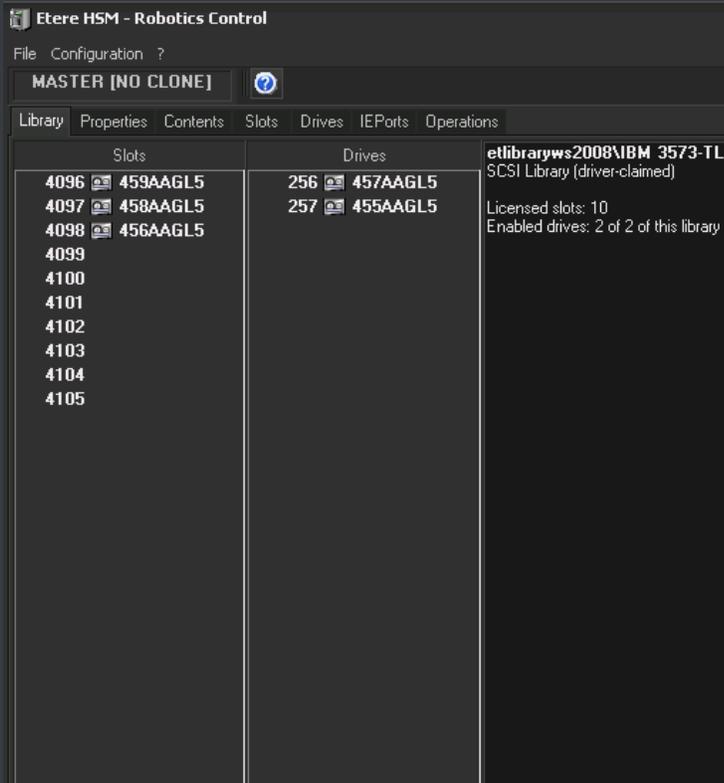
- Carry out loan-balanced movements on an intelligent multi-volume scenario,

- 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.

Moreover, owing to Etere's comprehensive character, these applications are perfectly integrated with other modules (e.g.: Ingest, EtereWeb, etc.) to allow all these modules to use shared resources and have unlimited communication.

▼ 3.6.   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.
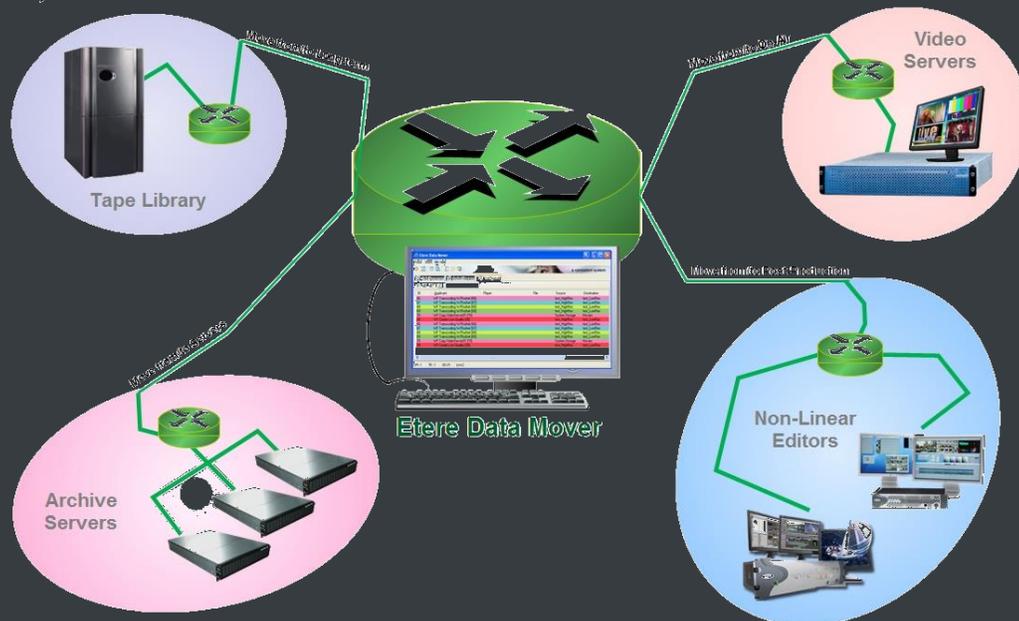
▼ 3.6.1. Simple and user-friendly interface

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.
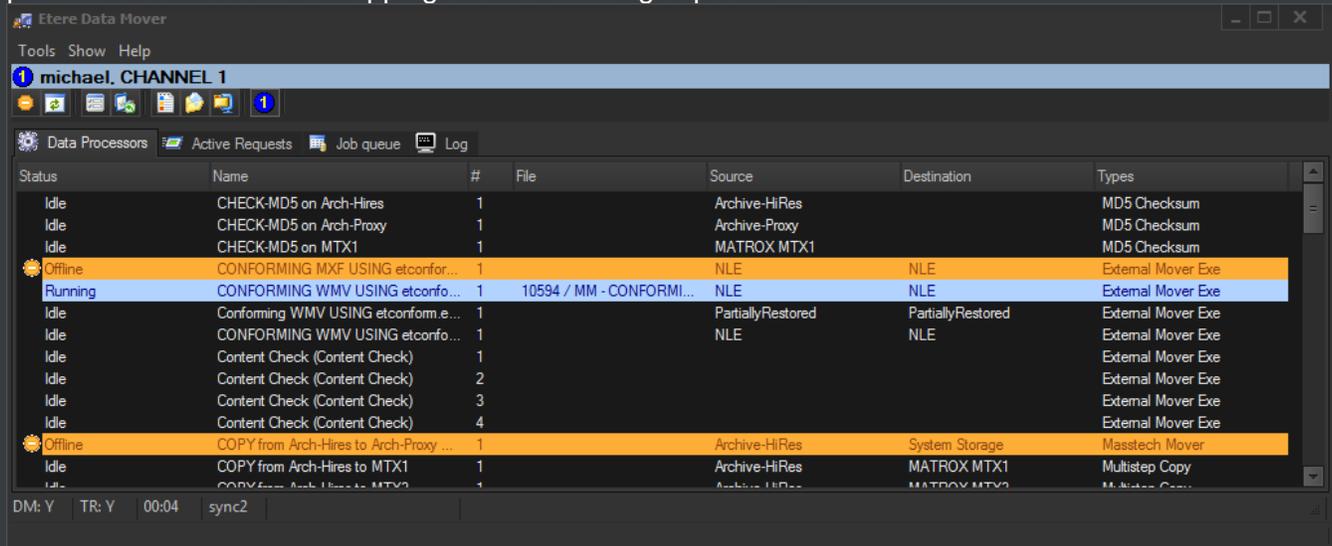
▼ 3.6.2.   Logical management of data

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:

Device name	Total	Available	Free space	Notes
NLE-100	1,34 Tb	1,04 Tb	78%	2 volume(s)
NLE-220	686,50 Gb	535,78 Gb	78%	1 volume(s)
NLE-350	2.01 Tb	1,56 Tb	78%	3 volume(s)
OmneonLR			0%	1 of 1 volumes are unavailable
P2 Storage Server	4,69 Tb	3,66 Tb	78%	7 volume(s)
VS-MTX1	Not available	0,00 b	0%	
VS-MTX3	465,75 Gb	203,47 Gb	43%	

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.

▼ 3.6.3.   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.
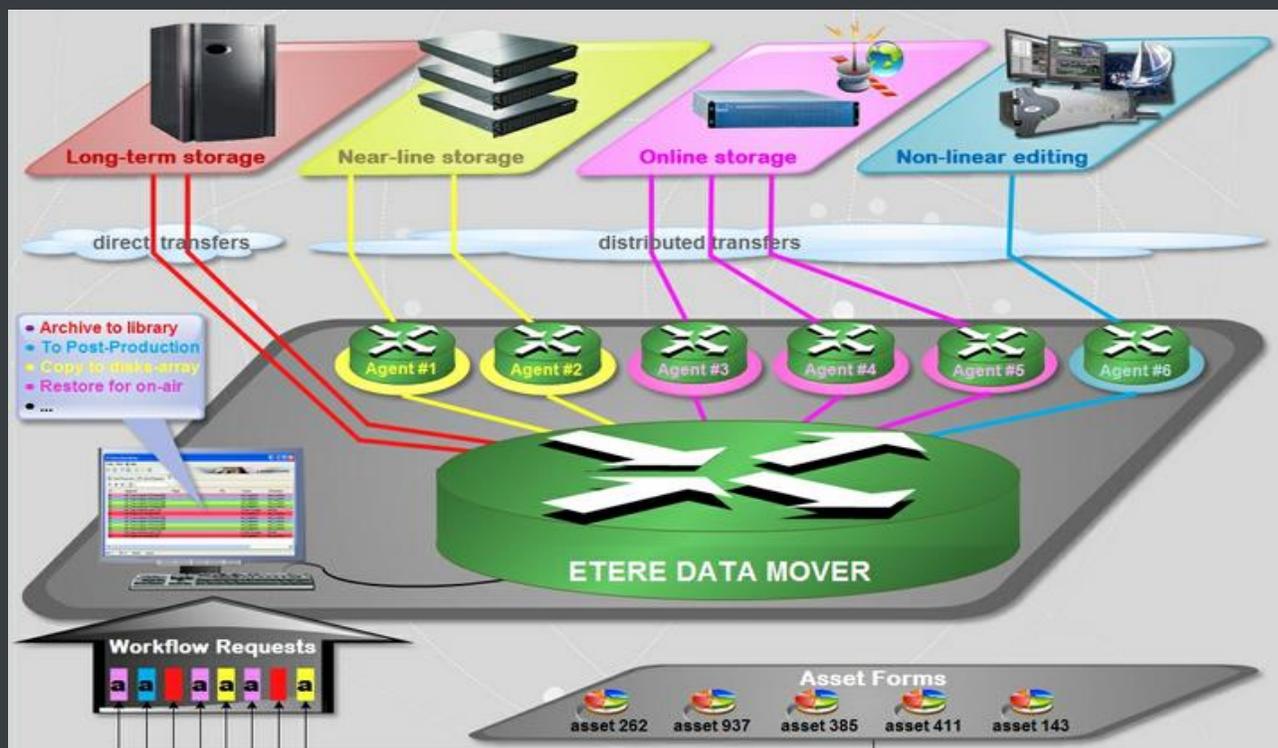
▼ 3.6.4.   Integrated transcoding

Etere's integration with **Carbon Coder** software handles a wide array of critical operations including format conversions that ensures content to be always stored in the right place in the right format:
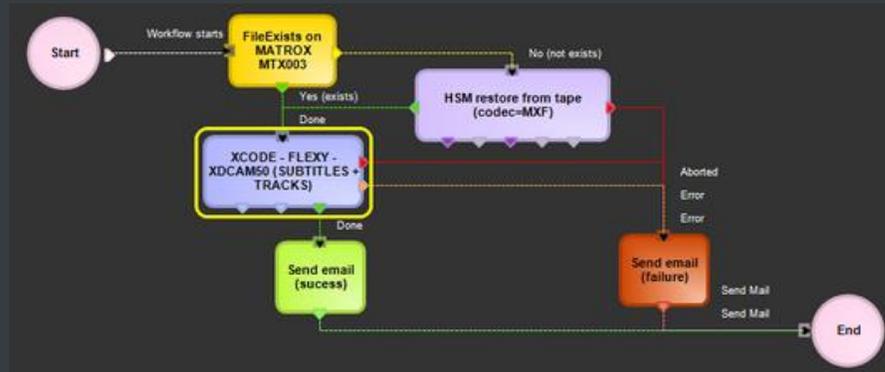
Etere provides multiple ways to use Carbon Coder within workflows, you can use Carbon **presets** as well as complex **projects**:
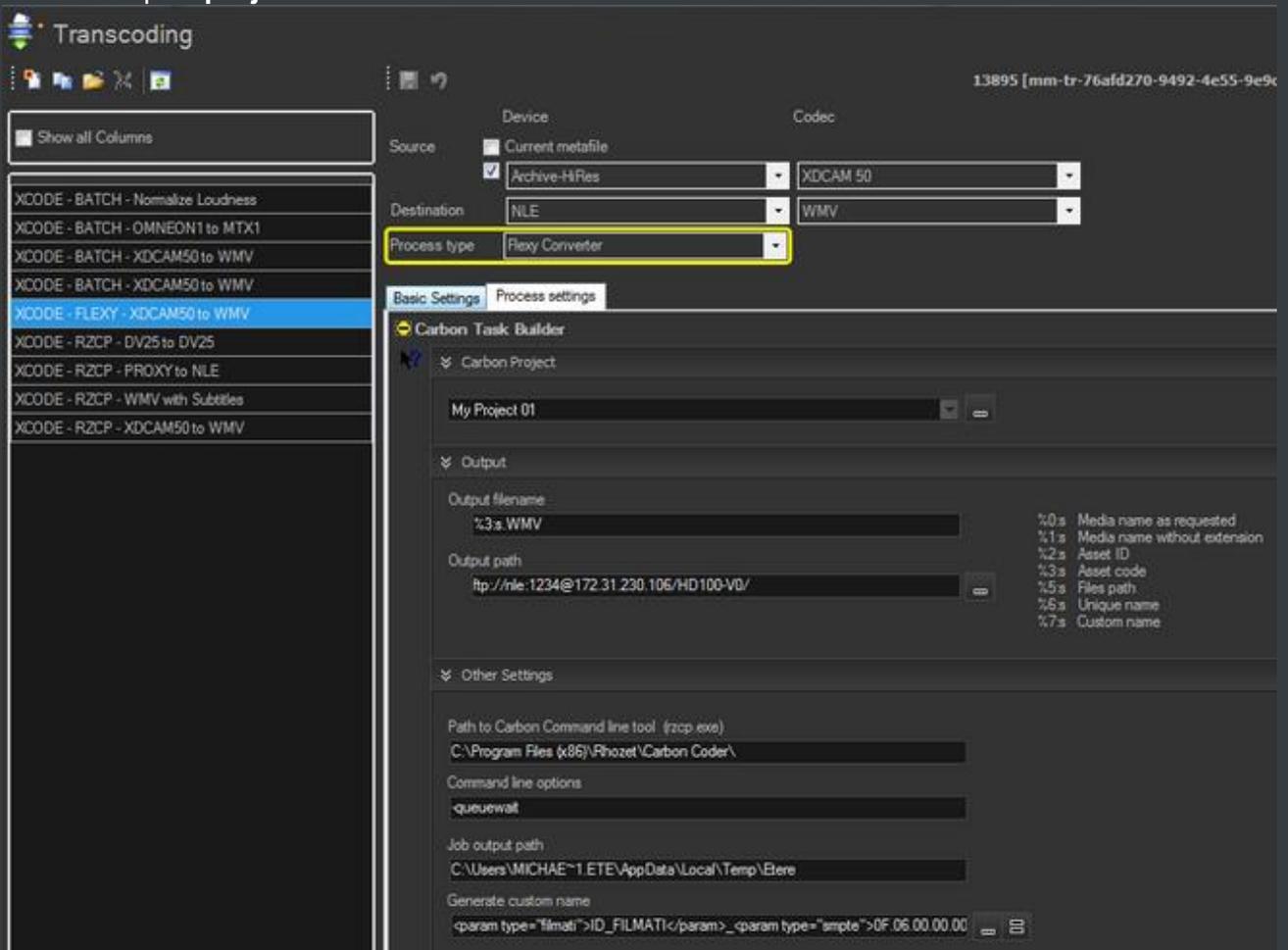
▼ 3.7.   NLE Plugin: Tight post-production integration

Besides the universal NLE integration provided by **EtereWeb** for media download and upload, Etere also offers more tight integration for specific editing systems, allowing to directly access the MAM system from within the NLE interface to any user authenticated in the system.

▼ 3.7.1.   Adobe extension

The **Etere's Adobe Extension** enables **Adobe Premiere Pro** users to access an Etere MAM platform without leaving their editing workspace, allowing each user to quickly and easily create and deliver their own requested content through a user-friendly interface:
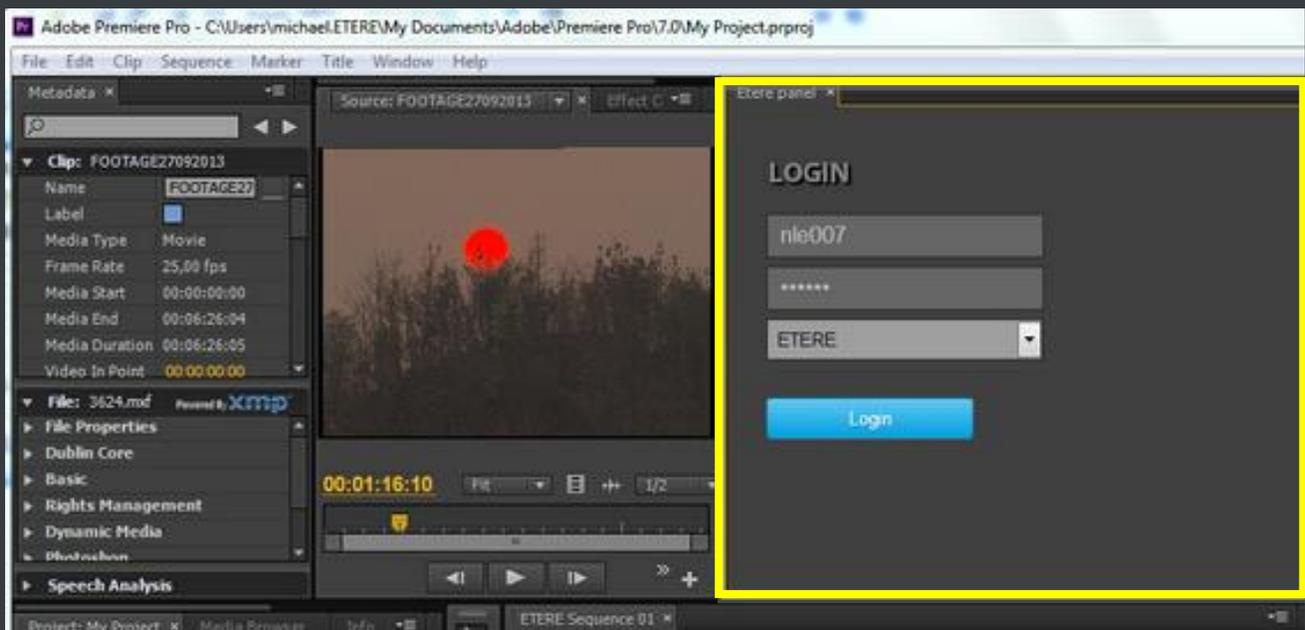
The integration is based on two components: the Adobe Web Application which is the html5-based application that makes the **Etere MAM** system available through the Adobe Extension Panel, the interface that allow users to graphically interact with Etere content from **Adobe Premiere Pro**:

The advanced, efficient, and practical extension panel will improve the way Adobe Premiere users contributes their content to Etere MAM systems, this, through the following features:
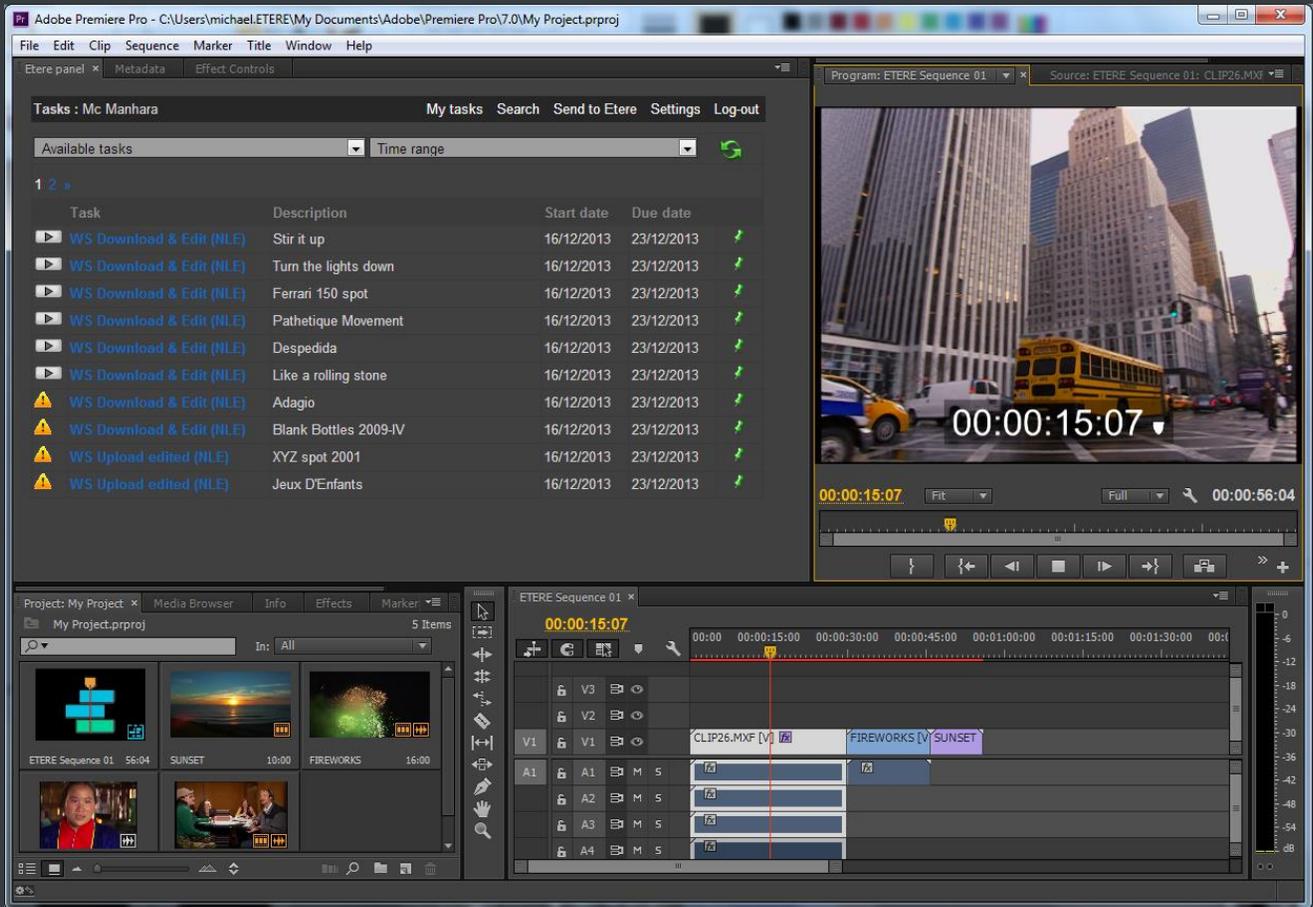
- ➢ Content delivery based on login authentication
- ➢ Search for Etere MAM segments
- ➢ Manage up to five different status for segments
- ➢ Insert an Etere MAM segment into an Adobe Premiere sequence
- ➢ Conform an Adobe Premiere sequence and upload it in Etere MAM
- ➢ Nunzio integration to deliver material related to rundown stories
- ➢ Centralized workflow media management without heavy file transfers nor duplicated media

▼ 3.8. FTP Server: A fast and reliable data sharing

Etere FTP Server is a special product mainly designed for sharing large video files, so most of its efforts are directed toward optimizing the file exchange process. Its unique architecture allows you to share large files minimizing fragmentation, improving in this way its overall performance by almost 20% more than any other currently available FTP software.
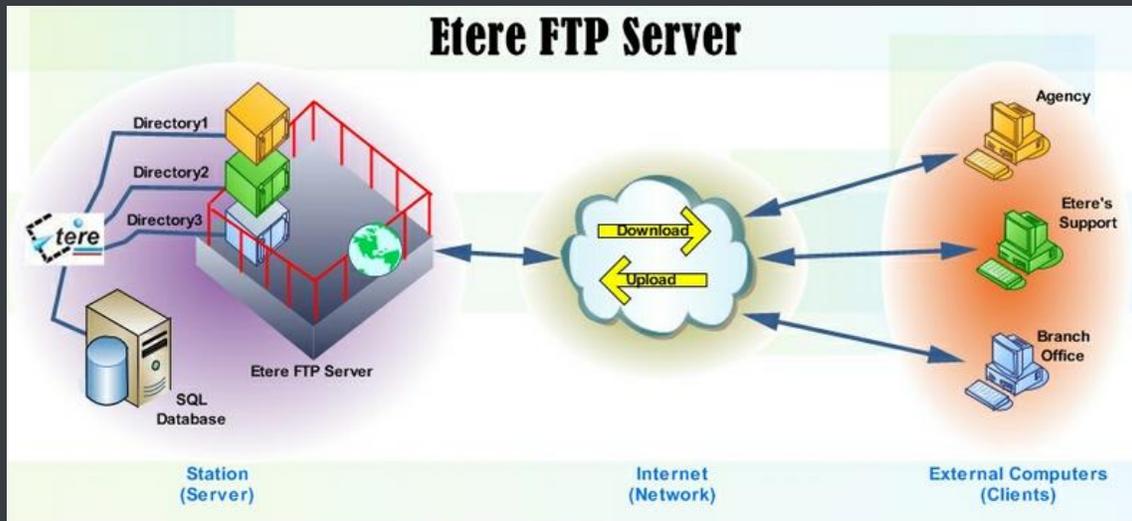
**Etere FTP Server** is a really useful tool, with a great performance and scalability as usual in Etere applications, it provides an advanced feature set, giving you total control through a simple and intuitive interface which makes of **Etere FTP Server** easy to configure and use. Its advantages and salient features are described in brief in the following key points:

- ✓ Allows external entities to exchange (either upload or download) files with your organization.

- ✓ Avoids excessive disk fragmentation,

- ✓ Easy, reliable and efficient transfer of High volumes of data,

- ✓ Capable to share an unlimited number of directories to specific users.

- ✓ Availability of the new EDT technology to increase the transfer rate efficiency in up to seven times on high-latency WAN networks.

Etere FTP Server provides a wide set of parameters (e.g. enabled users, EDT ports, etc.) and a detailed log of <u>operations</u> and <u>connected users</u>:
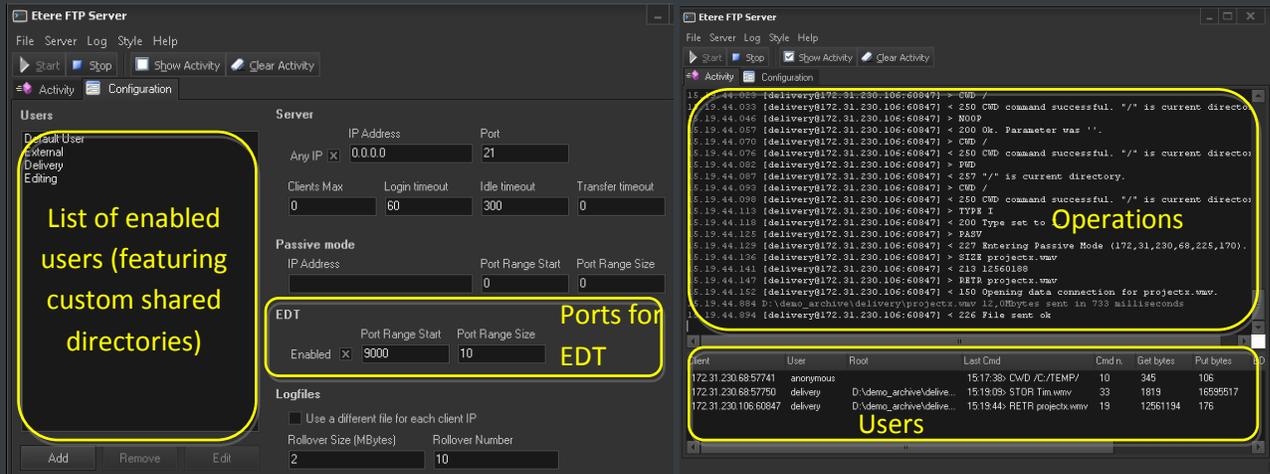
▼ 3.8.1. EDT protocol

EDT (Etere Data Transfer) is a technology developed by **Etere** based on the high-performance data transfer protocol UDT (UDP-based Data Transfer), it uses a streamlined algorithm capable to utilize all the available WAN bandwidth, making of it the ideal solution for data intensive transfers over high speed wide area networks (it's 7 times faster than FTP):
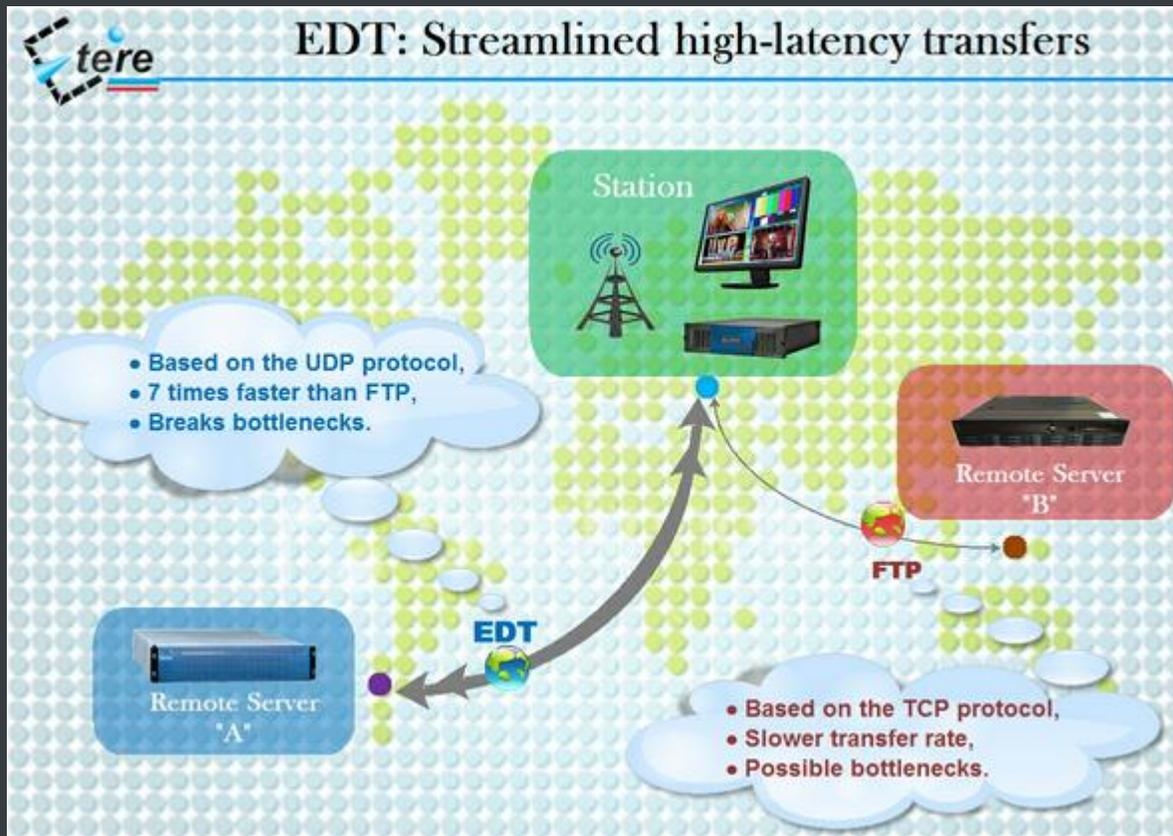

Etere EDT is included in the **Etere FTP server** for custom and faster FTP transfers.

▼ 3.9.   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:
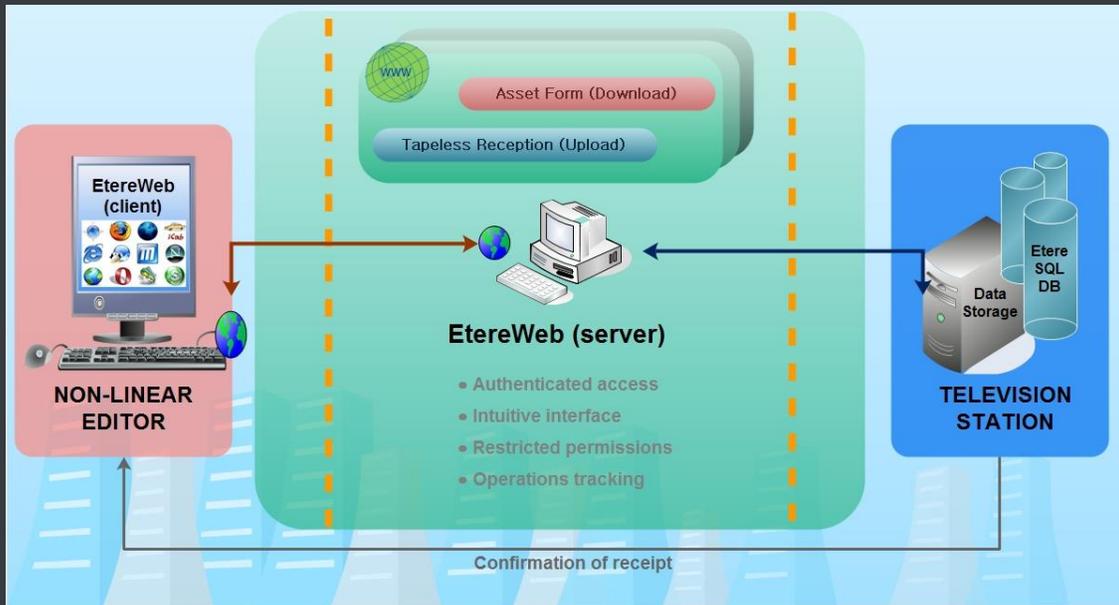
EtereWeb web service supports all major browsers including Microsoft Internet Explorer, Mozilla Firefox and Apple Safari; thus ensuring the reliability and quality of the service. EtereWeb integrates the latest streaming technologies for video distribution and a comprehensive rights management system that gives to authorized users the possibility to access via web to a user-friendly interface:
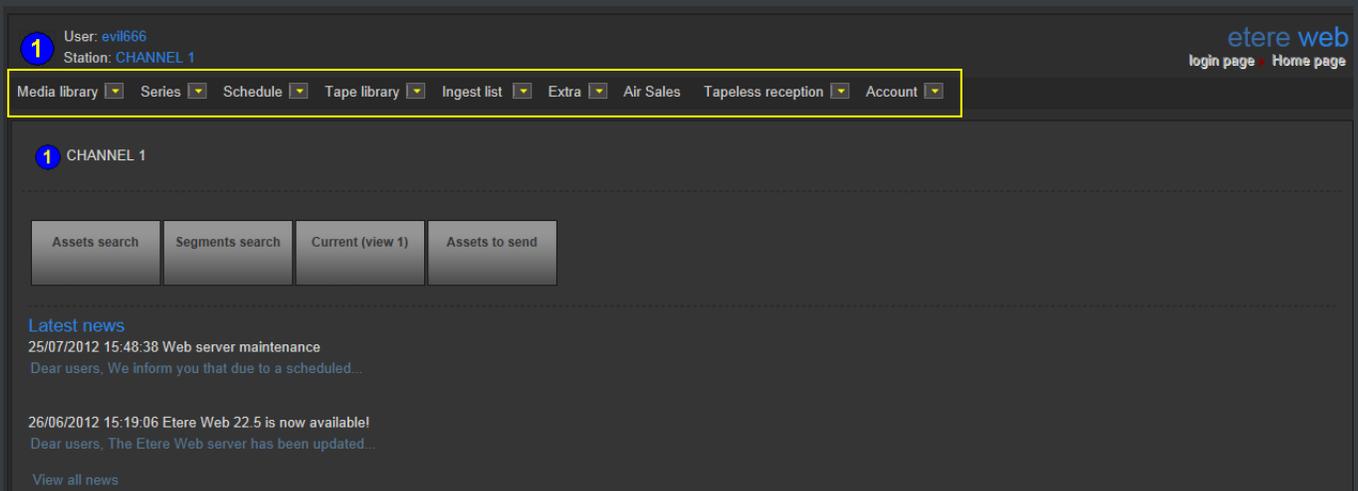
▼ 3.9.1. Authenticated access and rights

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:
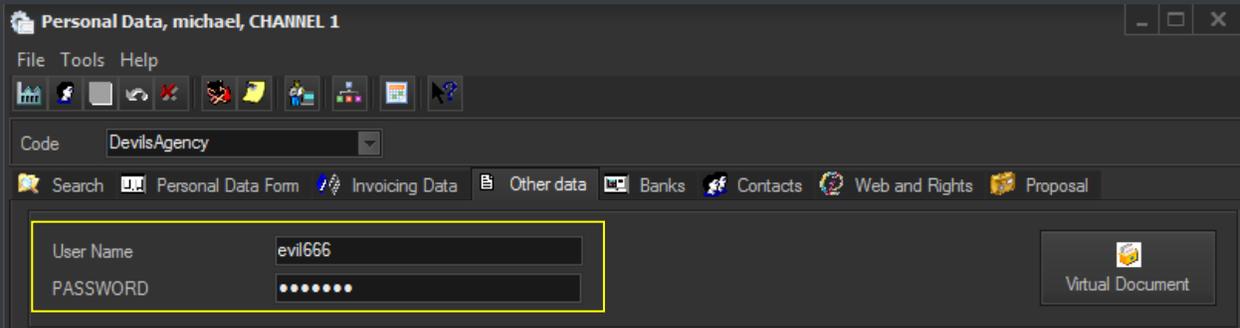
▼ 3.9.2.   Tapeless reception

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.

▼ 3.9.3.   Search, retrieval and preview

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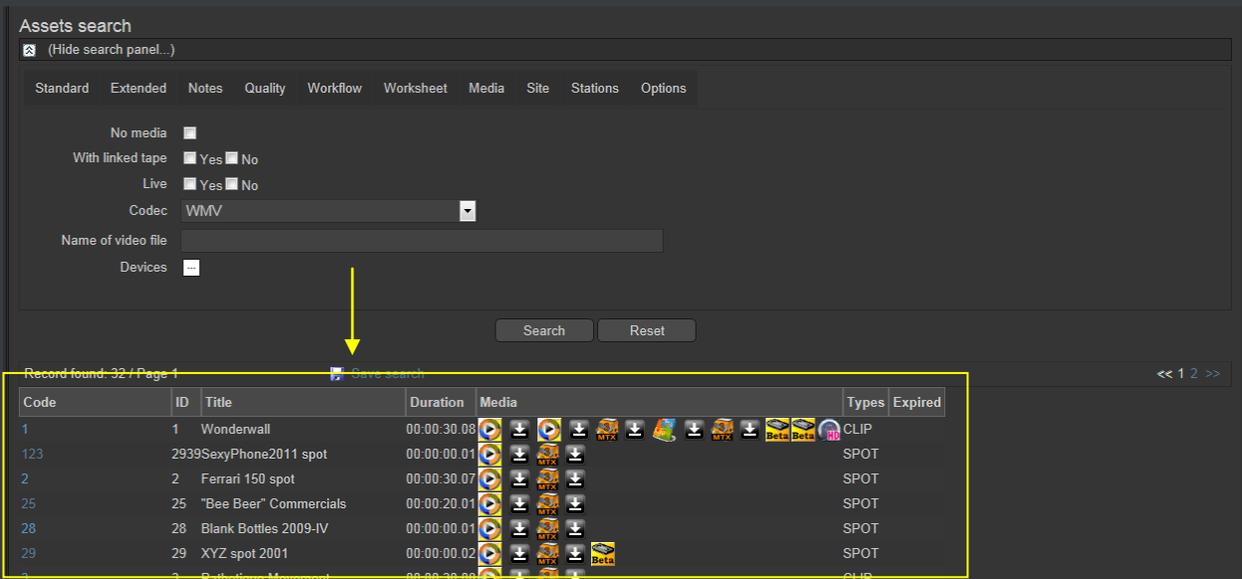

The Media tab holds information regarding the media associated to the asset, time code details and EDL configuration. By double clicking on any media item, if available, it will be available the preview and download of the asset:

▼ 3.9.4.   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:
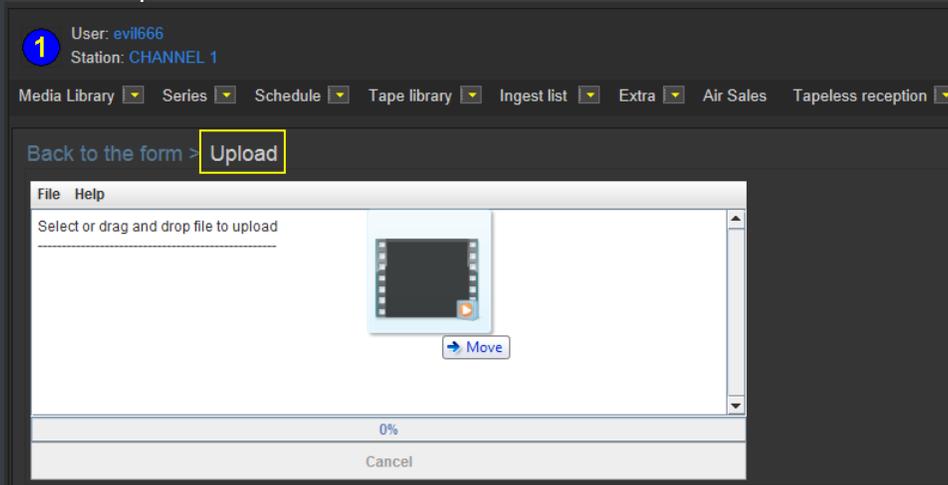
- **Active-X control**: This interface allows browsing for the media file(s) to be uploaded, being also possible to create a zip file for uploading an entire directory:
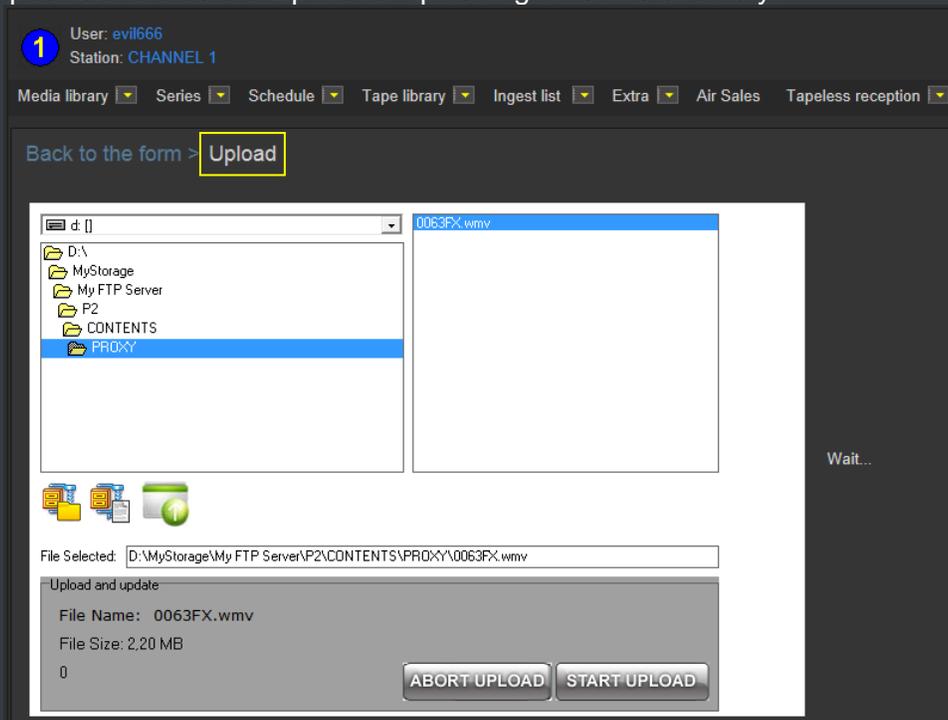
▼ 3.9.5.   Pre/Post upload processing

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**:
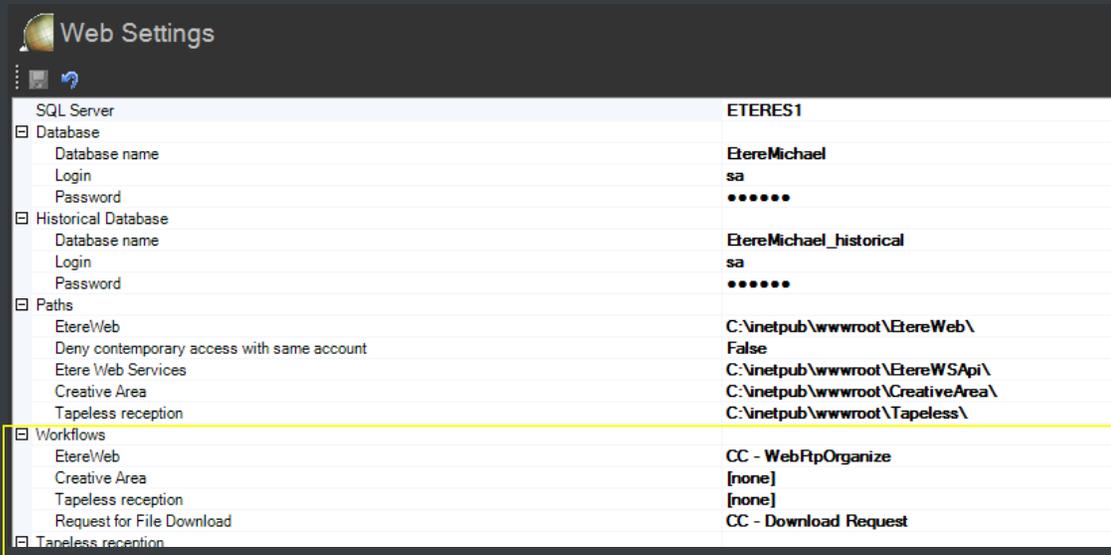
- **Post-upload workflows**:
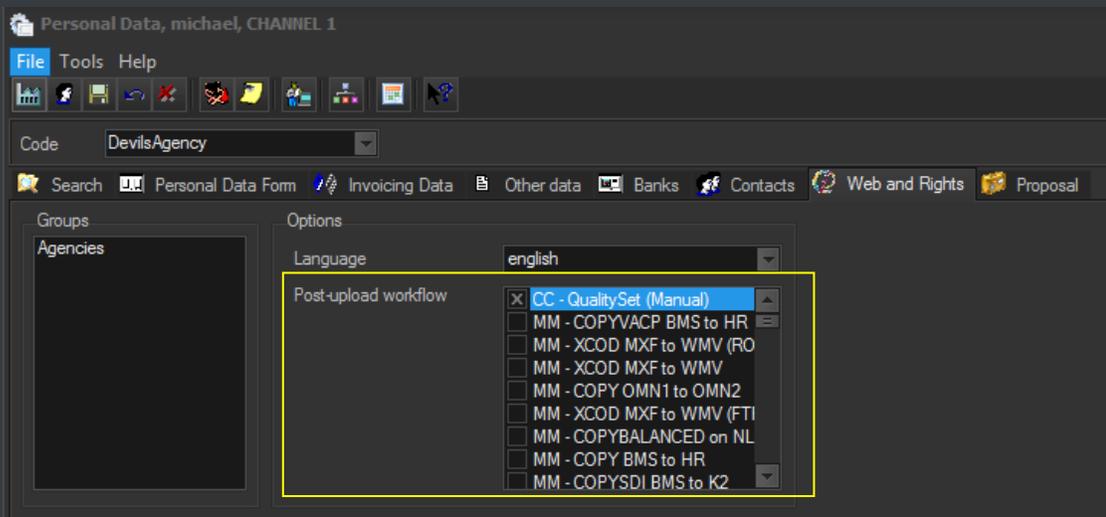
▼ 3.9.6. Multi-file upload support

EtereWeb supports not only uploading multiple files with a simple drag and drop action, but also manage them as a single metafile:
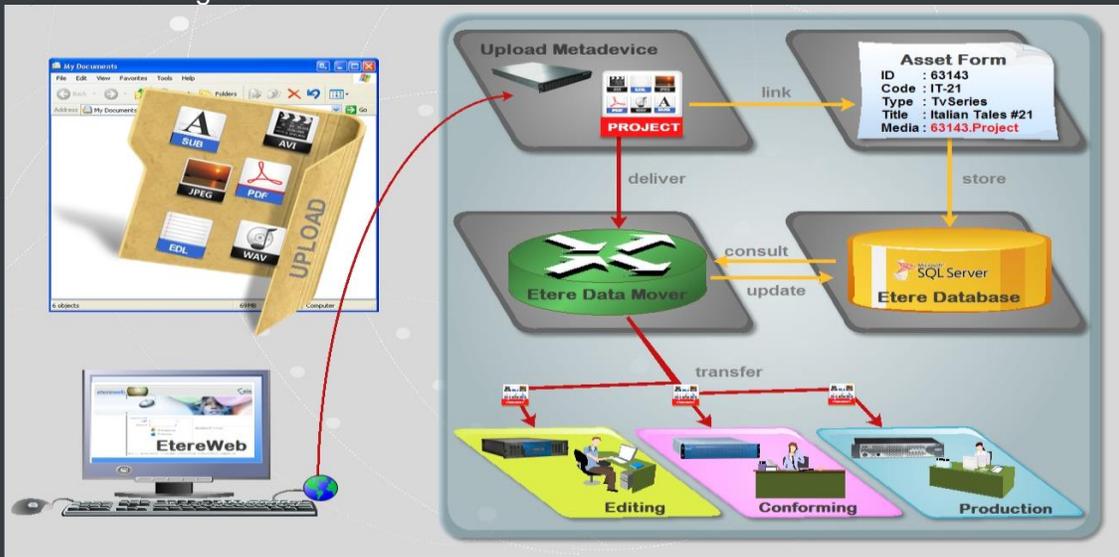
This feature allows NLE systems to, for example, upload into the station's server all the files which make part of a project (e.g. production of promos, conforming of separate scenes, editing of source material, etc.) and deliver them to the related department with a single click and with the reliability of a workflow management.

▼ 3.9.7. 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:
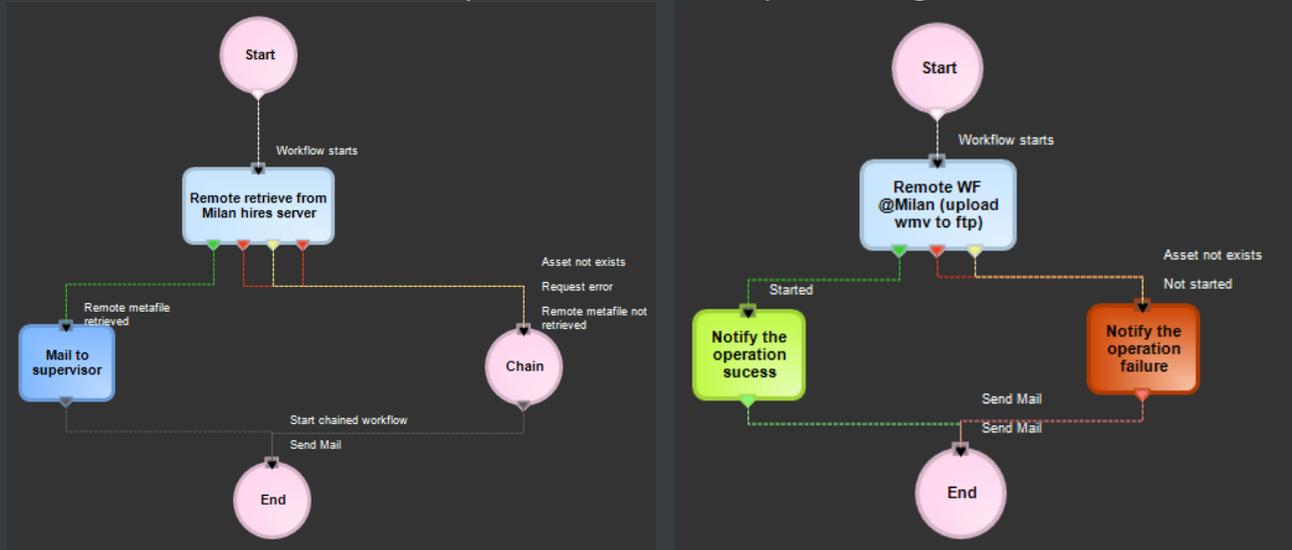
(remote retrieve from a federated system)   *(remote upload to ftp)*

▼ 3.9.8.   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:

▼ 3.9.9.   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).
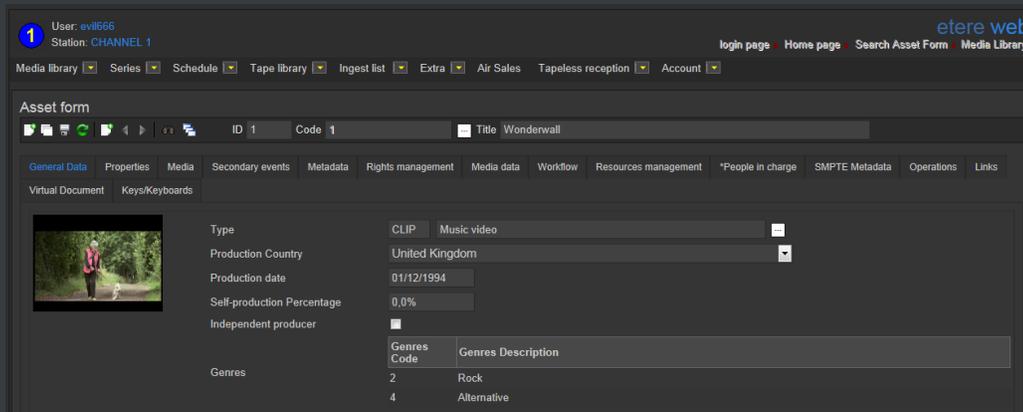
Specially, a section dedicated to the media management will provide information regarding all media files associated to the asset, indicating for all of them the timecode details and EDL configuration with further preview/cut/download/upload capabilities.

▼ 3.9.10.   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):
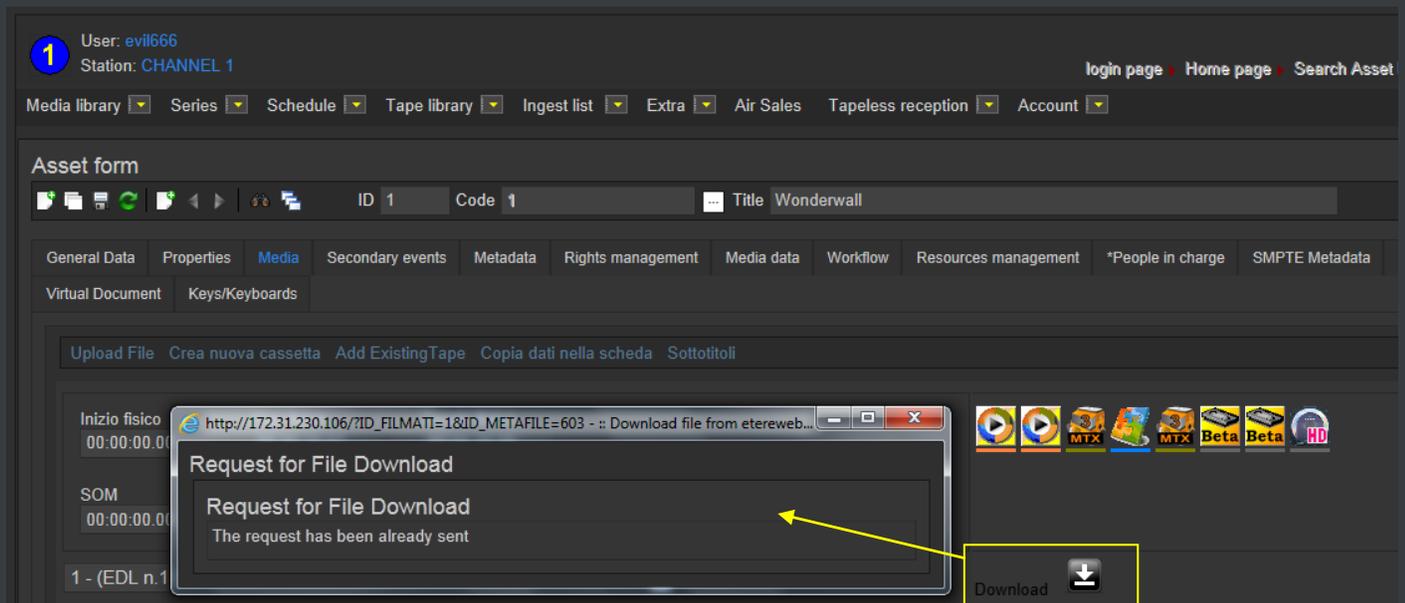
Web requests are managed via workflow to allow a custom and automatic launch of worksheets:
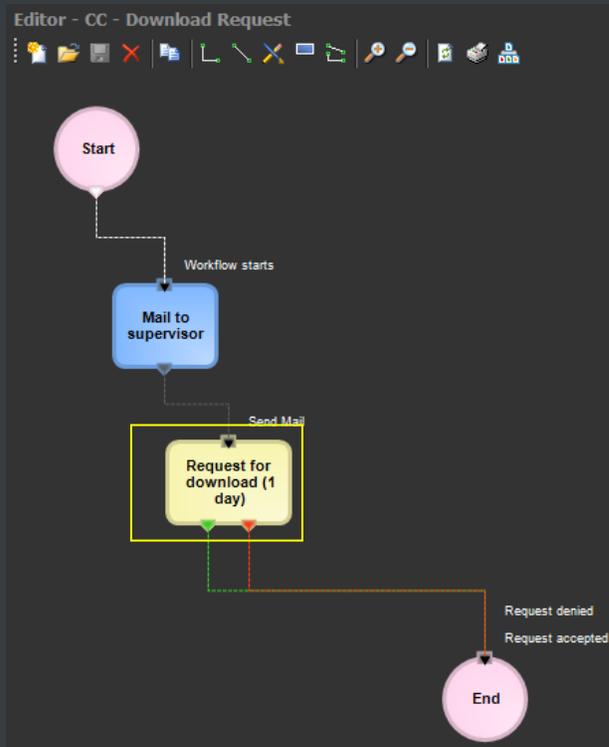
(download request)
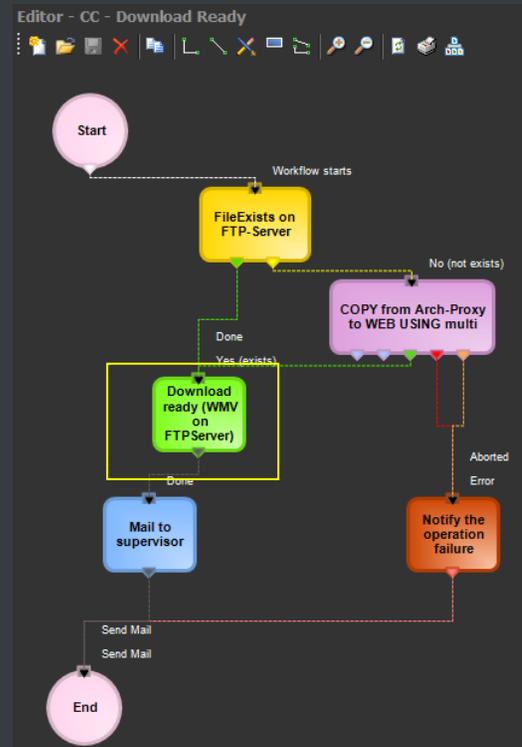
(download ready)

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:
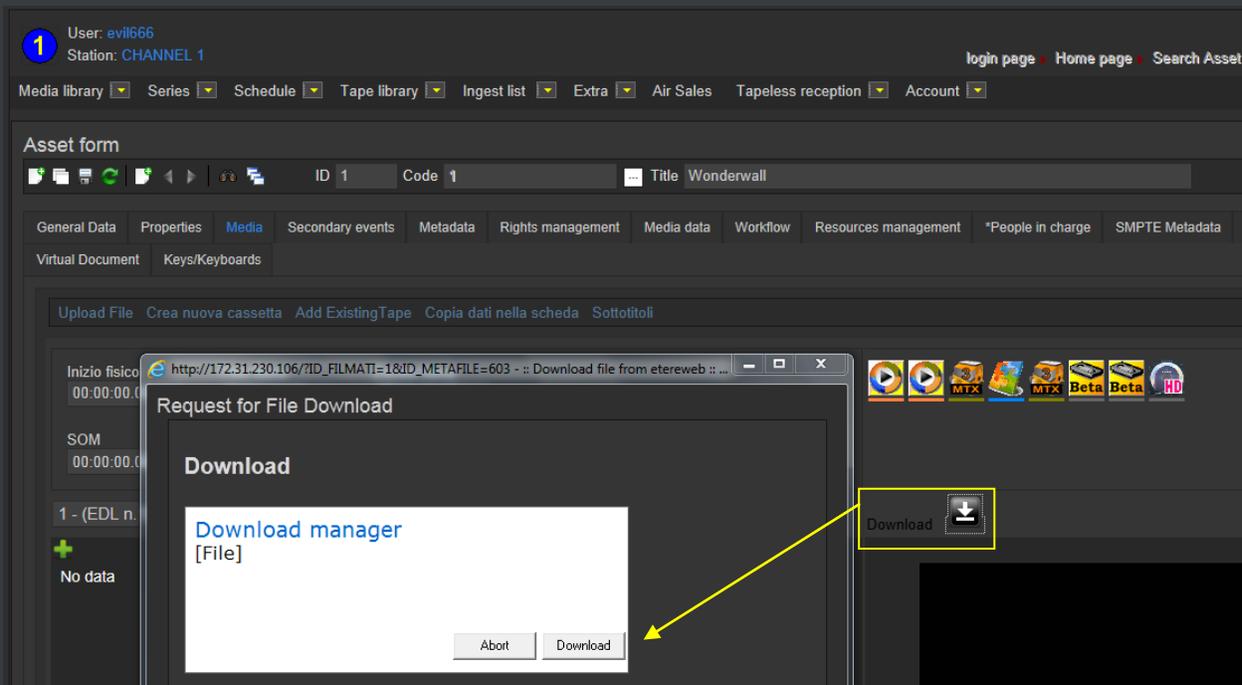
▼ 3.9.11.   Security integration

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.

▼ 3.10. 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.).
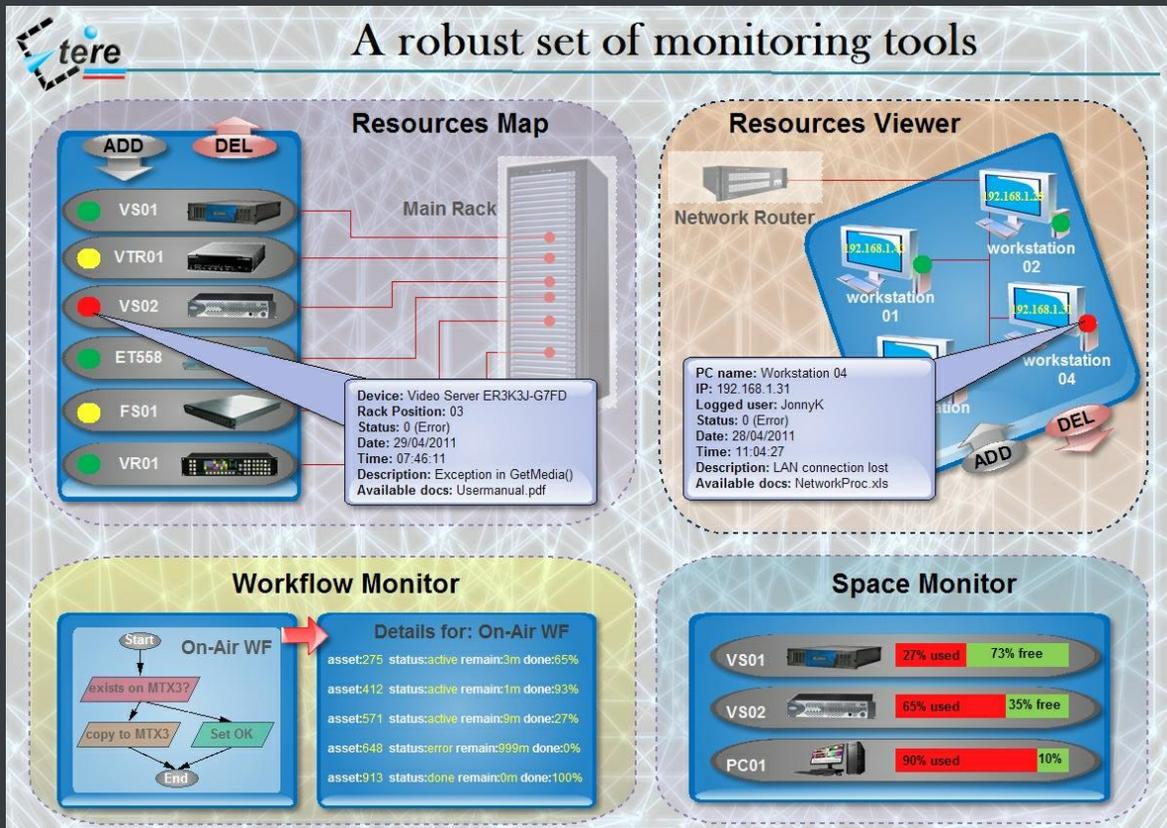
The **Monitoring Console** is a key part of the broadcasting process because it permits to have a complete report of the way the Etere modules are working, allowing to catch errors, store them in a database for a further analysis and also forward them to an another console (forward the message to the 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.

▼ 3.10.1. 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.
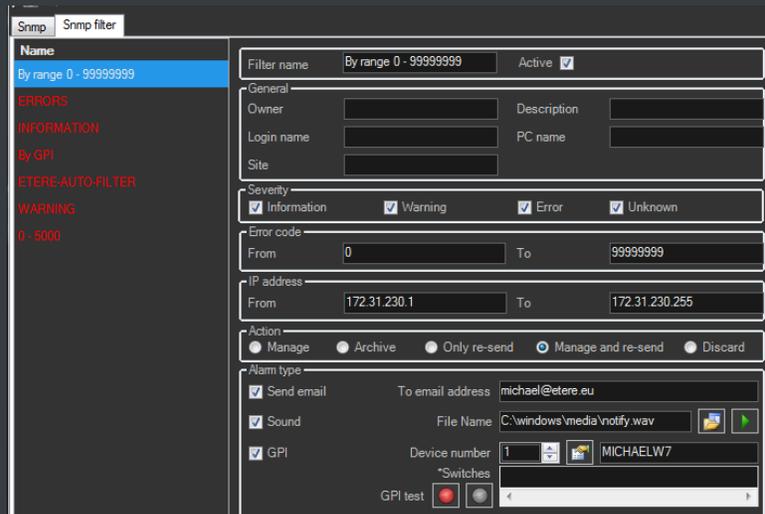
▼ 3.10.2.   Visual real-time monitoring

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.
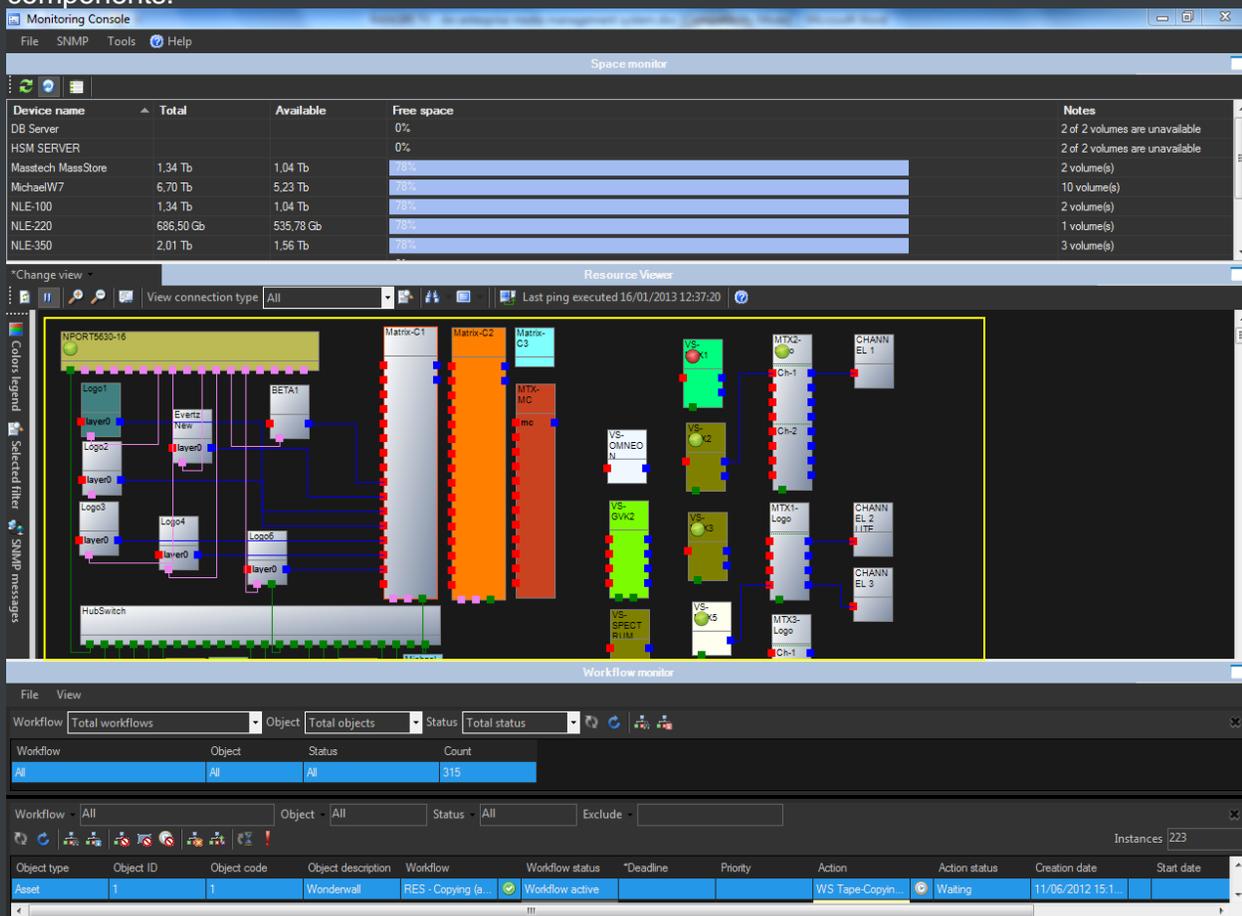
▼ 3.10.3.   Robust monitoring features

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	Description
SPACE MONITOR	Visualize the storage space of all devices for which *metadevices* are defined (e.g. video servers, workstations, servers, etc.).
RESOURCE MAP	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.
WORKFLOW MONITOR	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.
RESOURCE VIEWER	Show a map of all resources configured in the system, showing in real-time their connection status and SNMP messages.
STATUS BAR	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".

▼ 4.   FUNCTIONALITIES

▼ 4.1. Distributed architecture

ETERE is an integrated broadcasting solution that implements a modular system based on a single database and formed by a set of modules oriented to cover each complex phase of a broadcasting system, focusing to efficiently carry out specific operations (e.g. ingest, archiving, transfer, etc.).

▼ 4.2. Search engine

Etere comes 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. Among the several searching features which are available in this section, we can mention the following ones:

- Search for assets based on **database fields**,
- A **Full-text** search across various fields of assets,
- Full-text results are sorted on **degree of relevance**,
- Search for **synonyms** to extend the range of results,
- Searches can be saved as **profiles**,

- **Batch** management of several assets at once,
- **Customizable** tabs and fields, drag & drop enabled,
- Results can be **grouped** by types, genres or artists,
- Add, launch and view **workflows** on-the-fly,
- Filter results by **SMPTE metadata** or **Metadevice**.

▼ **4.2.1.   Search filters**

Some of the most common filters used for searching assets are:

Unique identification in local system

Asset identification code

Brief asset description

Asset expected length

Asset type (e.g. spot, promo, etc.)

Unique identification in federate system

Asset source site (local/federate)

Subtitles of any or a specific language

Information on asset workflows
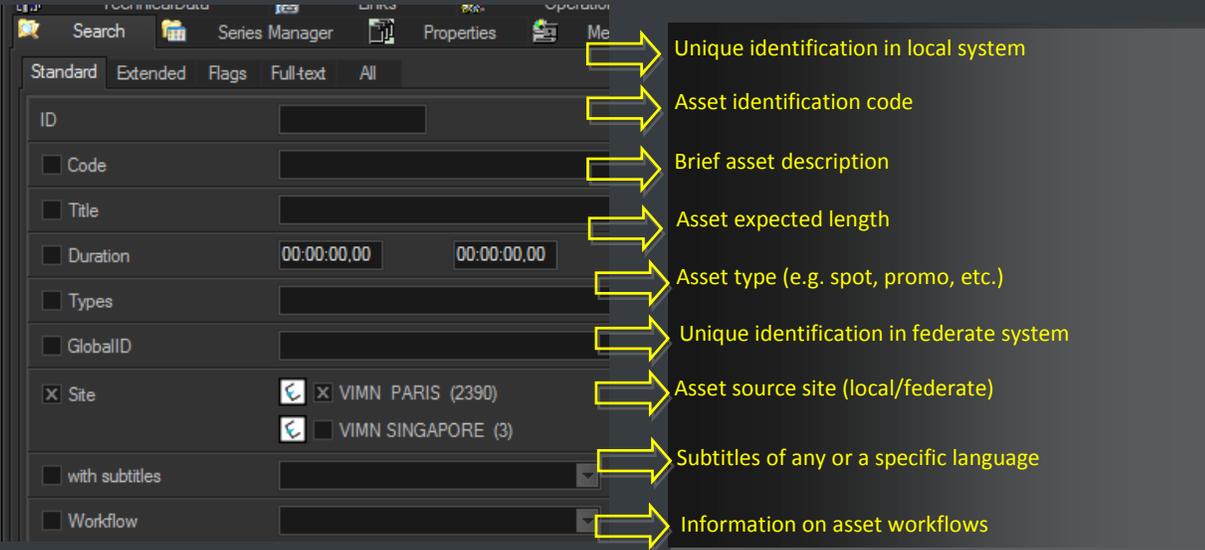
Assets matching the filters criteria are retrieved in the bottom part of the window, there, they can be selected (or multi-selected) in order to open or directly manage them (launch workflow, add to series, change type, etc.):
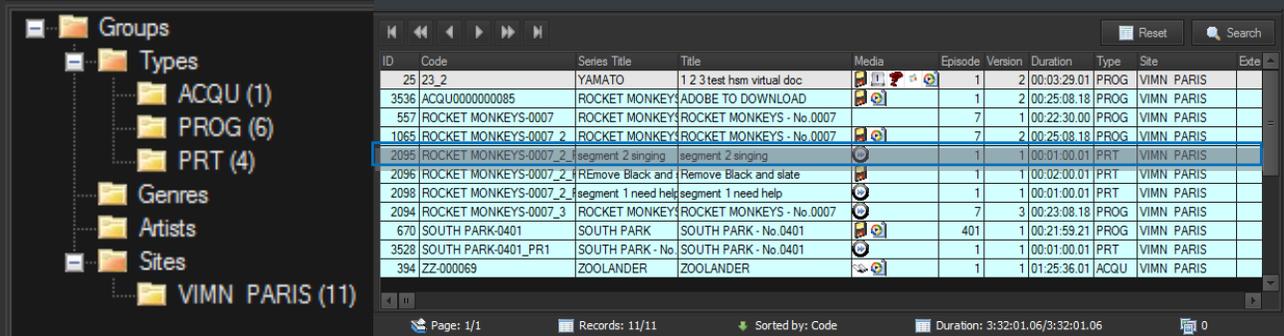
Filters can be classified according to their nature into the following categories:

Base	Base descriptions about the asset: **Id, code, title, type, stations, sites, genre, artist, etc**
Media	Media information regarding devices, files and processes: **Duration, metadevice, codec, video file, workflows, worksheets, etc**
Dates	Dates on which specific asset operations have been performed: **Production, ingest, creation, arrival, scheduling, validity start, expiry, etc**
Flags	Flags detailing specific asset properties: **Ok to broadcast, live, expired, ingested, archived, inactive, not tapeless, etc**
With	Properties that indicates the existence of a certain object associated to the asset: **Edl, video tape, data tape, subtitles, cad approval, detected blacks, etc**
Full-text	Special search performed simultaneously performed across multiple tables: **Title, segments, artists, genres, roles, metadata, subtitles, documents, etc**

▼ 4.2.2.   Multi-value filters

Filters can be used to search for multiple values, for instance, you can search for all assets which **"person in charge"** is one (or both) of the given users:
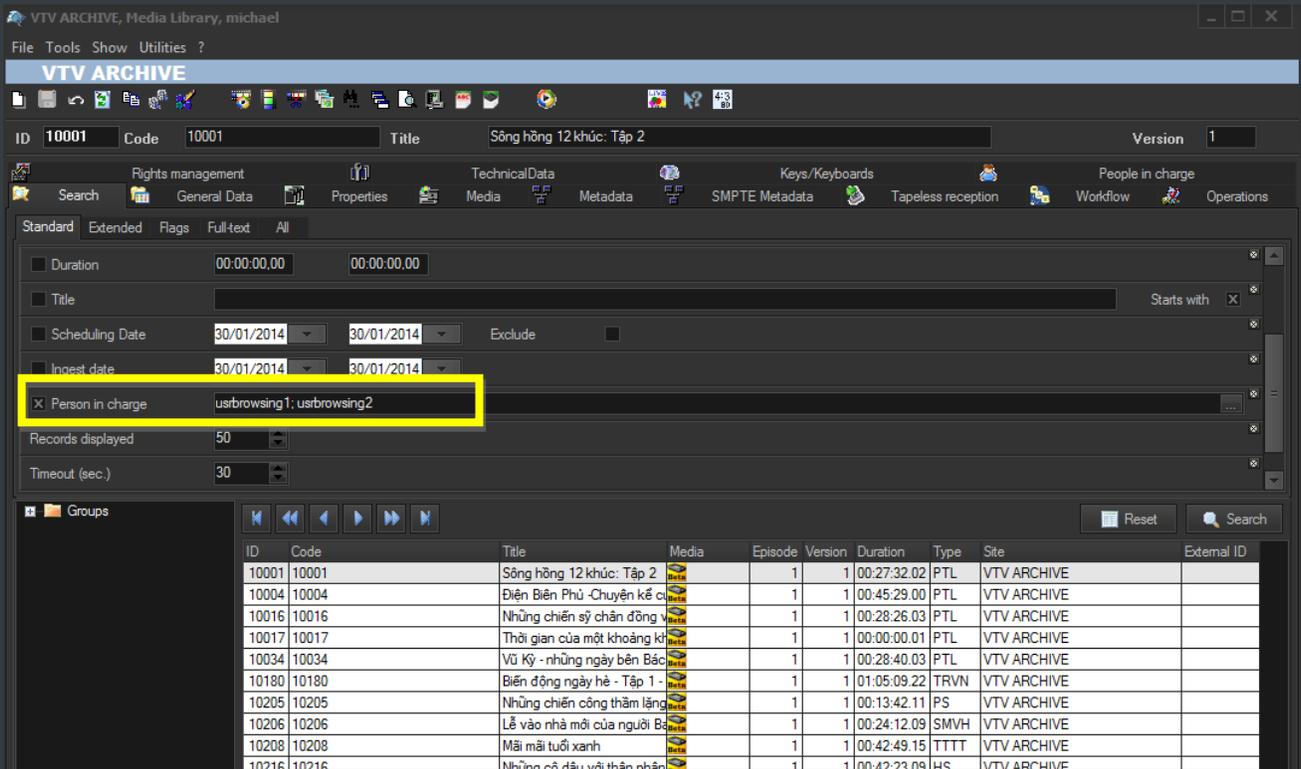
(search based on multiple "person in charge")
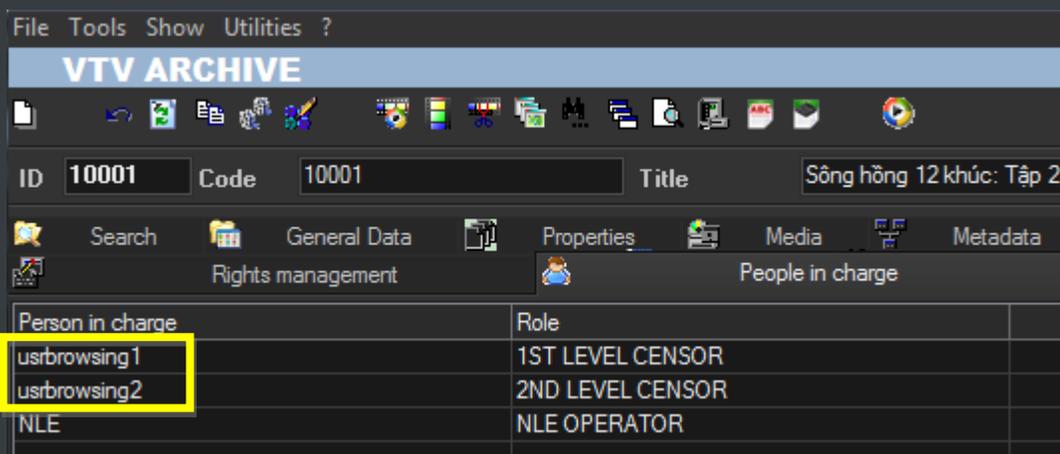
(retrieved asset with "persons in charge" matching the search criteria)

▼ 4.2.3.   Restricted search

Depending on whether user's groups are allowed or not to manage a certain type of asset (e.g. movies), search capabilities will be restricted to granted types only:

restricted permissions   *restricted search*

restricted results

▼ 4.3.   Operations history

All operations performed in Etere against **assets** are recorded and available for consulting from:

▼ 4.3.1.   Asset operation logs

Asset operations (e.g. copy, transcode, edit, etc.) are logged under the "Operations" tab of the **Media Library**. For instance, if a user modifies an **asset EDL**, said operations will be recorded and made available:

1. *The user modifies an EDL:*
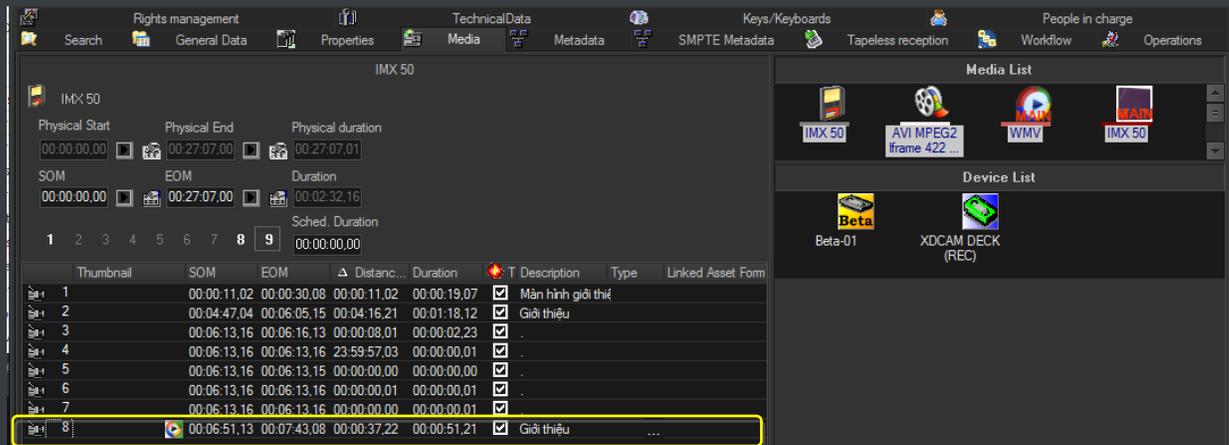
2. *The operation is automatically logged in the system:*
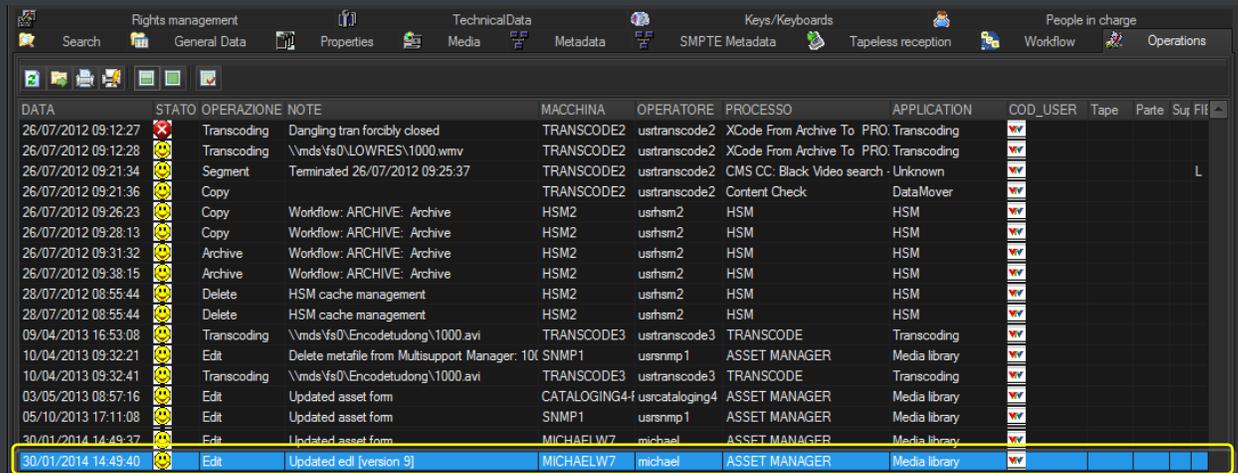
▼ 4.3.2.   Workflow logs

In the same way as for asset operations, all workflow operations are logged, they can be consulted under the "Workflow" tab of the **Media Library**:

▼ 4.3.3.   SMPTE stored values

Metadata automatically/manually compiled during the management of an asset can be consulted from the **"SMPTE metadata"** tab:

▼ 4.3.4.   Statistics

View statistics on a certain function (e.g. DataMover copies), detailed by period, events, type, computers, operators, media and genres:
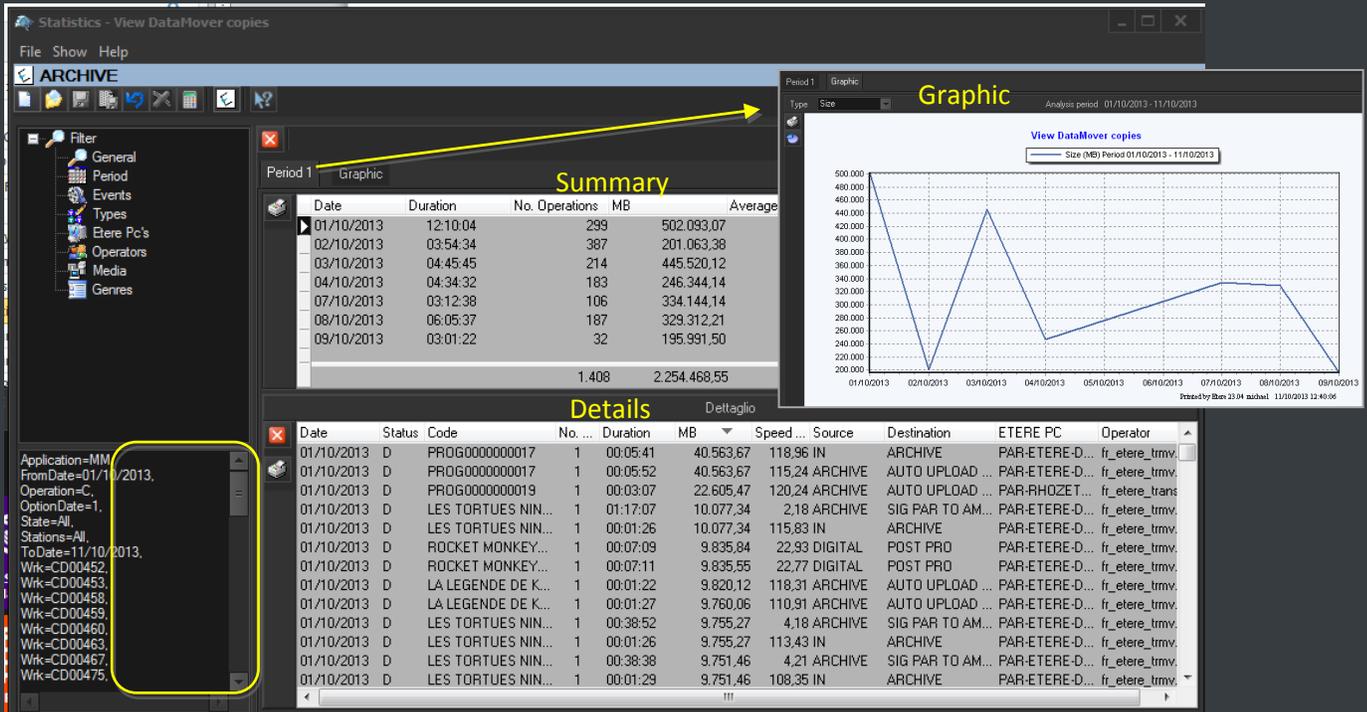
▼ 4.3.5.   Reports

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 enables reports to be easily designed and accurately managed though 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.

▼ 4.4. Role-based Access Control

Etere provides a **"Rights Management"** interface to control access to its various modules and functions, with it, stations will be able to freely grant or deny access to specific user groups (i.e. roles), thus allowing to set different mixtures of access levels for each group.

▼ 4.4.1.   Permission levels

Etere allows managing different access levels for users which form part of the system; specific access rights not only for different users, but also for different stations. As shown below, groups can be split into sub-groups to enable a more-specific assignment of permissions, for example, the **"Web"** group intended to control web users can be split as follows:

- **Web managers**: Users enabled to change the web service settings (e.g. upload devices).

- **Web operators**: Users enabled to view and modify data (e.g. fill asset metadata).

- **Web viewers**: Users enabled to view but not to modify data (e.g. watch proxy videos).
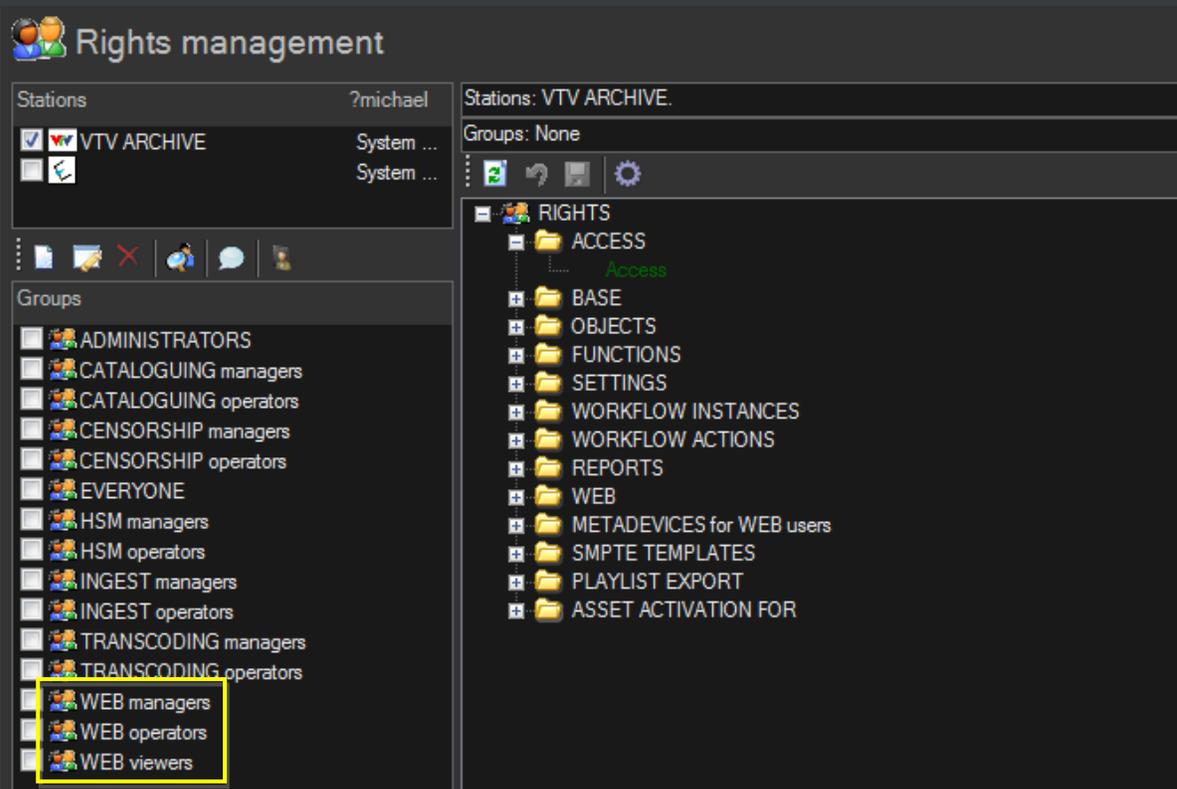
All Etere features (e.g. functions, workflows, stations, etc.) falls under different <u>categories</u>, the availability of these functions is determined by the "Rights Management Tool", where rights are set for *specific groups* of users:
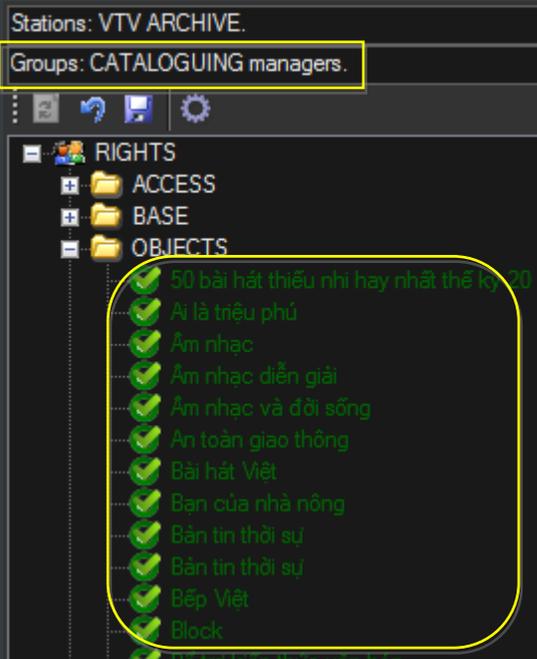
(Cataloguing managers: full permissions) | *(Cataloguing operators : restricted permissions)*
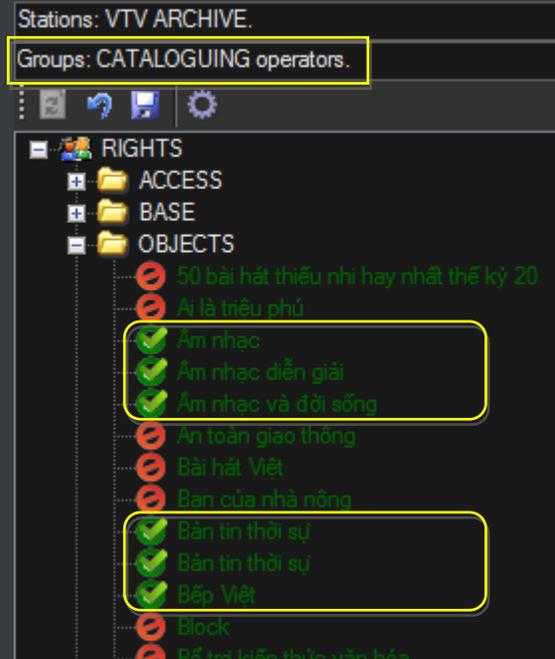
▼ 4.4.2. Active Directory Integration

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.

Groups and users will be displayed along with a status icon:

Icon	Description
⊕	The group/user will be added to the Etere Rights since it is present in the MS Active Directory.
⊗	The group/user will be removed from the Etere Rights since it is missing in the MS Active Directory.
◐	The group has users that will be added/removed from the Etere Rights since they are present/ missing on the MS Active Directory.

▼ 4.5.　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 associating files to one "virtual document" to 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.

▼ 4.6. Metadata Cataloguing

SMPTE 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:
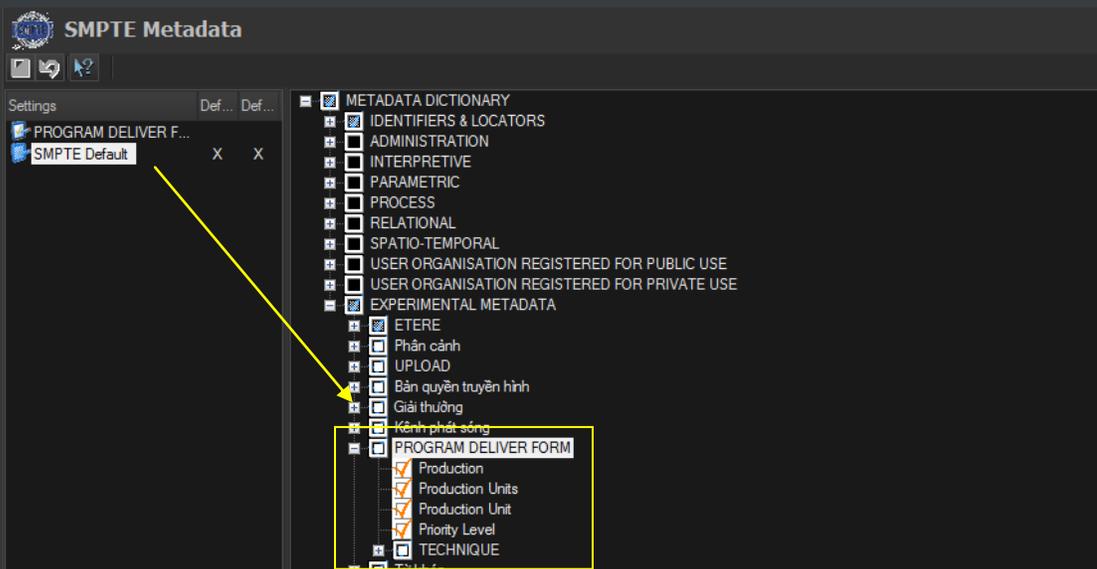
▼ 4.6.1. Custom definition

The metadata elements comprised in the media management can be freely configured, for example, adding custom metadata:
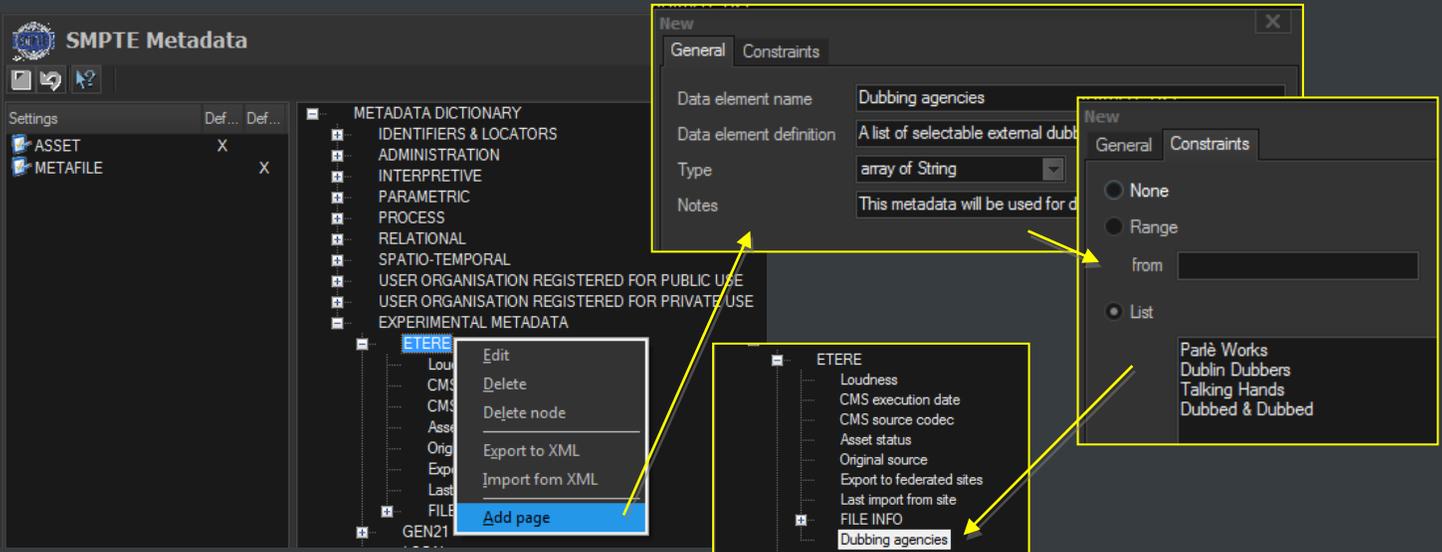
As shown above, metadata fields are grouped by tabs which form part of a master layout, said layout can be enabled only for a specific set of users.

▼ 4.6.2. Read-only and compulsory fields

Etere allows administrators configuring metadata fields as either:
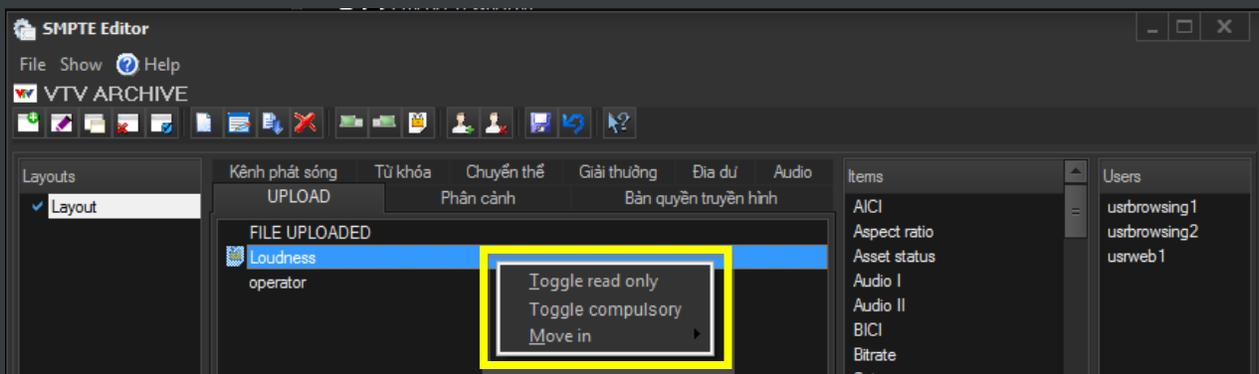
- **Read-only**: Selected users will be enabled to read but not modify the metadata

- **Compulsory**: Selected users will be forced to compile the metadata

▼ 4.6.3. 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):
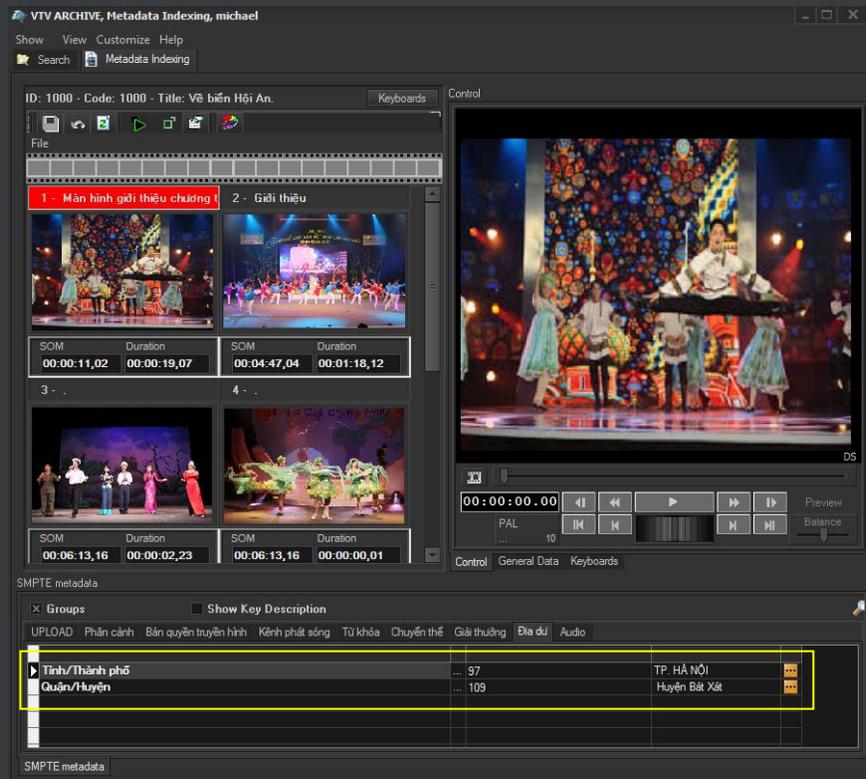
In Etere, all assets contain user-defined SMPTE metadata fields, these fields can be either manually compiled or automatically compiled (retrieved from specific asset properties):
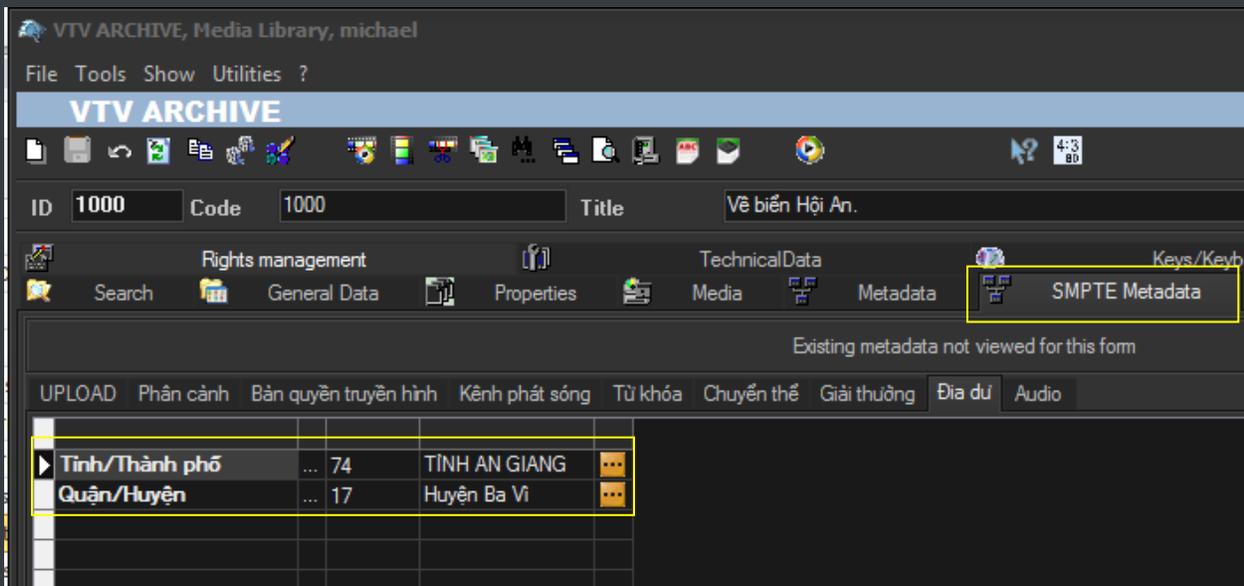
▼ 4.7.   Multi-level storage hierarchy

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:

▼ 4.8.   Multi-version management

Assets (i.e. media holders) 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:
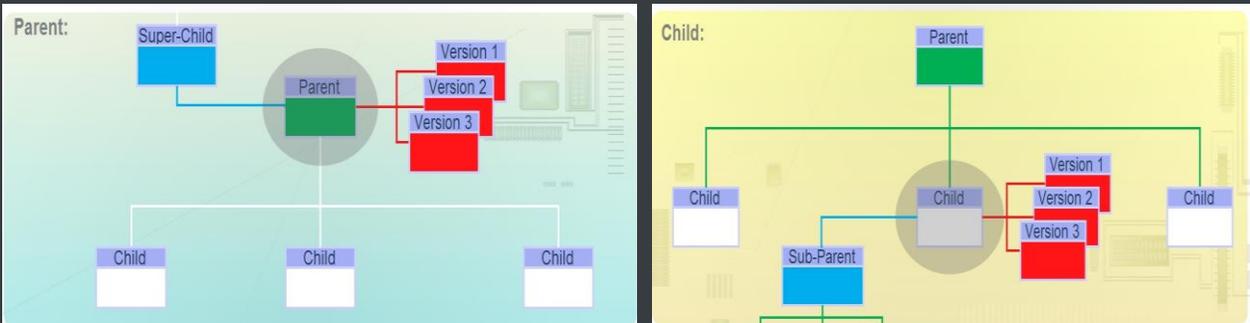
▼ 4.9. Multi-storage management

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 arching, 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:
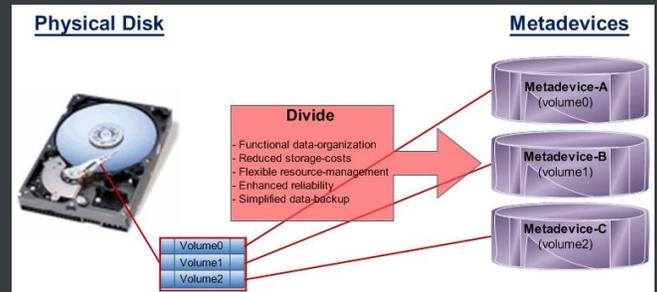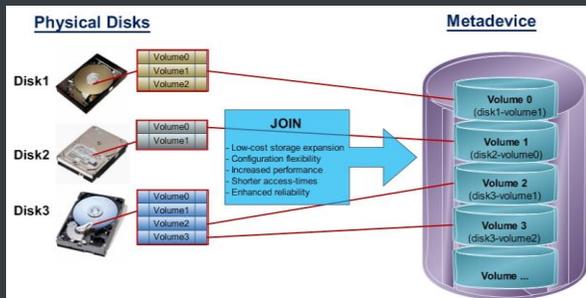
▼ 4.10.   Workflow management

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

A comprehensive and user-friendly workspace allows creating suitable workflows based on custom actions just by dragging and dropping the necessary elements into it. 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.

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:
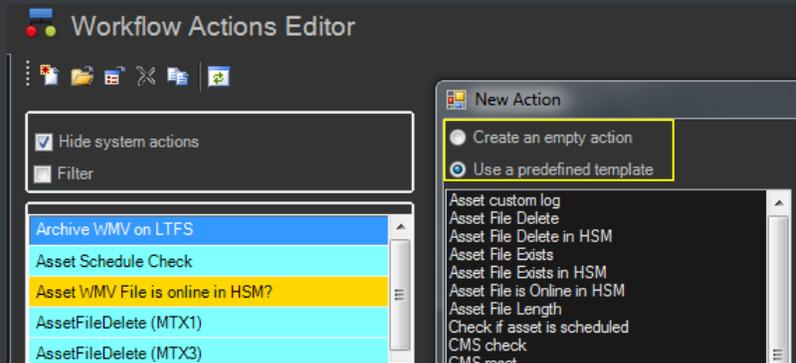
▼ 4.10.1.   Content check

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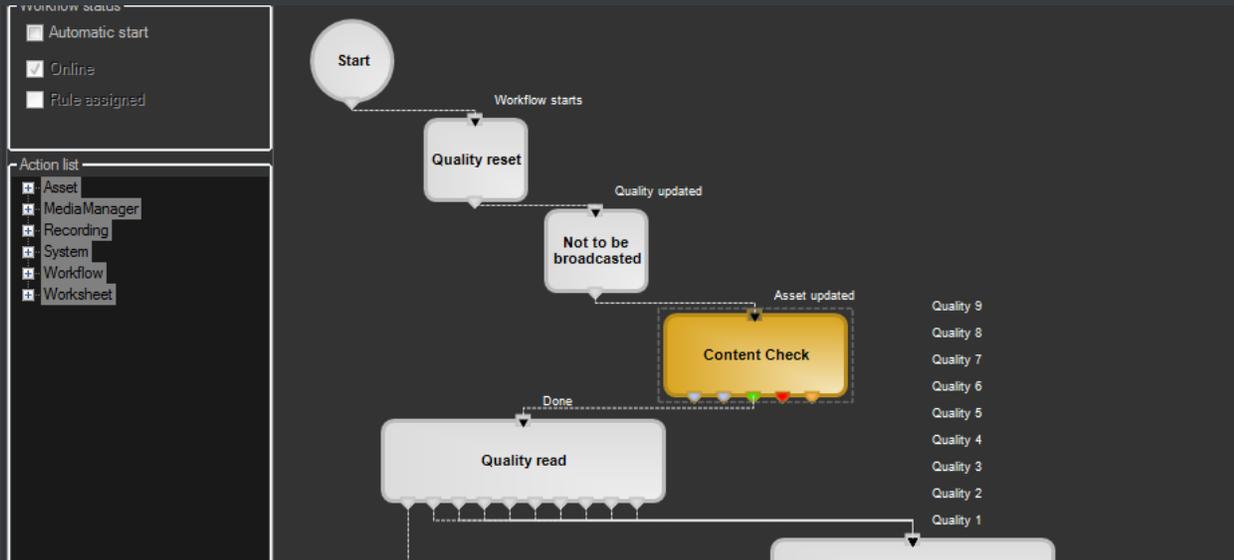
CMS is based on a workflow action which, once included into a workflow that will automatically analyze the asset's proxy video to detect and log (into its EDL) the following audio/video issues:

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.1770-2 loudness metering algorithm widely used as loudness-compliant standard.

▼ **4.10.2.   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:
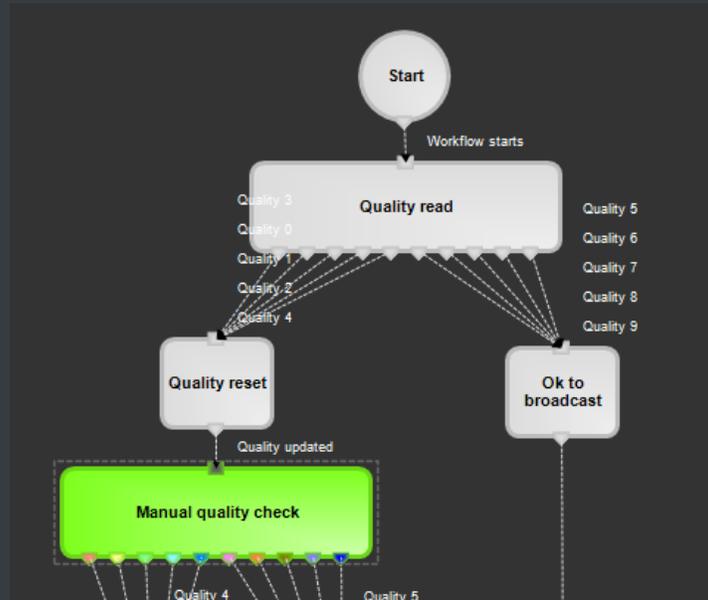
▼ 4.10.3.   Archive

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:
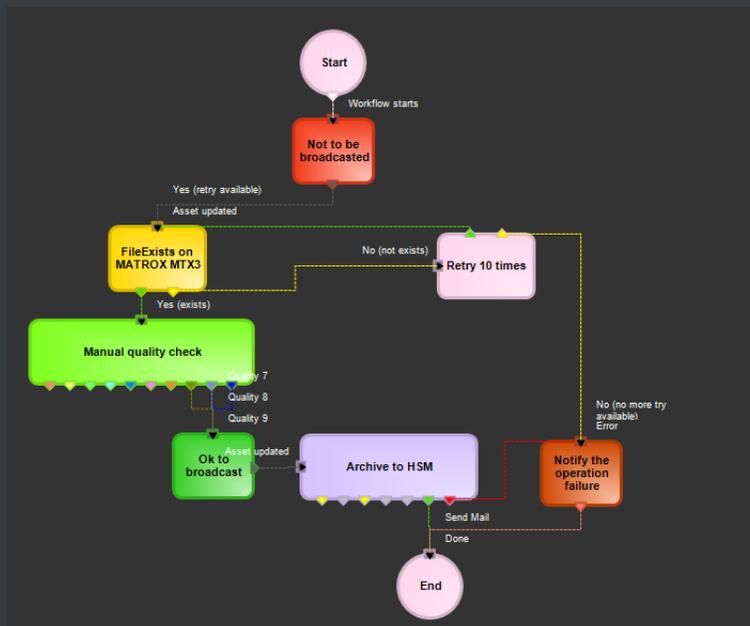
▼ 4.10.4.   Restore

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

▼ 4.10.5.   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:

▼ 4.10.6.   MD5 checksum

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:
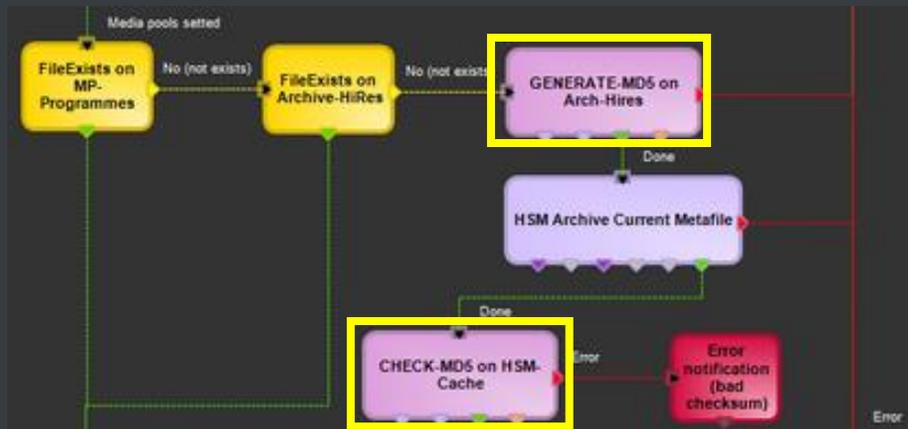

The editor allows creating custom workflows to either generate or check the MD5 hash of files.

▼ 4.10.7.   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.
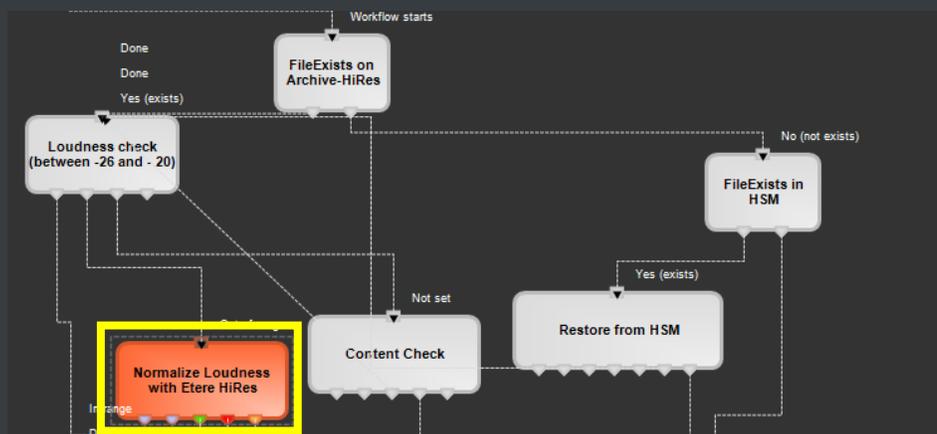
As shown in the sample above, "loudness normalization" workflows can be launched automatically for specific assets, for example, after their ingestion or tapeless reception (i.e. web upload).

▼ 4.10.8. Antivirus scan

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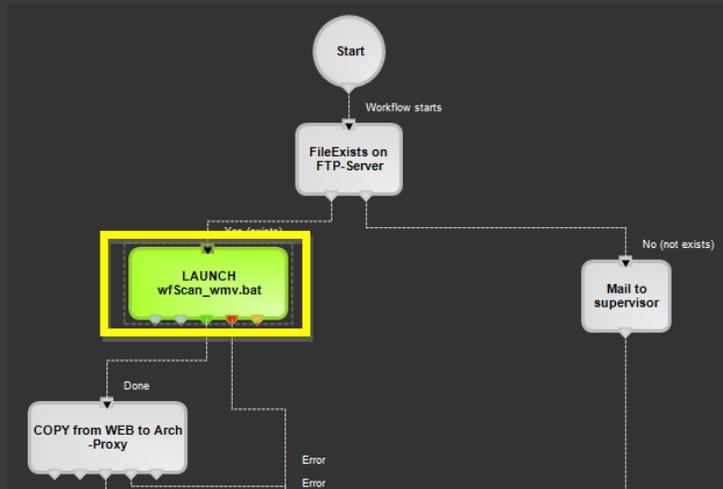

As shown in above, the automatic virus scan capability can be easily integrated within any workflow at any stage just by inserting an action block configured to perform the virus checking; stations can insert them, for example, within the default workflow to be launched after an EtereWeb upload.

▼ 4.10.9. 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:
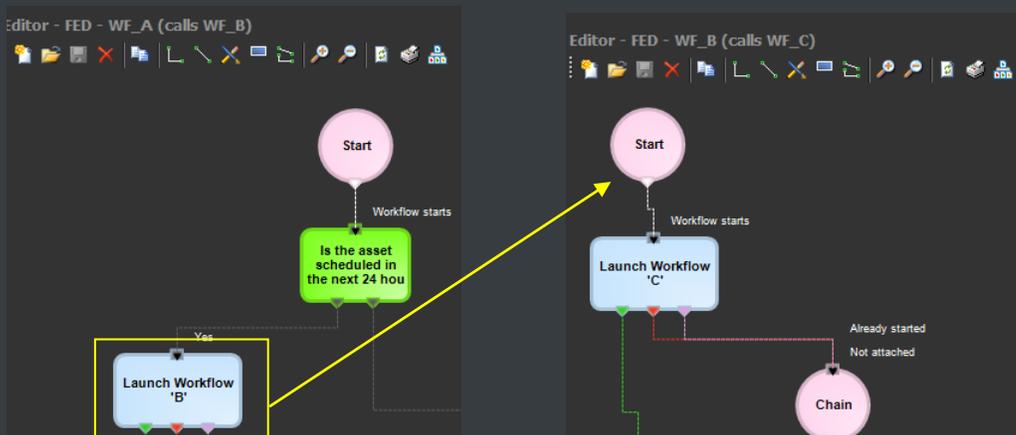
Etere maintains the system consistency by avoiding loops between workflows (a message is displayed indicating action incompatibilities between workflows). For instance, if 'workflow A' calls 'workflow B' and the 'workflow B' calls 'workflow C', the 'workflow C' will not be able to call the 'Workflow A'.

▼ 4.10.10. Batch code updating

A workflow action allows to automatically change the code of assets based on a specific metadata and also a fixed leading string, for instance:
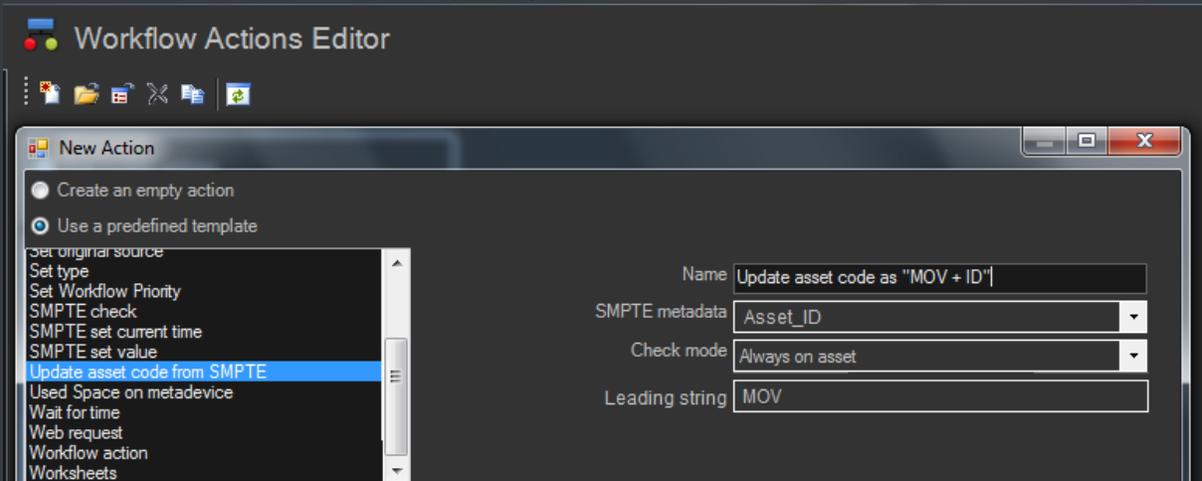
For instance, executing the above action for all "movies" assets will change their codes into: ***MOV145246 , MOV267634, MOV49527 , MOV53495 , etc.***

▼ 4.10.11. 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:

▼ 4.11. Look and feel

ETERE's GUI experience gives a professional interface with less distractions and more focus; high contrast helps working on any light condition from dark master control to enlightened editing rooms:
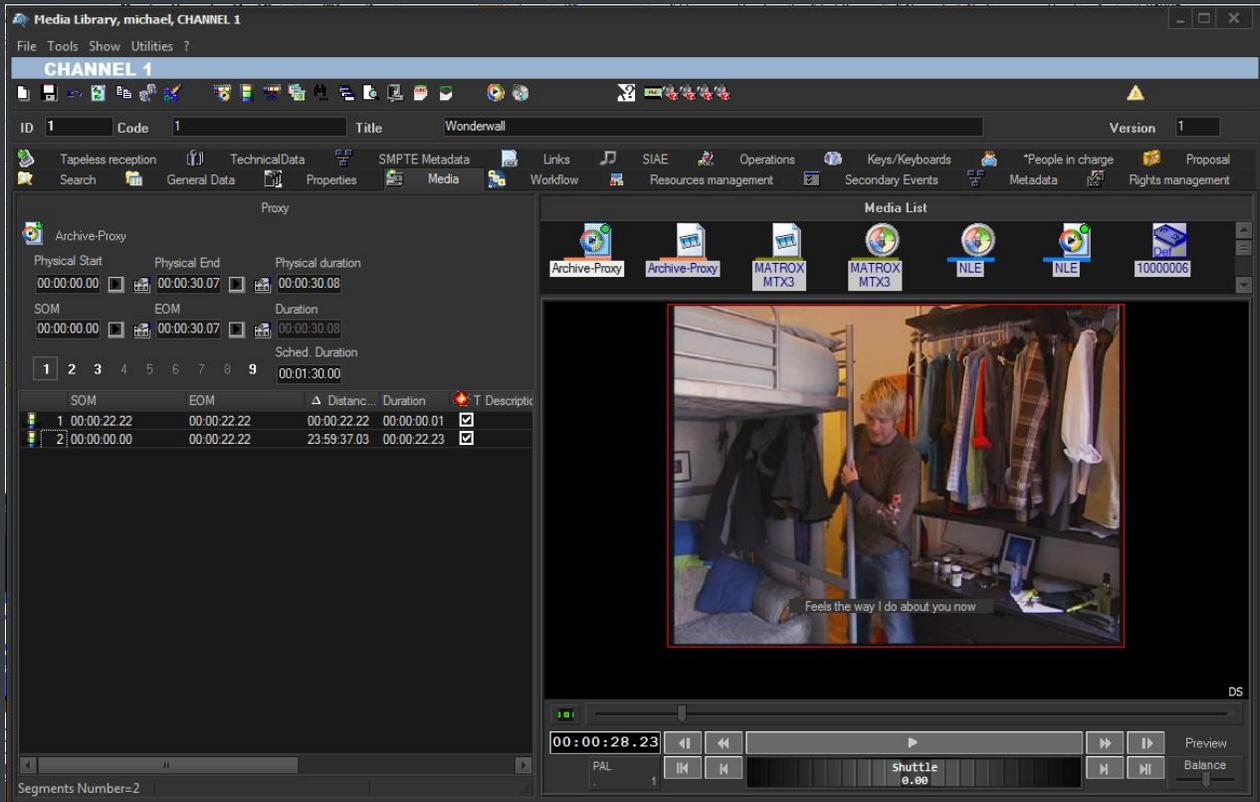
Moreover, main menus now follow the Windows 8 GUI to be simple, intuitive and easy to use:
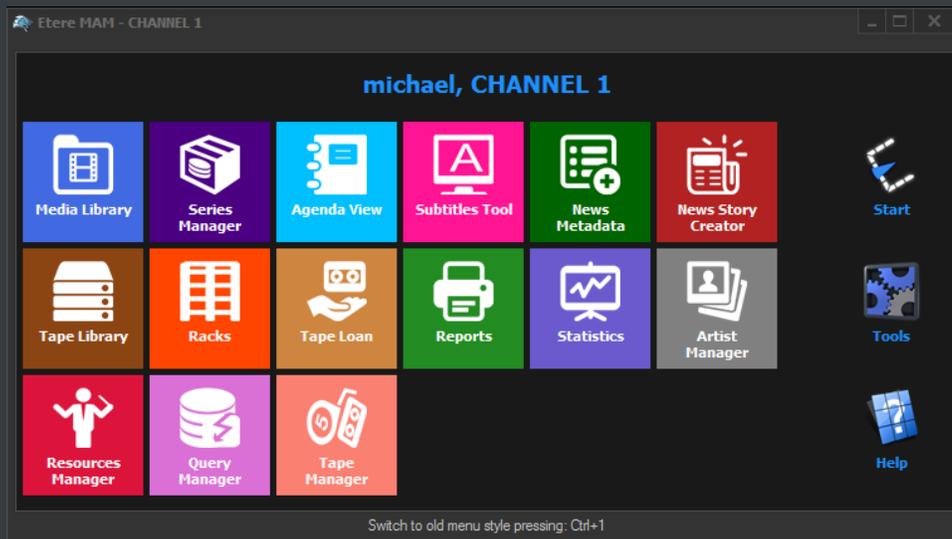
▼ 5.   BENEFITS

This paper has described how the development and deployment of an Etere-based **"Full Enterprise Wide Media Asset Management System"** able to provide the station with a large number of operational benefits and advantages derived from the correct use of ultimate media management technology. Etere will entirely manage the digital contents of the station, from acquisition to delivery, providing the following key features:

- **Reliability**, all workflow-based operations automatically generates fully customizable logs to track both the overall and individual functioning of the entire system

- **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

- **Efficiency**, reduced need for repetitive manual operations, allowing to define them in advance and then include them in the ingest workflow, thus increasing productivity

- **Accuracy**, during the whole media management process, reducing the risk of mistakes when retrieving data since all archived contents are continuously checked

- **Integration**, for non-linear editing systems to access the digital archive directly and efficiently through a proper production environment, making use of the highest security standards

Etere: a consistent system!

Etere is an international leader in the media market. Etere develops and distributes a wide range of high technology software for broadcasting and media businesses. With more than 24 years of experience, Etere provides powerful, flexible, cost-effective, high-performance, end-to-end media solutions. Etere is the only company worldwide that can offer you a solution to all your media needs in one single package.

Etere is the only solution 100% workflow based for all broadcast and media environments. It's a common framework where there is real-time sharing of all the data among several applications to manage all media business requirements. The workflow approach allows a fully customized design with edge performances.

From its headquarters in Tolentino, Italy, Etere guarantees the best after-sales support service on the market with engineers ready to give professional assistance 24 hours a day, 7 days a week. The service includes voice, email, VPN and VoIP with unlimited calls and connection time, and a pro-active system to help diagnose problems before they appear.

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