Videomize™

Automated Content Preparation System DATA SHEET

Description

Automation

Videomize™ is a software based platform for creating and managing automated workflows for VoD content preparation. The Videomize™ concept eliminates the need for expensive manual processes and expert knowledge needed in preparing and repurposing content for VoD markets as CableTV, IPTV, WebTV, MobileTV, digital archives and more.

The heart of the Videomize™ platform is a Vcodes developed software, which intelligently manages the transformation of any video source to any format.

Once a workflow has been designed by the Vcodes experts (or by the customer), the entire process is automated:

1. Source ingest from tapes, optic media, media files or NLEs
2. Complex source analysis, error detection and metadata retrieval
3. Video and audio advanced pre-processing
4. Video and audio transcoding
5. Multiple audio track dubbing
6. Subtitles insertion
7. Logo, watermarking graphics and ad insertion
8. Content verification
9. Content protection
10. Secure network delivery

Integration

The Videomize™ concept is unique: an intelligent engine that integrates and controls all of the video/audio processes required, via licensed 3rd party tools, both software and hardware. Those tools are carefully selected and go through extensive testing by the Vcodes engineers, for quality and compliance. This approach provides Videomize™ the advantage to deliver the highest quality results while conforming to the strictest industry standards.

On top of the already proven tools that Videomize™ is integrated with, the modular approach allows for future integration with newly required 3rd party tools, to enable quick adaptation to changing scenarios.

Videomize™ is open for external integration to content management systems (CMS/MAM), video servers and other specific environment needs. This allows Videomize™ to either serve as a stand-alone unit, or become a completely integrated part of an existing facility.

Customization

The Videomize™ modular architecture allows for full customization of specific required workflows, by quickly adding or replacing required modules. This actually means that no Videomize™ will be the same for every customer!

Vcodes CPS Ltd, 34b Habarzel Street, Ramat Hachayal, Tel Aviv 69710, Israel

In the first steps of building a VoD preparation workflow, the Vcodes expert team of engineers offers the customer a complete professional services package.
Our engineers study the specific VoD broadcast environment including STBs and VoD servers, then build, test and fine-tune the required Videomize™ workflows while ensuring maximum quality and conformance with end devices.
A software based solution means quick and flexible customization and protecting your investment. The Videomize™ system is future-proof and will grow with your needs. The software's server-client architecture provides multi CPU support and network processing for high volume throughputs.
Customization doesn't end at the Videomize™ software. Vcodes can provide a complete turn-key solution, starting from a single workstation to a fully redundant Telco-grade blade system.

Architecture

The Videomize™ software architecture operates in Windows .NET environment and is built out of the following modules:

Orchestrator

The Videomize™ Orchestrator is the engine which controls, manages and coordinates the different Videomize™ modules. The Orchestrator reads and writes to an SQL database to manage complex, high volume workflows.

Tape Capture

The Tape Capture module is in charge of controlling Betacam/HDCAM/DVCAM tape decks via RS-422 serial connection and supports frame accurate VITC timecode.
The module is fully integrated with the Blackmagic Decklink cards (models depending on requirements) to ensure high-quality 10-bit uncompressed video, via SDI or HD-SDI connections. Also available is support for analog Component connections and AES for audio.
The Tape Capture module receives a new capture job from the Videomize™ Orchestrator and asks the user to insert a required tape to the tape deck. The tape will then be captured according to the job specified Timecode In and Timecode Out values, to a temporary 10-bit uncompressed format, to be processed later by the other Videomize™ modules.
Depending on system configuration, multiple capture and encoding tasks can be ran simultaneously, thus maximizing resource allocation efficiency. No matter the configuration, the Tape Capture module always receives highest resource priorities to ensure no dropped frames.

Real-Time Encoding – *Coming Soon*

Real-time SD and HD tape/live ingest, to final encoding format. Required where delivery time is crucial and multiple formats from the same input are not required.

Optic Media Capture

The DVD/Blu-ray capture module supports full data access to the DVD or Blu-ray optic media, via a computer DVD or Blu-ray drives. This design has 2 major advantages over traditional optic deck players capture:

1. Providing full control over the media's directory structure to enable specific copying of programs, language audio tracks and subtitles.
2. Much faster than real-time capture. For example a typical 100 min. DVD title will take around 15 minutes to copy.
3. Option to directly multiplex the original audio track, without re-encoding. This saves time and ensures perfect original audio quality.

4. Automatic audio sync correction. Demuxed audio tracks can get out of sync with the video. The Optic Media Capture ensures the sync issues are corrected automatically.

Live to VoD – *Coming Soon*

The module will enable scheduling and capturing of Live TV programs received from multicast streams via Ethernet. The Live TV programs will be processed by Videomize™ and delivered as VoD titles to the customer's service platforms.

Metadata Editor & Support

Metadata can come in many formats, depending on the source application.
Videomize™ focuses on the CableLabs VOD format, based on the ADI (Asset Distribution Interface) specifications. Videomize™ has full support for versions 1.1 and 2.0 specifications.
The following features are supported:

- Import descriptive XML metadata files associated with source video files.
- Generate or edit descriptive metadata, via GUI forms.
- Automatically generate technical metadata for the transcoded file.
- Export descriptive and technical metadata in XML or XLS formats.

Subtitles

Videomize™ supports 2 modes of subtitles insertion: Overlaid or DVB subtitles.
Overlaid subtitles (also referred to as Open Subtitles or Burnt-in Subtitles) are superimposed and encoded with the video. The advantage: subtitles can be added to any video format. Cons: the process is irreversible and no support for multiple subtitle tracks.
With DVB subtitles, the subtitles are inserted as subtitle tracks, completely separate from the video data. This means that subtitles can be switched on and off by the end user and multiple subtitle tracks are supported. Cons: DVB subtitles are supported only in MPEG Transport Streams. DVB subtitling also requires support within the STB in IPTV and Cable environments.
Videomize™ uses its Watch Folder module to receive subtitle files and automatically assign them (via naming conventions) for processing with the relevant video. The subtitle module verifies that timecodes written in the subtitle files are in sync with the video timecode.
Videomize™ can also generate low resolution proxy videos, with timecode printed, to be used by external subtitling studios for reference.

Multiple audio tracks support

The multiple audio tracks engine provides a fully automatic workflow for multiplexing multiple audio tracks from DVD/VOB/MPEG-2 PS into one MPEG Transport Stream format. Supported audio formats are: WAV, PCM, MP2, AC3 and DTS.

Video/Audio Processing

Videomize™ uses an intelligent video/audio processing engine to cover all needs: from simple video crop and scale operations to advanced motion compensated noise removal and standards conversion (see complete table below).
The module deploys an accurate interlacement analysis algorithm and automatically applies predefined operations for deinterlacing/IVTC.

SD/HD Encoder

The Videomize™ Encoder module controls the most efficient 3rd party video and audio software encoders. Depending on format and customer requirements, Videomize™ integrates with Mainconcept, VSS and open source encoders like x264 and ffmpeg.

The Encoder module receives the encoding job from the Videomize™ Orchestrator along with the encoding parameters specified in the predefined encoding profile. It will then allocate the encoding job to an available CPU within the Videomize™ network. Upon completion, the encoded elementary streams are delivered to the multiplexer for wrapping in the correct container format.
Videomize™ supports encoding to MPEG-2, MPEG-4, H.263, H.264, WMV, VC-1, FLV and more (see complete table below)

Multiplexer

The Videomize™ Multiplexer module wraps the elementary streams received by the encoder modules, into the predefined container format. The more advanced container formats supports adding also multiple audio tracks, multiple subtitle tracks and metadata.
The Transport Stream multiplexer uses the industry's most advanced software to ensure full compliancy to CableLabs standards and robust error detection mechanism.

Video Editor

The Video Editor module enables interactive access to Videomize™ video/audio processing controls plus frame accurate trimming and cut list creation, for single job or batch processing.

Watch Folder

For a completely automatic operation, the Watch Folder module enables Videomize™ to monitor a specified directory on the local drive or the network (UNC). Once a media file is dropped into this folder, it will immediately enter the Videomize™ predefined workflow.

Distribution

The distribution module ensures the prepared file is transferred completely to its final destination, whether to a local drive, a network UNC location, or a secured FTP.

Notification – *Coming Soon*

The Notification module alerts the Videomize™ administrator via email or SMS, about completed/failed jobs.

Review

The Videomize™ Review module enables the operator to perform traditional QC by watching and listening to the final prepared file, checking the media technical information, verifying audio sync and timecode, and finally approving or denying the content.

Content Verification

Videomize™ integrates with the leading content verification tools for a completely automated quality check process. The process will automatically check compliancy to standards such as codec format, frame rate, bit rate, blockiness, freeze frames, black frames, dropped frames, luma/chroma levels, audio levels, play time, and more.
This significantly reduces the need for manual QC processes.

Content Protection

By integrating with proven 3rd party DRM/CAS engines, Videomize™ enables delivering the already secured content to its final VoD broadcast server or content management system depending on the deployment architecture.

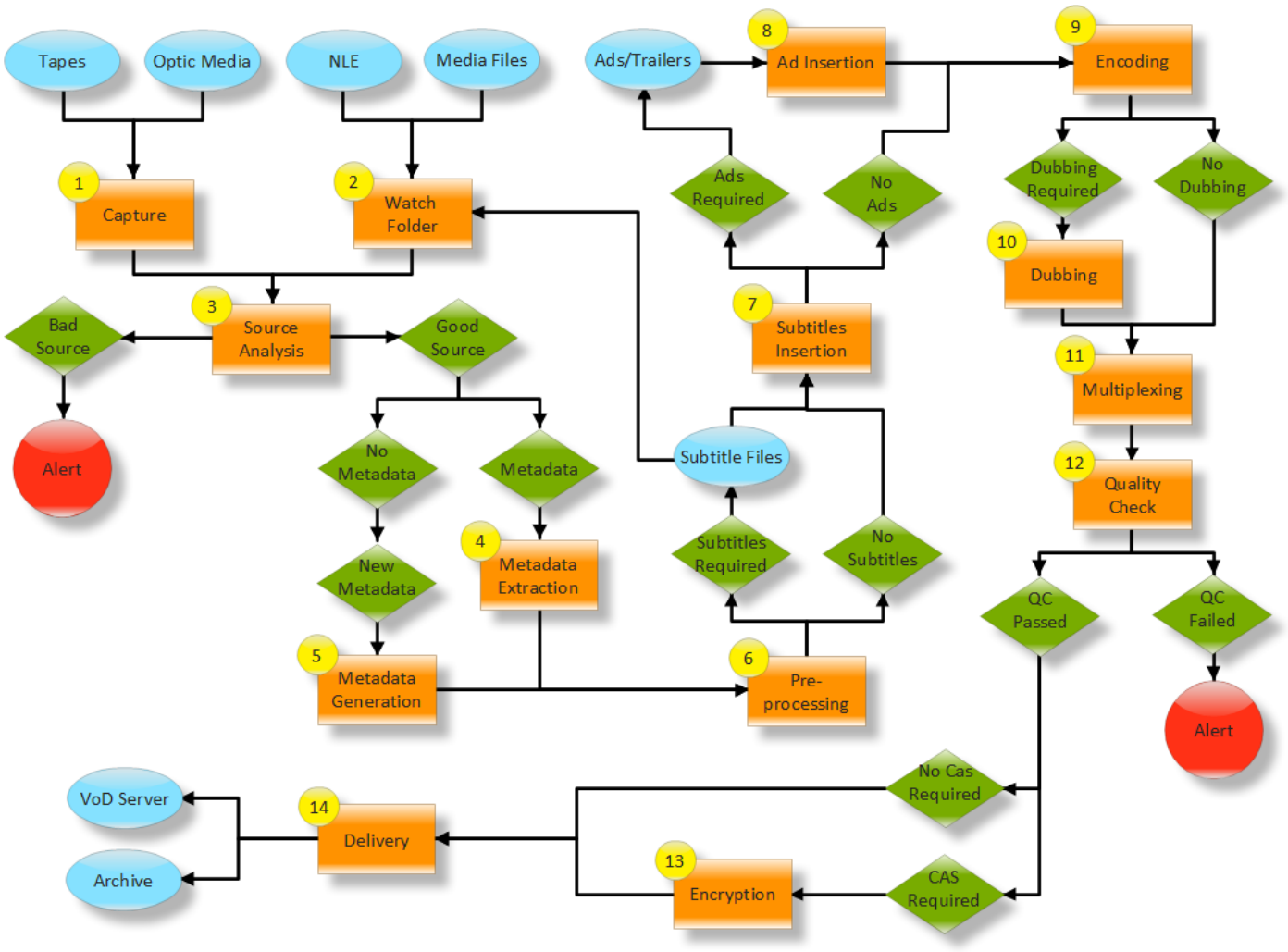

Figure 1: The Videomize™ automated workflow

Automation Points Explained

1. Capture from tapes and optic media would require the user to simply insert the media that Videomize™ requests. The capture points would be predefined in an Excel/XML job list, or in the case of a single job - within the Videomize™ Control Panel.
   Before Videomize™: The operator would have to manually capture each source, or use dedicated capture tools and devices for different formats. DVD/Blu-ray media are efficiently processed in Videomize™, which provides complete control over their content.
2. Media files have to be copied to the "Watch Folder" which automatically triggers the rest of the process.
   Before Videomize™: operator would have to manually specify the source media files names and locations in the network.
3. Videomize™ performs an automated source analysis, to verify whether the source files are compliant for the given workflow. A source which is found to be incompliant will trigger an alert and will not be processed.
   Before Videomize™: The operator has to analyze the source with special tools to check for frame size, frame rate, interlacement, etc. and decide whether it is compliant to the required workflow.

4. Videomize™ will automatically extract the source technical and descriptive metadata and add it to the project database. When integrated with content management systems, the metadata would automatically be transferred to the CMS in its required format if required. **Before Videomize™:** Operator would have to use an external metadata editor, convert and then import the metadata in the CMS.
5. Videomize™ ensures imported metadata is compliant to the required workflow and if it isn't, it will be converted to the correct format. If a source does not have any metadata associated with it, Videomize™ will trigger the operator to generate new metadata using the Videomize™ metadata generator. The same generator can also be used to manually edit and correct existing metadata.
   Before Videomize™: The operator would have to manually check each source for metadata existence or compliance and then manually convert it if necessary.
6. Pre-processing options defined in the workflow are assigned to the video and audio, from basic operations such as scaling, cropping, deinterlacing to complex high quality processing such as graphics/logos overlay, noise removal, spots/scratches cleanup and image stabilization.
   Before Videomize™: The operator would have to manually process each source in external, expensive post-production tools and then export it to an intermediate format, which means more time and storage wasted.
7. Subtitles will be inserted into the video, if required in the workflow definitions. Videomize™ will look for subtitle files in its Watch Folder, check them for compliancy and add them to the video according to their timecode information.
   Before Videomize™: The operator would need to manually use an external subtitle software or hardware to insert the subtitles to the video, and then export again to an intermediate file, meaning more time wasted.
8. Timecodes can be predefined in the Videomize™ job list, in order to insert predefined ad videos.
   Before Videomize™: The operator would have to first convert the advertisement videos to the proper format for editing, then use a dedicated editing tool, insert the ads where needed and then export an intermediate file, meaning more time and storage wasted.
9. Vcodes engineers constantly ensure that encoding in Videomize™ provides the highest quality possible while maintaining compliancy to the industry standards. Large volume encoding is processed efficiently on multiple CPUs using Videomize™ infinitely scalable server/client architecture.
   Before Videomize™: The operator would have to invest in encoding expertise, purchase multiple encoders for his different required formats, and for large volume encoding- purchase, install and maintain many encoder licenses.
10. If required by the workflow rules, Videomize™ will insert multiple external audio tracks and to be dubbed with the video.
    Before Videomize™: The operator would have to use an external post-production tools and conversion processes, and then exporting an intermediate file, meaning more time and storage wasted.
11. Multiplexing is a critical step, especially for the Cable/IPTV industries. Videomize™ uses the best tools, selected, configured and maintained by the Vcodes engineers to ensure complete compliancy to industry standards and features.
    Before Videomize™: The operator would have to invest in multiplexing expertise and manually use a dedicated software or hardware multiplexer.
12. Quality check in Videomize™ has 2 optional levels: basic and advanced. The basic QC verifies the completed file for full technical compliancy in the broadcast environment and lets the operator perform an audio/visual review to spot for any issues. The advanced QC automatically scans the entire video and audio for quality issues like blocking artifacts, frozen frames, black frames, audio levels and more.

Before Videomize™: The operator would have to open each file in special tools to verify compliancy to standards and also perform a full audio/visual check which is very time consuming and inaccurate.

13. If content protection is required as part of the automated workflow, Videomize™ will integrate with the required CAS vendor to encrypt the prepared content, according the predefined specifications.
    Before Videomize™: The operator would have to load and encrypt the content in a dedicated content protection tool.
14. At the end of a successful process, the content will be securely delivered by Videomize™ to its final destination, whether it is a local archive storage or a remote FTP for automated ingest by the VOD server.
    Before Videomize™: The operator would have to manually distribute the completed files and verify their integrity in destination.

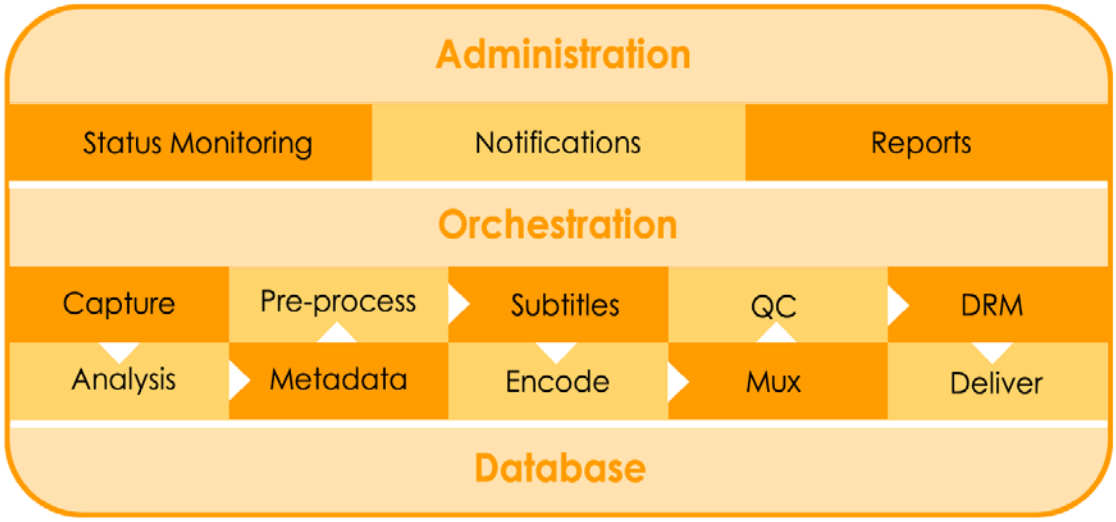

Figure 2: The Videomize™ architecture

Specifications and System Requirements

Supported video and audio formats:

Container	CODEC
AVI	Cinepak, Video-1, Indeo, IYUV, DivX, Xvid, DV, HDV, Uncompressed
MPEG-1	MPEG-1
MPEG-2 Program Stream / VOB	MPEG-2
MPEG-2 Transport Stream	MPEG-2, H.264, HDV, AVCHD
MP4 (MPEG-4)	MPEG-4, H.264
3GPP	MPEG-4, H.263, H.264
FLV	Sorenson, On2, H.263, H.264
WMV/ASF	WMV7, WMV8, WMV9, VC-1
MKV	H.264
MOV (Quicktime)	All QT 7 codecs (needs QT installed)
Image Sequence	BMP, GIF, JPEG, PNG, TGA, TIFF, PNG, PICT
Raw	I420, YV12, UYVY, VYUY, YUYV, YVYU, Y41P,

	YV16
MXF	MJPEG2000, MPEG-2, D10(IMX), XDCAM, DVCPRO, DVCPRO HD, DV
Real	Real 8, Real 9, Real 10
Audio Formats	WAV,MP2, MP3, Vorbis, AAC, AC3, DTS, PCM

Video Processing
Crop & Resize
Blur & Sharpen
Motion Compensated Deinterlacing
Inverse Telecine/3:2 Pulldown
Color Correction (proc amp)
Superimpose logos and graphics (watermarking)
PAL/NTSC motion compensated conversion
Frame rate conversion
Noise removal
Grain removal
Scratches/Spots removal
Image stabilization

Audio Processing
Audio levels
Audio normalization
Dynamic Range Compression
AC3 Delay correction

Data
Excel job lists
XML job lists
XML metadata
Cavena .890 subtitles

Minimum System Requirements*
Intel or AMD based configuration
Dual Core CPU at 2.4 Ghz or better
Windows 2003 Server or XP SP2
2GB RAM or more
120GB internal storage or more
**The size of the hardware configuration is dependent on the customer's requirements and scale of the deployment.*

For Tape Capture**
Blackmagic Decklink
Nvidia Geforce or Quadro display card
Dedicated storage
***Exact models and capacities depend on Videomize™ configuration.*

Example Processing Times

CPU	H.264 SD 2-pass Encoding
Dual Core 3.0 ghz	90 m
Quad Core 3.0 ghz	45 m

- *Time is per 1 hour of video & audio content from an MPEG-2 media file.*
- *Based on a high-quality 2-pass H.264 profile, with no video/audio pre-processing, using original MPEG-2 audio.*
- *Figures are approximation only. Encoding time varies according source complexity.*