Video Watermarking

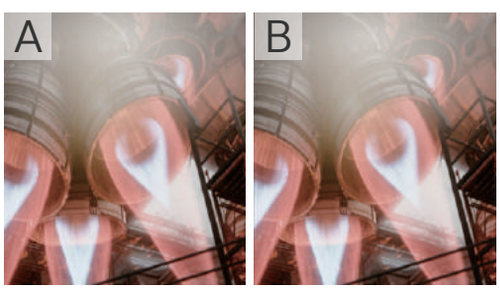
Video Watermarking, the industry's choice watermarking solution for video, is applicable for various services with an optimized algorithm to support variety of video formats.

Solution Intro

MarkAny Video Watermarking for video content allows the creator or service operator to embed a unique and imperceptible information of copyright in the content as it is playing on various customer's device and service system across UHD, Full HD and HD screens. This is the proven technology to trace illicit re-distribution and secure the value of content for various use cases across live and linear broadcast, OTT streaming, Set-tops and post production.

Imperceptibility of Watermark

(Before-and-After Comparison)



(A) Original Video (B) Watermarked Video

Automatic Identification of Copyright Information by Extractability of Copyright Information

- from both digital and analog capture
- without original video
- after video editing

Monitoring illegal distribution of video contents

Tracking the first pirated distribution location

Deterrence of illegal upload to webhard or portal site

Robustness At A Glance

1	Conversion Attacks	Video format conversion	○
2		Resolution : 33% of width or height, Max : QVGA	○
3		Frame-rate (Interchange between 12 fps ~ 60 fps)	○
4		Color space changes (Color → Gray Scale)	○
5		Digital → Analogue / Analogue → Digital	○
6	External Attacks	Noise attack (White Gaussian Noise)	○
7		Aspect-ratio change (4:3 ~ 16:9)	○
8		Letter boxing (10%), Pillar boxing (10%)	○
9		Rotation (± 5 °)	○
10		Scaling : 33% of width or height, Max : QVGA	○
11		Translation : for each direction	○
12		Flipping : Left-Right, Top-Bottom	○
13		Cropping : 5% of each side	○
14	Transcoding Attacks	MPEG-2, MPEG-4, H.264/AVC, H.265/HEVC	○
15	Combination Attacks	Transcoding + Conversion / External Attacks	○

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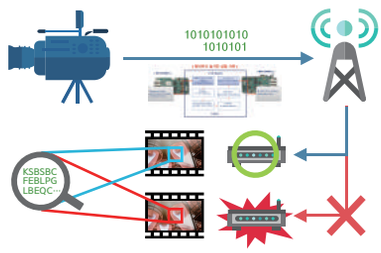
One Solution, Multi Use Cases

1. Live Sports Premium Content Piracy

Piracy of premium sports content is rampant today because it is easy to rip a stream from a compromised Set-Top-Box (STB) using readily available tools. The cost to the leagues and MVPDs is huge. Using robust forensic watermarking which embeds the watermark at the STB, the MVPD can detect the IP address of a rogue subscriber, and shut down the STB from which the pirated stream emanates, using a fast-response mechanism in conjunction with real-time monitoring of available pirate streaming sites.



Supported Features

- Ideal for live broadcast, live OTT Services such as Adaptive Streaming (HLS, MPEG-DASH)
- Compressed Domain Watermarking with no re-encoding or muxing during the streaming
- Real-time forensic marking with on-the-fly embedding on SD, Full HD, and UHD content
- Protect leakage cases on the post-production process
- No degration of valuable quality to human eyes
- Robust to Complicated Attacks
  - Conversion attacks : Video format conversion, A->D/D->A, Resolution, Framerate, Color space
  - External attacks : Noise attack, Aspect-ratio change, Letter boxing, Pillar boxing, Rotation, Scaling, Translation, Flipping, Cropping
  - Transcoding attacks : MPEG-2, MPEG-4, H.264, H.265/HEVC
  - Combination attacks
  - Camcording attacks : 99% with 20min WMS

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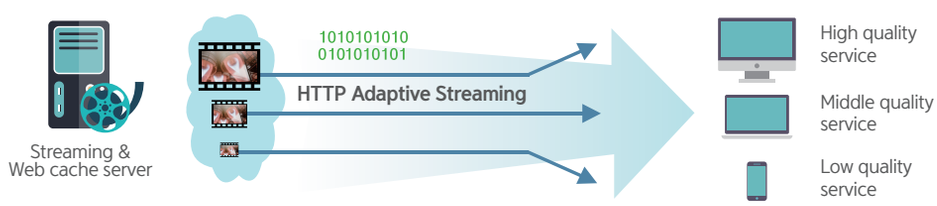
2. Competitive Adaptive Streaming

Providing unique forensic watermarking in an Adaptive Streaming environment is challenging because different stream segments are delivered to a specific client according to available network bandwidth and traffic. Using proprietary technologies that efficiently manage the watermarking stream segments in real time, MarkAny provides a scalable, protocol-agnostic watermarking solution specifically tailored to the unique requirements of Adaptive Streaming for Internet Delivery used in conjunction with common CDN providers.



Supported Features

- Perfect solution for
  - VOD - linear broadcast
  - linear OTT Streaming services such as Adaptive Streaming (HLS, MPEG-DASH)
- Encode once, play-out with all kinds of existing Adaptive Streaming technologies
  - Apple HLS (HTTP Live Streaming) - MPEG-DASH
- High-Performance Bitstream Watermarking
  - Real-time streaming with no re-encodings
  - Near real-time, fast embedding
- Integration Capabilities
  - Lowers cost to deploy by using generic HTTP caches / proxies
  - Supports standard HTTP delivery systems
  - Seamless integration at any point of digital distribution workflows : Before distribution / In- transit / At reception
  - Can be used in CE devices with constrained computational capabilities (e.g. STB, Mobile)
- Support Common Encryption (CENC)
  - Ultraviolet DRMs
  - Widevine Modular DRM
  - PlayReady DRM (PIFF)

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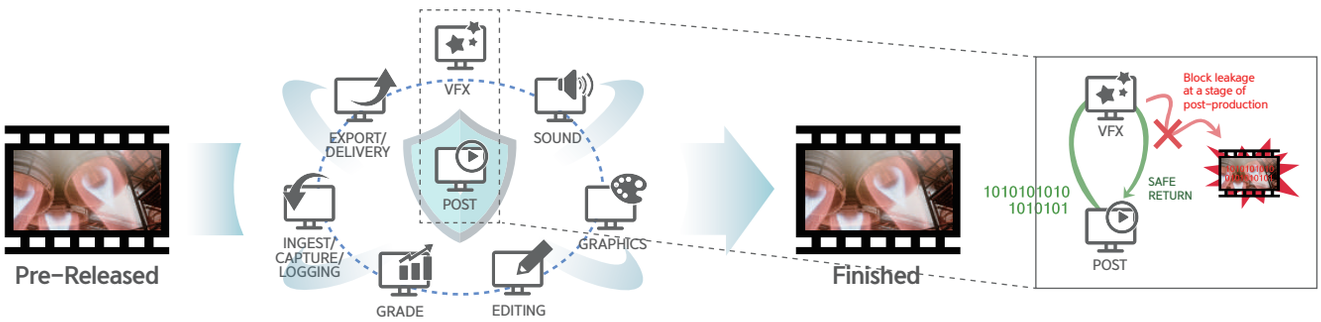
3. B2B Pre Release Post Production

The pre-release window for high value digital content is the most valuable timeframe for pirates. This is also the time period when it s imperative to close down any potential internal leaks. Digital Watermarking is used across all fulfilment processes (Capture / Scan, Packaging and Delivery) within Theatrical, Video and Digital content systems in the production chain to track and trace content during the extremely risk-prone pre-release window.

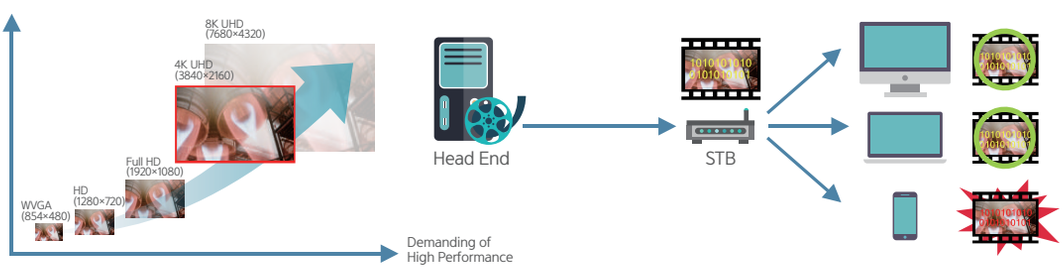


Supported Features

- Ideal for post-production process to protect leakage cases
- Compressed Domain Watermarking with no re-encoding or muxing during the streaming
- Real-time forensic marking with on-the-fly embedding on SD, Full HD, and UHD content
- Reliable detection to trace the source of piracy
- No degration of valuable quality to human eyes
- Robust to Complicated Attacks
  - Conversion attacks : Video format conversion, A->D/D->A, Resolution, Framerate, Color space
  - External attacks : Noise attack, Aspect-ratio change, Letter boxing, Pillar boxing, Rotation, Scaling, Translation, Flipping, Cropping
  - Transcoding attacks : MPEG-2, MPEG-4, H.264, H.265/HEVC
  - Combination attacks
  - Camcording attacks : 99% with 20min WMS

4. 4K UHD Content Delivery over Set-Tops

As content distribution and delivery technologies evolve to ever-higher resolutions, the risk of day and date piracy becomes much higher due to the availability of sophisticated content ripping systems which can easily bypass the DRM and Content Protection technologies. Digital Watermarking is required by content owners to provide more robust end-to-end security, and piracy deterrence based on forensic tracking in order to license content in high resolution formats such as 4K UHD.



Supported Features

- Perfect solution for
  - Set-Top-Box hardware vendors with less changeability for the hardware APIs or frame buffers due to the solid chip setting
  - OTT service with streaming and downloading on Set-Top-Box
  - Low hardware specs
- Forensic marking available in situations where server systems being not built
  - Easily applicable without establishing platform
- Bigger payload than DCI (Digital Cinema Initiatives) International standards
- Robust to External Attacks
  - Conversion attacks : Video format conversion, A->D/D->A, Resolution, Framerate, Color space
  - External attacks : Noise attack, Aspect-ratio change, Letter boxing, Pillar boxing, Rotation, Scaling, Translation, Flipping, Cropping
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5. Cross-Platform and Various Applications

Please contact us to share your specific requirement. We are more than welcome to listen and design the optimized solution to implement for your business needs.

Supported Features

- Platforms
  - Server Based (Stand alone)
  - Client Based (Set-Top-box)
  - Cloud Based (SaaS)
  - New platforms based on HTML5
  - Modular architecture designed to accommodate future platforms with ease
- Infrastructure Solutions
  - AWS (Amazon Web Service)
  - Wowza Streaming
  - Can be implemented across CDNs
- Applications
  - Over the Top Television (OTT)
  - Internet Protocol TV (IPTV)
  - Premium Video-On-Demand (VOD)
  - Mobile TV
  - Internet TV
  - Download-to-Own

Recommended Specification

		Server-based	Client-based
Server OS		MS Windows XP or later, Window Server 2003 or later, Linux, Unix	Not applicable
Device OS		PC, Laptop, Smart TV, Tablet, Smartphone (Android, IOS), MS Windows XP or later, Window Server 2003 or later, Linux, Unix	STB, Smart TV (Android OS, iOS)
File format		AVI, TS, MP4, MKV, FLV, ASF, MOV, MXF, DV	
			Overlay' watermarked layer supports all kinds of original content / file format / codecs.
Codec Encoder		HEVC/H.265, H.264/AVC, H.261, MPEG4, MPEG2, MJPEG, VP7, Theora, XVID, WMV, XDCAM-50, IMX-30	
			Overlay' watermarked layer supports all kinds of original content / file format / codecs.
Infra	Streaming	HTTP Streaming, RTP Streaming, Adaptive Streaming (MPEG-DASH, HLS, Smooth Streaming)	
	Servers	Wowza, AWS (Amazon Web Service)	
	DRM	PlayReady, WideVine, ContentSAFER, HTML5 common encryption which are used by the legacy system can be integrated	

For more, please contact us at overseas@markany.com
www.markany.com