Video Stitching Engine™ (VSE)
HTML to Video Conversion for UX and Content Creation

COMMSCOPE®

BUSINESS ADVANTAGES

- VSE Enables modern and consistent operator branded User Experience (UX) across the many variations of Set Top Boxes (STBs) installed.
- Accelerates UX innovation.
- Reduces cost/complexity associated with UX experience and technology updates.
- Helps operators avoid bulk replacement of STBs.
- Decouples the User Experience (UX) from the limitations of the device hardware, such as CPU speed, memory size and graphics capabilities.
- Expands available talent pool for HTML development and ongoing enhancement and support.
- Supports scaling to handle deployments of millions (10,000,000+) of STBs through its robust and proven architecture, and can be deployed on-premise, in a private cloud, or hybrid environments.

CommScope's Video Stitching Engine™ (VSE) uses server-side HTML code execution to enable consistent implementation and enhanced maintenance of Program Guides, VOD Storefronts, and Content Creation Apps.

Business Uses Cases:

- **Operator UX Modernization / IP Video Migration**

  Enables cost savings and incremental migration of Video Services from QAM System to IP Video Systems. For example: Guide, VOD, NPVR, Apps, etc.

  VSE enables the delivery of modern HTML User Experience (UX) to old and new Set-top Boxes (STBs).

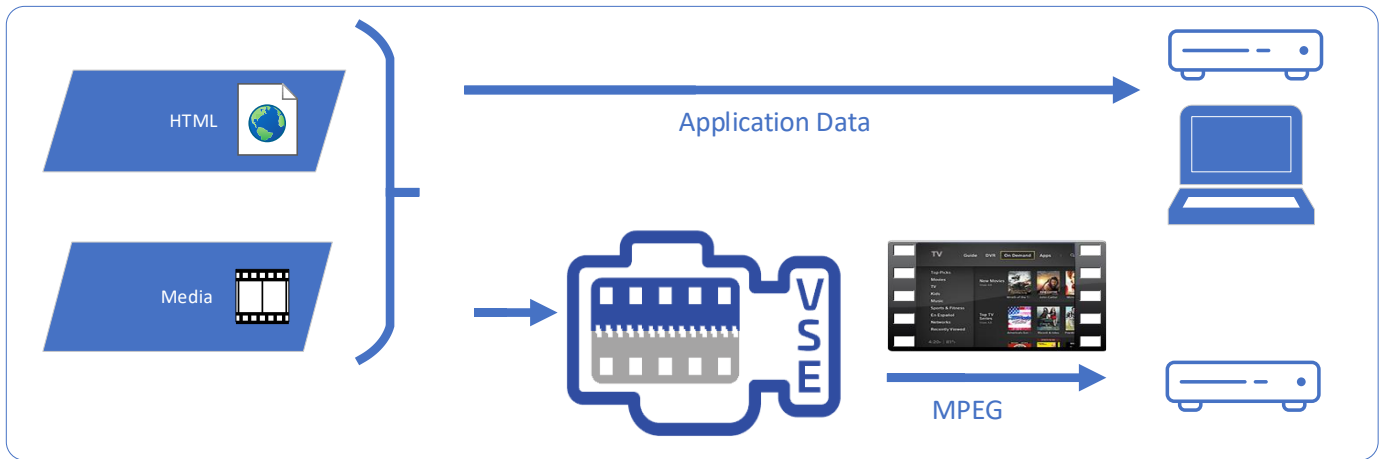- **Custom Content Creation:**

  Supports automated Computer Rendering of HTML content into short form MPEG video enabling customized content for Local and Regional Information Services.

- **Stream Conversion:**

  Performs ABR Stream (Linear/VOD/NPVR) conversion to MPEG-TS for delivery to legacy devices.
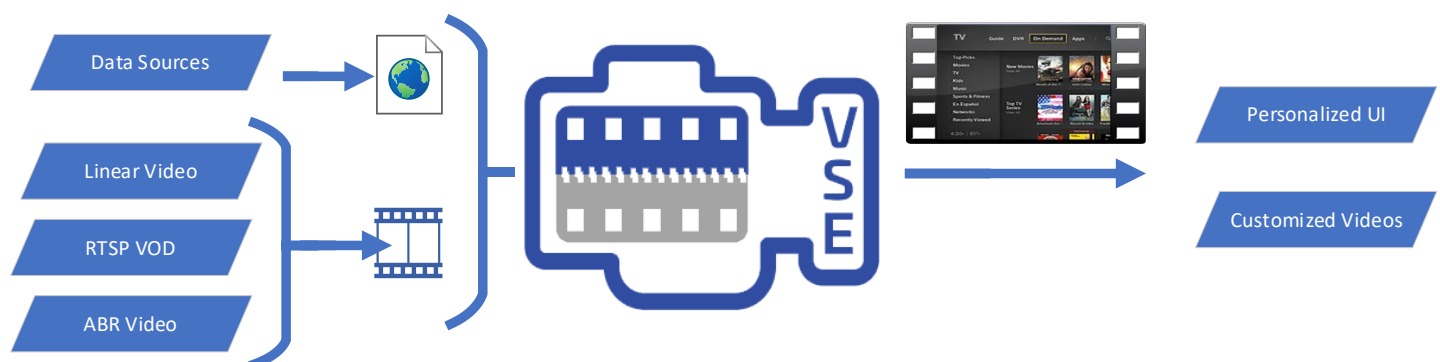
UX MODERNIZATION

- Server-side execution of HTML UX for consistent delivery across a wide range of STBs.

- Smooth transition to IP Video - VSE enables ABR video playback to older STBs (ABR to MPEG-TS conversion and DRM termination in the network).

- Facilitates DVR to nPVR transition.

- Integrates with existing Bandwidth Management Systems.

- QoS / Differentiated Services Code Point (DSCP) IP Traffic Designation for Guide Traffic Prioritization.

- Supports Cookies and App Local Storage unique to STBs.

- Bandwidth Capacity Optimization:

    - **Smart Multiplexing** – Significantly reduces bandwidth for streaming large volumes of concurrent UX streams.

    - **Dual-Path Rendering** – Enables partial-screen user interfaces displayed over full-screen video ("overlays") enables efficient playback progress bars, quick menus, error or reminder notifications. Reduces bandwidth required for from server to client.

CONTENT CREATION
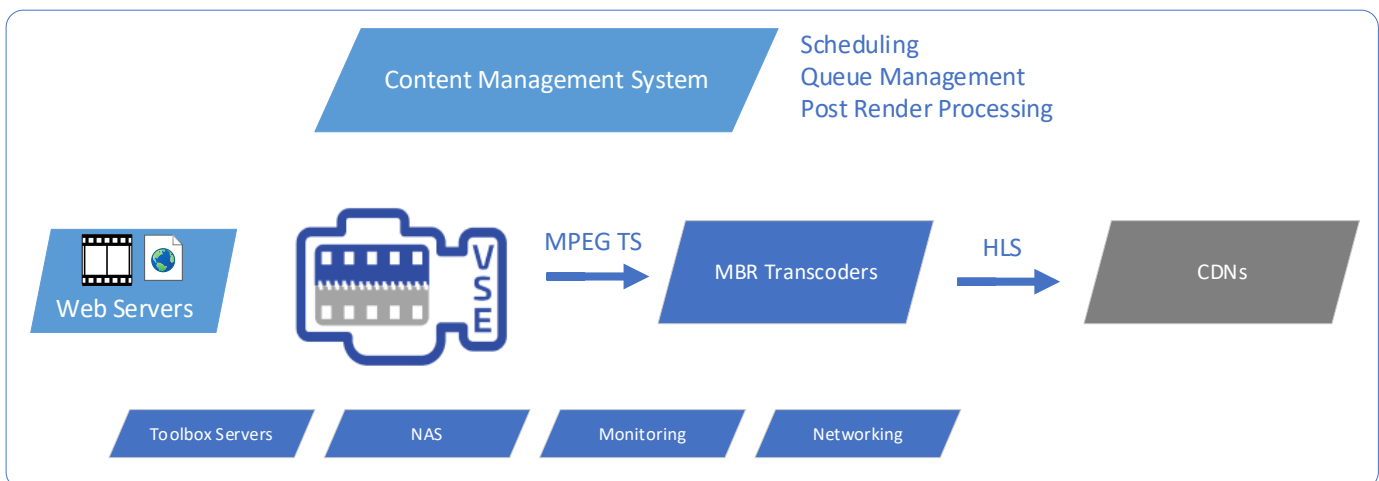
- Scripted execution of HTML Apps for computer generation of video products for use in a variety of use cases including personalized channels, data driven video products such as weather and sports, and short form video.

- Media pipeline and rendering engine control for bulk content creation.

- Ingestion, Normalization and Caching of Data Feeds for HTML Apps.

SYSTEM DESCRIPTION

VSE executes HTML server-side and creates a video stream per requested session. This core functionality can be used to:

- Render video products from HTML code for Content Creation,

- Support coexistence and migration of (legacy/older) devices and new IP Video systems,

- Enable modern UX on older devices.

Even the most basic STBs can easily decode and display the rendered (Stitched) video stream. Delivering decodable stitched streams is more efficient and reliable than STBs locally executing HTML code and handling the related complexities. Sessions are launched and managed in real-time and Remote-Control interactions are sent back to the appropriate server-side session.

VIDEO STITCHING ENGINE (VSE) COMPONENTS
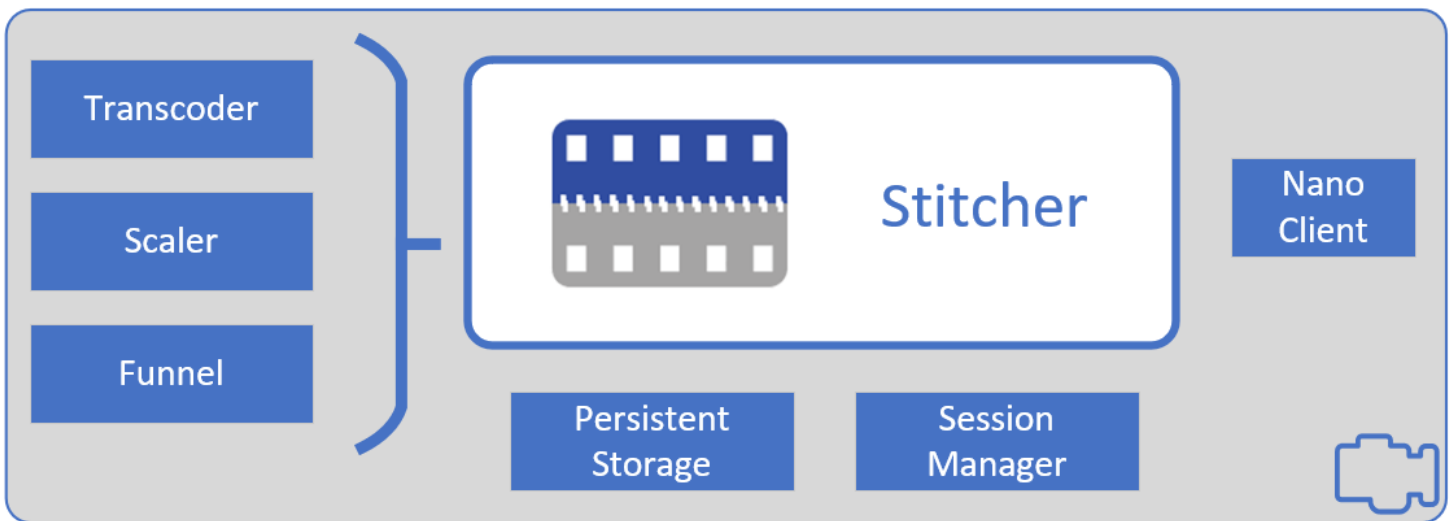
- **Stitcher** - The powerhouse of the Video Stitching Engine platform runs HTML applications in a browser-like application execution environment. It converts the rendered output, including multiple graphic or video elements, into a combined (stitched) MPEG video stream. Stitcher receives keystrokes from the end-user's client device, thus ensuring the user's input is reflected in the rendered application output.

- **Session Manager** – Handles bandwidth allocation and messaging between Stitcher and clients.

- **Persistent Storage** – Securely handles application local storage and cookies for each client device.

- **Transcoder** - Ingests stored or downloaded MPEG A/V content (such as MPEG2 TS and MP4 content) and re-encodes it upon request to a format specified by the Stitcher.

- **Scaler** - Optimized to ingest (live) broadcast streams, in UDP transport, to scale these down to a smaller size, and multicasts the resulting streams to many Stitcher servers at the same time.

- **Funnel** - Provides for assets that are ingested and normalized prior to being made available to applications. Accepts ingest formats such as RSS and ADI feeds.

- **Nano client** – Thin client for server messaging; streams playback control (keystrokes) for set-top boxes.

FEATURES

Video	Specification
Input Codecs	H.264, MPEG2 (4:2:0, 4:2:2)
Input Containers	MPEG-TS, MP4, MPEG DASH
Input Transport	UDP, HTTP, HTTPS
Input Resolution	1080p, 720p, 576p, 480p
Input Frame Rate	23.976, 24, 25, 29.97, 30, 50, 59.94, 60
Output Codecs	H.264, MPEG2 (4:2:0)
Output Resolution	1080p, 720p, 576p, 480p
Output Frame Rate	24, 25, 29.97, 30, 60

Audio	Specification
Input/Output Codecs	MPEG Audio Layer-3, AAC, Dolby Digital (AC-3), MPEG1-Layer 2
Input/Output Channels	Mono, Stereo, Multi-channel
Output Sampling Rate	48 kHz

Closed Captioning	Specification
Input/Output	CEA-708, ATSC A/53 Part 4, ANSI/SCTE 20, EIA-608

Application Authoring	Specification
Authoring Language	HTML Living Standard CSS JavaScript
Browser equivalence	Webkit
Persistent Storage	Cookies Local Storage
Images	PNG, BMP, JPEG, GIF, WebP

Integrations	Specification
Session Resource Management	SeaChange Adrenalin, USRM, DNCS, EC, Vecima VSE can also manage its own dedicated QAM channels
VoD Backend Support	SeaChange Adrenalin, Vecima, CommScope CMM
Security (VSE to Client)	DVB SimulCrypt, NDS, PowerKEY, DCAS, MediaCipher, Common Tier Encryption, HTTPS (TLS)
Security (Video Ingest)	Encrypted Media Extensions, Widevine
Client Middleware Support	Passport, SARA/PowerTV, OpenTV2, TiVo (Rovi), Orion
Minimum Client Hardware Required	400 MHz CPU 1MB graphics buffer 500 KB RAM 128 KB ROM
IP Video	IP Video Back Office Live/Linear streams VOD Playback HLS/DASH nPVR Scheduling and Playback ME7000 Transcoding MDC (Manifest Delivery Controller)

ORDERING INFORMATION

Model Name	Description
803805	Video Stitching Engine™ (VSE) Core License

RELATED PRODUCTS

VCM	VOD Content Manager
MDC	Manifest Delivery Controller
CMM	ConvergeMedia Management
SDV Systems	Switched Digital Video
ME7000	Media Encoder
VUE	Video Unified Edge

additional information can be found at www.commscope.com

Contact Customer Care for product information and sales:
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