Synamedia

Data Sheet

Synamedia Virtual Digital Content Manager

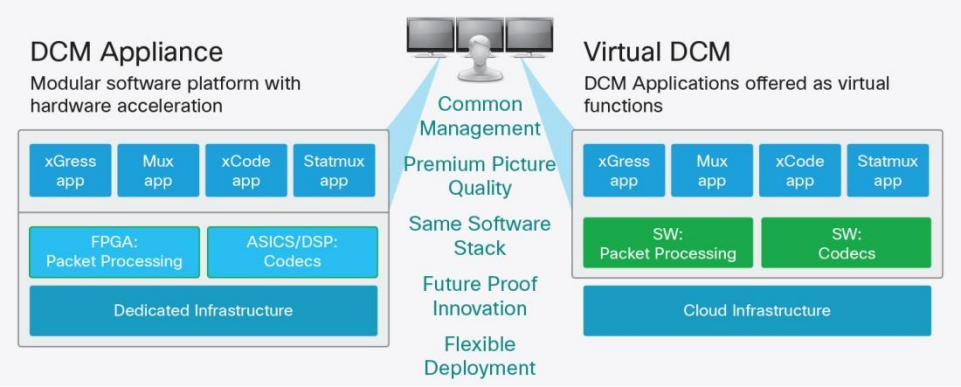
Product Overview

The Synamedia® Virtual Digital Content Manager (Virtual DCM) represents a new generation of virtualized and software-based video processing, providing advanced video, audio, and metadata processing for live multiformat video delivery. It enables broadcasters, content providers, and service providers to deliver best-in-class viewing experiences while meeting their service requirements for premium picture quality, bandwidth efficiency, and multiscreen transcoding.

Implemented as a set of virtualized video functions on a cloud-based Network Functions Virtualization (NFV) infrastructure, the Virtual DCM accelerates the support of new features and innovation in software. It optimizes costs with flexible deployment options across a pool of common compute resources and enables service portability between both hardware and software resources.

The Virtual DCM is derived from the modular software architecture of the Synamedia Digital Content Manager (DCM). The Virtual DCM is a platform that virtualizes the entire video headend, offering the well-known feature richness, picture quality, stability, and reliability of the widely deployed DCM platform. (See Figure 1).

Figure 1. Common Code Base



The Virtual DCM comes with an easy-to-use interface, simplifying the configuration of video processing functions across your video sources, and is supported by the Synamedia Video Services Manager (VSM), which enables you to easily provision Virtual DCM instances and even have service portability between the physical DCM and the software-based Virtual DCM.

The Virtual DCM is a fully optimized solution on the Cisco Unified Computing System™ (Cisco UCS®) server platform, and it runs on general-purpose computing hardware.

Features and Benefits

Synamedia Virtual DCM offers exceptional video services for linear pay TV broadcast and live streaming. It provides:

Platform Flexibility

Video processing functions such as live transcoding to multiple bit rates and formats can be flexibly implemented across x86 general compute, fully optimized to run on Cisco UCS platforms, as well as a virtualized application.

Broad Feature Set

The Virtual DCM offers several broad features and functions of the DCM platform, now available in software, including support for:

- Multicodec and multiscreen adaptive bit rate transcoding
- Multicodec and multiscreen adaptive bit rate encoding using Uncompressed over IP interfaces
- Ultra-HD HEVC transcoding and Encoding including High Dynamic Range (HDR) support
- Statistical multiplexing
- Optimized bit-rate for ABR via Synamedia's Smart Rate Control that is based on Synamedia's patented "Stream Video Quality" objective measure technology
- Intelligent remultiplexing

- Content protection
- Integrated Low-Delay PUSH Packaging
- Advanced and hierarchical redundancy including Hitless Merge, Transport stream backup and Service level backup

Scalable Video Functions

Virtualized video functions in the Virtual DCM can be independently instantiated and elastically scaled, enabling cost- and resource-efficient growth and contributing to reduced overall TCO.

Superior Picture Quality

The Virtual DCM offers best-in-class video quality equivalent to that of the Hardware DCM platform, optimized for your bandwidth requirements.

Simplified Operation

An intuitive user interface simplifies the configuration and operation of the Virtual DCM. Common management across Virtual and Hardware DCM platforms further simplifies ongoing video headend operations.

Product Specifications

Table 1 lists specifications for the Synamedia Virtual DCM.

Table 1. Synamedia Virtual DCM Product Specification

Input formats	
	• MPEG-2 TS (MPEG-2, H.264, HEVC) over IP/UDP, and IP/UDP/RTP • Multiple program transport stream (MPTS) or single program transport stream (SPTS) • SD, HD, full HD (1920 x 1080p50/59.94), and Ultra-HD (3840 x 2160p50/59.94) • Unicast or multicast • SMPTE2022-6 (SDI over IP) ingress totally in software • Adaptive Transport Stream (ATS) input for ABR to TS functionality • Zixi feed over IP for reliable transport over Internet
Output formats	

	• MPEG-2 TS (MPEG-2, H.264, HEVC) over IP/UDP, and IP/UDP/RTP
	• Multiple program transport stream (MPTS) or single program transport stream (SPTS)
	• Adaptive Transport Stream (ATS)
	• Embedded packaging
	  ◦ Apple HLS
	  ◦ MPEG-DASH
	  ◦ Microsoft Live Smooth Streaming (HSS)
	• SD, HD and Ultra-HD including down conversion support
	• Unicast or multicast

IP Input Video formats	
	• H.264 HD/SD 4:2:0 8 bit and 4:2:2 8/10 bit • MPEG-2 HD/SD 4:2:0 8 bit • HEVC Ultra-HD/HD 4:2:0 8/10 bit • Ultra-HD bit rates ◦ HEVC: Main10 profile, High Tier @ Level 5.1 up to 125 Mbps • Ultra-HD resolutions

	◦ 3840 x 2160 @ 50/59.94 or 25/29.97 fps ● HD bit rates ◦ MPEG-2: MP @ HL up to 50 Mbps ◦ H.264: HP @ L4.0-L4.1 up to 50 Mbps ◦ HEVC: Main/Main10 profile, Main/High Tier @ L4.1 up to 50Mbps ● HD resolutions ◦ 1080p x 1920/1440/1280/960 @ 50 or 59.94 fps ◦ 1080i x 1920/1440/1280/960 @ 25 or 29.97 fps ◦ 720p x 1280/960 @ 50 or 59.94 fps ● SD bit rates ◦ MPEG-2: MP @ ML up to 15 Mbps ◦ H.264: MP @ L3-L4.1 up to 12.5 Mbps ● SD resolutions ◦ PAL: 576i x 720/704/640/544/528/480/352 @ 25 fps ◦ NTSC: 480i x 720/704/640/544/528/480/352 @ 29.97 fps
SDI Input Video formats	
	● Ultra-HD resolutions ◦ Quad SDI inputs with 1080p @ 50 or 59.94; Interleaved or quadrant modes support ● HD resolutions ◦ 1080p @ 50 or 59.94 fps ◦ 1080i @ 25 or 29.97 fps ◦ 720p @ 50 or 59.94 fps ● SD resolutions ◦ PAL: 576i @ 25 fps ◦ NTSC: 480i @ 29.97 fps
De-interlacing	
	● HD resolutions ◦ Input 1080i25 → 720p25 or 50 fps ◦ Input 1080i29.97 → 720p29.97 or 59.94 fps ◦ Input 1080i25 → 1080p25 or 50 fps ◦ Input 1080i29.97 → 1080p29.97 or 59.94 fps ● SD resolutions ◦ Input 576i25 → 576p25 or 576p50 ◦ Input 480i29.97 → 480p29.97 or 480p59.94
Output video formats	
	● Ultra-HD bit rates ◦ HEVC: Main10 profile, Main tier @ Level 5.1, up to 25 Mbps ● Ultra-HD resolutions ◦ 3840 x 2160 @ 50/59.94 ● HD bit rates ◦ MPEG-2: MP @ HL 1 to 25 Mbps ◦ H.264: MP @ Level up to 4.2 0.5 to 25 Mbps ◦ H.264: HP @ Level up to L4.2 1 to 25 Mbps ◦ HEVC: Main/Main10 profile, Main tier @ Level 4.1, up to 16 Mbps ● HD resolutions ◦ 1080p x 1920 @ 50/59.94 fps ◦ 1080i x 1920/1280 @ 25 fps ◦ 1080i x 1920/1280 @ 29.97 fps ◦ 720p x 1280/960 @ 50 fps ◦ 720p x 1280/960 @ 59.94 fps ● SD bit bates ◦ MPEG-2: MP @ ML 0.6 to 15 Mbps ◦ H.264: MP @ L3.0 0.3 to 15 Mbps

- H.264: HP @ L3.0 0.3 to 25 Mbps
- SD resolutions
  - PAL: 576i x 720/704/640/544/528/480/352 @ 25 fps
  - NTSC: 480i x 720/704/640/544/528/480/352 @ 29.97 fps
- ABR resolutions
  - H.264/HEVC: Ranging from 128x96 to 1920x1080 – from 1/2 of input frame-rate to double the frame rate
  - HEVC: 3840 x 2160

Video processing

- Static, hierarchical, and dynamic GOP
- Motion compensated temporal filtering (MCTF)
- De-interlacing
- Prefiltering to remove noise and macroblocking artifacts from video sources
- Inverse Telecine
- Aspect ratio: 16:9 and 4:3, AFD and manual control

Input audio formats

- MPEG-1 layer 2
  - Sample rates: 32, 44.1 and 48 kHz
- Dolby Digital (AC-3), Dolby Digital Plus (EAC-3), Dolby-E
  - Sample rates: 48 kHz
- Advanced audio coding (AAC-LC)
  - Sample rates: 32, 44.1 and 48 kHz
  - Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM

Output audio formats

- MPEG-1 layer 22
  - Mono: 32, 48, 56, 64, 80, 96, 112, 128, 160, and 192 kbps
  - Stereo: 64, 96, 112, 128, 160, 192, 224, 256, 320, and 384 kbps
  - Sample rates: 32, 44.1, and 48 kHz
- AAC-LC
  - Mono: 32, 48, 56, 64, 80, 96, 112, 128, 160, and 192 kbps
  - Stereo: 32, 40, 48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, and 512 kbps
  - 5.1: 32, 40, 48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, and 640 kbps
  - Sample rates: 32, 44.1 and 48 kHz1, and 48 kHz2
  - Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM
- AAC-HE
  - Mono: Up to 64 kbps
  - Stereo: Up to 96 kbps
  - 5.1: Up to 224 kbps
  - Sample rates: 32, 44.1 and 48 kHz1, 48 kHz2
  - Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM
- Dolby Digital (AC-3):
  - Mono: 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, and 320 kbps
  - Stereo: 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, and 640 kbps
  - 5.1: 224, 256, 320, 384, 448, 512, 576, and 640 kbps
  - Sample rates: 48 kHz
- Dolby Digital Plus (E-AC3)
  - Mono: 32, 40, 48, 56, 64, 72, 80, 88, 96, 104, 112, 120, 128, 144, 160, 176, 192, 200, 208, 216, 224, 232, 240, 248, 256, 272, 288, 304, 320, 336, 352, 368, 384, 400, 448, 512, 576, 640, 704, 768, 832, 896, 960, and 1024 kbps
  - Stereo: 96, 104, 112, 120, 128, 144, 160, 176, 192, 200, 208, 216, 224, 232, 240, 248, 256, 272, 288, 304, 320, 336, 352, 368, 384, 400, 448, 512, 576, 640, 704, 768, 832, 896, 960, and 1024 kbps
  - 5.1: 192, 200, 208, 216, 224, 232, 240, 248, 256, 272, 288, 304, 320, 336, 352, 368, 384, 400, 448, 512, 576, 640, 704, 768, 832, 896, 960, and 1024 kbps
- Sample rates: 48 kHz

Metadata	
	• Closed caption support: CEA-608 and CEA-708 conversion • SCTE 104/SCTE 35 processing • VBI/VANC formats: WST, DVB-WST, WSS, OP-47, OP42, SMPTE-2031, SMPTE-2038, SMPTE-2016
Multiplexing	
	• PID filtering and remapping • Fixed output PID remapping • Dynamic PSI/SI/PSIP regeneration with advanced descriptor handling support • Service and component merging
Statistical multiplexing	
	• MPEG-2, H.264, HEVC, HD, and SD • Statmux controller for Virtual DCM supporting pools up to 100 services per pool • Statmux controller for Hardware DCM supporting pools up to 64 services
Scrambling	
	• Encryption algorithms: ◦ DVB CSA v1/v2 ◦ BISS mode 1 ◦ Synamedia PowerKey ◦ Synamedia PowerVu® technology ◦ AES: AES ECB, ATIS, DVB-CPCM, AES CBC, and AES CISSA according ETSI TS 103 127 • DVB SimulCrypt Scrambling according ETSI TS 103 197
Splicing & Switching	
	• Live Linear Broadcast Splicing ◦ Advanced Digital Program Insertion: Ad Insertion ◦ Local Program Insertion ◦ Video Seamless Alternate channels ◦ SCTE-35 and SCTE-30 interface protocol support • Live Linear ABR support ◦ Adaptive Transport Stream Conditioning & SCTE-35 processing ◦ POIS interface Cablelabs Real-time Event Signaling and Management API (ESAM) • Linear Stream Switching ◦ Switch to alternate channel using Cablelabs™ Real-time Event Signaling and Management API triggers
Redundancy	
	• 1:1 IP interface backup • IP port mirroring • Input service and transport stream redundancy • Hitless Merge for MPEG-2 Transport Stream input and for SMPTE2022-6 input (SMPTE-2022-7) • User-configurable triggers • 1:1 and N:M Virtual DCM node redundancy
Monitoring and Management	
	• Integrated Grafana dashboards • Elastic Search, Logstash and Kibana (ELK) stack support • Alarm notifications including SNMP traps • Syslog • Easy control local web GUI • VSM support for lineup configuration, resource pool redundancy for hybrid setups (mix of hardware DCM and software Synamedia Virtual DCM), capacity modeling, and centralized monitoring • Fully documented open API allowing integration with third-party components

Platform Support and Compatibility

Table 2 summarizes the recommended hardware for Synamedia Virtual DCM installation on a Cisco UCS B Series Blade Server.

Table 2. Recommended Hardware Configuration on Cisco UCS B Series Blade Server

Description	Specification	Quantity
UCSB-B200-M5-U	UCS B200 M5 Blade Server	1
UCS-CPU-6150	2.7 GHz Gold 6150 22C/42MB Cache / DDR4 2666Mhz	2
UCS-MR-1X081RU-A	8GB DDR4-2133-MHz RDIMM/PC4-17000/single rank/x4/1.2v	12
A03-D600GA2	600GB 6Gb SAS 10K RPM SFF HDD/hot plug/drive sled mounted	2
UCSB-MLOM-40G-03	Cisco UCS VIC 1340 modular LOM for blade servers	1

Table 3 lists the SDI input card option for rack servers.

Table 3. SDI Input option cards for rack servers

Description	Specification	Quantity
VDCM-OEM-CVD88	Virtual DCM 8 port SDI input card	Up to 2

Table 4 gives the minimum hardware resource specifications for an ESXi-based host.

Table 4. Minimum Host System Hardware Requirements

Description	Specification
Central processing unit (CPU)	2 x 64-bit (x86) 2.6 GHz 14-core processor supporting AVX 2.0
Memory (RAM)	64 GB
Storage (HDD)	64 GB
BIOS	See installation guide for full list of BIOS settings

Table 5 provides the host system software and license requirements.

Table 5. Host System Software and Licensing Requirements

Description	Specification
Operating system (OS)	Minimum CentOS 7.3-1611, recommended CentOS 7.5-1804
Red Hat Enterprise Linux support	Minimum RHEL 7.3, recommended RHEL 7.5
VMware vSphere hypervisor ESXi	Release 6.0 or higher
Docker Container	Minimum V1.13

Warranty Information

Find warranty information on Virtual DCM solution page on Synamedia.com.

Ordering Information

To place an order or download software, visit the Synamedia Ordering Portal Home Page

Table 6. Ordering Information

Product Name	Part Number
Synamedia Virtual DCM Software Application: Assembly to Order PID	R-VDCM-APPS
Virtual DCM Software	
• Virtual DCM Software Package	SW-VDCM-Vxx-K9
• Virtual DCM Platform License	L-VDCM-PLATFORM
Virtual DCM Transcoding Licenses: options enabling transcode functionality	
• Virtual DCM Video XCode License, 1 credit (AVC/MP2 1st screen)	L-VDCM-V-XCODE-P1
• Virtual DCM Video XCode License, 1 credit (HEVC 1st screen and ABR)	L-VDCM-V-XCODE-P2
• Virtual DCM Video XCode License, 1 credit (AVC ABR)	L-VDCM-V-XCODE-P3
• Virtual DCM Audio XCode License, 1 credit	L-VDCM-A-XCODE-P1
Virtual DCM Ingress/Egress Licenses: options enabling I/O, multiplexing, FEC and statmux functionality	
• Virtual DCM XGress License, 1 credit	L-VDCM-XGRESS-P1
Virtual DCM XCrypt Licenses: options enabling scrambling functionality	
• Virtual DCM XCrypt License, 1 credit	L-VDCM-XCRYPT-P1

For more information

For more information about Synamedia video solutions, visit www.synamedia.com.

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