



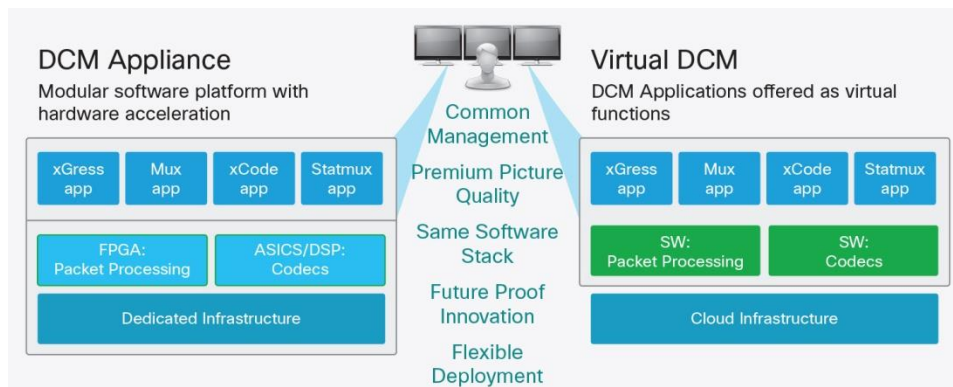
Synamedia Digital Content Manager

The Synamedia® Digital Content Manager (DCM) represents a new generation of virtualized and software-centric 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 video functions on a cloud-based Network Functions Virtualization (NFV) infrastructure, the 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 or optimized hardware appliances and enables service portability between both hardware and software resources.

The DCM is the modular software architecture running on common compute node as DCM or on optimized hardware as DCM appliance (D9902). The 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 D9902 hardware platform. (See Figure 1).

Figure 1. Common Code Base



The 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 Network Service Manager (VSM), which enables you to easily provision DCM instances and even have service portability between the DCM appliance model and the virtualized DCM (software-based) model.

The DCM is a fully optimized solution on Synamedia dedicated hardware as well as on the Synamedia Compute Node platform, and it runs on general-purpose computing hardware on premises or in the cloud.

Features and Benefits

Synamedia 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 dedicated hardware, fully optimized to run on Synamedia Compute Nodes, as well as a virtualized application.

Broad Feature Set

The DCM offers several broad features and functions of the DCM platform, 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

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

Superior Picture Quality

The DCM offers best-in-class video quality, optimized for your bandwidth requirements.

Simplified Operation

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

Product Specifications

Table 1 lists specifications for the Synamedia DCM.

Table 1. Synamedia DCM Product Specification

Input formats	DCM (software)	DCM (D9902)
	<ul style="list-style-type: none"> • 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 • SMPTE2110-10 / -20 / -21/ -30/ -40 (Single stream) • Adaptive Transport Stream (ATS) input for ABR to TS functionality • Zixi feed over IP for reliable transport over Internet 	<ul style="list-style-type: none"> • MPEG-2 TS (MPEG-2, H.264) 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), • Unicast or multicast • SMPTE2022-6 (SDI over IP) ingress totally in software
Output formats	Virtualized DCM	DCM (D9902)
	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> ◦ Apple HLS ◦ MPEG-DASH ◦ Microsoft Live Smooth Streaming (HSS) • SD, HD and Ultra-HD including down conversion support 	<ul style="list-style-type: none"> • MPEG-2 TS (MPEG-2, H.264) over IP/UDP, and IP/UDP/RTP • Multiple program transport stream (MPTS) or single program transport stream (SPTS) • Unicast or multicast

IP Input Video formats	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> ◦ HEVC: Main10 profile, High Tier @ Level 5.1 up to 125 Mbps • Ultra-HD resolutions <ul style="list-style-type: none"> ◦ 3840 x 2160 @ 50/59.94 or 25/29.97 fps • HD bit rates <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ MPEG-2: MP @ ML up to 15 Mbps ◦ H.264: MP @ L3-L4.1 up to 12.5 Mbps • SD resolutions <ul style="list-style-type: none"> ◦ 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 	<ul style="list-style-type: none"> • 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 • HD bit rates <ul style="list-style-type: none"> ◦ MPEG-2: HP@HL 0.5 Mbps to 30 Mbps ◦ H.264: MP@L4.0 1 Mbps to 20 Mbps ◦ H.264: HP@L4.0 1 Mbps to 25 Mbps ◦ H.264: MP@L4.1 1 Mbps to 30 Mbps • HD resolutions <ul style="list-style-type: none"> ◦ 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 ◦ ABR: resolution freely configurable • SD bit rates <ul style="list-style-type: none"> ◦ MPEG-2: MP@ML 0.5 Mbps to 10 Mbps ◦ H.264: MP@L3.0 0.5 Mbps to 10 Mbps ◦ H.264: HP@L3.0 0.5 Mbps to 12.5 Mbps • SD resolutions <ul style="list-style-type: none"> ◦ MPEG-2: MP@ML 0.5 Mbps to 10 Mbps ◦ H.264: MP@L3.0 0.5 Mbps to 10 Mbps ◦ H.264: HP@L3.0 0.5 Mbps to 12.5 Mbps
SDI Input Video formats	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • Ultra-HD resolutions <ul style="list-style-type: none"> ◦ Quad SDI inputs with 1080p @ 50 or 59.94; Interleaved or quadrant modes support • HD resolutions <ul style="list-style-type: none"> ◦ 1080p @ 50 or 59.94 fps ◦ 1080i @ 25 or 29.97 fps ◦ 720p @ 50 or 59.94 fps • SD resolutions <ul style="list-style-type: none"> ◦ PAL: 576i @ 25 fps ◦ NTSC: 480i @ 29.97 fps 	<ul style="list-style-type: none"> • HD resolutions <ul style="list-style-type: none"> ◦ 1080i @ 25, 29.97 or 30 fps ◦ 720p @ 50, 59.94 or 60 fps • SD resolutions <ul style="list-style-type: none"> ◦ PAL: 576i @ 25 fps ◦ NTSC: 480i @ 29.97 fps
De-interlacing	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • HD resolutions <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ Input 576i25 → 576p25 or 576p50 ◦ Input 480i29.97 → 480p29.97 or 480p59.94 	<ul style="list-style-type: none"> • HD resolutions <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ Input 576i25 → 576p25 or 576p50 ◦ Input 480i29.97 → 480p29.97 or 480p59.94
Output video formats	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • Ultra-HD bit rates <ul style="list-style-type: none"> ◦ HEVC: Main10 profile, Main tier @ Level 5.1, up to 25 Mbps • Ultra-HD resolutions <ul style="list-style-type: none"> ◦ 3840 x 2160 @ 50/59.94 • HD bit rates <ul style="list-style-type: none"> ◦ 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 	<ul style="list-style-type: none"> • HD bit rates <ul style="list-style-type: none"> ◦ 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 • HD resolutions <ul style="list-style-type: none"> ◦ 1080p x 1920 @ 50/59.94 fps ◦ 1080i x 1920/1280 @ 25 fps ◦ 1080i x 1920/1280 @ 29.97 fps

	<ul style="list-style-type: none"> • HEVC: Main/Main10 profile, Main tier @ Level 4.1, up to 16 Mbps • HD resolutions <ul style="list-style-type: none"> ◦ 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 rates <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ H.264/HEVC: Ranging from 128x96 to 1920x1080 – from 1/2 of input frame-rate to double the frame rate ◦ HEVC: 3840 x 2160 	<ul style="list-style-type: none"> ◦ 720p x 1280/960 @ 50 fps ◦ 720p x 1280/960 @ 59.94 fps • SD bit rates <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ 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
Video processing	Virtualized DCM <ul style="list-style-type: none"> • 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 	DCM Appliance <ul style="list-style-type: none"> • 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 • High-Density Mode (144 SD or 48 HD)
Input audio formats	Virtualized DCM <ul style="list-style-type: none"> • MPEG-1 layer 2 <ul style="list-style-type: none"> ◦ Sample rates: 32, 44.1 and 48 kHz • Dolby Digital (AC-3), Dolby Digital Plus (EAC-3), Dolby-E <ul style="list-style-type: none"> ◦ Sample rates: 48 kHz • Advanced audio coding (AAC-LC) <ul style="list-style-type: none"> ◦ Sample rates: 32, 44.1 and 48 kHz • Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM 	DCM Appliance <ul style="list-style-type: none"> • MPEG-1 layer 2 <ul style="list-style-type: none"> ◦ Sample rates: 32, 44.1 and 48 kHz • Dolby Digital (AC-3), Dolby Digital Plus (EAC-3), Dolby-E <ul style="list-style-type: none"> ◦ Sample rates: 48 kHz • Advanced audio coding (AAC-LC) <ul style="list-style-type: none"> ◦ Sample rates: 32, 44.1 and 48 kHz • Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM
Output audio formats	Virtualized DCM <ul style="list-style-type: none"> • MPEG-1 layer 22 <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ 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 kHz ◦ Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM • AAC-HE <ul style="list-style-type: none"> ◦ Mono: Up to 64 kbps ◦ Stereo: Up to 96 kbps 	DCM Appliance <ul style="list-style-type: none"> • MPEG-1 layer 22 <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ 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 kHz ◦ Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM • AAC-HE <ul style="list-style-type: none"> ◦ Mono: Up to 64 kbps ◦ Stereo: Up to 96 kbps

	<ul style="list-style-type: none"> • 5.1: Up to 224 kbps • Sample rates: 32, 44.1 and 48 kHz • Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM • Dolby Digital (AC-3): <ul style="list-style-type: none"> • 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) <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 5.1: Up to 224 kbps • Sample rates: 32, 44.1 and 48 kHz • Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM • Dolby Digital (AC-3): <ul style="list-style-type: none"> • 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
Metadata	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • PID filtering and remapping • Fixed output PID remapping • Dynamic PSI/SI/PSIP regeneration with advanced descriptor handling support • Service and component merging 	<ul style="list-style-type: none"> • PID filtering and remapping • Fixed output PID remapping • Dynamic PSI/SI/PSIP regeneration with advanced descriptor handling support • Service and component merging
Statistical multiplexing	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • MPEG-2, H.264, HEVC, HD, and SD • Statmux controller for DCM supporting pools up to 100 services per pool • Statmux controller for Hardware DCM supporting pools up to 64 services 	<ul style="list-style-type: none"> • MPEG-2, H.264, HD, and SD • Statmux controller for DCM supporting pools up to 100 services per pool • Statmux controller for Hardware DCM supporting pools up to 64 services
Scrambling	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • Encryption algorithms: <ul style="list-style-type: none"> • DVB CSA v1/v2 • BISS mode 1 • 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 	<ul style="list-style-type: none"> • Encryption algorithms: <ul style="list-style-type: none"> • DVB CSA v1/v2 • BISS mode 1 • 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	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • Live Linear Broadcast Splicing <ul style="list-style-type: none"> • Advanced Digital Program Insertion: Ad Insertion • Local Program Insertion • Video Seamless Alternate channels • SCTE-35 and SCTE-30 interface protocol support 	<ul style="list-style-type: none"> • Live Linear Broadcast Splicing <ul style="list-style-type: none"> • Advanced Digital Program Insertion: Ad Insertion • Local Program Insertion • Video Seamless Alternate channels • SCTE-35 and SCTE-30 interface protocol support

	<ul style="list-style-type: none"> • Live Linear ABR support <ul style="list-style-type: none"> ◦ Adaptive Transport Stream Conditioning & SCTE-35 processing ◦ POIS interface Cablelabs Real-time Event Signaling and Management API (ESAM) • Linear Stream Switching <ul style="list-style-type: none"> ◦ Switch to alternate channel using Cablelabs™ Real-time Event Signaling and Management API triggers 	<ul style="list-style-type: none"> • Live Linear ABR support <ul style="list-style-type: none"> ◦ Adaptive Transport Stream Conditioning & SCTE-35 processing ◦ POIS interface Cablelabs Real-time Event Signaling and Management API (ESAM) • Linear Stream Switching <ul style="list-style-type: none"> ◦ Switch to alternate channel using Cablelabs™ Real-time Event Signaling and Management API triggers
Redundancy	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • 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 DCM node redundancy 	<ul style="list-style-type: none"> • 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 DCM appliance redundancy
Monitoring and Management	Virtualized DCM	DCM Appliance
	<ul style="list-style-type: none"> • 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 DCM), capacity modeling, and centralized monitoring • Fully documented open API allowing integration with third-party components 	<ul style="list-style-type: none"> • 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 DCM), capacity modeling, and centralized monitoring • Fully documented open API allowing integration with third-party components

Platform Support and Compatibility

Table 2 gives the minimum hardware resource specifications for a server running virtualized DCM.

Table 2. 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 3 provides the host system software and license requirements.

Table 3. 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

Table 4 provides the DCM appliance Chassis specifications.

Table 4. DCM Appliance Chassis Specifications

Category	Specification
Physical and Power	
Physical Specifications	Height: 2RU 3.48 in. / 88 mm Width: 19 in. / 483 mm Depth: 21.8 in. / 554 mm Weight: <ul style="list-style-type: none"> ● 14.5kg (unloaded) ● 17kg (fully loaded with GbE & 3 ASI cards) ● 21 kg (fully loaded with Gateway cards)
Power Consumption	Empty chassis: 100W
Input Voltage	Worldwide ranging AC <ul style="list-style-type: none"> ● Nominal 100 – 240 VAC ● Normal service voltage range 90 – 254 VAC ● Frequency 47 – 63 Hz ● Maximum current 10 A Worldwide ranging DC <ul style="list-style-type: none"> ● Nominal -48 - -60 VDC ● Normal service voltage range -40 to -72 VDC; ● Maximum current, 29A
Cooling	Front to rear, forced air, units are stackable, fan speed is ambient temperature controlled
Environmental	
Operating Temperature	32 to 122°F – 0 to 50°C
Storage Temperature	-40 to 158°F (-40 to 70°C)
Relative Operating Humidity	5% to 85% (gradation < 10% per hour)
Relative Storage Humidity	5% to 95%
Operating Altitude	-61 to 3048m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)
Regulatory Compliance	
ETSI Standards	EN 300 386: Telecommunications Network Equipment (EMC)
EMC Standards	<ul style="list-style-type: none"> ● FCC 47 CFR Part 15 Class A ● ICES- 003 Class A ● AS/NZS 3548 Class A ● CISPR 22 / EN55022 Class A ● CISPR 24 / EN55024 ● VCCI Class A ● KN 22 ● IEC/EN 61000-3-2: Power Line Harmonics
Immunity	<ul style="list-style-type: none"> ● IEC/EN-61000-4-2: Electrostatic Discharge Immunity ● IEC/EN-61000-4-3: Radiated RF Immunity ● IEC/EN-61000-4-4: Electrical Fast Transient Immunity ● IEC/EN-61000-4-5: Surge Immunity ● IEC/EN-61000-4-6 : Conducted RF Immunity ● IEC/EN-61000-4-11: Voltage DIPS, Short Interruptions and Voltage Variations

Safety	<ul style="list-style-type: none"> ● UL/CSA/IEC/EN 60950-1 2nd edition ● IEC/EN 60825 Laser Safety ● ACA TS001 ● AS/NZS 60950 ● FDA: Code of Federal Regulations Laser Safety
Management and monitoring	
Number of ports on chassis	3 (1 on front, and 2 on the rear)
Connector type	RJ-45
Interface type	10/100/1000 BT
Protocols	HTTP, SNMP, IIOIP, REST
User interface	Embedded HTML user interface
Local RS-232 communication interface	Mini USB type B, to initially configure management ports
General Purpose Inputs	25 pin connector (to be supported in the future)

Figure 2. Synamedia DCM Digital Content Manager Appliance Front / Rear Panel



Table 5. DCM MIC Card Specifications

Category	Specification
Physical and Power	
Physical specifications	Height: 39.5 mm/1.54 in Width: 145 mm/5.70 in Depth: 365 mm/14.37 in Weight: 1.120 kg/3.46 lbm
Power Consumption	DCM Media Interface Card: 160W maximum
Environmental Specifications	
Operating Temperature	32 - 122°F (0 to 50°C)
Storage Temperature	-40 - 158°F (-40 to 70°C)
Relative Operating Humidity	5 to 90 percent Note: Not to exceed 0.024 kg water or dry air
Relative Storage Humidity	5 to 95 percent Note: Not to exceed 0.024 kg water or dry air

Operating Altitude	-61 to 3048m (up to 2000m conforms to IEC/EN/UL/CSA 60950 requirements)
Compliance	
Network Equipment Building Standards (NEBS)	Designed for SR-3580: NEBS Criteria Levels (Level 3) GR-1089-CORE: NEBS EMC and Safety GR-63-CORE: NEBS Physical Protection
ETSI Standards	<ul style="list-style-type: none"> ● EN300 386: Telecommunications Network Equipment (EMC) ● FCC 47 CFR Part 15 Class A ● ICES- 003 Class A ● AS/NZS 3548 Class A ● CISPR 22/EN55022 Class A ● CISPR 24/EN55024 ● VCCI Class A ● KN 22
EMC Standards	<ul style="list-style-type: none"> ● IEC/EN 61000-3-2: Power Line Harmonics ● IEC/EN-61000-4-2: Electrostatic Discharge Immunity ● IEC/EN-61000-4-3: Radiated Immunity ● IEC/EN-61000-4-4: Electrical Fast Transient Immunity ● IEC/EN-61000-4-5: Surge
Immunity	<ul style="list-style-type: none"> ● IEC/EN-61000-4-11: Voltage DIPS, Short Interruptions, and Voltage Variations
Safety	<ul style="list-style-type: none"> ● UL/CSA/IEC/EN 60950-1 2nd edition ● IEC/EN 60825 Laser Safety ● ACA TS001 ● AS/NZS 60950 ● FDA: Code of Federal Regulations Laser Safety
Baseband Video Interfaces	
Number of Ports per Card	Up to 8 ports for SD/HD-SDI inputs Up to 4 ports for 3G-SDI inputs
Connector Type	SFP plug-in - Please refer to Table 3
IP Interfaces	
Number of Ports per Card	Four 10Gigabit Ethernet either unidirectional or full duplex, configured in two 1+1 redundant ports
Connector Type	10Gigabit Ethernet: Optical or electrical SFP+
Interface Type	10Gigabit Ethernet according to IEEE 802.3ae
Protocols	UDP/IP, RTP/UDP/IP, ARP, IGMPv2/v3, Diffserv/TOS 802.1p Support for IEEE 802.Q VLAN tagging
IP Address Format	Multicast, unicast
Redundancy	Port, TS and Service backup
TS Streaming	Multiple SPTS/MPTS streams
Number of TS Streams	Up to 2500 input streams and 2500 output streams per card
TS Tables	Input SI/PSI/PSIP acquisition, Output SI/PSI/PSIP processing

Table 6. DCM MFP Card Specifications

Category	Specification
Physical and Power	
Physical specifications	Dual layer MFP Card (DCM-MFP) that occupies 1 slot in the DCM MkII 2RU chassis: <ul style="list-style-type: none"> ● Height: 39.5 mm ● Width: 145 mm

	<ul style="list-style-type: none"> ● Depth: 365 mm ● Weight: 1,570 kg
Power Consumption	DCM-MFP : 150 W
Environmental Specifications	
Operating Temperature	32 – 122°F / 0 – 50°C
Storage Temperature	-40 – 158°F (-40 – 70°C)
Relative Operating Humidity	5 to 90% Note: Not to exceed 0.024 kg water or dry air Relative Storage Humidity
Relative Storage Humidity	5 to 95% Note: Not to exceed 0.024 kg water or dry air.
Operating Altitude	-61 to 3048 m (up to 2000 m conforms to IEC/EN/UL/CSA 60950 requirements)
Compliance	
Network Equipment Building Standards (NEBS)	Designed for SR-3580: NEBS Criteria Levels (Level 3) GR-1089-CORE: NEBS EMC and Safety GR-63-CORE: NEBS Physical Protection
ETSI Standards	<ul style="list-style-type: none"> ● EN300 386: Telecommunications Network Equipment (EMC)
EMC Standards	<ul style="list-style-type: none"> ● FCC 47 CFR Part 15 Class A ● ICES- 003 Class A ● AS/NZS 3548 Class A ● CISPR 22 /EN55022 Class A ● CISPR 24 / EN55024 ● VCCI Class A ● KN 22 ● IEC/EN 61000-3-2: Power Line Harmonics
Immunity	<ul style="list-style-type: none"> ● IEC/EN-61000-4-2: Electrostatic Discharge Immunity ● IEC/EN-61000-4-3: Radiated Immunity ● IEC/EN-61000-4-4: Electrical Fast Transient Immunity ● IEC/EN-61000-4-5: Surge ● IEC/EN-61000-4-11: Voltage DIPS, Short Interruptions, and Voltage Variations
Safety	<ul style="list-style-type: none"> ● UL/CSA/IEC/EN 60950-1 2nd edition ● IEC/EN 60825 Laser Safety ● ACA TS001 ● AS/NZS 60950 ● FDA: Code of Federal Regulations Laser Safety

Warranty Information

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

Ordering Information

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

Table 7 summarizes the licenses for Synamedia DCM software installation on a Compute Node.

Table 7. Ordering Information

Feature	Part Number
Synamedia DCM Software Application: Assembly to Order PID	R-VDCM-APPS
DCM Software	
<ul style="list-style-type: none"> DCM Platform License 	L-VDCM-PLATFORM
DCM Transcoding Licenses: options enabling transcode functionality	
<ul style="list-style-type: none"> DCM Video XCode License, 1 credit (AVC/MP2 1st screen) 	L-VDCM-V-XCODE-P1
<ul style="list-style-type: none"> DCM Video XCode License, 1 credit (HEVC 1st screen and ABR) 	L-VDCM-V-XCODE-P2
<ul style="list-style-type: none"> DCM Video XCode License, 1 credit (AVC ABR) 	L-VDCM-V-XCODE-P3
<ul style="list-style-type: none"> DCM Audio XCode License, 1 credit 	L-VDCM-A-XCODE-P1
DCM Ingress/Egress Licenses: options enabling I/O, multiplexing, FEC and statmux functionality	
<ul style="list-style-type: none"> DCM XGress License, 1 credit 	L-VDCM-XGRESS-P1
DCM XCrypt Licenses: options enabling scrambling functionality	
<ul style="list-style-type: none"> DCM XCrypt License, 1 credit 	L-VDCM-XCRYPT-P1

Table 8 lists Recommended Synamedia compute node for Virtual DCM.

Table 8. Recommended Compute Server for Virtualized DCM

Feature	Part Number
VP Compute Node XL, 12x8GB, 2xSSD, 2xAC-1000, US	VP-NODE-XL-2AC-US
VP Compute Node L, 12x8GB, 2xHDD, 2xAC-750, US	VP-NODE-L-2AC-US
VP Compute Node M, 12x8GB, 2xHDD, 2xAC-750, US	VP-NODE-M-2AC-US
VP Compute Node S, 8x8GB, 2xHDD, 2xAC-750, US	VP-NODE-S-2AC-US
VP Compute Node XS, 4x16GB, 1xHDD, 1xAC-350, Brazil	VP-NODE-XS-1AC-BR

Table 9 lists the PCIe card options for compute node.

Table 9. SDI Input option cards for rack servers

Feature	Quantity	Part Number
DCM 8 port SDI input card	Up to 2	VN-OEM-SDI
DCM 4 port ASI input / output card	Up to 2	VN-OEM-ASI
DCM 10G Ethernet card	Up to 2	VN-OEM-10G

Table 10 summarizes the items and license for Synamedia DCM appliance.

Table 10. Items and license for DCM appliance

Feature	Part Number
Chassis	
D9902 DCM Chassis, 2RU	DCM-MK2-2RU

D9902 DCM Chassis, No PSU, SPARE	DCM-MK2-2RU=
Power Supplies	
D9902 DCM 2RU PSU, AC (AC power cord needs to be ordered separately)	PWR-850-AC-2RU
D9902 DCM 2RU PSU, AC (Spare)	PWR-850-AC-2RU=
D9902 DCM 2RU PSU, DC	PWR-850-DC-2RU
D9902 DCM 2RU PSU, DC (Spare)	PWR-850-DC-2RU=
AC Power cords	
Argentina	CAB-PWR-DMN-ARG
Australia	CAB-PWR-DMN-AUS
China	CAB-PWR-DMN-CHN
Europe	CAB-PWR-DMN-EU
Italy	CAB-PWR-DMN-IT
Japan	CAB-PWR-DMN-JPN
UK	CAB-PWR-DMN-UK
DC Power cords	
D9902 DCM DC Power Cable	DCM-D9902-CAB-DC
D9902 DCM DC Power Cable (Spare)	DCM-D9902-CAB-DC=
Mounting kit - Optional	
D9902 DCM MID-MOUNT BRACKETS	DCM-D9902-MID-BRK=
Accessories	
D9902 DCM MINI-USB-B - USB	DCM-D9902-MINIUSB=
Licenses	
Software licenses via e-delivery (Add licenses in Ordering Tool)	DCM-LIC-UPGR
MIC Hardware	
D9902 DCM Media Interface card - (req. SW, DCM, V13.10 or later)	DCM-IO-PROC
D9902 DCM Media Interface card - SPARE (req. SW, DCM, V13.10 or later)	DCM-IO-PROC=
MIC Licenses	
D9902 10Gigabit License per Card Main	LCDM-10G-IO
D9902 10Gigabit License per Card Backup	BCDM-10G-IO
Video SFPs	
Video SFP HD-BNC SD/HD/FHD Transceiver, MSA Compliant	VSFP-BNC-3G
Video SFP HD-BNC SD/HD/FHD Transceiver, MSA Compliant - Spare	VSFP-BNC-3G=
MFP Hardware	
D9902 DCM Multi Format Processor Board, Double Layer (req. SW, DCM, V10.00.05 or later)	DCM-MFP
D9902 DCM Multi Format Processor Board, Double Layer, Spare (req. SW, DCM, V10.00.05 or later)	DCM-MFP=
MFP Licenses	
Software license CD-ROM (Add licenses in Cisco's Dynamic Configuration Tool)	DCM-LIC-UPGR
Main DCM Device Licenses	
D9900/01/02 MPEG-2 SD Transcoding Lic (1/prg; req MFP)	LDCM-MP2SDTC
D9900/01/02 MPEG-2 HD Transcoding Lic (1/prg; req MFP)	LDCM-MP2HDTC

D9900/01/02 AVC SD Transcoding Lic (1/prg; req MFP)	LDCM-AVCSBTC
D9900/01/02 AVC HD Transcoding Lic (1/prg; req MFP)	LDCM-AVCHBTC
D9900/01/02 ABR Transcoding Lic (1/engine; req MFP)	LDCM-ABBTC
D9900/01/02 MFP Statmux (1/prg; req. MFP)	LDCM-SMX
D9900/01/02 MPEG-1 LII Transcode Lic (1/stereo; req MFP)	LDCM-MP1LII-TC
D9900/01/02 Dolby AC-3 Transcoding Lic (1/stereo; req MFP)	LDCM-DLBYAC3-TC
D9900/01/02 Dolby Digital Plus Transcode Lic (1/stereo; req MFP)	LDCM-DDP-TC
D9900/01/02 AAC Audio Transcode Lic (1/stereo; req MFP)	LDCM-AAC-TC
Backup DCM Device Licenses	
D9900/01/02 BU MPEG-2 SD Transcoding Lic (1/prg; req MFP)	BDCM-MP2SDTC
D9900/01/02 BU MPEG-2 HD Transcoding Lic (1/prg; req MFP)	BDCM-MP2HDTTC
D9900/01/02 BU AVC SD Transcoding Lic (1/prg; req MFP)	BDCM-AVCSBTC
D9900/01/02 BU AVC HD Transcoding Lic (1/prg; req MFP)	BDCM-AVCHBTC
D9900/01/02 BU ABR Transcoding Lic (1/engine; req MFP)	BDCM-ABBTC
D9900/01/02 BU MFP Statmux (1/prg; req. MFP)	BDCM-SMX
D9900/01/02 BU MPEG-1 LII Transcode Lic (1/stereo; req MFP)	BDCM-MP1LII-TC
D9900/01/02 BU Dolby AC-3 Transcode Lic (1/stereo; req MFP)	BDCM-DLBYAC3-TC

For more information


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

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