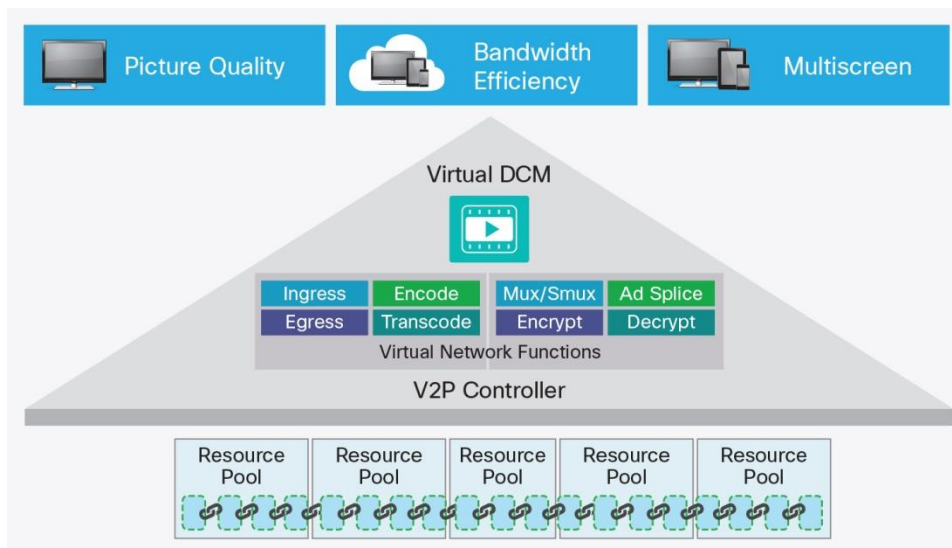


# Cisco Virtual Digital Content Manager



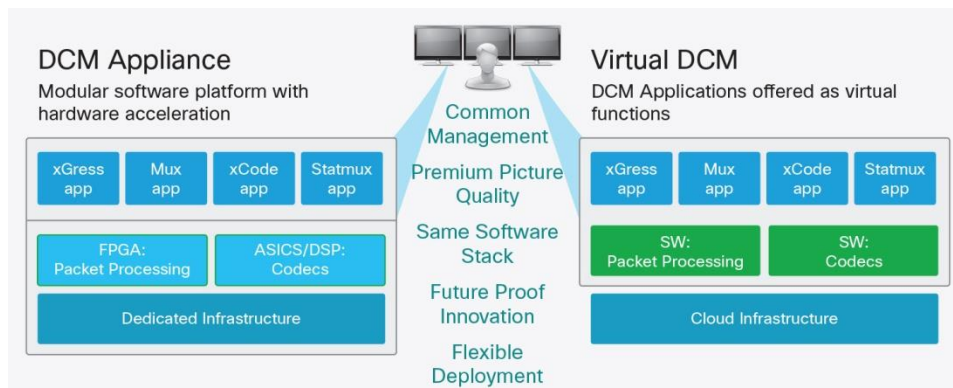
## Product Overview

The Cisco® 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 [Cisco DCM Series](#). 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 is one of the primary applications running on the [Cisco Virtualized Video Processing \(V2P\)](#) platform. V2P is a media application and hosting platform for orchestrating end-to-end workflows, from video acquisition to delivery. V2P provides an open, programmable, scalable, and extensible platform simplifying all of your video processing applications in your headend and data centers without being tied to the operational features of the underlying potentially hybrid infrastructure.

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 [Cisco Video Service 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

Cisco 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
- Statistical multiplexing
- Expert remultiplexing
- Content protection
- Advanced and hierarchical redundancy down to the service level

## 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 Cisco Virtual DCM.

**Table 1.** Cisco Virtual DCM Product Specifications

Description	Specification
<b>Input formats</b>	<ul style="list-style-type: none"><li>• MPEG-2 TS (MPEG-2, H.264, HEVC) over IP/UDP, and IP/UDP/RTP</li><li>• Multiple program transport stream (MPTS) or single program transport stream (SPTS)</li><li>• SD, HD, and full HD (1920 x 1080p50/59.94)</li><li>• Unicast or multicast</li><li>• SDI<sup>1</sup></li></ul>
<b>Output formats</b>	<ul style="list-style-type: none"><li>• MPEG-2 TS (MPEG-2, H.264, HEVC) over IP/UDP, and IP/UDP/RTP</li><li>• Multiple program transport stream (MPTS) or single program transport stream (SPTS)</li><li>• Adaptive Transport Stream (ATS)</li><li>• SD and HD, including down conversion support</li><li>• Unicast or multicast</li></ul>
<b>IP Input Video formats</b>	<ul style="list-style-type: none"><li>• H.264 HD/SD 4:2:0 8 bit and 4:2:2 8/10 bit</li><li>• MPEG-2 HD/SD 4:2:0 8 bit</li><li>• HD bit rates<ul style="list-style-type: none"><li>◦ MPEG-2: MP @ HL up to 50 Mbps</li><li>◦ H.264: HP @ L4.0-L4.1 up to 50 Mbps</li></ul></li><li>• HD resolutions<ul style="list-style-type: none"><li>◦ 1080p x 1920/1440/1280/960 @ 50 or 59.94 fps</li><li>◦ 1080i x 1920/1440/1280/960 @ 25 or 29.97 fps</li><li>◦ 720p x 1280/960 @ 50 or 59.94 fps</li></ul></li><li>• SD bit rates<ul style="list-style-type: none"><li>◦ MPEG-2: MP @ ML up to 15 Mbps</li><li>◦ H.264: MP @ L3-L4.1 up to 12.5 Mbps</li></ul></li><li>• SD resolutions<ul style="list-style-type: none"><li>◦ PAL: 576i x 720/704/640/544/528/480/352 @ 25 fps</li><li>◦ NTSC: 480i x 720/704/640/544/528/480/352 @ 29.97 fps</li></ul></li></ul>
<b>SDI Input Video formats</b>	<ul style="list-style-type: none"><li>• HD resolutions<ul style="list-style-type: none"><li>◦ 1080p @ 50 or 59.94 fps</li><li>◦ 1080i @ 25 or 29.97 fps</li><li>◦ 720p @ 50 or 59.94 fps</li></ul></li><li>• SD resolutions<ul style="list-style-type: none"><li>◦ PAL: 576i @ 25 fps</li><li>◦ NTSC: 480i @ 29.97 fps</li></ul></li></ul>

<sup>1</sup> For multiscreen applications

Description	Specification
<b>De-interlacing</b>	<ul style="list-style-type: none"> <li>• HD resolutions <ul style="list-style-type: none"> <li>◦ Input 1080i25 → 720p25 or 50 fps</li> <li>◦ Input 1080i29.97 → 720p29.97 or 59.94 fps</li> <li>◦ Input 1080i25 → 1080p25 or 50 fps</li> <li>◦ Input 1080i29.97 → 1080p29.97 or 59.94 fps</li> </ul> </li> <li>• SD resolutions <ul style="list-style-type: none"> <li>◦ Input 576i25 → 576p25 or 576p50</li> <li>◦ Input 480i29.97 → 480p29.97 or 480p59.94</li> </ul> </li> </ul>
<b>Output video formats</b>	<ul style="list-style-type: none"> <li>• HD bit rates <ul style="list-style-type: none"> <li>◦ MPEG-2: MP @ HL 1 to 25 Mbps</li> <li>◦ H.264: MP @ Level up to 4.2 0.5 to 25 Mbps</li> <li>◦ H.264: HP @ Level up to L4.2 1 to 25 Mbps</li> <li>◦ H.264: BP @ Level up to 4.1 0.5 to 25 Mbps</li> <li>◦ H.265: MP @ Level up to 4.2 0.5 to 25 Mbps</li> </ul> </li> <li>• HD resolutions <ul style="list-style-type: none"> <li>◦ 1080i x 1920/1280 @ 25 fps</li> <li>◦ 1080i x 1920/1280 @ 29.97 fps</li> <li>◦ 720p x 1280/960 @ 50 fps</li> <li>◦ 720p x 1280/960 @ 59.94 fps</li> </ul> </li> <li>• SD bit rates <ul style="list-style-type: none"> <li>◦ MPEG-2: MP @ ML 0.6 to 15 Mbps</li> <li>◦ H.264: MP @ L3.0 0.3 to 15 Mbps</li> <li>◦ H.264: HP @ L3.0 0.3 to 25 Mbps</li> </ul> </li> <li>• SD resolutions <ul style="list-style-type: none"> <li>◦ PAL: 576i x 720/704/640/544/528/480/352 @ 25 fps</li> <li>◦ NTSC: 480i x 720/704/640/544/528/480/352 @ 29.97 fps</li> </ul> </li> <li>• ABR resolutions <ul style="list-style-type: none"> <li>◦ H.264/H.265: Ranging from 128x96 to 1920x1080 – from 1/2 of input frame-rate to double the frame rate</li> </ul> </li> </ul>
<b>Video processing</b>	<ul style="list-style-type: none"> <li>• Static, hierarchical, and dynamic GOP</li> <li>• Motion compensated temporal filtering (MCTF)</li> <li>• De-interlacing</li> <li>• Prefiltering to remove noise and macroblocking artifacts from video sources</li> <li>• Inverse Telecine<sup>2</sup></li> <li>• Aspect ratio: 16:9 and 4:3, AFD and manual control</li> </ul>
<b>Input audio formats</b>	<ul style="list-style-type: none"> <li>• MPEG-1 layer 2 <ul style="list-style-type: none"> <li>◦ Sample rates: 32, 44.1 and 48 kHz</li> </ul> </li> <li>• Dolby Digital (AC-3), Dolby Digital Plus (EAC-3) <ul style="list-style-type: none"> <li>◦ Sample rates: 48 kHz</li> </ul> </li> <li>• Advanced audio coding (AAC-LC) <ul style="list-style-type: none"> <li>◦ Sample rates: 32, 44.1 and 48 kHz</li> <li>◦ Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM</li> </ul> </li> </ul>
<b>Output audio formats</b>	<ul style="list-style-type: none"> <li>• MPEG-1 layer 22 <ul style="list-style-type: none"> <li>◦ Mono: 32, 48, 56, 64, 80, 96, 112, 128, 160, and 192 kbps</li> <li>◦ Stereo: 64, 96, 112, 128, 160, 192, 224, 256, 320, and 384 kbps</li> <li>◦ Sample rates: 32, 44.1, and 48 kHz</li> </ul> </li> <li>• AAC-LC <ul style="list-style-type: none"> <li>◦ Mono: 32, 48, 56, 64, 80, 96, 112, 128, 160, and 192 kbps</li> <li>◦ Stereo: 32, 40, 48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, and 512 kbps</li> <li>◦ 5.1: 32, 40, 48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, and 640 kbps</li> <li>◦ Sample rates: 32, 44.1 and 48 kHz<sup>2</sup>, and 48 kHz<sup>1</sup></li> <li>◦ Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM</li> </ul> </li> <li>• AAC-HE <ul style="list-style-type: none"> <li>◦ Mono: Up to 64 kbps</li> </ul> </li> </ul>

<sup>2</sup> For 1<sup>st</sup> screen applications

Description	Specification
	<ul style="list-style-type: none"> <li>◦ Stereo: Up to 96 kbps</li> <li>◦ 5.1: Up to 224 kbps</li> <li>◦ Sample rates: 32, 44.1 and 48 kHz2, 48 kHz1</li> <li>◦ Container formats: MPEG-2 ADTS, MPEG-4 ADTS, and LOAS/LATM</li> <li>● Dolby Digital (AC-3): <ul style="list-style-type: none"> <li>◦ Mono: 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, and 320 kbps</li> <li>◦ Stereo: 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, and 640 kbps</li> <li>◦ 5.1: 224, 256, 320, 384, 448, 512, 576, and 640 kbps</li> <li>◦ Sample rates: 48 kHz</li> </ul> </li> <li>● Dolby Digital Plus (E-AC3) <ul style="list-style-type: none"> <li>◦ 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</li> <li>◦ 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</li> <li>◦ 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</li> <li>◦ Sample rates: 48 kHz</li> </ul> </li> </ul>
<b>Metadata</b>	<ul style="list-style-type: none"> <li>● Closed caption support: CEA-608 and CEA-708 conversion</li> <li>● SCTE 104/SCTE 35 processing1</li> </ul>
<b>Multiplexing</b>	<ul style="list-style-type: none"> <li>● PID filtering and remapping</li> <li>● Fixed output PID remapping</li> <li>● Dynamic PSI/SI/PSIP regeneration with advanced descriptor handling support</li> <li>● Service and component merging</li> </ul>
<b>Statistical multiplexing</b>	<ul style="list-style-type: none"> <li>● MPEG-2, H.264, HD, and SD</li> <li>● Statmux controller for Virtual DCM supporting pools up to 64 services per pool</li> <li>● Statmux controller for Hardware DCM supporting pools up to 100 services</li> </ul>
<b>Scrambling</b>	<ul style="list-style-type: none"> <li>● Encryption algorithms: <ul style="list-style-type: none"> <li>◦ DVB CSA v1/v2</li> <li>◦ BISS mode 1</li> <li>◦ Cisco PowerKey</li> <li>◦ Cisco PowerVu<sup>®</sup> technology</li> <li>◦ AES: AES ECB, ATIS, DVB-CPCM, AES CBC, and AES CISSA according ETSI TS 103 127</li> </ul> </li> <li>● DVB SimulCrypt Scrambling according ETSI TS 103 197</li> </ul>
<b>Redundancy</b>	<ul style="list-style-type: none"> <li>● 1:1 IP interface backup</li> <li>● IP port mirroring</li> <li>● Input service and transport stream redundancy</li> <li>● User-configurable triggers</li> <li>● 1:1 and N:M Virtual DCM node redundancy</li> </ul>
<b>Management</b>	<ul style="list-style-type: none"> <li>● Alarm notifications including SNMP traps</li> <li>● Syslog</li> <li>● Easy control local web GUI</li> <li>● VSM support for lineup configuration, resource pool redundancy for hybrid setups (mix of hardware DCM and software Cisco AnyRes Live and Cisco Virtual DCM), capacity modeling, and centralized monitoring</li> <li>● Fully documented open API allowing integration with third-party components</li> </ul>

## Platform Support and Compatibility

Table 2 summarizes the recommended hardware for Cisco 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	Recommended Quantity
<b>UCSB-B200-M4-U</b>	<ul style="list-style-type: none"> <li>UCS B200 M4 Blade Server</li> </ul>	1
<b>UCS-CPU-E52697D</b>	<ul style="list-style-type: none"> <li>2.60 GHz E5-2697 v3/145W 14C/35MB Cache/DDR4 2133MHz</li> </ul>	2
<b>UCS-MR-1X081RU-A</b>	<ul style="list-style-type: none"> <li>8GB DDR4-2133-MHz RDIMM/PC4-17000/single rank/x4/1.2v</li> </ul>	8
<b>A03-D600GA2</b>	<ul style="list-style-type: none"> <li>600GB 6Gb SAS 10K RPM SFF HDD/hot plug/drive sled mounted</li> </ul>	2
<b>UCSB-MLOM-40G-03</b>	<ul style="list-style-type: none"> <li>Cisco UCS VIC 1340 modular LOM for blade servers</li> </ul>	1

Table 3 gives the minimum hardware resource specifications for an ESXi-based host. Table 4 provides the host system software and license requirements.

**Table 3.** Minimum Host System Hardware Requirements

Item	Minimum Specification
<b>Central processing unit (CPU)</b>	<ul style="list-style-type: none"> <li>2 x 64-bit (x86) 2.6 GHz 14-core processor supporting AVX 2.0</li> </ul>
<b>Memory (RAM)</b>	<ul style="list-style-type: none"> <li>64 GB DDR4-2133-Mhz with at least one memory module populated per CPU memory channel</li> </ul>
<b>Storage (HDD)</b>	<ul style="list-style-type: none"> <li>64 GB</li> </ul>
<b>BIOS</b>	<ul style="list-style-type: none"> <li>See installation guide for full list of BIOS settings</li> </ul>

**Table 4.** Host System Software and Licensing Requirements

Item	Minimum Specification
<b>Operating system (OS)</b>	<ul style="list-style-type: none"> <li>CentOS 7.2</li> </ul>
<b>VMware vSphere hypervisor ESXi</b>	<ul style="list-style-type: none"> <li>Release 6.0 or higher</li> </ul>

## Ordering Information

To place an order, visit the [Cisco Ordering page](#). To download software, visit the [Cisco Software Center](#).

Table 5 provides ordering information.

**Table 5.** Ordering Information

Product Name	Part Number
<b>Cisco Virtual DCM Software Application: ATO PID</b>	R-VDCM-APPS
<b>Virtual DCM Software: downloadable from cisco.com</b>	
<ul style="list-style-type: none"> <li>Virtual DCM Software Package</li> <li>Virtual DCM Base License Appliance</li> </ul>	SW-VDCM-Vxx-K9 L-VDCM-BASE-APP
<b>Virtual DCM Transcoding Licenses: options enabling transcode functionality</b>	
<ul style="list-style-type: none"> <li>Virtual DCM Base XCode Usage License (1 per instance)</li> <li>Virtual DCM Video XCode License, 1 credit (1<sup>st</sup> screen AVC/MP2)</li> <li>Virtual DCM Video XCode License, 1 credit (HEVC and OTT)</li> <li>Virtual DCM Audio XCode License, 1 credit</li> </ul>	L-VDCM-XCODE-USE L-VDCM-V-XCODE-P1 L-VDCM-V-XCODE-P2 L-VDCM-A-XCODE-P1
<b>Virtual DCM Ingress/Egress Licenses: options enabling I/O, multiplexing, and statmux functionality</b>	
<ul style="list-style-type: none"> <li>Virtual DCM Base XGress Usage License (1 per instance)</li> <li>Virtual DCM XGress License, 1 credit</li> </ul>	L-VDCM-XGRESS-USE L-VDCM-XGRESS-P1
<b>Virtual DCM XCrypt Licenses: options enabling scrambling functionality</b>	
<ul style="list-style-type: none"> <li>Virtual DCM Base XCrypt Usage License (1 per instance)</li> <li>Virtual DCM XCrypt License, 1 credit</li> </ul>	L-VDCM-XCRYPT-USE L-VDCM-XCRYPT-P1

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## Service and Support

Cisco offers a wide range of service programs to accelerate customer success. These innovative service programs are delivered through a unique combination of people, processes, tools, and partners, helping to achieve high levels of customer satisfaction. Cisco Services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, refer to [Cisco Technical Support Services](#).

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## For More Information

For more information about the Cisco Virtual DCM, visit <http://www.cisco.com/go/virtualdcm> or contact your local account representative.



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