Media Cloud Server



- Video Analytics in Surveillance
- Video Conferencing in Business, Education and Healthcare
- Transcoding Server for OTT TV

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Business / Education

Video Conferencing



- Combines video streams from all participants into a single video stream for each client to reduce bandwidth consumption.
- Generates output streams with different audio/video quality required by each client.
- Has capability to set up and tear down conference calls; provides authentication services, recording service and gateway to PSTN.
- Equalizes and mixes all audio streams; processes to filter out environmental noise, reduces echo to enhance audio quality, sends single combined audio stream to each client.



Healthcare

Telehealth

- Decodes VP8 video streams from multiple clients, composites real-time VP8 video streams to reduce bandwidth and power requirements for mobile devices, and sends single composite VP8 video stream to end user.
- Decodes H.264 video streams for clients, encodes and sends the composite video stream to clients in H.264 format.
- Provides intelligent QoS control mechanism, allowing participants with different processing and bandwidth capabilities to adapt to network environment.
- Enables interoperability with traditional real-time communication systems (e.g. bi-directional communication between WebRTC and SIP-based IMS clients).







Surveillance

Facial Recognition

- Decodes input video stream into original image data in YUV format.
- Renders decoded video into format required by the video analytics algorithm (color format changing, down-scaling, noise reduction, color space conversion).
- Executes video analytics algorithm; objects or events are identified, highlighted on display, and indexed for fast future retrieval.
- Triggers audio alarm or SMS if pre-defined thresholds/rules are reached.

Entertainment

Video Streaming



- Demuxes input video stream from storage or live broadcast.
- Transcodes to required resolution and bitrate, improves video quality.
- Packages transcoded files or live streams according to specifications (for adaptive HTTP Streaming).
- Delivers multi-screen, multi-format video via RTP/RTSP or HTTP using content delivery network (CDN).



ADLINK Dedicated Platform to Manage Media Processing Challenges With Software MediaManager

• Standard Server vs. Dedicated Platform

The MSC-2040 is a dedicated Media Cloud Server designed for real-time encoding, transcoding and processing of media streams that was previously performed by GPGPUs and dedicated ASIC/DSP hardware. Intel® Quick Sync Video implements a flexible hardware design approach by using hybrid of fixed function hardware and programmable execution unit (EU) arrays.

Flexibility within the encode pipeline enables finer control of the video encoding process, providing balance between performance, power, and flexibility. With support for OpenCL, Intel® Quick Sync Video faster implementation of new features compared to ASIC solutions. An x86 architecture also supports a native development environment and debugging tools, significantly shortening development cycles and reducing costs.

Comparison of media hardware solutions

Media Solution	Performance	Power	Flexibility	Development Cost
General Purpose GPU	low	High	High	Middle
Fix Function HW	High*	Low	Low	High
Flexible Intel® Quick Sync Video	High	Low	Balanced	Low

• Cost-effective Video Processing Platform

ADLINK MCS-2040 is a 2U, four node, cost-effective media processing platform equipped with Intel® Quick Sync Video. It is also the first hardware platform in the Intel® Media SDK ecosystem that can support an Intel® Xeon™ processor.

ADLINK MCS-2040 is designed for media applications that require advanced media processing capability, and allows optimal access to Intel® Quick Sync Video hardware for video encoding/decoding and customized video processing.



• Hardware Acceleration Enables High Performance

Comparison of GPU-based and CPU-based transcoding

Transcoding Tasks	HW RT Max. Streams	SW RT Max. Streams	HW avg FPS	SW avg FPS
1080.MPEG2 to 1080P.H264	12	3	346.5	89.6
1080P.H264 to 480P.H264	16	5	496.1	163.9
D1.H264 to CIF. H264	55	20	1342.6	616.5

With the ADLINK MCS-2040, developers can create media server applications that take full advantage of hardware-accelerated media processing for video decode, encode, and a rich set of video pre/post processing as illustrated in the following figure. The Intel® Media SDK library supports a range of mainstream operating systems, including Microsoft Windows 8, Windows 2012, CentOS, and SuSE Linux. This provides more flexibility than customized solutions, which generally provide just a Linux-based development library.

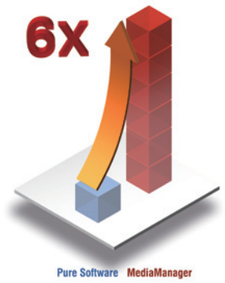
The Intel® Quick Sync Video hardware enables a high media processing performance with the ADLINK MCS-2040. The GPU-based (HW) transcoding gave significantly better results than the CPU-based (SW) transcoding, no matter the maximum real-time (RT) transcoding streams or the average transcoding frames per second.

• MediaManager Enables End-to-End Solution

ADLINK MediaManager software, which comes standard on the MCS-2040, expands on the functionality of the Intel® MSDK by providing additional media building blocks to handle common media processing tasks not natively supported by the Intel® MSDK Library, including demux/mux of media container files, RTP receiving and streaming, video composition, and audio processing.

- **Demux/Mux Module:** Demuxes/muxes the video and audio elements from/into a container file. Common video formats include H.264/MPEG2, and audio formats AAC/MP3 are supported.
- **Video Composition:** Composites 2-16 input video streams into a video mosaic. The composition module can assist with development of an MCU within a conference server (supporting WebRTC).
- **RTP Receiver/Sender Module:** Receives video and audio elements from separate RTP streams. Streams video and audio elements with respective RTP streams to a destination over the network. The streaming format for video and audio are H.264 and AAC, respectively.
- **Audio Processor Routine:** Transcodes audio between AAC and MP3, and supports audio playback.

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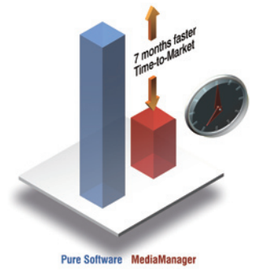
Increased System Performance

- **6x** performance than pure software transcoding
- CPU load < **20%** , reserved for applications



Reduced Cost

- Net reduction in overall product cost **~50%** by increased performance
- Upgrade to new generation of CPU/GPU without changing a line of source code



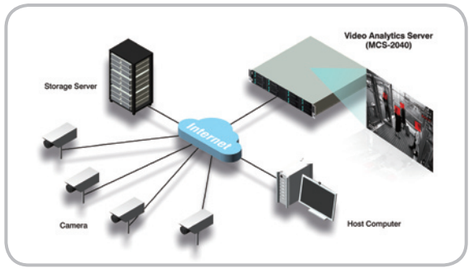
Shorter Development Time

- **MediaManager** enriches MSDK features, mitigates technical risks, and accelerates TTM
- Enables faster implementation of new features than ASIC solution

Video Analytics Server

Video surveillance technologies are widely used in urban security systems today. Intelligent video analytics are, an important aspect of video surveillance technology, using image recognition processing to identify the existence of security threats that have already occurred or may occur in the future, and alerting users in real-time.

The increasing need for real-time video analytics presents a big challenge to video surveillance providers today. Real-time video analytics requires that videos be collated and processed immediately, providing meaningful, actionable data that can be used in real-time. In addition, successfully harnessing big-data processing technology to quickly identify required video segments becomes more difficult with the increasing volume of video data used in analytics.



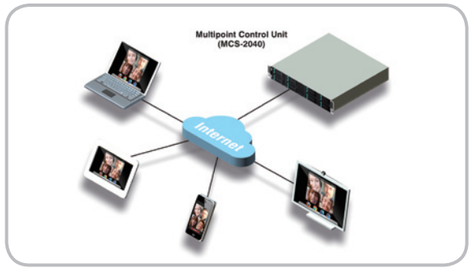


Video Conferencing Multipoint Control Unit (MCU)

Video conferencing is widely used for communication among branch offices of a company or organization at multiple locations or remote employees, and also plays an important role in virtual or distance learning classrooms.

The conference multipoint control unit (MCU) is a central point that maintains a single one-to-one stream with each participant. The MCU receives and mixes each incoming audio and video stream to generate a single stream out to every participant.

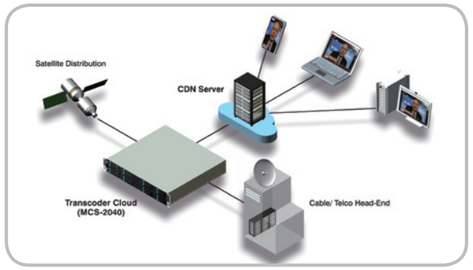
Achieving better quality video and voice at low bandwidths is always the most effective path to success in the video conferencing market. This goal induces MCU providers to incorporate the latest video processing technologies into next generation products. Technologies include dynamic bitrate control, 60fps encoding, and H.265 codec. These advancement in video codecs promise significant quality improvements, but they also require an MCU to carry more media processing capability.



Streaming Transcoder

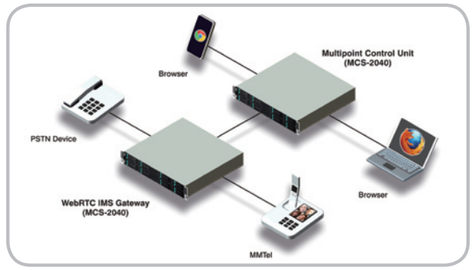
The delivery of live, on-demand video over IP networks continues to rise due to the increasing number of people watching Internet video over smart mobile devices and Internet-enabled set-top boxes.

There are two main types of video streaming. Transitional video streaming delivers video to end users via RTP/RTSP over a digitized cable television network; adaptive HTTP streaming delivers video over a telecommunication network. The latter is becoming more and more popular due to its ability to adapt video streaming to fluctuating network conditions. The emerging adaptive HTTP streaming technologies include Apple HTTP LiveStreaming (HLS), Microsoft Smooth Streaming, Adobe HTTP Dynamic Streaming (HDS), and MPEG Dynamic Adaptive Streaming over HTTP (DASH) .



The main challenges facing streaming transcoders include ultra-HD transcoding to improve existing high-quality video delivery and multi-screen and multi-rate transcoding to cater to different screen sizes and network bandwidth. All of these challenges require a high-density, high-performance video transcoding pool.

WebRTC MCU and IMS Gateway



WebRTC is an HTML 5-based technology that enables audio/video streaming and data sharing between browser clients (peers). As a set of standards, WebRTC provides any browser with the ability to share application data and perform teleconferencing peer-to-peer, without the need to install plug-ins or third-party software. While the web-based and plugin-free WebRTC makes it attractive for multi-conferencing, the peer-to-peer method may not the best choice for WebRTC implementations.

The MCU has been used for traditional multi-conferencing for years with great success. The introduction of the WebRTC MCU relieves the burden on a client to receive and decode multiple video streams as done with a traditional MCU. The WebRTC MCU can also be a bridge between VP8 and H.264 the latter being a better choice for most smart phones and tablets with native H.264 acceleration. Furthermore, the WebRTC MCU is also the control point for interoperating between WebRTC clients and legacy devices.

Enabling WebRTC for a MCU server requires a high performance VP8 and H.264 real-time transcoding platform. And enabling WebRTC for mutli-drop communication and interoperability with IMS also needs significant development effort.



MCS-2040

2U 19” Media Cloud Server

- Four hot-pluggable compute nodes
- Each node supports the following:
  - >> Two independent systems communicate via GbE
  - >> Dual sockets support 4th Gen Intel® Core™ i7/i5/i3 and Xeon® Processor E3-1200 v3 (LGA 1150)
  - >> 4 DIMMs, up to 32GB DDR3 memory (16GB/ system)
  - >> Quad GbE via RJ-45 (2 per system)
  - >> 4x hot-swappable 2.5” SATA drive bays
- 2x 1600W redundant power supplies

Specifications

CPU / Chipset /Memory (per node)

CPU	Dual 4th Gen Intel® Core™ i7/i5/i3 (LGA1150), or Dual Intel® Xeon® E3 V3 Processors (LGA1150)
Chipset	Intel® Q87/H81
Memory	Four 240-pin DIMM sockets, DDR3-1600 up to 32GB

BIOS

Chip	AMI BIOS on SPI flash memory
Features	Intel® PXE pre-boot
	Remote Console
	ACPI 1.0/2.0 support
	UEFI

I/O Interfaces (per node)

Graphics	Intel® HD Graphics, VGA on rear panel (switchable between systems), up to 1920 x 1440 resolution
Ethernet	Quad 10/100/1000BASE-T Base Interface channels
	Supports Intel® AMT, remote power on/off/reboot
Storage	Internal: Two mSATA slots, support SSD modules up to 512GB
	External: 4x 2.5” SATA 6Gb/s hot-swappable drive trays, or 3x 3.5” SATA 6Gb/s hot-swappable drive trays
USB	2x USB 2.0 ports on rear panel (switchable between systems)
Expansion	1x PCIe x16 expansion slot

Mechanical and Environmental

Form Factor	2U 19” rackmount system
Power Modules	2x hot-swappable 1600W high-efficiency redundant power modules
Dimension	438mm x 88mm x 733mm (W x H x D)
Fans	3x fans per node with speed control (PWM)
Operating Temp.	0°C to +55°C
Storage Temp.	-40°C to +70°C
Humidity	5% to 95%, non-condensing
Certification	FCC, CE, UL, NEBS Level 3 (design)
RoHS	RoHS Compliant

Software

Supported Software	Intel® Media SDK: GPU based video processing, supports both Linux and Windows
	OpenCL SDK: provides customers with the ability to offload portions of their own codec/video filter implementations to the GPU
	ADLINK MediaManager: supports file-to-stream, stream-to-stream, file-to-file and stream-to-file media processing
Compatible 3rd Party Software	Flexible Encoder Infrastructure (FEI) for Intel® Media SDK: designed for customers who need to fine tune or augment the h264 encode process
	Open source H.265 encoder from f265.org

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