deliver fast, brilliant video experiences with Intel® media server Studio XE 2017

Innovate Enterprise-grade Media Solutions & Applications

(intel)
Software

30-3-30 presentation
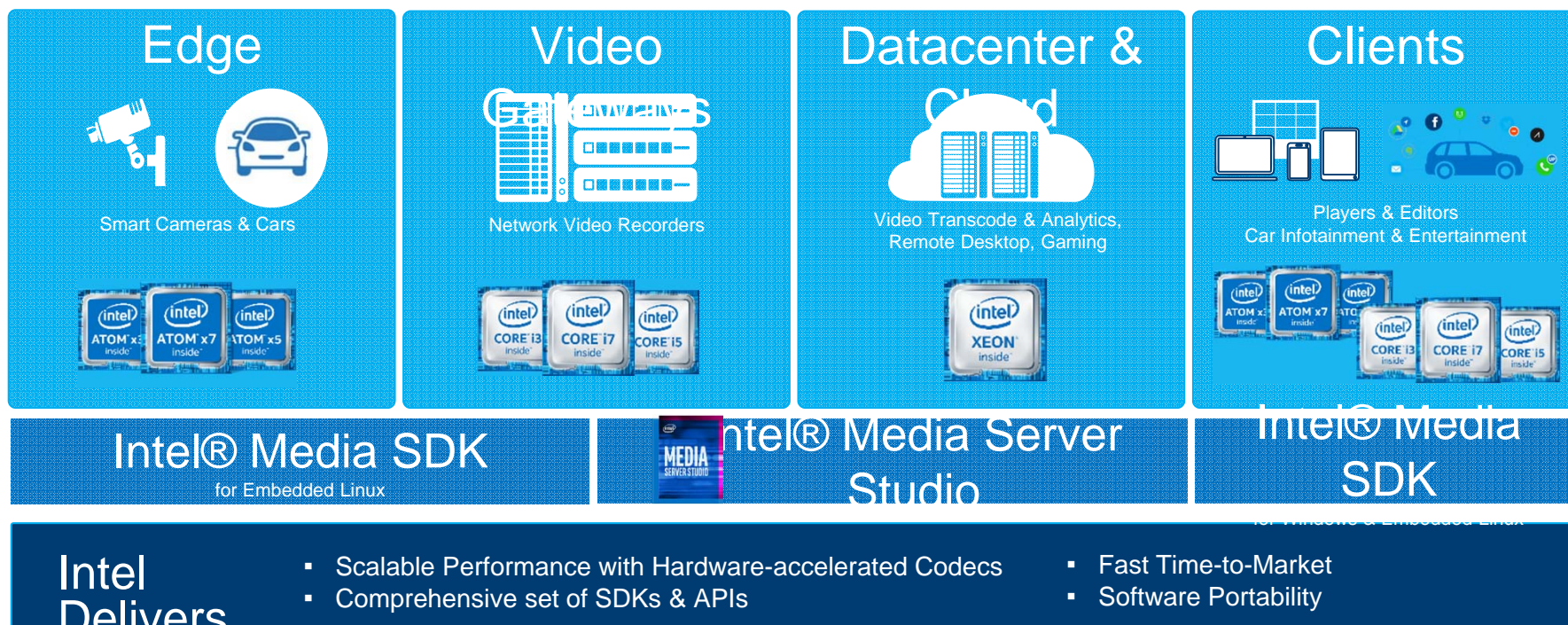Intel SSG Developer Products Division
Updated Feb. 5, 2018

MEDIA
SERVER STUDIO

Intel® media server Studio
30 Seconds

End-to-End Media Processing

Seamless Software Development Experience from Edge to Cloud & Clients

Edge	Video Gateways	Datacenter & Cloud	Clients
Smart Cameras & Cars	Network Video Recorders	Video Transcode & Analytics, Remote Desktop, Gaming	Players & Editors Car Infotainment & Entertainment

Intel® Media SDK for Embedded Linux

Intel® Media Server Studio

Intel® Media SDK for Windows & Embedded Linux

Intel Delivers

- Scalable Performance with Hardware-accelerated Codecs
- Comprehensive set of SDKs & APIs
- Fast Time-to-Market
- Software Portability

Intel® Media Server Studio

Deliver fast, high quality video transcoding. Speed transition to new formats.

- **Boost performance** with hardware-accelerated codecs & programmable graphics on Intel® processors.**

- **Ensure quality & compliance** with expert-grade quality analysis tools.

- **Speed transition to higher frame rates & resolutions**.

- **Innovate cloud graphics, media analytics & immersive video**.

- **Reduce development costs** & time-to-market.

- **Take advantage of <u>Priority Support</u>** with direct, private access to Intel media engineers for technical questions.[1]

Download FREE Community Edition ▶

Hardware support: Intel® Xeon® E3-1200 v4 Family with C226 chipset; Intel® Xeon® E3-1200 & E3-1500 v5 Family with C236 chipset, 5th & 6th gen Intel® Core™ processors with Intel® Iris™ Pro Graphics, (Haswell support is in 2016 version) see OS support for more.
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Optimization Notice

Intel® Media Server Studio

Deliver High Performance & Quality Video Transcoding

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Intel® Media SDK provides access to **Intel® Quick Sync Video** –
Hardware-accelerated encoding, decoding & processing

- H.265 (HEVC)
- H.264 (AVC)
- MPEG-2 and more

- Resize, Scale, Deinterlace
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- Denoise, Sharpen and more

Flexible Encode Infrastructure (FEI)
Fine-tune encoding pipeline

Intel® SDK for OpenCL™ Applications
Build, debug & optimize for CPU & GPU

Graphics Driver for Linux* & Windows*

Essentials Edition

Community Edition + Priority Support

PROFESSIONAL EDITION

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H.265 (HEVC)
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Encode & Decode

Audio Encode & Decode

Premium Telecine Interlace Reverser

OpenCL and the OpenCL logo are trademarks of Apple Inc. used by permission by Khronos.

Intel® media server Studio
3 minutes

Visual Cloud Usage Model Overview

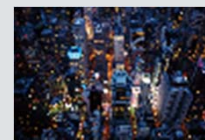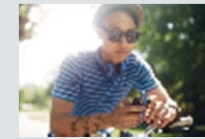Cloud Service Providers Comms Service Providers Media and Entertainment Enterprise Government, Academia, Science

Media Creation and Delivery

Media Analytics

Cloud Graphics

Immersive Media

By 2020, 75% of mobile data traffic will be video[1], with a…

…$2.1T+ Global Media Cumulative Market[2]

Intel Visual Compute

1. Cisco Visual Networking Index, 2016
2. Price Waterhouse Cooper Global Media outlook 2016-2020 (Captures film, TV, Video, Music, Internet advertising, and Video Games)
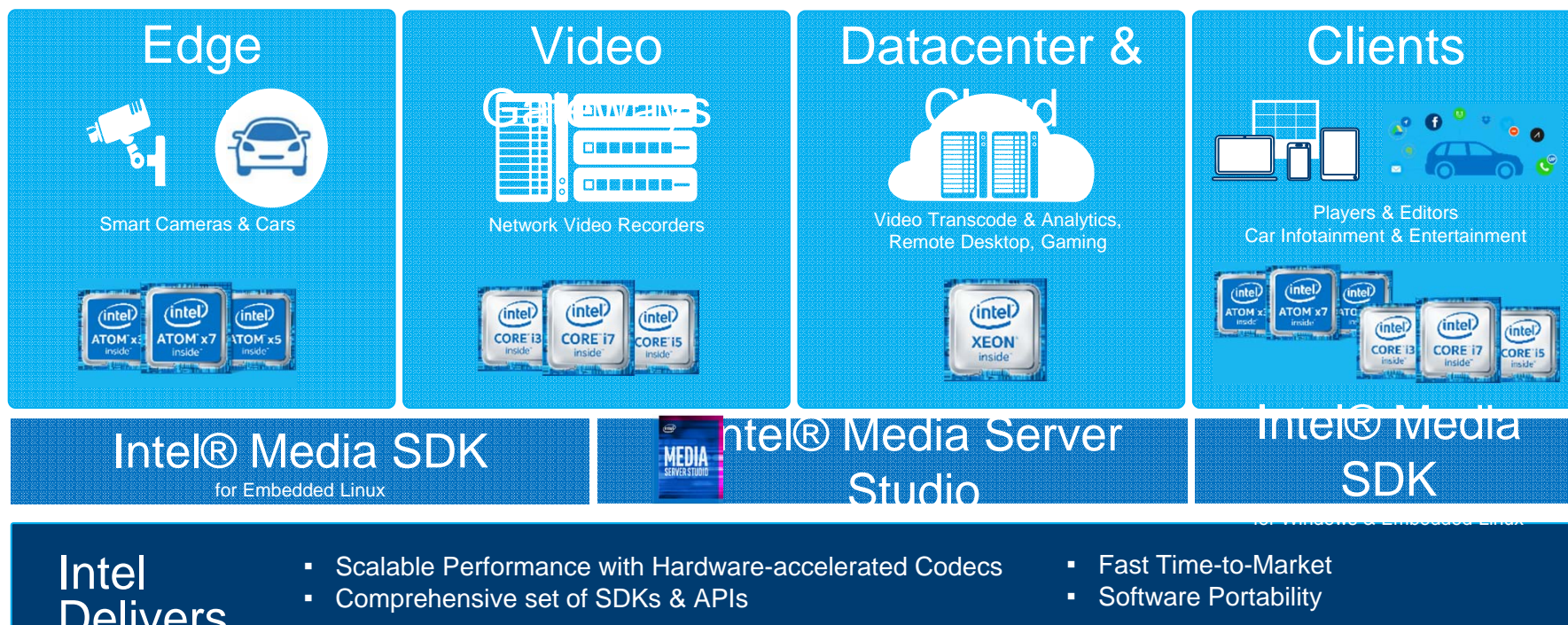
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What's New in Intel® Media Server Studio 2017 R3

New Features Deliver Ultra Video Performance & Quality

Linux* version delivers

- Major HEVC encode video quality improvements, such as control over CU QP & support of P-frames.
- Enhanced AVC FEI[1] adds explicit weighted prediction for P-frames & bias adjustment. VDBOX balancing improves a performance for multisession & multiprocess decode & encode for all codecs.
- New OpenCL™ extensions (VEBox, HEVC PAK, NV12) provide programming flexibility for Intel CPUs &graphics processors.
- Supports CentOS v.7.3 with new OS features & security updates.

Windows* version delivers

- Substantial video encoding improvements for cloud gaming & remote desktop applications.
- Supports weighted predictions for P- & B-frames & low delay bitrate control for AVC; max frame size bitrate control for HEVC.

Get more details in this blog: Deliver Fast, Brilliant Video Experiences with New Intel® Media Server Studio 2017 R3

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Interlace Reverser**

Why Intel is the Best Choice for Media Solutions Providers

Intel® hardware & software help deliver advanced, innovative solutions & brilliant viewing experiences

Hardware

- Intel® Xeon® E3 & Core™ processors[1] with integrated graphics deliver hardware-accelerated codecs (Intel®Quick Sync Video)
- Each processor generation brings improved performance & new codec features

Software - Intel® Media Server Studio allows you to

- Build high-performance media pipelines at low cost
- Stay competitive, speed transition to real-time 4K and HEVC
- Use enterprise-grade codecs for quick time-to-market
- Reduce costs - write apps once & port across multiple platforms & OSs

Intel® media server Studio
30 minutes

Video is Evolving

- **Video consumption** and global **video traffic** are growing[1]

- **4K drives industry innovation:** more pixels, better colors, higher frame rate

- **Network bandwidth constraints** drive need for efficient media encoding

- **To stay competitive** solution providers need to deliver economical, high-

- **Nearly every leading transcoding vendor heads its portfolio with Inte**
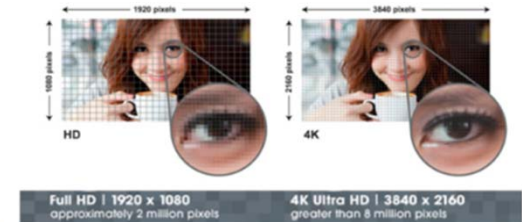
[1]Video traffic will be 80% of all consumer Internet traffic in 2019, see Cisco Visual Networking Index
[2]*Intel won Technology Innovation Award in Video Transcoding*, Frost & Sullivan

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Cloud Service Providers • Comms Service Providers • Media and Entertainment • Enterprise • Government, Academia, Science

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Intel Visual Compute

intel XEON inside | intel XEON PHI inside | ALTERA Arria 10 FPGA+SoC | intel IRIS Pro GRAPHICS | intel MEDIA SERVER STUDIO

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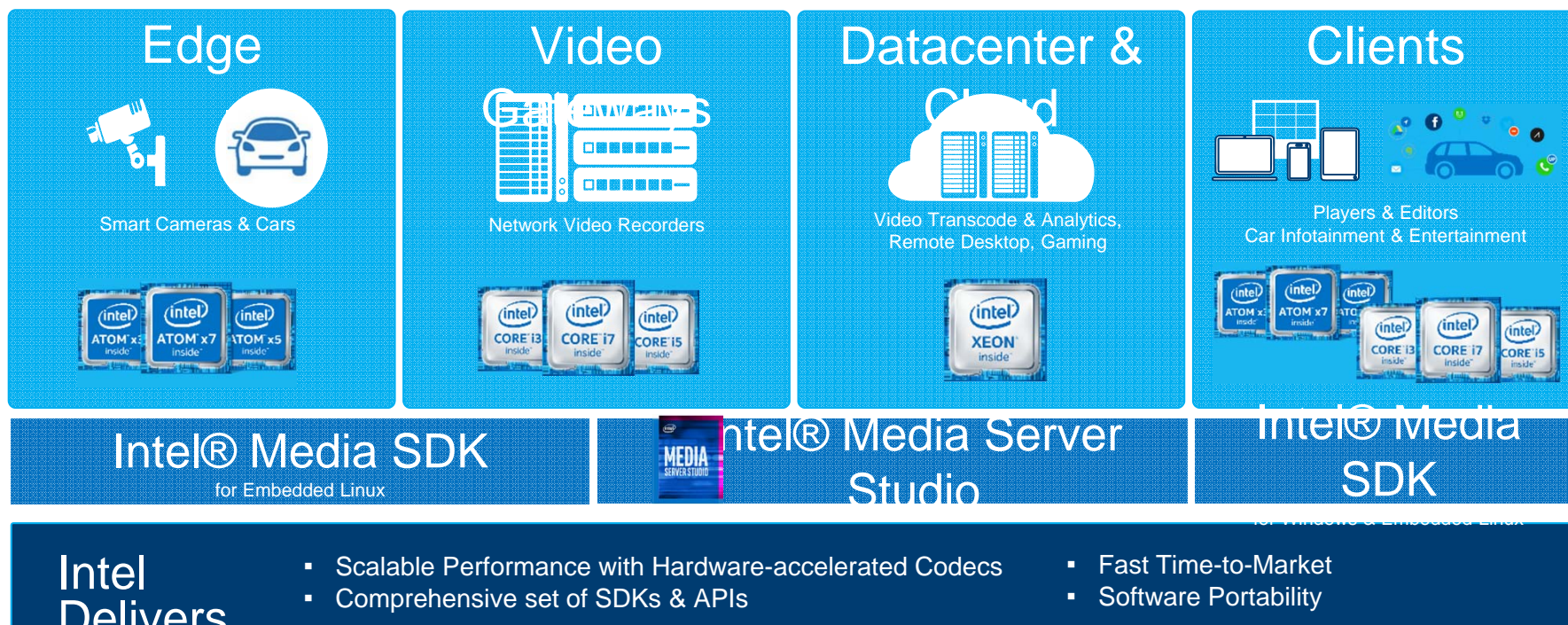# End-to-End Media Processing

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**Audio Encode &
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Media Content Creation & Delivery Use Cases

Broadcasting – live and VOD	OVER THE TOP – VOD	Over the Top - Live
• Comms media providers (Comcast, DirecTV, ATT) • Live TV streaming • Video on Demand content	• Cloud media providers (Amazon, Netflix, Hulu) • Video on Demand content	• Live streaming video (Twitch, YouTube, Facebook Live) • User-generated content

Workflow: Content Capture and Production ▸ Content Storage and Distribution ▸ Content Consumption

Cloud Graphics Use Cases

Cloud Gaming

GAMESTREAM
GAMEFLY STREAMING
playgiga

Remote Rendering

AUTODESK
Adobe
Daz 3D

Remote Desktop

CITRIX XenDesktop
vmware Horizon View
vmware ESXi

Benefits

Same content/experience on any device

Enhanced security

Ease of management

Increased mobility

(intel) IRIS Pro GRAPHICS

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Details about the edit

Community, Essentials, Professional
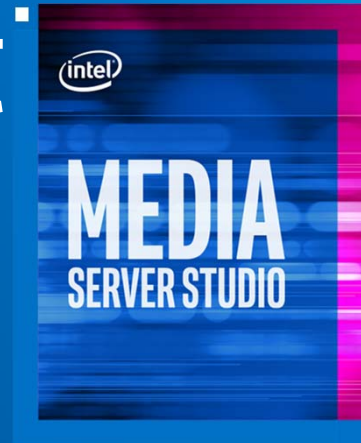
Users: Server Applications Developers spanning Media, Communications Infrastructure (Video Processing/Conferencing, Digital Surveillance), Network, Video Cloud & Data Center

Community & Essentials Editions

Build Highly-Optimized Embedded & Data Center Media Solutions

Cost & Licensing
- Community - **FREE**
- Essentials - MSRP $499 USD, Named user license

Get Fast Performance with the Power of Intel® Processors**

Features
- Intel® Media SDK, runtimes, graphics drivers
- HEVC, AVC, MPEG-2, VC-1, MJPEG support & more
- Build & debug applications with OpenCL™ programmability
- Balance accelerator usage with Metrics Monitor for Linux*
- Includes Flexible Encode Infrastructure (FEI) for AVC[1]
- *Essentials only*: Take advantage of Priority Support with access to Intel media engineers for private technical questions

Top Usages
- Use hardware accelerated codecs in media distribution and cloud graphics applications
- Simplify development of real-time encode, decode, transcode solutions deployed on servers
- Build, debug, analyze OpenCL™ media apps

[1]FEI is an extension of Intel® Media SDK that gives more control over encoding process compared to the standard Media SDK API, and is available with limitations: (See Notes or Media Server Studio site for details.
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Video Transcoding Rack Level Density on Intel® Xeon® Processors[1]

	Number of simultaneous streams per socket[1]	Number of simultaneous **streams/ rack**[2]
AVC (1080p30)	**18**	**7,290**
HEVC (4kp30)	**2**	**810**

7,290 AVC streams

810 HEVC streams

Specific hardware technical specifications apply. See performance benchmarks and Media Server Studio site for details.

Benchmark results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system. For more complete information about performance and benchmark results, visit www.intel.com/benchmarks.

[1]Number of real time threads transcoded simultaneously: 18 on both E3-1285Lv4 and E3-1585Lv5 using 1080p30 20Mbps streams and Intel® Media SDK (Target Usage 7). Note: for AVC, performance is the same as E3-1285v4 - **Benchmark platform configuration**: Processor: Intel® Xeon® processor E3-1585Lv5 @ 3.0GHz, Ring @ 3.0GHz and GT @1.15GHz; primary BIOS Version: SKLSE2R1.R00.B104.B01.1511110114; driver: 20.19.15.4377. platform: RVP11 halo fab 2; OS: Windows* 8.1x64 Enterprise, 16 GB memory, 2 DIMMS 2133 MHz, one socket, four cores, Intel®Iris™ Pro Graphics P580, Intel® Hyper-threading Technology enabled, Intel® Virtualization technology enabled.

[2]Rack density based on the HP Moonshot with 45 cartridges. Each cartridge contains 1 Intel® Xeon® E3-1585L v5 for a total of 45 E3-1500 v5 processors per 4.3U chassis. Assuming 2U for top of rack switches, 9 4.3U chassis could fit in each rack, giving 9*45=405 sockets in a 42u rack. E3-1585Lv5 AVC streams=405*18=7290, E3-1585Lv5 HEVC streams=405*2=810

Benchmark source: Intel Corporation.

Intel's compilers may or may not optimize to the same degree for non-Intel microprocessors for optimizations that are not unique to Intel microprocessors. These optimizations include SSE2, SSE3, and SSSE3 instruction sets and other optimizations. Intel does not guarantee the availability, functionality, or effectiveness of any optimization on microprocessors not manufactured by Intel. Microprocessor-dependent optimizations in this product are intended for use with Intel microprocessors. Certain optimizations not specific to Intel microarchitecture are reserved for Intel microprocessors. Please refer to the applicable product User and Reference Guides for more information regarding the specific instruction sets covered by this notice. Notice revision #20110804
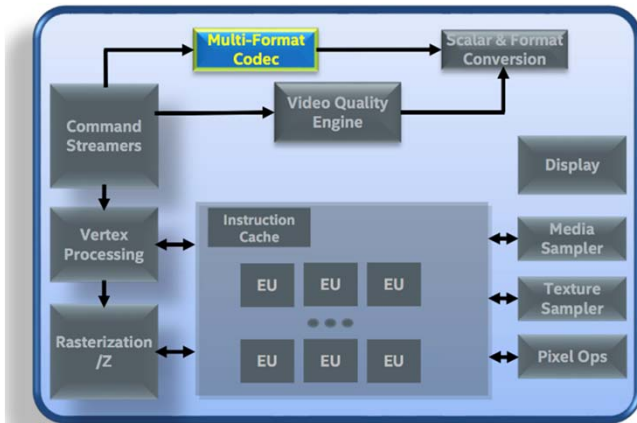
Video Transcoding Performance: HEVC on Intel® Xeon® Processors[1]

Multistream Performance (1xRT=30fps)		Number of Real-time (30fps) streams	Number of Real-time (60fps) streams
1080p-to-1080p	**AVC-to-HEVC**	**15**	**7**
	HEVC-to-HEVC	**8**	**4**
4K-to-4K	**AVC-to-HEVC**	**4**	**2**
	HEVC-to-HEVC	**2**	**1**

E3-1500 v5 HEVC is fully accelerated targeting 4K60 capability

NEW! Up to 2 Real-time HEVC streams per processor[1]

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[1] 15 real-time HD AVC-HEVC or 4 realtime UHD AVC-HEVC transcode , 8 real-time HD HEVC-HEVC or 2 realtime UHD HEVC-HEVC transcode using Intel MediaSDK (Target usage 7), all content 8-bit 4:2:0. - **Benchmark platform configuration:** Processor: Intel® Xeon® processor E3-1585Lv5 @ 3.0GHz, Ring @ 3.0GHz and GT @1.15GHz; primary BIOS Version: SKLSE2R1.R00.B104.B01.1511110114; driver: 20.19.15.4444. platform: RVP11 halo fab 2; OS: Windows* 8.1x64 Enterprise, 16 GB memory, 2 DIMMS 2133 MHz, one socket, four cores, Intel®Iris™ Pro Graphics P580, Intel® Hyper-threading Technology enabled, Intel® Virtualization technology enabled. Benchmark source: Intel Corporation.

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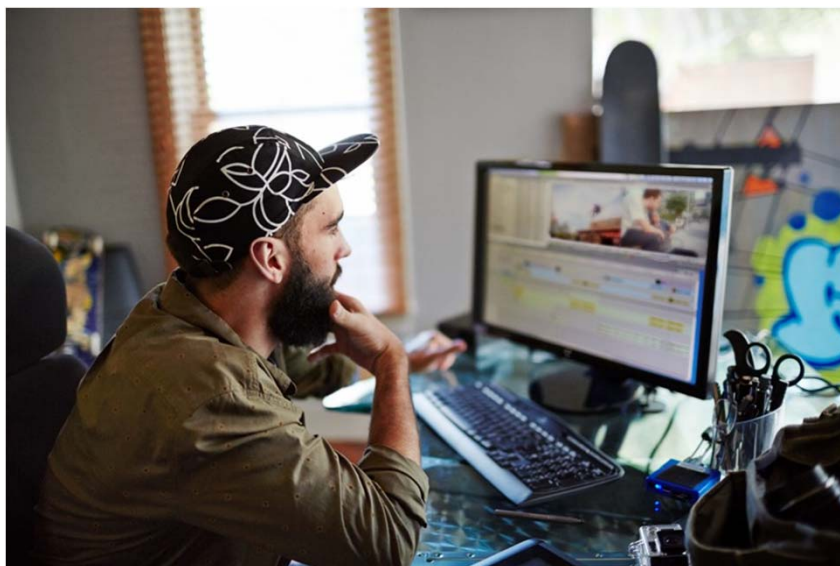
Professional Edition

Speed Transition to real-time 4K HEVC, Improve Quality with Advanced Analysis Tools

Cost & Licensing
- MSRP $3,999, Named user license
- 40-socket/100 copies limit on some components; unlimited pricing available

Improve Video Quality & Performance

Features
- Essentials Edition+
- Intel's award-winning[1] HEVC codec ingredients
- Software audio codecs
- Advanced performance & quality analyzers: Intel® VTune™ Amplifier, Video Quality Caliper
- Premium Telecine Interlace Reverser

Top Usages
- Speed transitions to new video codecs
- Identify performance bottlenecks, inspect video sequences for anomalies
- Perform remote automated regression testing
- Deliver fast, high-density video transcoding, streaming & conferencing
- Analyze GPU usage for Media & OpenCL™ applications

See Technical Requirements for hardware and software support
[1]*Intel won Technology Innovation Award in Video Transcoding*, Frost & Sullivan, Intel HEVC Codec Scores *Fast Transcoding* Title Codec Comparison Report, Moscow State Univ.
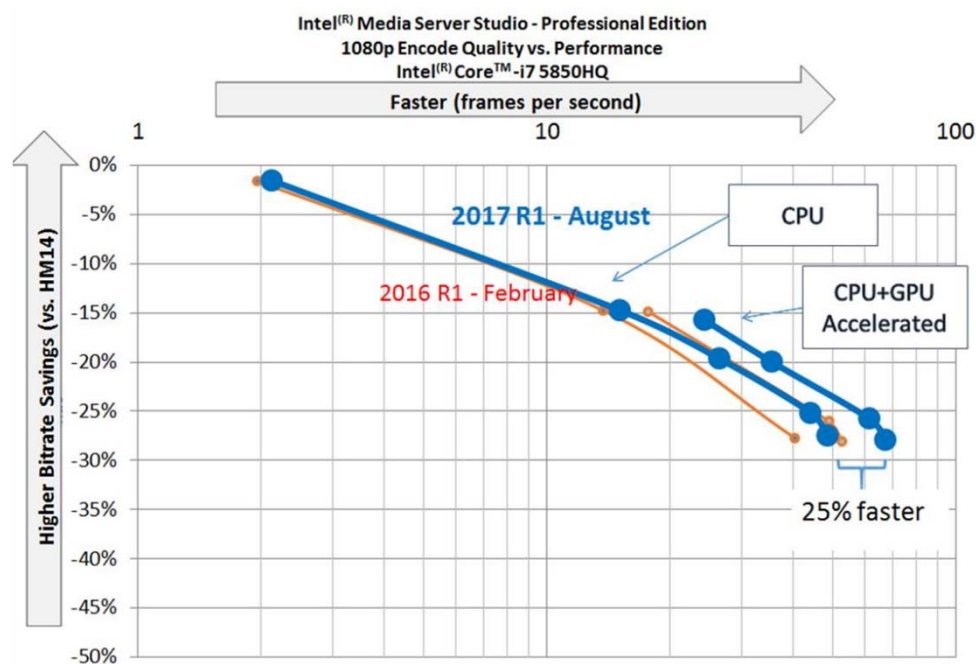
Intel® Media Server Studio Pro Edition – HEVC Performance

Intel(R) Media Server Studio - Professional Edition
1080p Encode Quality vs. Performance
Intel(R) Core™-i7 5850HQ

1.25x performance gain & improved quality

in HEVC encoder (compared to prior release).

Transcoding solution providers can achieve

real-time 4K HEVC encode with broadcast quality**

Figure 1. *The 2017 edition continues the rapid cadence of innovation with 25% performance gain over the 2016 version. In addition to delivering real-time 4K30 encode on select Intel® Xeon® E5 processors, this edition now provides real-time 1080p60 encode on previous generation Intel® Core™ i7 and Xeon E3 platforms.** HEVC Software/GPU Accelerated Encode quality vs. Performance on 4:2:0, 8-bit 1080p content. Quality data is baseline to ISO HM14 ("0 %") and computed using Y-PSNR BDRATE curves. Performance is an average across 4 bitrates ranging from low bitrate (average 3.8Mbps) to high bitrate (average 25 Mbps). For more information, refer to the Enabling HEVC whitepaper.*

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Baseline configuration: Intel® Media Server Studio Professional 2017 R1 vs. 2016 R1, running on Microsoft Windows 2012 R2. Intel Customer Reference Platform with Intel® Core-i7 5850HQ (47W, 4C,2.7GHz, Intel® Iris™ Pro Graphics 6200). 16 GB (4x4GB DDR3-1600MHz UDIMM), Turbo Boost Enabled, and HT Enabled. Source: Intel internal measurements as of August 2016. Benchmark source: Intel Corporation.
**Specific technical requirements apply. See Media Server Studio site for details.

Intel® Media Server Studio Editions – At a Glance

Components	Community Edition	Essentials Edition	Professional Edition
Intel® Media SDK	✓	✓	✓
Graphics Driver	✓	✓	✓
Code Samples	✓	✓	✓
Intel® SDK for OpenCL™ Applications	✓	✓	✓
Flexible Encode Infrastructure (FEI) for AVC	✓	✓	✓
Priority Support		✓	✓
Intel® VTune™ Amplifier			✓
HEVC Software & GPU-accelerated Decoder & Encoder			✓
Video Quality Caliper			✓
Audio Decoder & Encoder			✓
Premium Telecine Interlace Reverser			✓

Free Download

Media Solution Success Stories

Real-time hevc HDR broadcasting

Fast, high-quality video broadcasting on-the-go to inform world of fast-changing events

[Mobile Viewpoint](#)

Omni-directional smart camera

84% CPU utilization reduction for decoding, display up 25 Full HD or 4 UHD streams

[Milestone](#)

360/virtual reality experience

Live streamed a 360-degree VR jazz concert using hardware-assisted 4K video

Wowza, Rivet VR: intel.ly/2cTCIfg

Sports video replays

Instant high-quality video replays from **18** cameras showing angles, slow motion, or zoom

[Slomo.tv videoReferee* systems](#)

More Resources

Hardware	Software
▪ Intel® Xeon® Processor E3 Family ▪ Intel Xeon Processor E3 v5 Product Brief ▪ Intel Visual Cloud Computing ▪ Intel Communications – Media Processing ▪ Intel® Visual Compute Accelerator	▪ Intel® Media Server Studio ▪ Intel® Media SDK ▪ Intel® SDK for OpenCL™ Applications ▪ Whitepaper: *Deliver High Quality, High Performance HEVC via Intel® Media Server Studio* ▪ Webinar Replay: *Get Amazing Intel GPU Acceleration Media Pipelines*

Learn more: software.intel.com/intel-media-server-studio

Backup

Media Market Trends

More Content

- Growth in production & consumption.
- Video will be 80-90% of global consumer traffic by 2020[1]
- Move to richer content (4K, 8K)
- MPEG->AVC->HEVC/VPx

More Screens

- Viewing Habits Changing. OTT Content to TV & PayTV Content To Mobile Devices
- Over half of all IP traffic will originate from non-PC devices by 2019
- Just-In-Time Transcoding/ Packaging (JITT/P)

Cloudification

- Cloud DVR
- CloudTV (aka virtual STB)
- QAM to IP-based Delivery

[1]Video traffic will be 80% of all consumer Internet traffic in 2019, see Cisco Visual Networking Index

Intel® Xeon® Processor - Skylake SKUs

Processor

E3-1585 v5
65W, 4C/GT4e, 8M
3.5/3.9GHz, 0.35/1.15GHz

E3-1578L v5
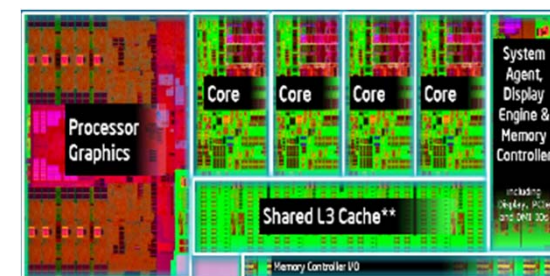45W, 4C/GT4e, 8M
2.0/3.4GHz, 0.7/1GHz

E3-1585L v5
45W, 4C/GT4e, 8M
3.0/3.7GHz 0.35/1.15GHz

E3-1558L v5
45W, 4C/GT3e, 8M
1.9/3.3GHz, 0.65/1GHz

E3-1565L v5
35W, 4C/GT4e, 8M
2.5/3.5GHz, 0.35/1.05GHz

Intel® Media Server Studio Products – An Inside Look

Decode, Encode, Transcode	Broadcasting, Streaming, Video Conferencing	Visual Understanding Virtual Desktop, Remote Gaming	Analyze, Debug, Tune	Validate, Ensure Compliance	**Use Cases**

Community & Essentials
- Media SDK, SDK for OpenCL™ applications, Runtimes, Drivers
- Hardware-accelerated HEVC, AVC, MPEG-2, and more
- Video Pre Processing filter
- Flexible Encode Infrastructure (FEI) to fine-tune encode VQ

Professional
- Essentials plus software & GPU-accelerated HEVC codec components
- Audio codecs
- Video Performance (Intel® VTune™ Amplifier) & Quality (Video Quality Caliper) Analyzers

Features & Components

Linux* & Windows* Server

OS X* (Tools only)

Operating Systems

intel XEON inside™   intel IRIS™ Pro GRAPHICS   intel CORE inside™   Intel® HD Graphics

Optimized for Intel® Processors

Customer Reviews

Intel® Media server studio editions

2 reasons we partner with Intel is we achieve amazing performance using GPU accelerated technology…..we increased density from 6 streams on 1 server to 176 streams…..Intel® Media Server Studio made the development experience easier…

ARTESYN™
EMBEDDED TECHNOLOGIES

…in SBP TV Mega Encoder...we can achieve up to 100 HD channels for multi-bitrates video transcoded streams. This a powerful video transcoding solution, we have a competitive advantage in the OTT market and mobile TV. With Intel® Media Server Studio, we achieved very good results - support was superb…

SPB TV
media solutions

See full quotes, and in some cases videos at the Product sites.

Benefits for Media Infrastructure & Solution Developers

Build High-Performance Media Pipelines at Low Cost	Stay Competitive - Transition to 4K & HEVC	Embed Enterprise-Grade Codecs for Quick Time to Market	Use Performance & Visual Quality Analysis Tools to Save Time & Reduce Engineering Efforts
• Use hardware acceleration of Intel® Xeon® & Core™ processors for premium performance** • Reduce infrastructure and support burden	• Deliver real-time 4K HEVC • Use HEVC software and GPU-accelerations to tune for specific scenarios	• HEVC, AVC, MPEG-2 decode, encode, transcode and video conferencing • AAC, MP3 and MPEG-audio codecs	• Debug and optimize performance with Intel® VTune™ Amplifier • Inspect and measure quality with Video Quality Caliper

**See Technical Specifications for details

Legal Disclaimer & Optimization Notice

Benchmark results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system.

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