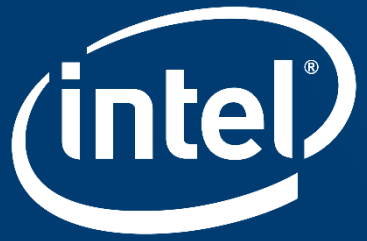
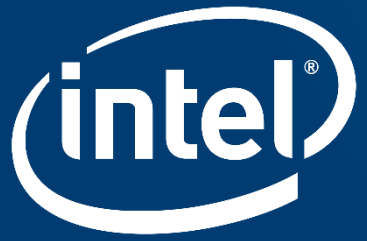


ENHANCE VIDEO PERFORMANCE USING INTEL HARDWARE AND SOFTWARE

Agenda

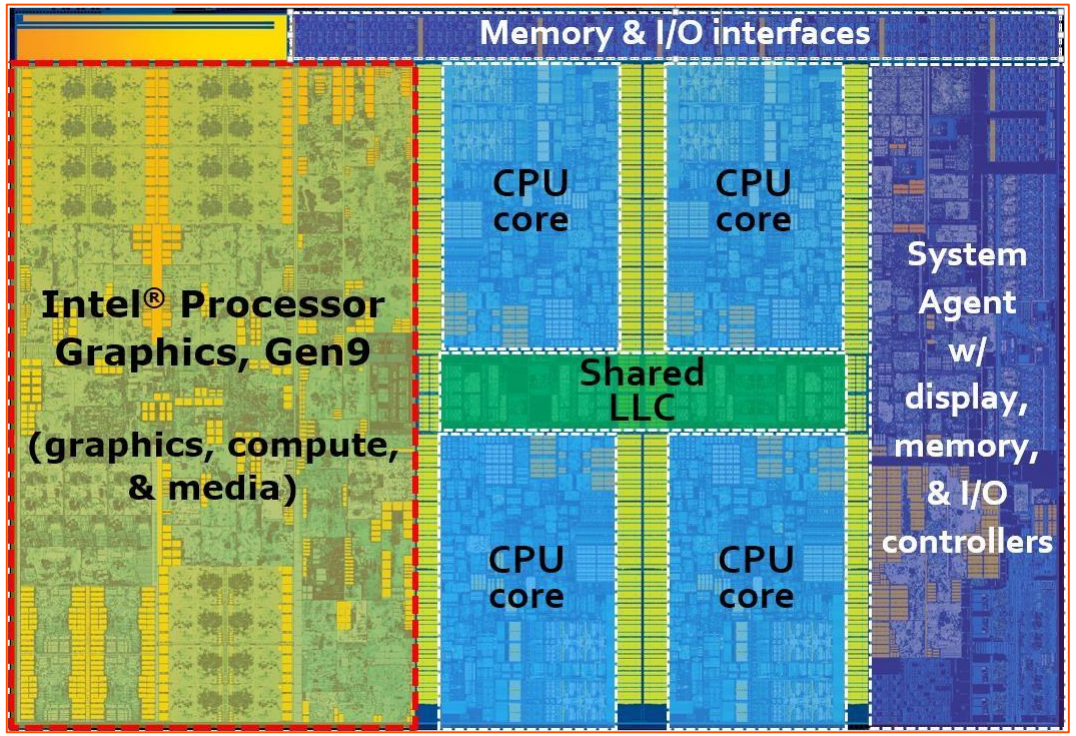
- ✓ Intel® Media SDK/Media Server Studio Overview
- ✓ Lab Overview
- ✓ Intel® Media Accelerator Reference Software Overview



GPU VS CPU

Discrete GPU vs Integrated GPU

Intel Hardware is Heterogeneous



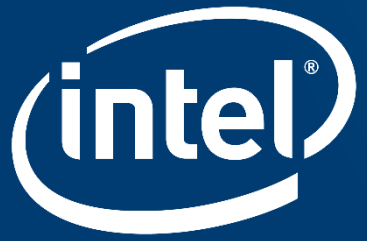
CPUs

- Awesome general purpose performance
- Large software ecosystem

Other Programmable Intel Hardware

- GPU (shown here)
- IPU
- FPGA

See Technical Specifications for System Requirements - Select SKUs of Intel® Xeon® & Core™ processor-based platforms apply.



INTEL® MEDIA SDK/MSS OVERVIEW

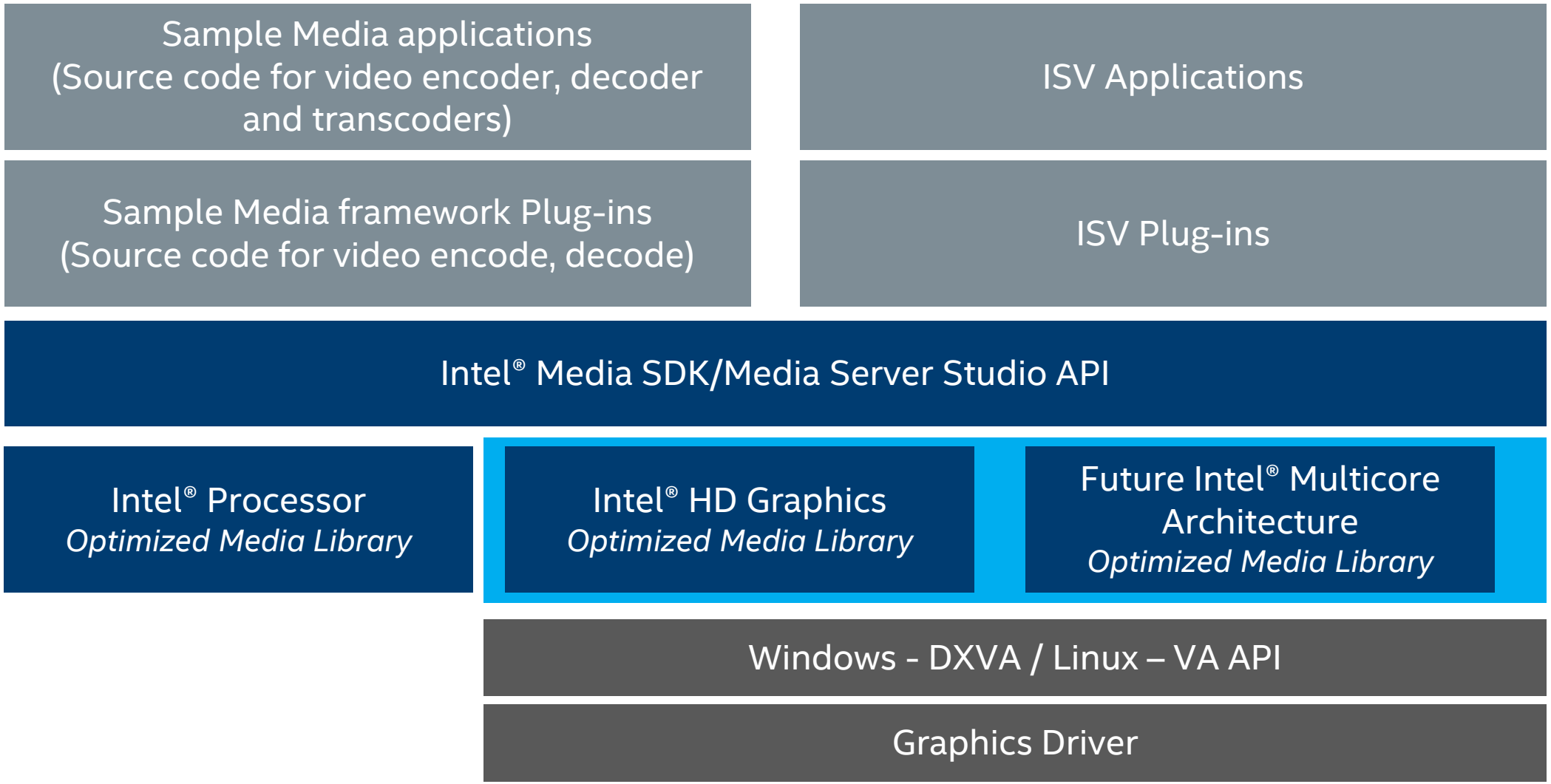
Intel® Media SDK Overview

- Intel® Media SDK equips developers with a standard API to create high-performance video solutions for consumer and professional uses.
- Intel® Media SDK provides easy access to hardware acceleration with Intel-optimized software fallback.
- Developers can also use their own software codecs as needed
- Development teams can shift resources from performance optimization for each individual hardware platform to focusing on feature innovation and application capabilities in their video solutions.

Intel® Media SDK Developer value proposition

- **Optimized routines** for delivering maximum video performance on a variety of platforms
- **Improved productivity** for development teams through greater efficiency
- **Built-in future proofing** of video applications with support for upcoming platforms

Intel® Media SDK/Server Studio Architecture



Intel® Media SDK 2017 Supported Codecs

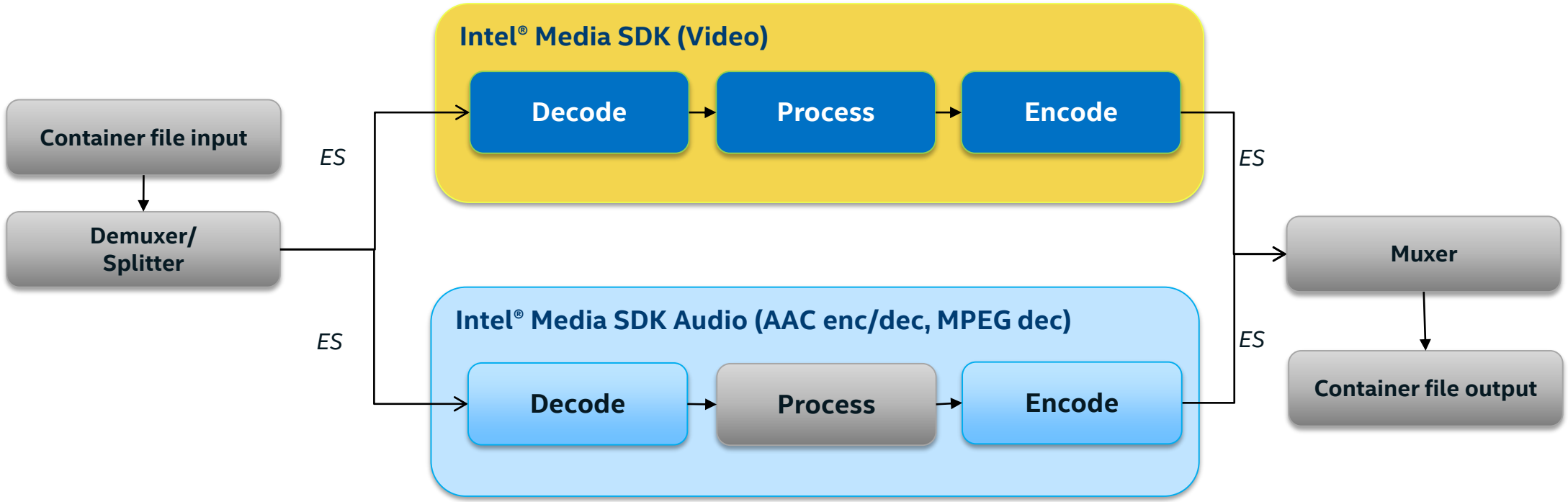
Standard	Encode	Decode
HEVC (main profile) (High Efficiency Video Coding)	HW	HW
AVC (Advanced Video Coding)	SW/HW/ low power	SW/HW
MPEG-2	SW/HW	SW/HW
MJPEG	SW/ HW	SW/ HW
MVC	SW/HW	SW/HW
VC-1	-	SW/HW

green=new in Intel® Media Server Studio for Gen9

Intel® Media SDK 2017
Supported Video Processing Features

- N:1 Frame Composition
- Resizing
- Color Conversion
- Deinterlacing
- Denoising
- Frame Rate Conversion
- Brightness/Contrast/Saturation
- Sharpening

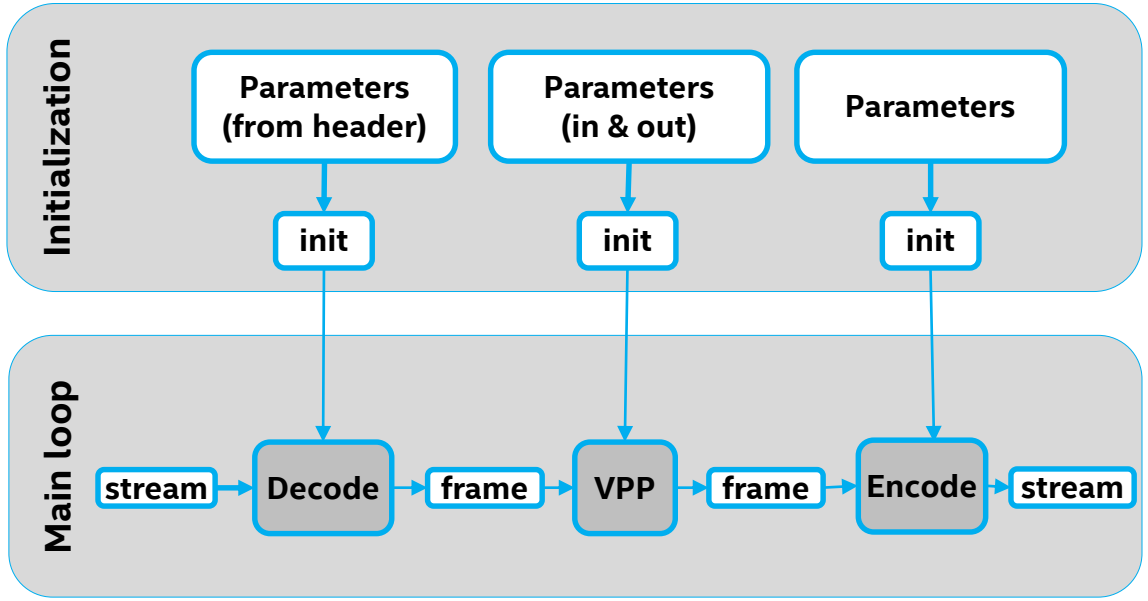
Media Software Scope Diagram



	Intel Media SDK/Intel® Media Server Studio focus
	Limited support
	Out of scope/external component

ES = Elementary stream

Intel® Media SDK / Intel® Media Server Studio



Media accelerator framework
Codec based
High level/parameter interface
3 operations

Links to More Information

- Media Server Studio
- Media SDK
- Intel Media Code Samples

Simple Encoding and Decoding

The following two pseudo-code examples illustrate the simplicity and efficiency of the Intel® Media SDK.

Decoding Procedures

```
Create SDK session
Initialize DECODE
Allocate I/O buffers
While (!EOF || FramesRemaining) do
      If !EOF, read bitstream from file
      Locate available frame buffers
            DECODE::DecoderFrameAsync
            CORE::SyncOperation
      Write output frames to file
Done
De-allocate I/O buffers
Close DECODE
Close SDK session
```

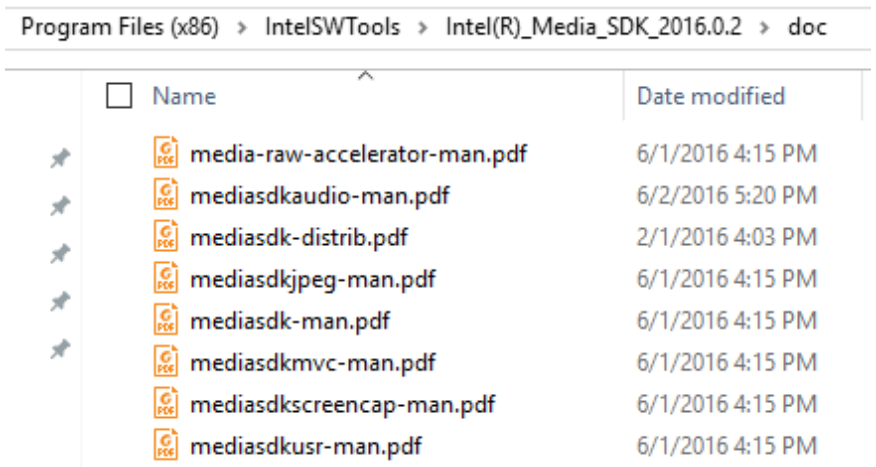
Encoding Procedures

```
Create SDK session
Initialize ENCODE
Allocate I/O buffers
For each frame do
      Locate available frame buffers
      Read raw frames from file
            ENCODE::EncodeFrameAsync
            CORE::SyncOperation
      If output bitstream available, then
            Write bitstream to file
      Endif
Done
De-allocate I/O buffers
Close ENCODE
Close SDK session
```

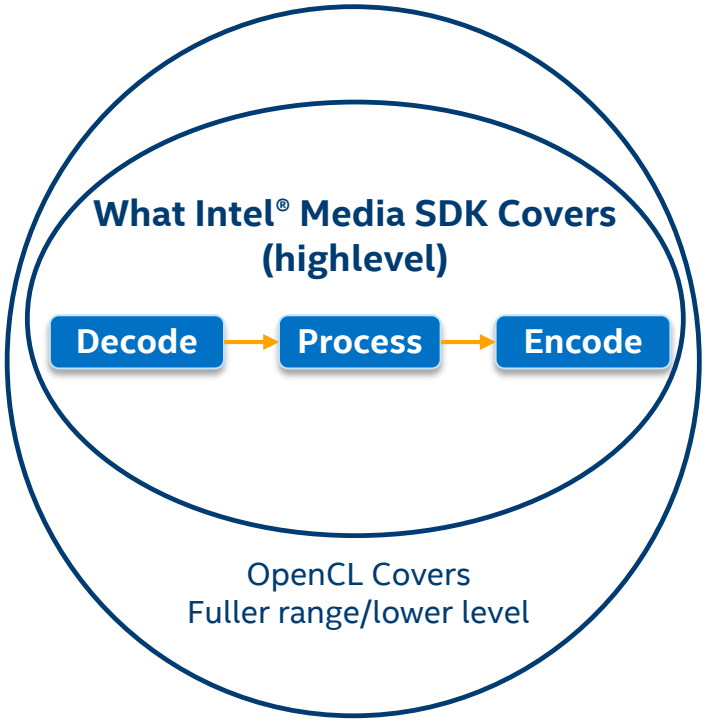
Decoding sample code

```
MFXVideoDECODE_DecodeHeader(session, bitstream, &init_param);
MFXVideoDECODE_QueryIOSurf(session, &init_param, &request);
allocate_pool_of_frame_surfaces(request.NumFrameSuggested);
MFXVideoDECODE_Init(session, &init_param);
sts=MFX_ERR_MORE_DATA;
for (;;) {
      if (sts==MFX_ERR_MORE_DATA && !end_of_stream())
            append_more_bitstream(bitstream);
      find_unlocked_surface_from_the_pool(&work);
      bits=(end_of_stream())?NULL:bitstream;
      sts=MFXVideoDECODE_DecodeFrameAsync(session,bits,work,&disp,&syncp);
      if (sts==MFX_ERR_MORE_SURFACE) continue;
      if (end_of_bitstream() && sts==MFX_ERR_MORE_DATA) break;
      … // other error handling
      if (sts==MFX_ERR_NONE) {
            MFXVideoCORE_SyncOperation(session, syncp, INFINITE);
            do_something_with_decoded_frame(disp);
      }
}
MFXVideoDECODE_Close();
free_pool_of_frame_surfaces();
```

```
mfxVersion ver = { {1, 1 }}; // minimum API version which supports multiple de
MFXInit(MFX_IMPL_HARDWARE_ANY, &ver, &auxSession);
```



OpenCL + Intel® Media SDK?



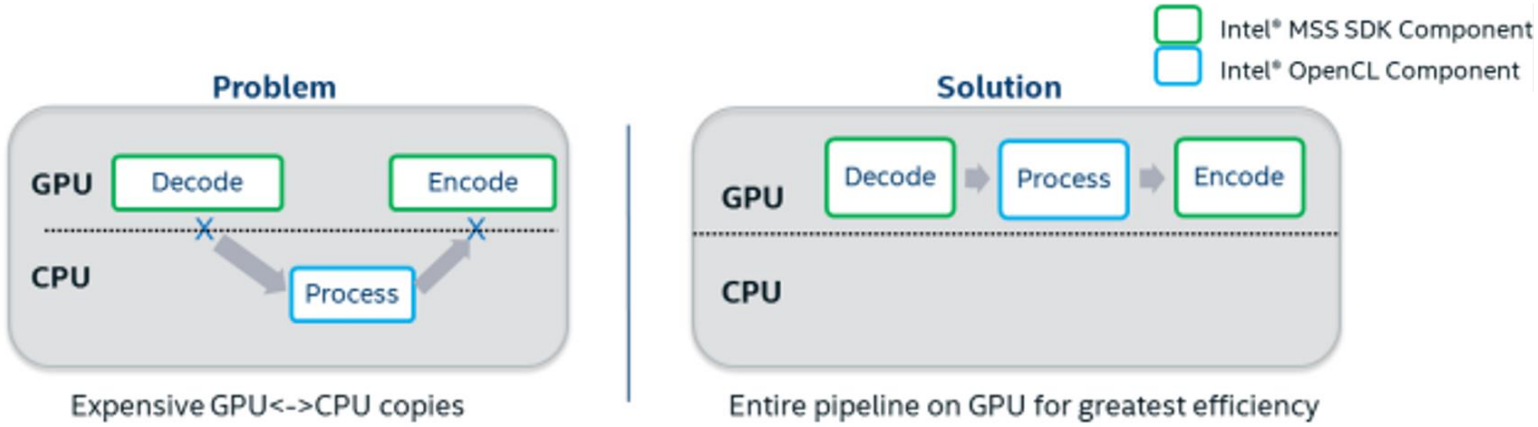
Media SDK provides optimized implementations for:

- Codecs
- Frame Processing Operations

For video processing tasks not in Media SDK's scope, extend with OpenCL

- Make use of growing GPU capabilities
- Keep pipelines on GPU

Example uses: color conversions, custom bit rate control



Media SDK Products

- Media SDK/Media Server Studio—The software API to the hardware codec on GPU.
- Hardware support: Xeon, 3G Core(GEN 7), 4G Core(GEN 7.5), 5G Core(GEN 8), 6G Core(GEN 9) see the details
- OS Support: Windows 7/8/10, CentOS, Yocto, Android, Ubuntu.
- Application: Digital Signage, Set Top Box, FFMpeg, G-Streamer, Media Server, IVI, Surveillance

How to get the Intel® Media SDK/Media Server Studio

Intel® Media Server Studio – 3 Editions
(includes Free Community)

Platform / Device Targets

- Select SKUs of Intel® Xeon® & Core™ processor-based platforms
- Applications for media, communications infrastructure, video processing/conferencing, digital surveillance, video cloud & data center
- For HEVC, AVC, MPEG-2, MPEG-Audio

See Technical Specifications for System Requirements

Download
software.intel.com/intel-media-server-studio

Intel® Media SDK - FREE

Platform / Device Targets

- Intel® Core™ or Core™ M processors
- Select SKUs of Intel® Celeron™, Pentium™ & Atom™ processors with Intel® HD Graphics supporting Intel® Quick Sync Video
- Client devices – Desktop/mobile applications

See Technical Specifications for System Requirements

Download
software.intel.com/media-sdk

Intel® Media Server Studio – 3 Editions

	Community Edition	Essentials Edition	Professional Edition
FREE 30-DAY EVALUATION	NA	No trail needed	Windows/Linux
Buying	Free	From $499	From $3999
Intel® Premier Support	No	Yes	Yes
HEVC software & CPU-accelerated Decoder & Encoder	No	No	Yes
Audio Decoder & Encoder	No	No	Yes
Video Quality Caliper	No	No	Yes
Intel® VTune™ Amplifier	No	No	Yes
Premium Telecine Interlace Reverser	No	No	No

Download
software.intel.com/intel-media-server-studio

LAB OVERVIEW

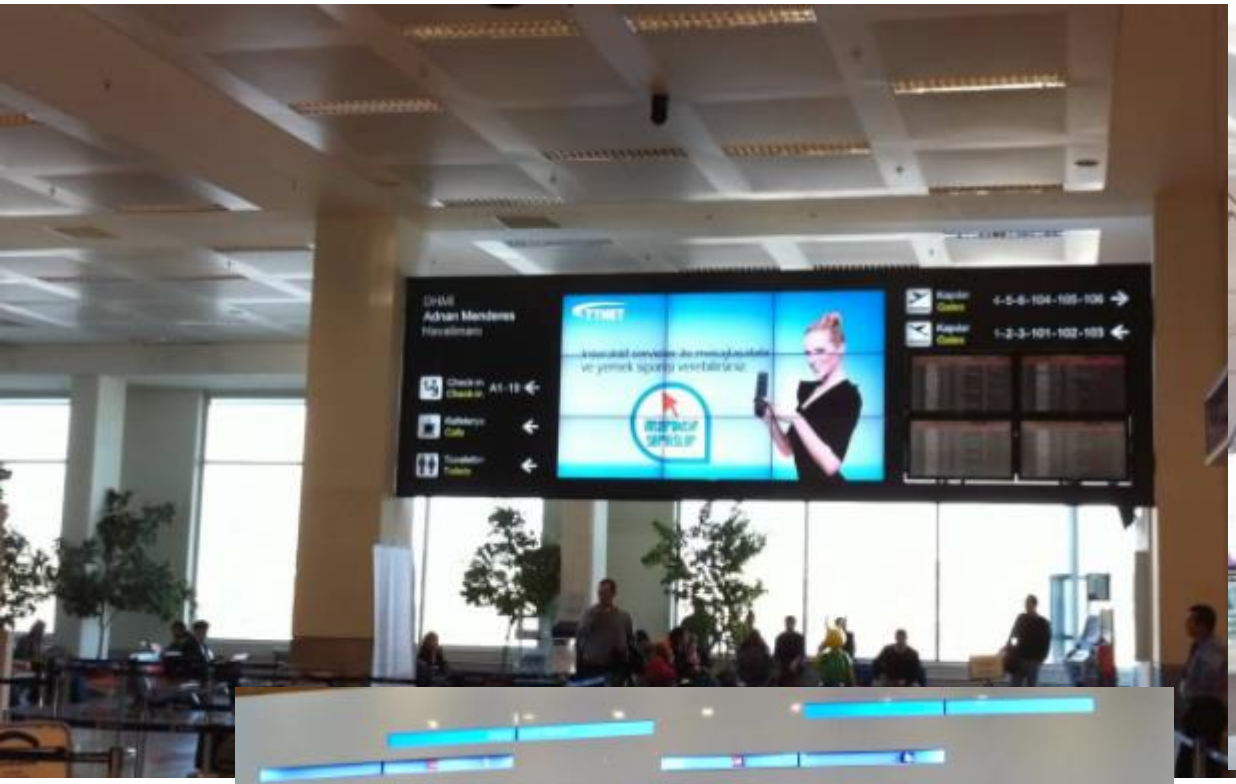
What are we trying to solve?

Customer Requirement

- Need HD quality digital signage in our Retail store for various marketing activities
- Need faster service and lower downtime
- Real-time analytics on number of people looking at my signage

ISV/SI Business Requirement

- Reduced TCO
  - Lower service visit
  - Lower network bandwidth usage
  - Easy maintenance and Centralized control
  - Easy system upgrade
- Faster time to market



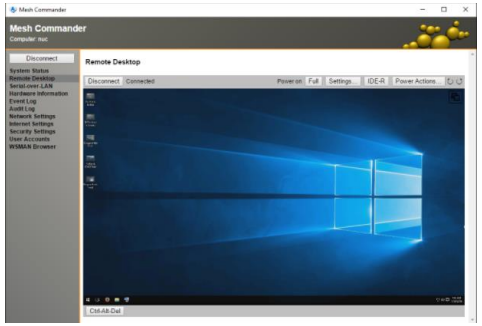
Optimiz

Workshop Inventory

Intel® NUC Kit

Intel® Media SDK

Intel® vPro Technology



Intel® AMT, Mesh Commander and Mesh Central

Python-OpenCV and Camera

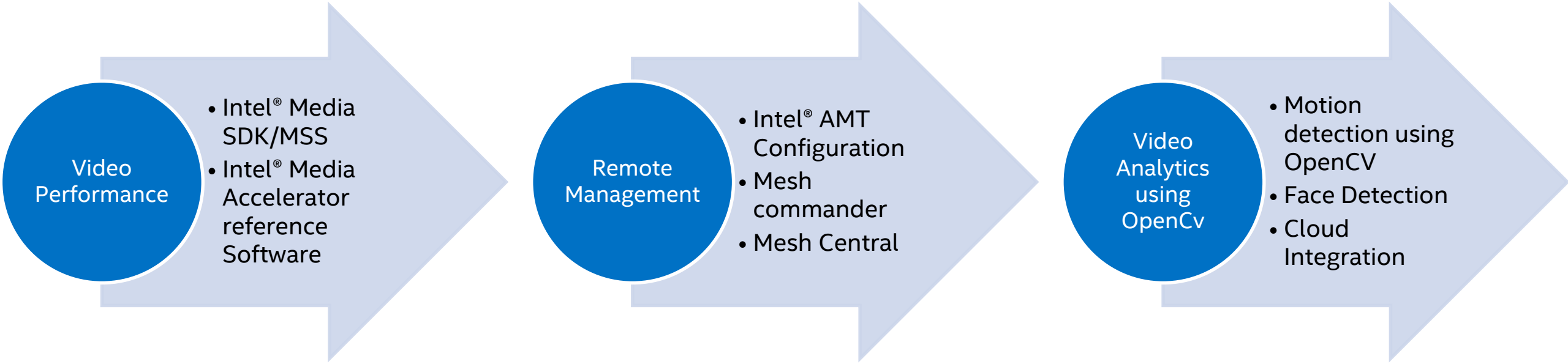
[1] The edge device, gateway and sensors could change to a new technology or vendor

Developer kit is certified for the US, CAN, and EU and can be purchased under a single SKU. In other regions, components can be purchased separately

Code samples can be downloaded from GitHub

In some countries due to import/exports laws, the attendees may not be able to receive certain/all components of the kit

Workshop Flow



Workshop Setup

http://192.168.11.100:**9000**

http://192.168.11.100:**8000**

Wifi:

SSID = Intel_Retail

Password: intel@123

Cloud

Cloud Server URL: http://192.168.11.100:9002

Mesh Central URL: **https**://192.168.11.100

LET'S GET STARTED

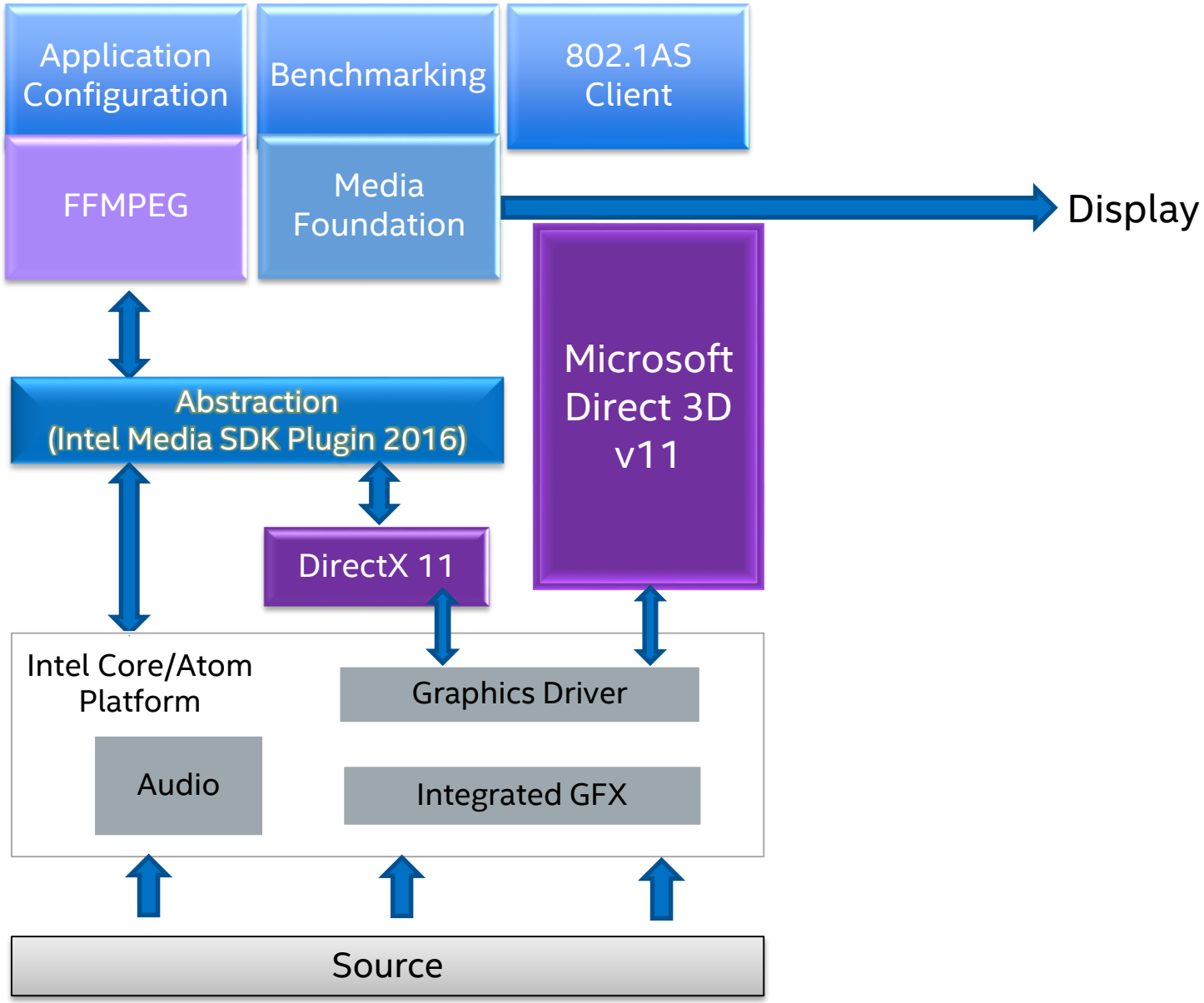
INTEL® MEDIA ACCELERATOR REFERENCE SOFTWARE OVERVIEW

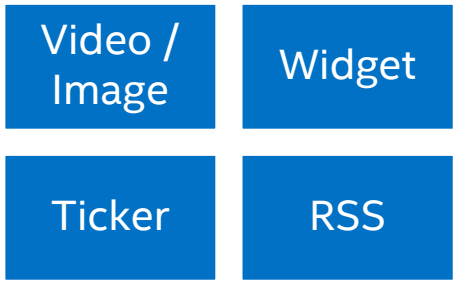
What is Intel® Media Accelerator Reference Software?

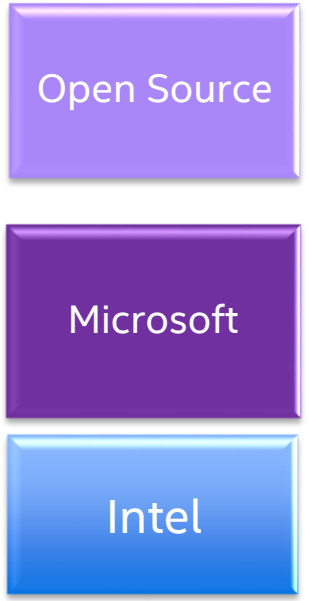
Intel licensed reference code for Digital Signage that uses the best practices for video decode, transcode, playback, compositing, blending, streaming and rendering by using a combination of Intel and other SDKs on Intel platforms

- Target Platforms – Intel Sky Lake/Kaby Lake Core & Braswell, Apollo Lake Atom Platforms
- OS supported – Windows 10
- SDK - FFMPEG, Media Foundation, Media SDK 2016, DirectX 11 (DXVA2.0+)

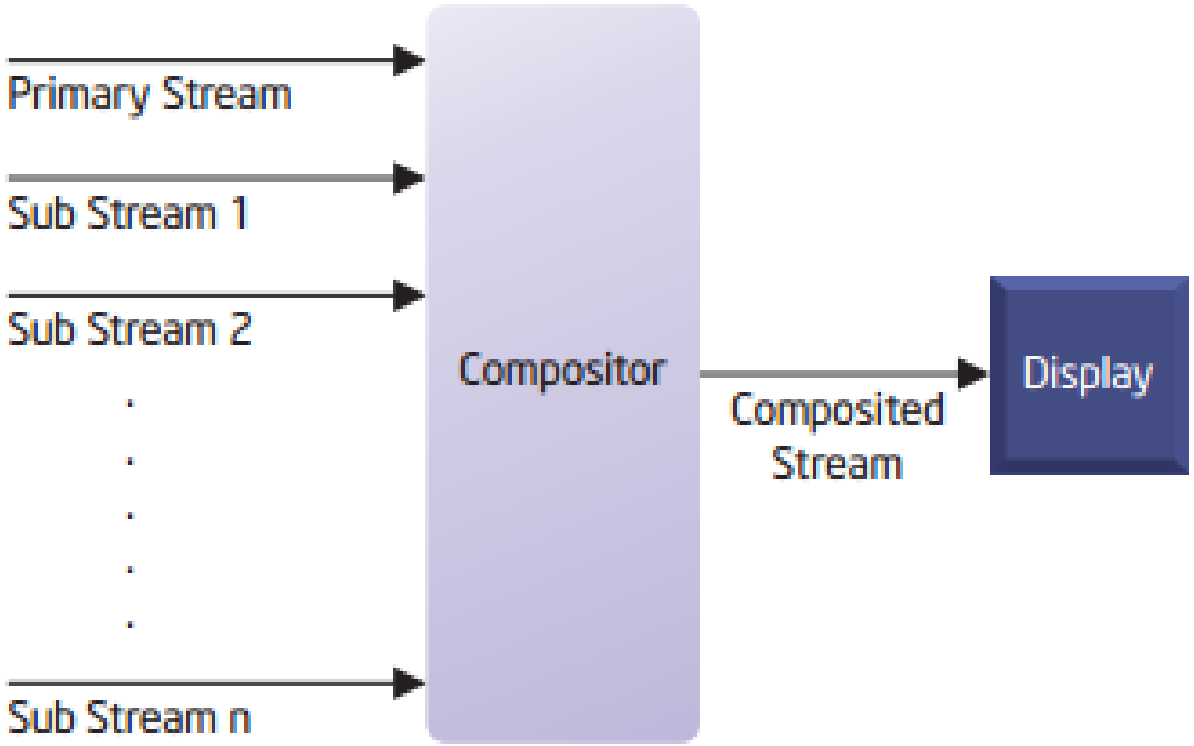
Architecture





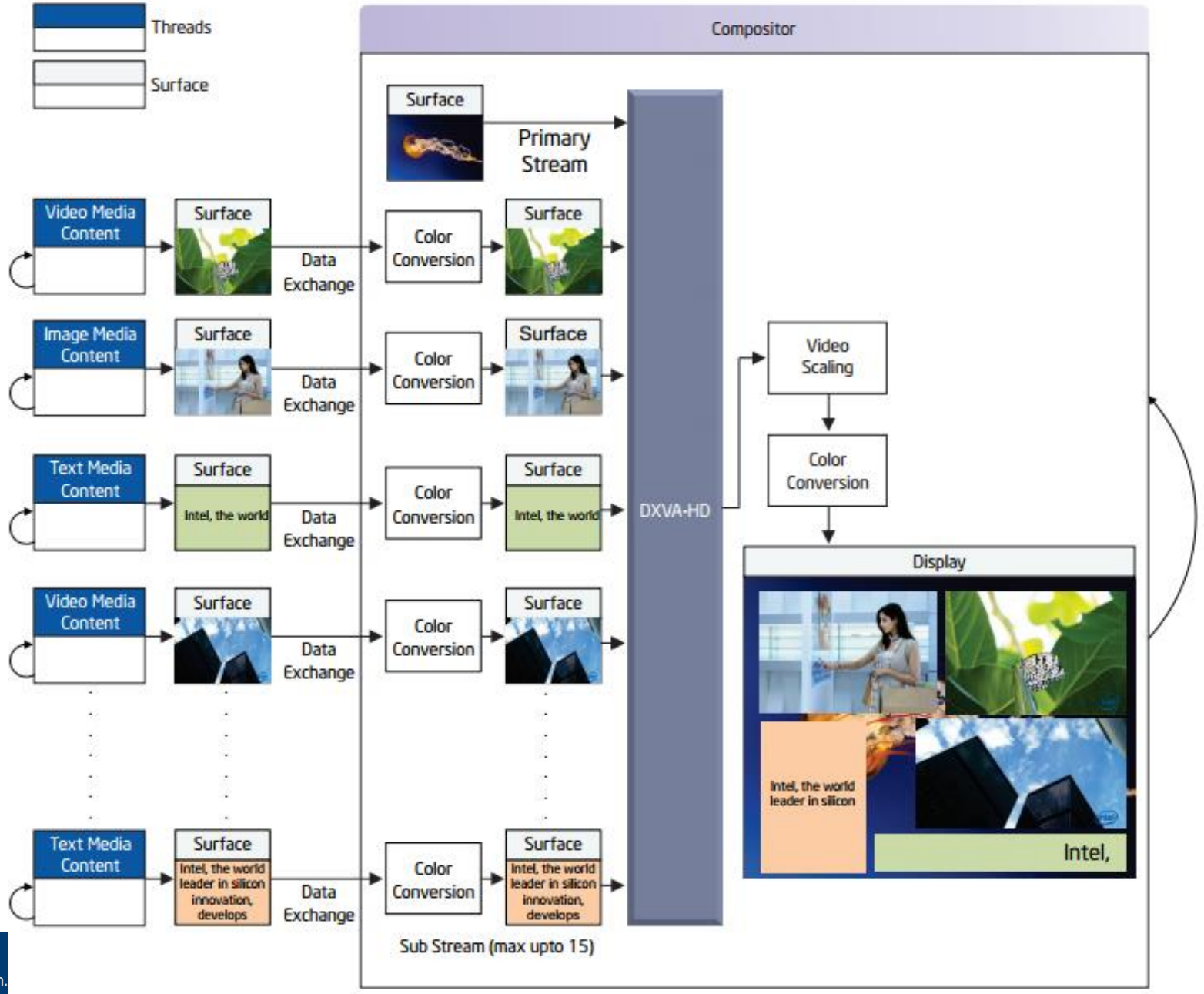


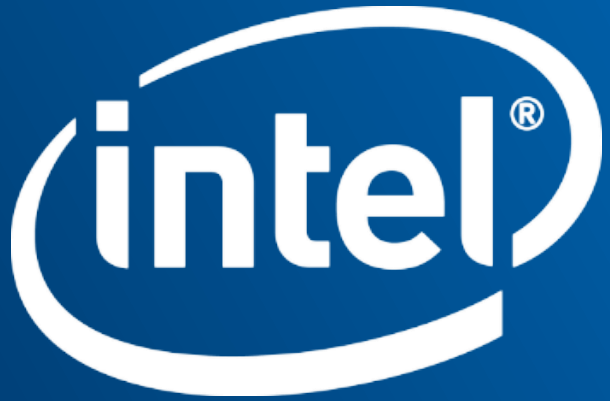
Process flow



- Compositing is a technique of combining visual elements from separate sources into a single frame to create an illusion that all the elements are part of the same scene.
- This process involves a primary stream and multiple secondary streams
- The secondary streams are mixed together with the primary stream to form a single frame that gets rendered to the display

Process flow

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