The Cloud Transition Challenge

Need for flexible infrastructure

DID YOU KNOW?

80% of Internet traffic is expected to be video by 2019

50% of homes in the US will own a 4K TV by 2020

The Market Landscape Today

Market Uncertainty
Ever changing product requirements and continuously evolving standards

Exponentially Increasing Bandwidth
Need for infrastructure upgrades

The Cloud Transition Challenge

Need for flexible infrastructure

Resolution
Frames per second
Color depth

Bandwidth

SD
HD
4K
8K

Ever changing product requirements and continuously evolving standards

Need for infrastructure upgrades
FlexibLe, fUtUre-Proof platform

Intel provides a future-proof, plug-and-play portfolio of intellectual property (IP) for the video conferencing, A/V networking, display and projection, and media processing end markets. You can combine modular blocks with the latest IP to build a flexible video framework with less development time. Additionally, these off-the-shelf building blocks help you respond to rapid design changes. With Intel's state-of-the-art software tools, you can build a professional, customized solution that scales to any bandwidth and product requirements.

Prepare Yourself With Intel

Applications are becoming virtualized and moving to the cloud with hybrid FPGA + CPU solutions residing in commercial off-the-shelf (COTS) servers. Get engaged early with the right platform to start building an ecosystem that is future-proof. Intel provides solutions that enable current and future industry needs as well as the flexibility necessary to accommodate the transition process requirements.

Virtual Machine (VM) or Containerization Realized through Altera Virtualization Framework
**ACQUISITION**

Broadcast and movie production applications need digital cameras that perform at various performance levels with different associated end costs. Intel® FPGAs and related IP cores can accomplish these tasks while providing a higher level of flexibility, lower risk, reduced engineering costs, and faster time to market than off-the-shelf solutions. Scale your solution with the right input streams (coming from high quality sensors or optics) and differentiate it with a custom ISP or in-house video processing. Then, stream the video out in the desired format (e.g., uncompressed serial digital interface (SDI), Ethernet, or any standard compression) or display it to a monitor.

**PRODUCTION**

FPGAs provide much of the I/O and video processing horsepower for video production in the form of dongles, boxes (standalone or rack-mounted), or cards that fit into a workstation or workstation expansion box. Intel’s extensive, certified connectivity IP provides the ultimate flexibility and reliability to input and output a large variety of video formats. In a market with constantly changing standards, you can upgrade to the latest video-over-IP solutions to adapt your product continuously without changing the hardware. Moreover, our modular and off-the-shelf UHD-ready Video and Image Processing Suite enables future-proof video editing solutions with reduced time to market.
DISTRIBUTION AND CONTRIBUTION

The broadcast industry’s contribution and distribution areas need equipment that can ingest video from multiple sources, compress it, and packetize it for transport. Once at the receiver, the process is reversed to de-packetize the transported video and decompress it. Intel’s certified connectivity IP provides the necessary flexibility and reliability to interface between SDI and the latest video-over-IP standards. Furthermore, our state-of-the-art CODEC IP—with the industry’s highest quality H.265—gives your solution an advantage in the market. Intel’s CODEC framework enables full FPGA implementation as well as “ready for virtualization” hybrid solutions incorporating x86 processors with FPGA acceleration.

CONSUMPTION

The broadcast environment uses displays that accept a variety of digital and analog interfaces. Intel’s fully scalable solutions encompass efficient performance at economical entry-point devices through high-end devices with high-speed transceivers. These devices, together with Intel’s modular video framework, are the perfect fit for displaying video for multiviewers and standalone monitors. Interface your video input and output with our future-proof, certified connectivity IP and pre-process it with our interoperable UHD-ready Video and Image Processing Suite prior to being displayed.
ACCELERATING INNOVATION WITH DEVICES, TOOLS, AND IP

20 nm FPGAs Power Next-Gen Studio Applications
Intel presents a unique solution to your studio system solution needs combining comprehensive IP and device portfolios. Our 20 nm Intel® Arria® 10 SoCs are an exact match for next-generation 4K/UHD applications. With the right feature set, including up to 2,400 Mbps DDR4 SDRAM memory interfaces, system designers are ready to create fast time to market, complex and high throughput designs. These IP solutions are developed by our in-house video system experts who optimally combine algorithmic and design expertise.

Intel FPGA IP Portfolio
Intel provides an extensive IP portfolio that includes certified connectivity solutions with:
- The latest traditional and video over IP interfaces
- Modular and future proof (4K ready and beyond) Video and Image Processing Suite
- State-of-the-art compression and decompression engines

VIDEO AND IMAGE PROCESSING SUITE

Intel's Video and Image Processing Suite is a plug-and-play IP portfolio, and presents a highly-integrated alternative to video ASSPs. Together with easily incorporated connectivity IP blocks, the Video and Image Processing Suite provides a design philosophy for rapid new design creation and easy integration of custom value-add features. Moving from HD to 4K/UHD processing requires no system re-design. The architecture is future-proofed to 8K, HFR, and HDR requirements.

Key Concepts
- Support for all Intel FPGAs
- Visual quality exceeds ASSPs
- Easy integration with video connectivity IPs and CODECs
- 4K/UHD and 120 fps+ support
- Released as IP MegaCore® functions
- Highly configurable for cost optimal SD to 4K/UHD systems
- Easy interface to connectivity IP

Size Performance Trade-off
- Range of scaling algorithms from nearest neighbor to edge-adaptive polyphase
- De-interlacer has multiple algorithm options including bob, weave, motion adaptive, and video over film support

Arria® 10 FPGA•SoC

![Arria 10 FPGA SoC Diagram]
CODEC IP

Intel offers a comprehensive portfolio of in-house and partner IP blocks for the Contribution and Distribution markets. Furthermore, Intel's state-of-the-art HEVC solutions offer the ultimate flexibility through full FPGA implementations as well as ready for virtualization hybrid solutions that combine x86 processors with FPGA acceleration.

H.265
- Xeon® E5 + FPGA broadcast encoder
  - 10 bit, 4kp60, 4.2.0
- Low-latency FPGA encoders
  - 4kp30, 8 bit, 4.2.0
  - 1080p60, 10 bit, 4.2.2
- Configurable FPGA decoder
  - Up to 12 bit, 4kp60, 4.2.2

H.264 (Partner Solutions)
- Low latency (AVC-I or I&P), FPGA encoders
  - Up to 1080p60, 10 bit, 4.2.2
- Broadcast (IP&B), FPGA encoders
  - Up to 1080p60, 10 bit, 4.2.2
- Configurable FPGA decoder
  - Up to 10 bit, 1080p60, 4.2.2

JPEG2K and TICO (IntoPix)
- Up to 8K visually lossless

SYSTEM SOLUTION READY FOR PRODUCTION

Customize and own your solutions with full turn-key and part turn-key (with your engineering team) system solutions available through trusted Intel FPGA Design Solution Network (DSN) partners. Intel plug-and-play IP enables the ownership of your solution's differentiation value for existing and future product developments. Please contact a sales representative for more details.

https://www.altera.com/dsn
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<th>FAMILY / DENSITY</th>
<th>PART NUMBER</th>
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| **Arria 10 GX FPGA Development Kit**  
1 DisplayPort TX, 2 FMC, 1 PCIe Gen3x8, 25 Gbps transceivers | 10AX115S2F45I1SG | ![Image](image1.png) |
| **Arria 10 SoC Development Kit**  
1 DisplayPort TX, 2 FMC, 1 PCIe Gen3x8, 25 Gbps transceivers, 1G DDR4 | 10AS066N3F40I2LG | ![Image](image2.png) |
| **Stratix® V Advanced Systems Development Kit**  
2 Stratix V devices, 1 FMC, 1 HSMC, 2 PCIe Gen3, 1 USB 2.0 | 2 x 5SGXEA7N2F45C2N | ![Image](image3.png) |
| **Arria V FPGA Development Kit**  
2 Arria V devices, 2 GB DDR3, 2 HSMC, 1 FMC | 2 x 5AGXFB3H4F40C5NES | ![Image](image4.png) |
| **Cyclone® V GT FPGA Development Kit**  
301 KLE, 5 Gbps transceiver, PCIe Gen2x4 | 5CGTFD9E5F35C7N | ![Image](image5.png) |
| **ALSE Advanced Video Development Board**  
30K LEs, 6.1 Gbps transceivers, 1GB DDR3, 1 Ethernet, 1 HDMI 1.4, 1 DisplayPort 1.2 | 5CGTFD9E5F31C7N | ![Image](image6.png) |
| **Coveloz BACH SoM**  
1 GB DDR3, 3xGbE, IEEE 1588, MADI/AES3/TDM/Analog, Audio I/F | 5CSEA5U23C8 | ![Image](image7.png) |
| **BITEC HDMI 2.0 FMC Card** | | ![Image](image8.png) |
| **BITEC DisplayPort 1.2 FMC Card** | | ![Image](image9.png) |
| **Terasic 12G SDI FMC Card** | | ![Image](image10.png) |