BEAMR

Content Adaptive Bitrate with Intel Gen11 - the Tiebreaker for Video Coding

Sharon Carmel, Founder and CEO

Intel Experience Day, Oct 29th, 2019

AGENDA

Beamr intro

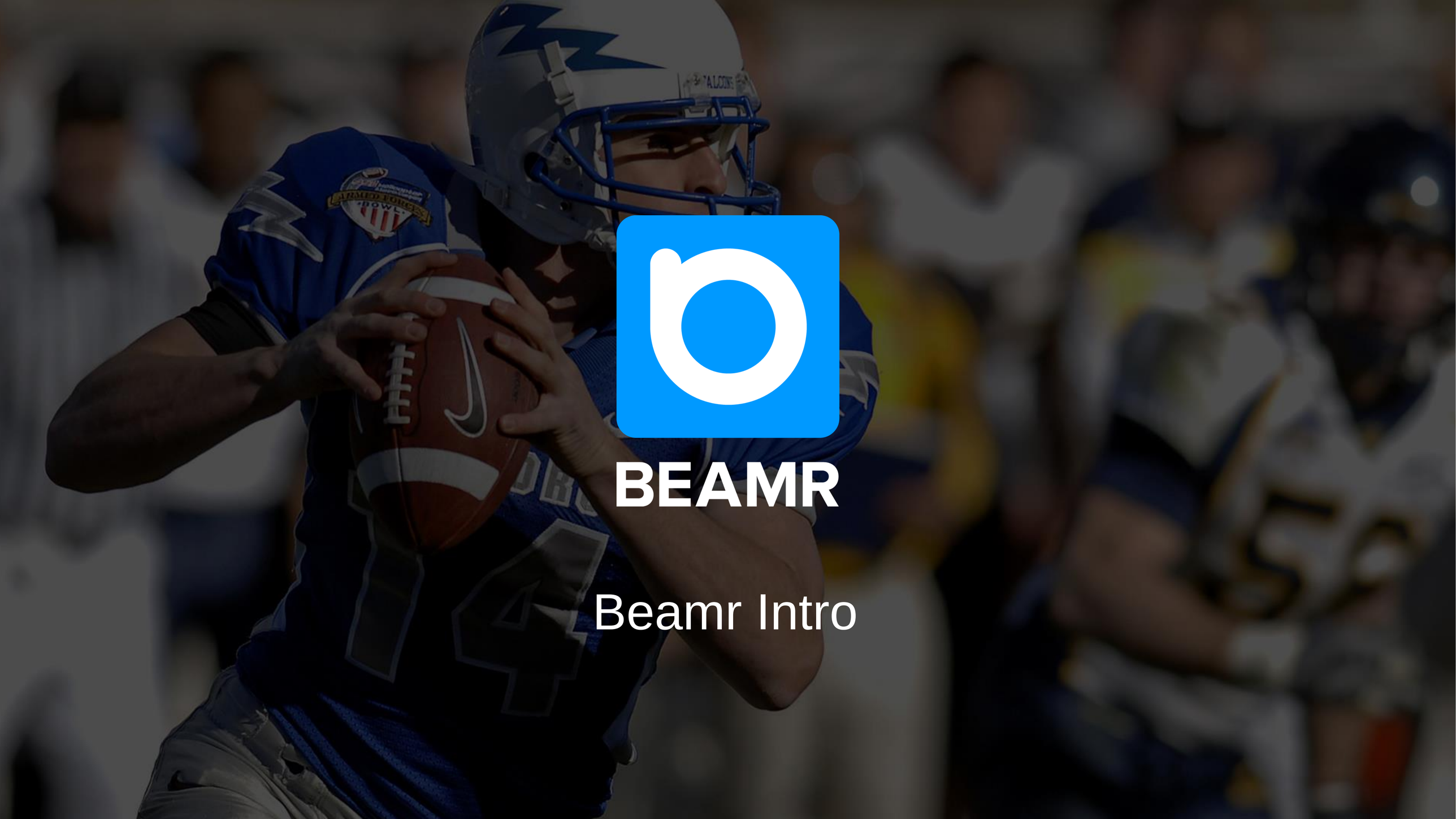
What is content-adaptive encoding

What is Intel Media SDK

How we integrated with Media SDK

Demo

Roadmap



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Beamr Intro

COMPANY SNAPSHOT

2009

- Founded to address need for optimization of videos
- Funded by Innovation Endeavours, and Verizon Ventures.

3

3 offices

- Tel Aviv, Israel - engineering and operations.
- Saint Petersburg, Russia - engineering.
- Palo Alto, California - sales and marketing.

2019

Microsoft Azure

NETFLIX

intel

vudu

deluxe

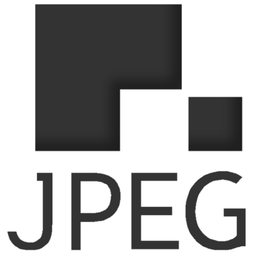
WHO IS BEAMR?

Beamr is the industry leader

in image and video compression solutions

which provide the best quality,

highest density and lowest bitrates



BEAMR'S TECHNOLOGY BACKED BY 46 GRANTED PATENTS

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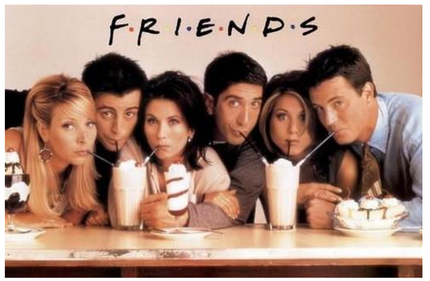
Content-Adaptive Encoding

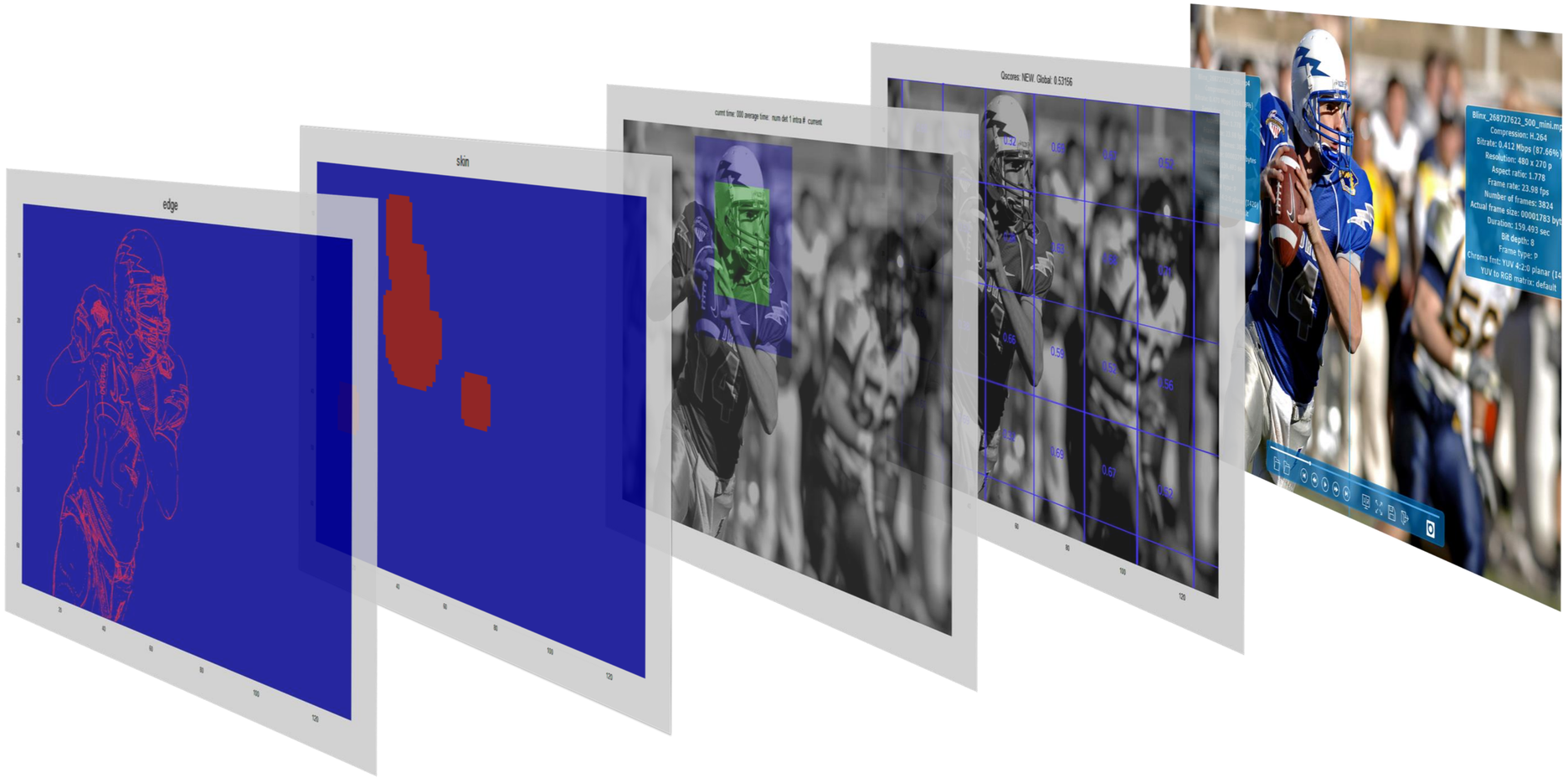
WHAT IS CONTENT-ADAPTIVE ENCODING?

Content (1080p30)			
Regular Encoding	6 Mbps	6 Mbps	6 Mbps
Content-Adaptive Encoding	5 Mbps	4 Mbps	3 Mbps
Bitrate Savings	17%	33%	50%

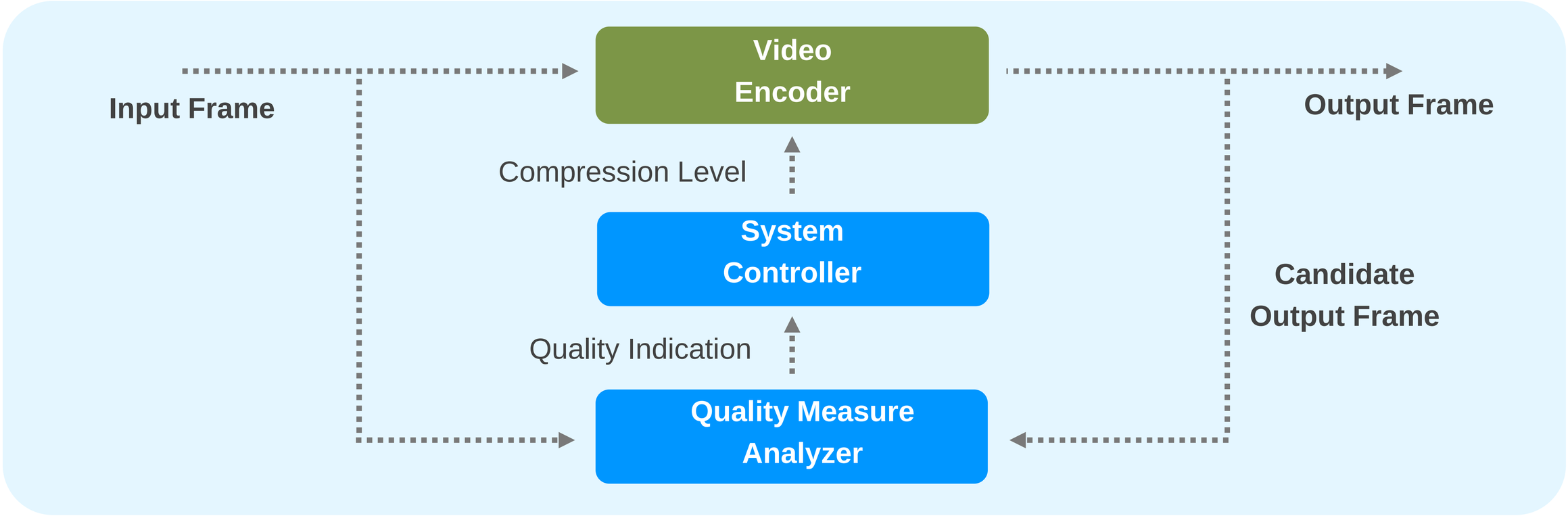
BENEFITS OF CONTENT-ADAPTIVE ENCODING

- Cost Reduction
  - Networking Costs
  - Storage Costs
- User Experience Improvement
  - Improved Quality (Higher ABR Layers)
  - Faster Start Time
  - Less Buffering Events

BEAMR'S CONTENT ADAPTIVE QUALITY MEASURE



CLOSED LOOP FRAME LEVEL OPTIMIZATION



Video Encoder
Encodes input frame into candidate output frame using compression parameters provided by system controller

System Controller
Controls iterative process of frame recompression

Quality Measure Analyzer
Compares quality of candidate output frame with quality of input frame by computing value using patented perceptual quality measure

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Intel Media SDK

OVERVIEW

SW framework for accessing media processing on Intel platforms

Media processing implemented on CPU, GPU and HW (Quick Sync)

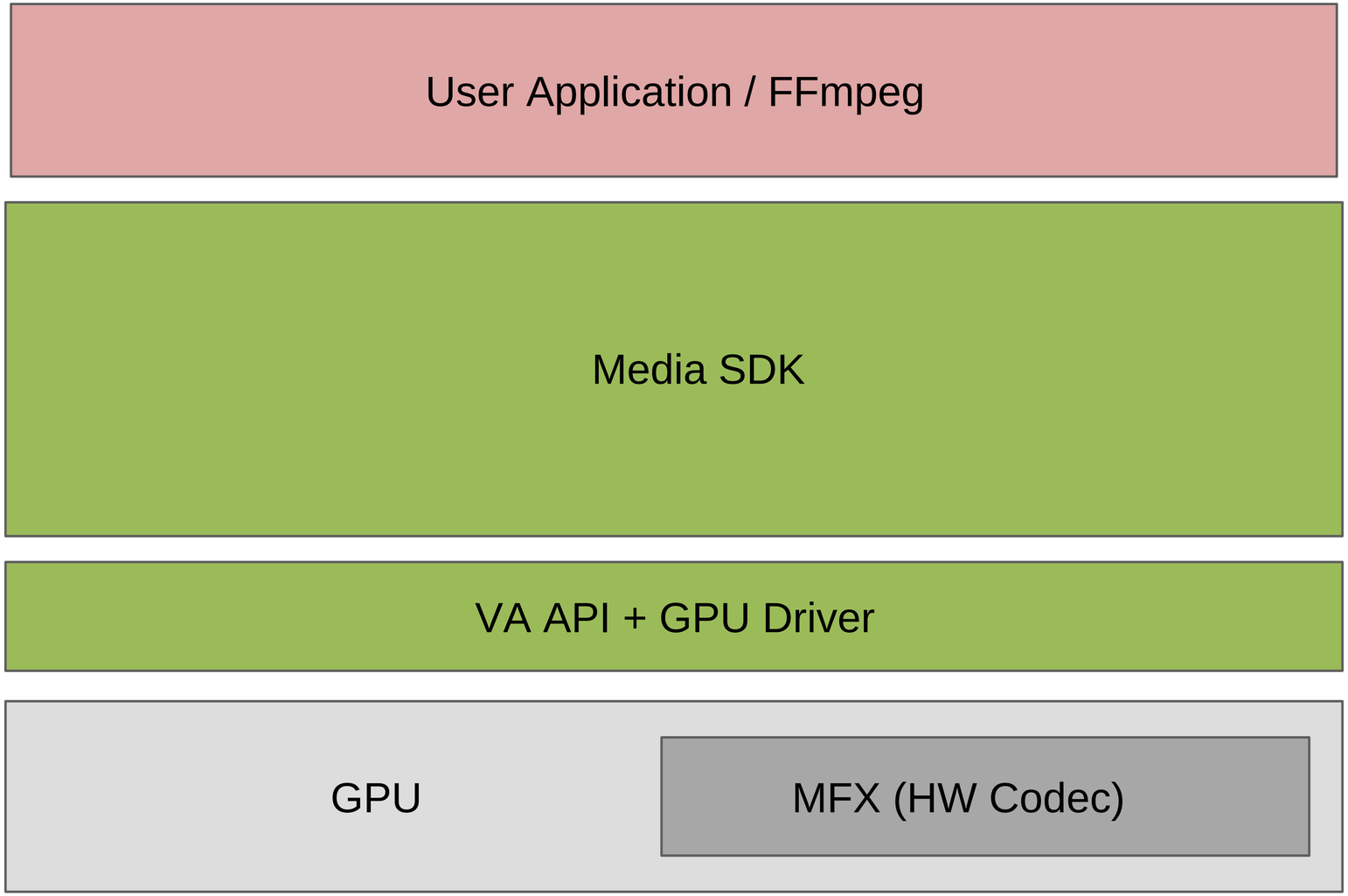
Supports image and video processing, encoding and decoding

Image and video processing: Color conversion, Deinterlace, Denoise, Resize, Rotate, Crop, etc.

Video encoding and decoding: MPEG-2, AVC, HEVC, VP9, etc.

Linux version is open source at https://github.com/Intel-Media-SDK/MediaSDK

ARCHITECTURE



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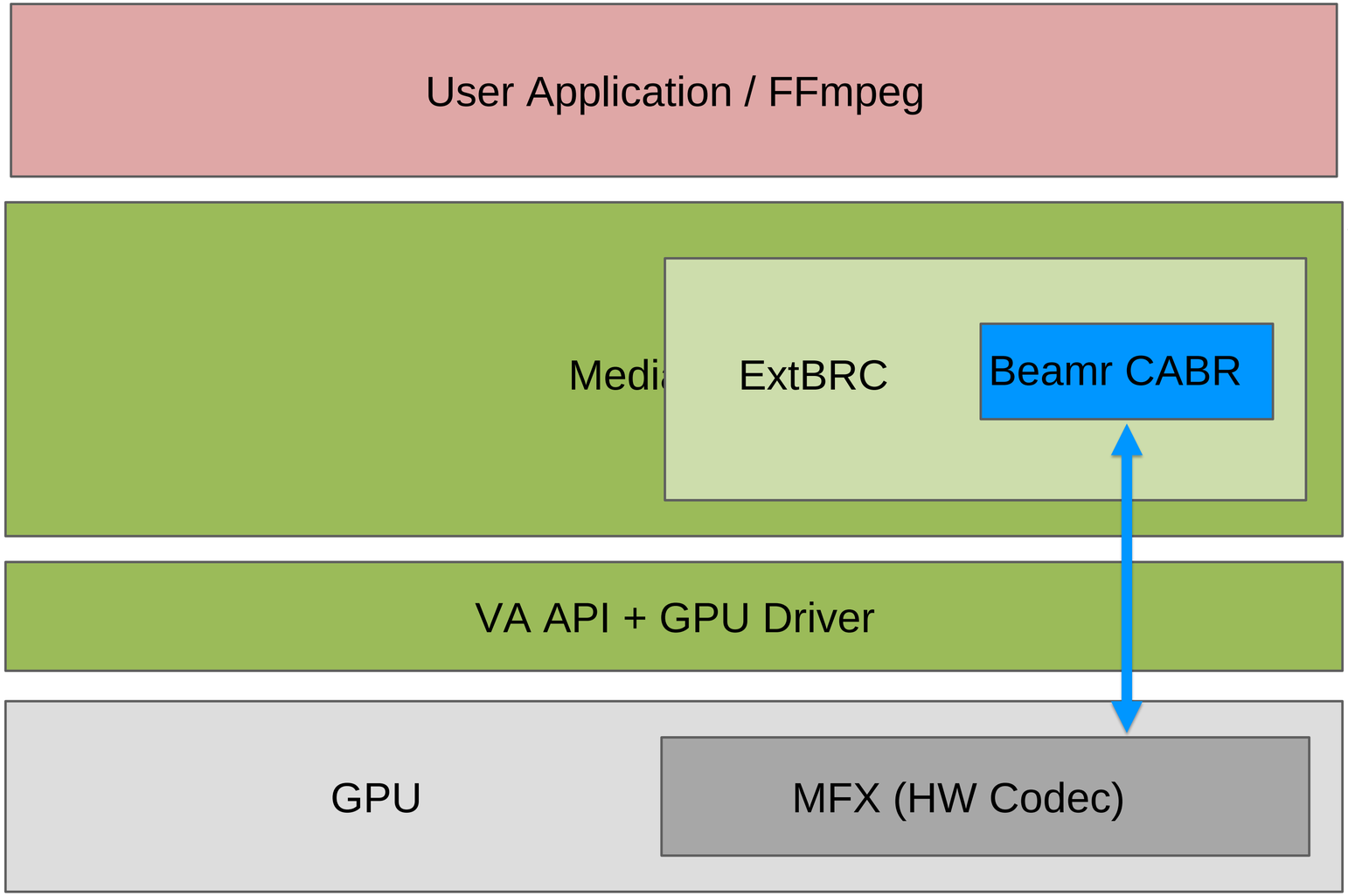
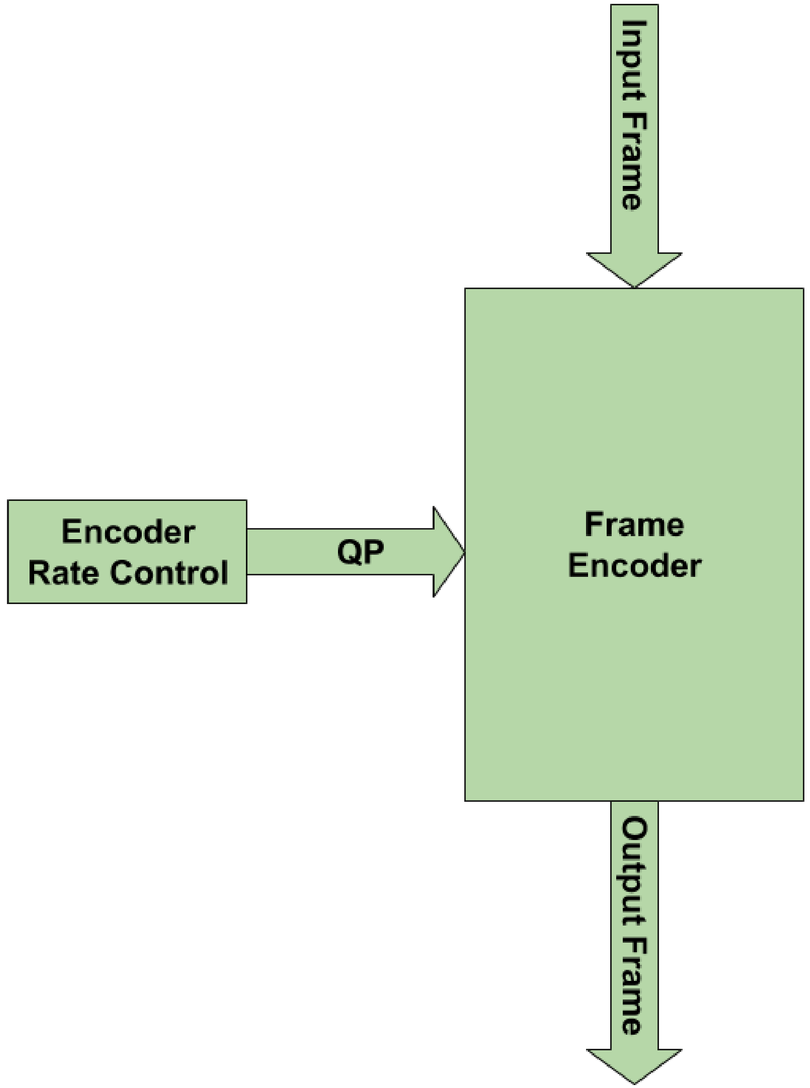
Beamr - Intel Integration

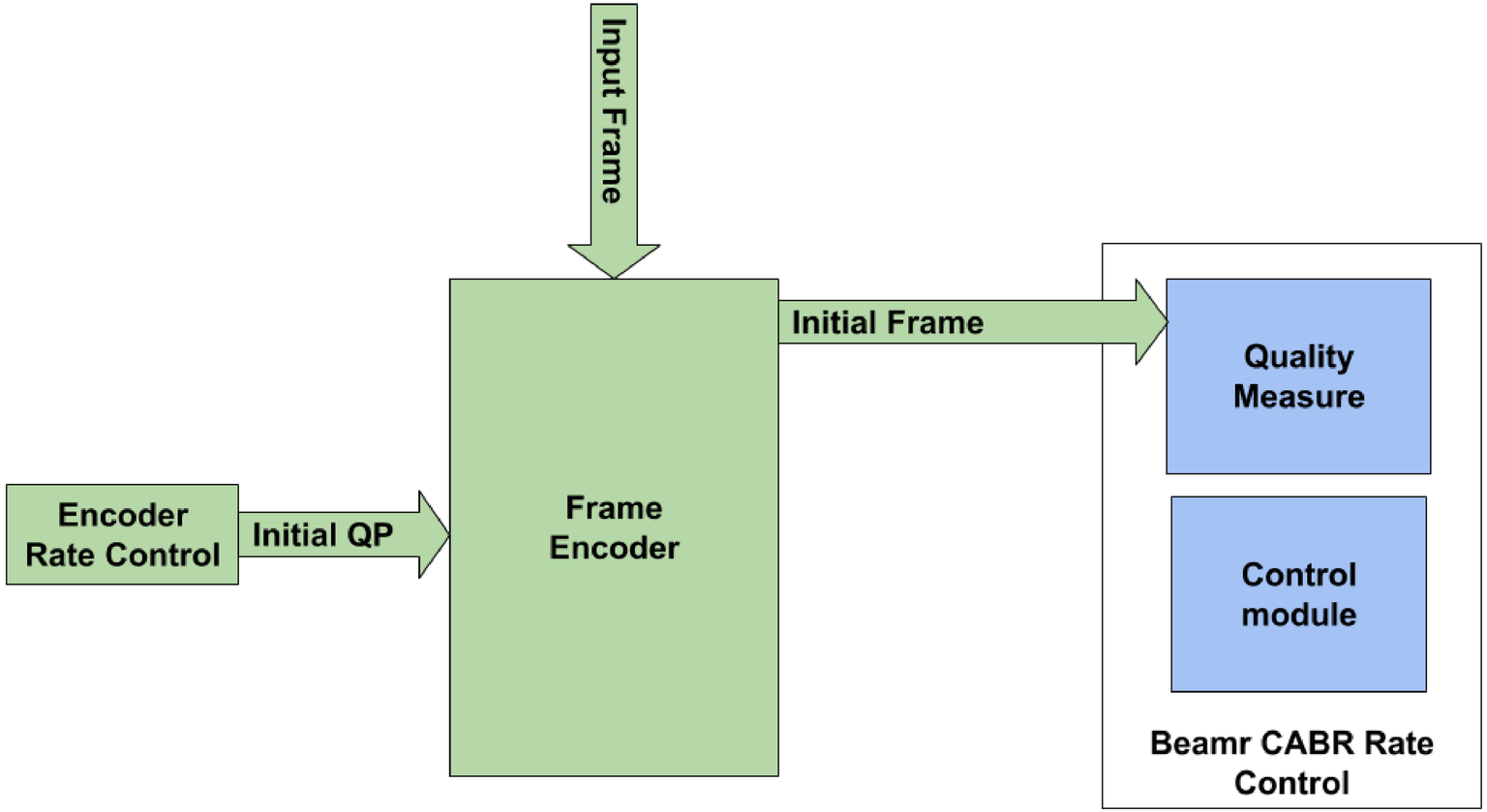
INTEGRATING BEAMR INTO INTEL MEDIA SDK



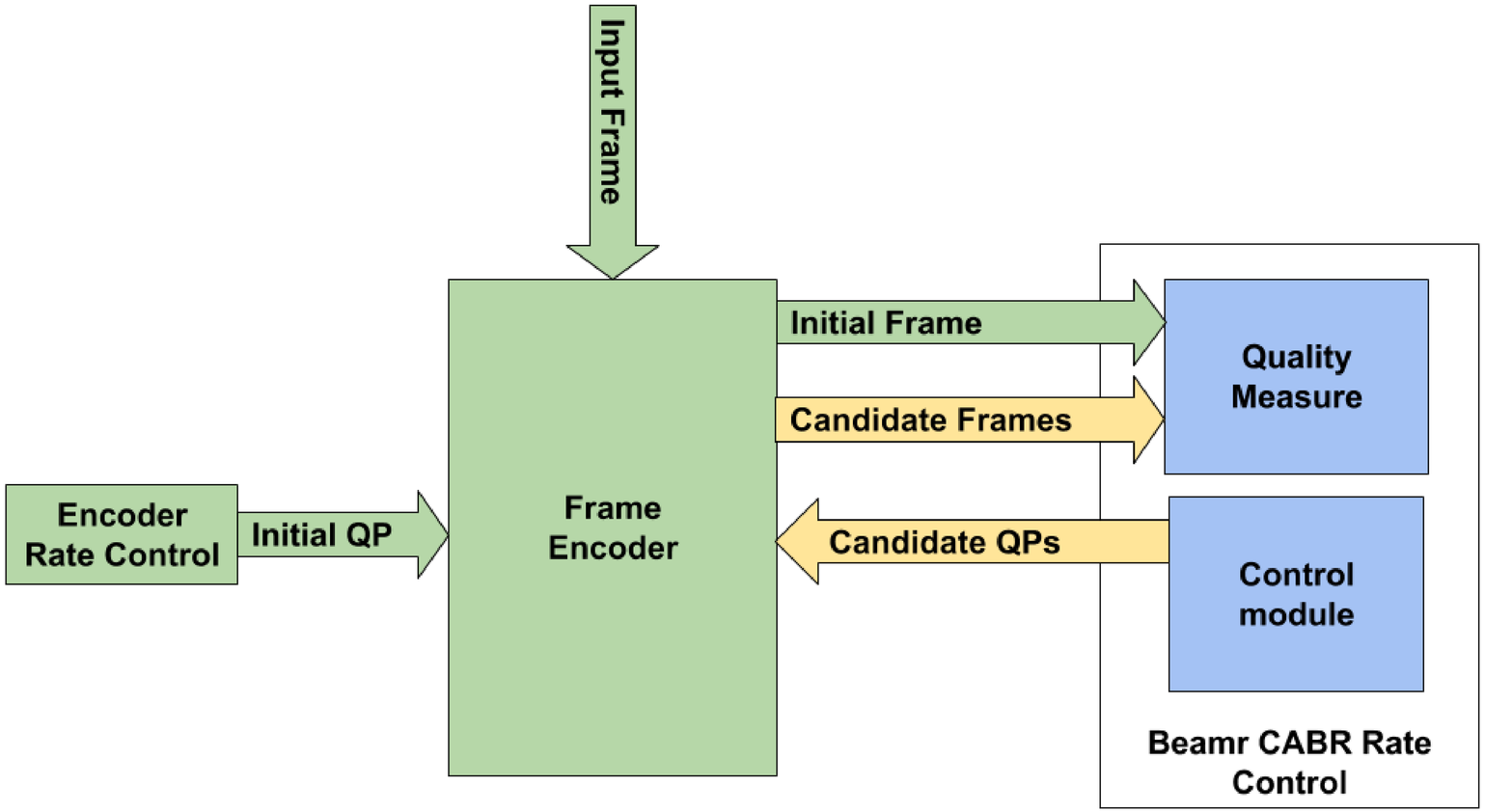
INTEGRATING WITH INTEL HW ENCODER



INTEGRATING WITH INTEL HW ENCODER



INTEGRATING WITH INTEL HW ENCODER



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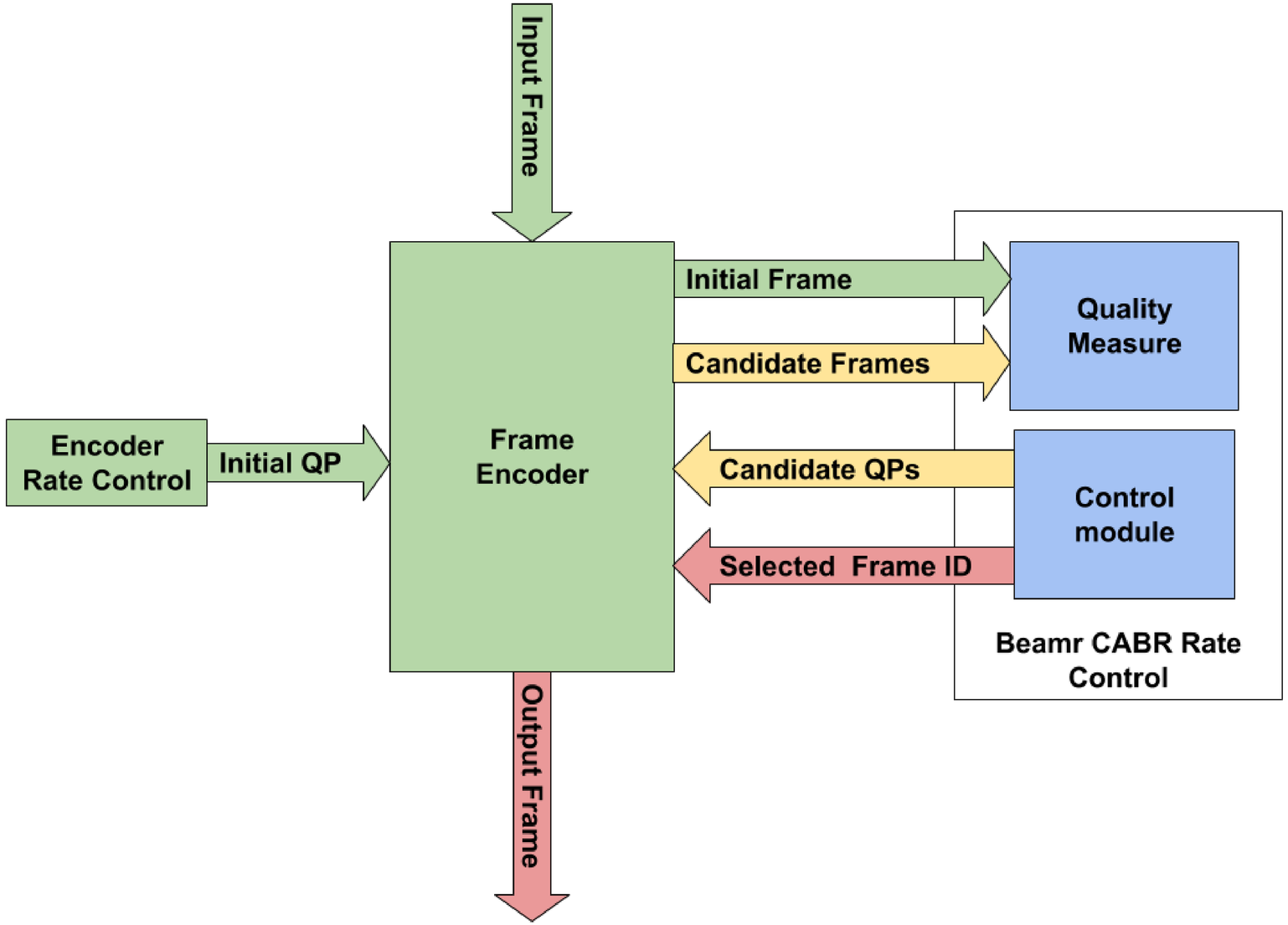
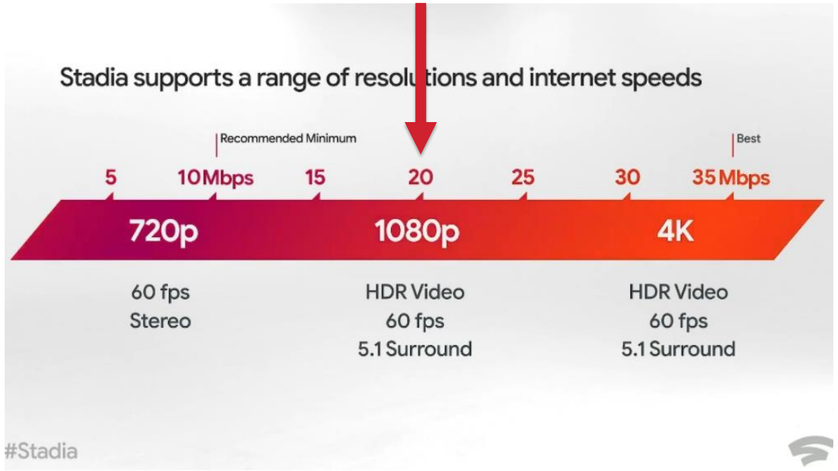
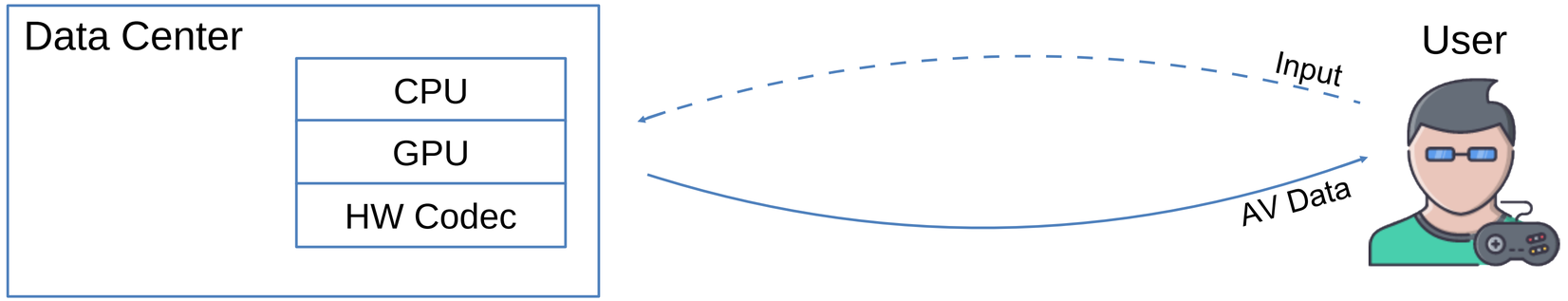


CABR FOR CLOUD GAMING - THE TIEBREAKER

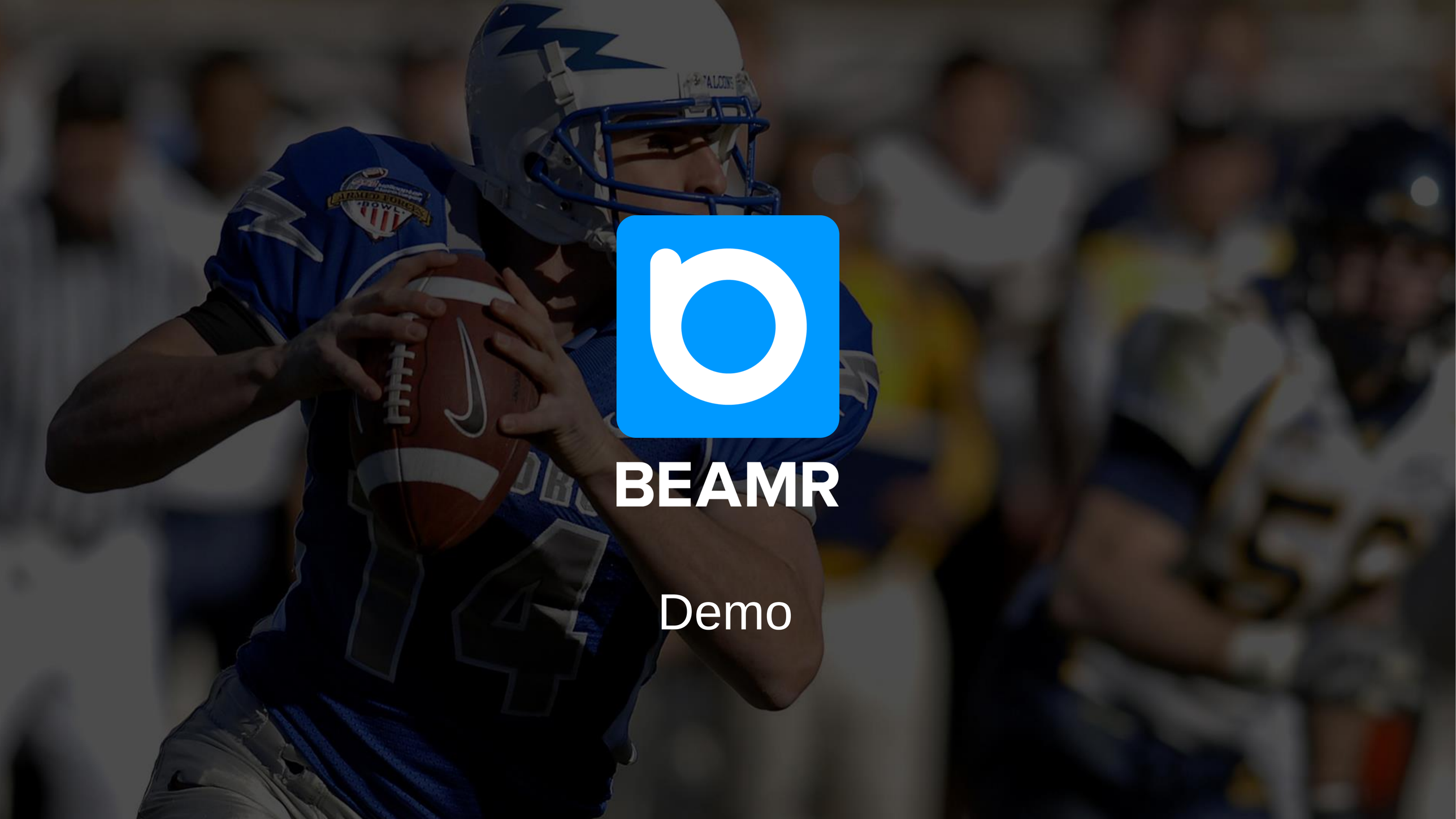
- Low latency
  - No B frames
  - No lookahead
- 60fps
- Hard to encode 3D Graphics





CABR FOR CLOUD GAMING - THE TIEBREAKER

Content (1080p60)			
Regular Encoding	21 Mbps	21 Mbps	21 Mbps
Content-Adaptive Encoding	16 Mbps	14 Mbps	13 Mbps
Bitrate Savings	25%	33%	40%



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Demo

ROADMAP

Succesful POC

- CPU Implementation of CABR
- Modified Intel Media SDK
- Gen11 graphics (IceLake)

Commercial Product

- **1080p30 for VoD and Live Video**
- **1080p60 for Cloud Gaming**

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Thank You!

www.beamr.com