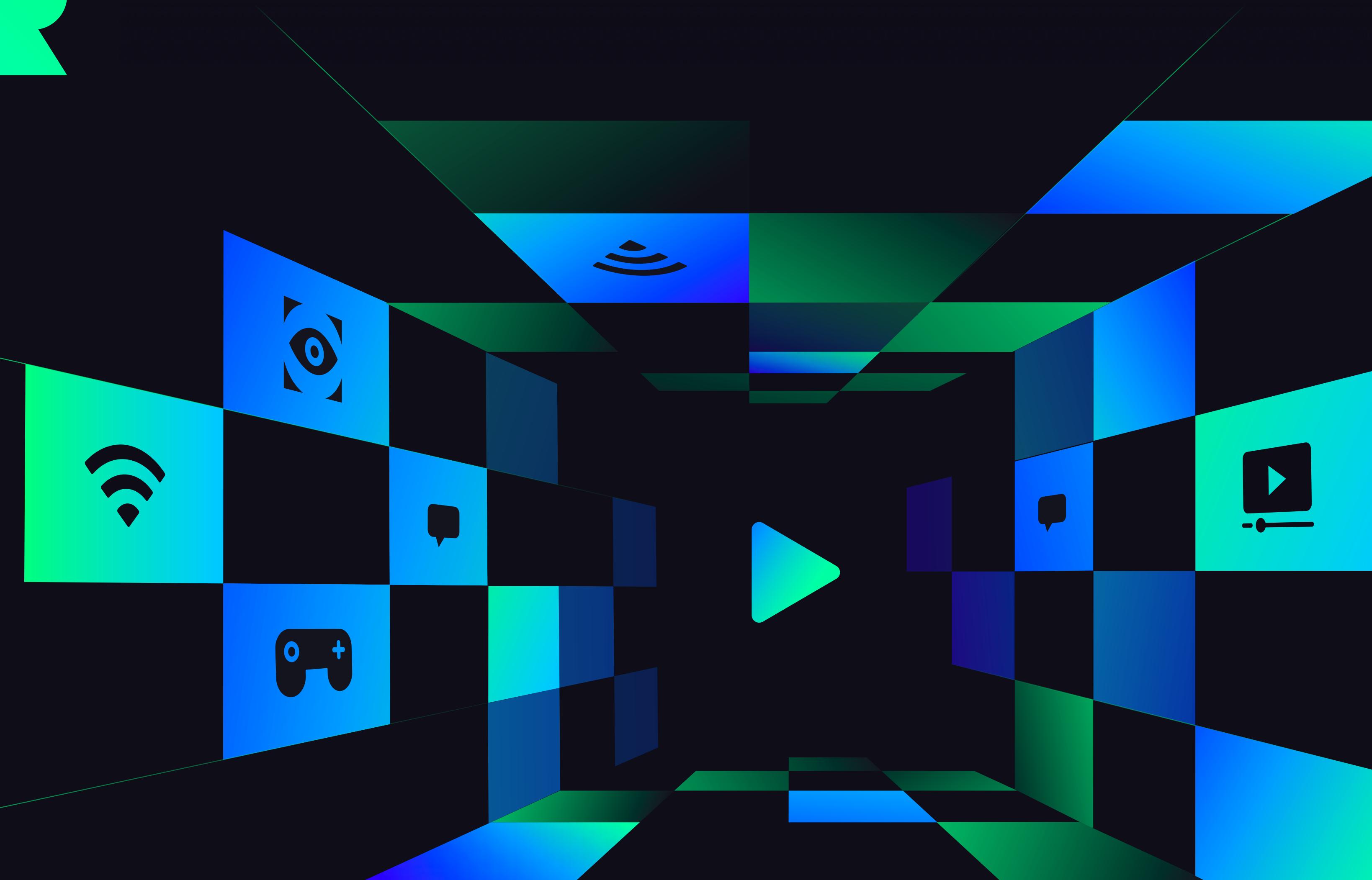


Next-Gen Codec Solution



The right time to enter the market

We produce so much data daily:



 **4PB**
OF DATA CREATED BY
FACEBOOK, INCLUDING
350M PHOTOS & 100M
HOURS OF VIDEO

 **500M**
TWEETS ARE
SENT EVERY DAY

 **65BN**
MESSAGES SENT OVER WHATSAPP
AND TWO BILLION MINUTES OF
VOICE AND VIDEO CALLS MADE

 **>1BN**
HOURS OF VIDEO ARE
VIEWED ON YOUTUBE

 **294BN**
NUMBER OF
EMAILS ARE SENT

 **4TB**
OF DATA PRODUCED
BY A CONNECTED CAR

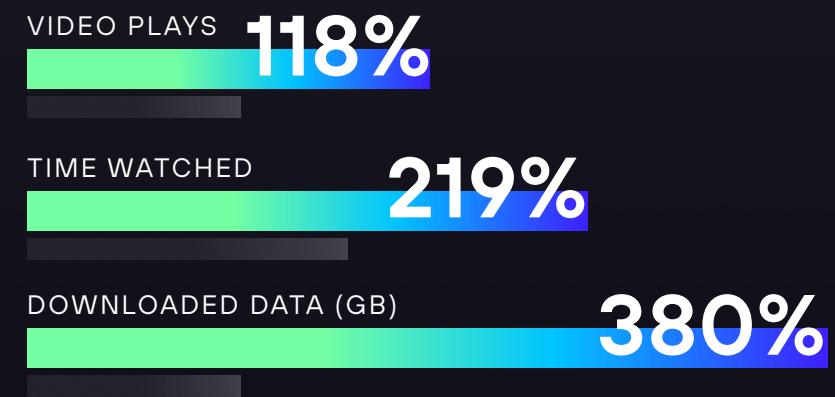
4TB

OF DATA PRODUCED
BY A SINGLE CONNECTED CAR



Market Growth Drivers

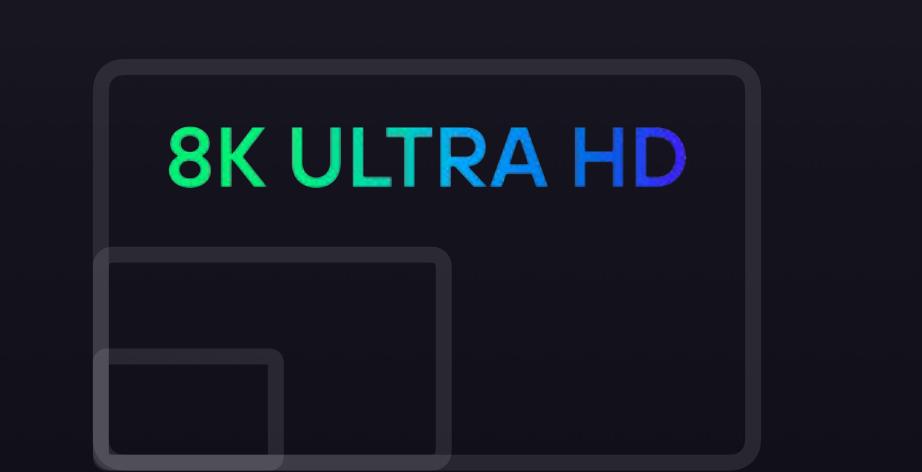
Continued demand for High Efficiency Compression



Content Explosion

MULTISCREEN OTT

Viewers are watching more and are watching longer, but data use is growing faster!



Ultra HD television

4K HDR HFR UHD VR 8K TV

The bandwidth application requirement will grow 10x due to new, higher quality, video formats and disruptive new technologies such as UHD VR.



Bandwidth demand

AUTONOMOUS 8K MOBILE

Mass adoption of 5G networks will support the market need for higher traffic consumption. This will open the gate for bandwidth-demanding multimedia, AI, and ML.



Hardware efficiency

EDGE GAMING AI/ML/AR/VR

Current bottleneck of the market start from the video compression on servers and is transferred to edge and users' devices, which influences battery consumption.

Video content in global Internet traffic: +82% in 2022

50% CAGR in Streaming Costs, 10x in 2024!

Technology impact

There is extreme public pressure on content distributors to lower bandwidth

As providers see record levels of growth, they also need to ensure they are managing costs appropriately as they scale

Netflix Streaming Traffic Hits All-Time Highs on AT&T Networks

HOME > DIGITAL > NEWS

[f](#) [p](#) [i](#) [g+](#) [t](#) [in](#)



YouTube Defaults to Lower-Quality Video Worldwide During COVID-19 Crisis

HOME > DIGITAL > NEWS

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1

Our Target Technology

What is a multimedia codec?

We live in a multi-codec world

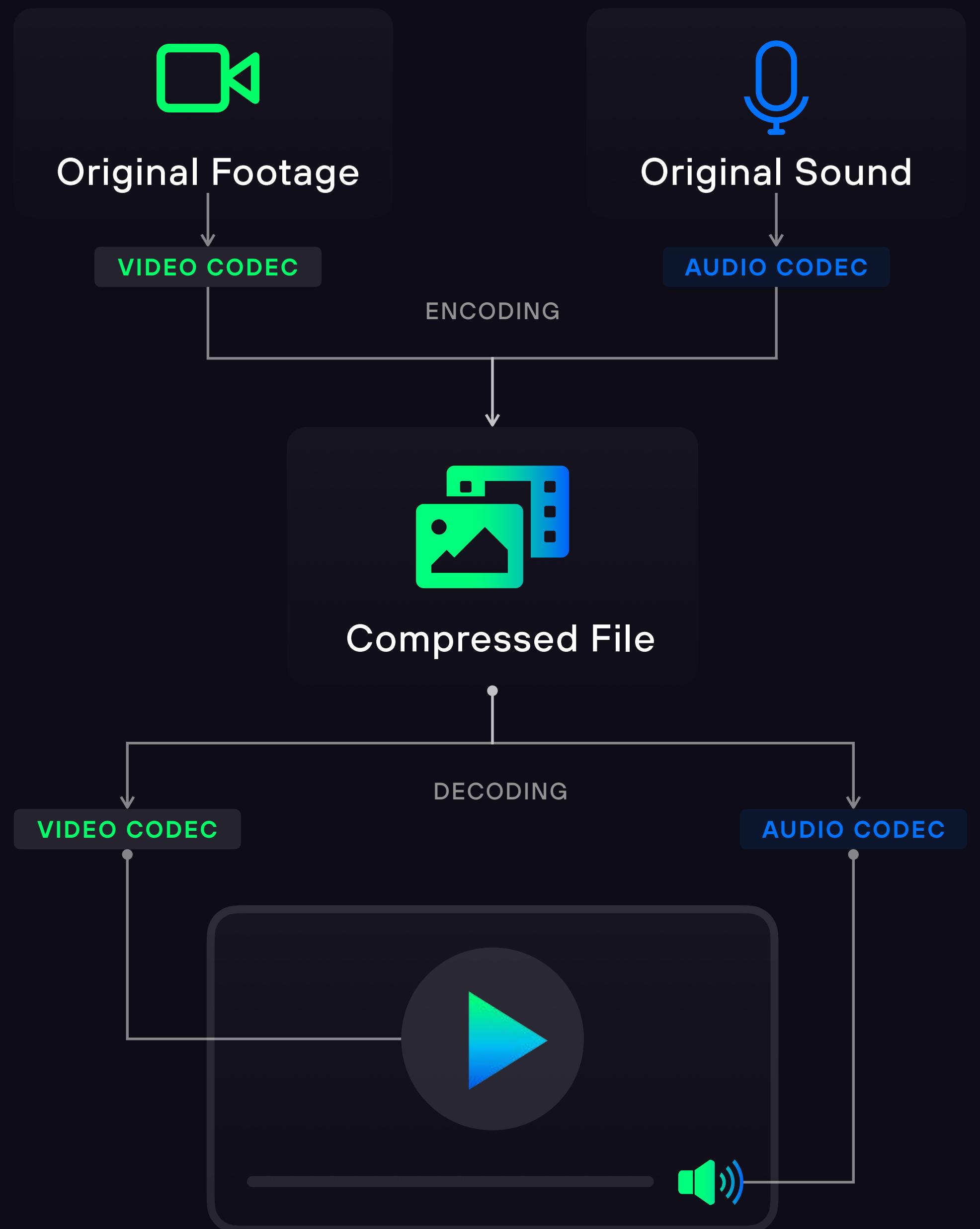
**Production
codec**

**Streaming
codec**

**Texture
codec**

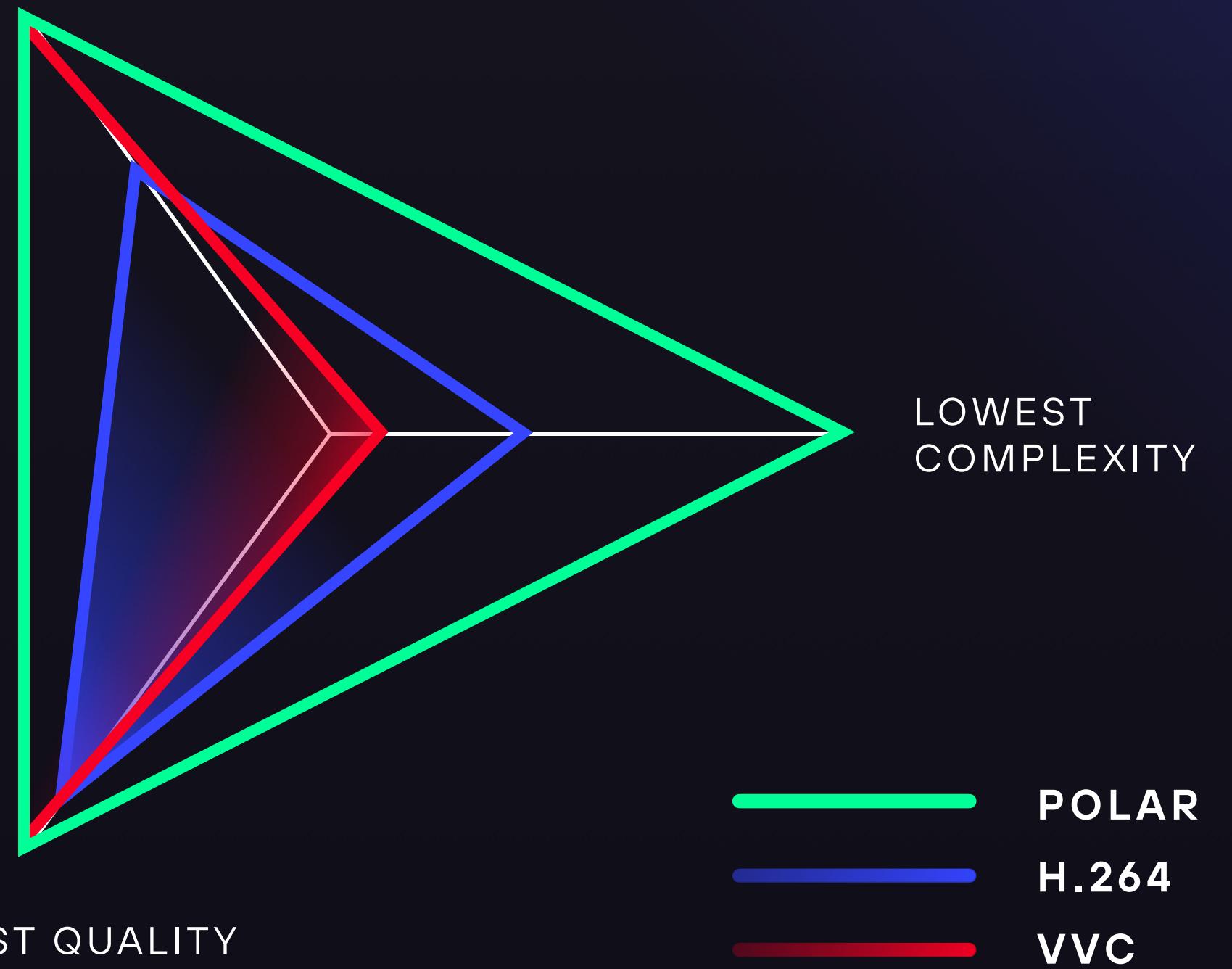
**Machine
Vision codec**

Codec is a compression technology with a two-step process, an encoder to compress the file and a decoder to decompress. There were always two main parameters to each codec - compression and quality vs. the original file. The third parameter that became crucial in recent years is complexity - how much computational power is required to encode and decode a file.



Complexity vs Compression: a tradeoff

HIGHEST COMPRESSION



Each industry has a defined level of quality which acts as a benchmark. Unless market participants achieve (or exceed) this level of quality, their product will not be competitive.

A codec's complexity and compression levels are features that form its competitive advantage. By their nature, they are interchangeable. This means higher compression rates will increase complexity, and conversely, lower complexity will lower the codec's ability to compress a file.

POLAR CODEC:

Same broadcasting channel with

5x

faster encoding

Up to

30%

lower bandwidth consumption

Complexity vs Compression: a tradeoff

5x faster encoding

POLAR's non-DCT technology offer processing of video data up to 5x times faster whilst maintaining the narrow broadcasting channel.

30% better compression

In exchange for complexity, POLAR's 2-Components offers a better compression. At the same time, codec will still be computationally lighter than market alternatives without sacrificing the benchmark level of quality in the industry.

	NEXT-GEN CODECS					
Codec Adoption	h.264/AVC	h.265/HEVC	VP9	AV1 8K	VVC 8K	Polar 16K
Compression efficiency	91%	42%	12%	11%	NEW	NEW
Complexity (lower is better)	BASIC	23% BETTER	20% BETTER	32% BETTER	39% BETTER	30% BETTER or 5X LOWER
Licensing costs	LOW	10-20X HIGHER	10-20X HIGHER	55X HIGHER	100X HIGHER	\$\$*

Video Production codec industry

How does this industry currently work?

The post-production industry has 2 key parameters: Quality - where the main goal is to minimise data losses during encoding, and Complexity - which directly impacts data processing time and amount of parallel streams on one machine. Currently, there are 3 codecs that dominate this industry: Avid DNxHD, Apple ProRes and REDCODE.



What the this industry needs?

BEST COMPRESSION

BEST QUALITY

LOWER COMPLEXITY

Decreased complexity to speed up the post-production process.

Increased compression without sacrificing a high quality level.

Market Insights

\$2.2B Video Production market in 2025

at a CAGR of 22.17% over the forecast period 2020–2025

POLAR CODEC:

Same broadcasting channel with

5x

faster encoding

Up to

30%

better compression



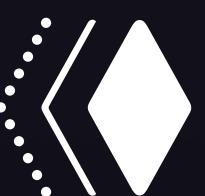
Faster encoding



More parallel streams



Faster editing



Higher compression

2 POLAR Solution

Streaming codec industry

How does this industry currently work?

Companies like Netflix, Google, Amazon, and Facebook are using well-tested solutions (such as the H.264, H.265, VP9 codecs) for their streaming services and, at the same time, actively searching for a unified solution. However, these streaming codecs have a number of limitations in complexity and compression that lead to high operating costs caused by expensive hardware and the power demand required to compute these codec algorithms.



What this industry needs?

BEST COMPRESSION

BETTER QUALITY

LOWEST COMPLEXITY

Decreased operational costs of processing data streams.
More efficient data compression.

Market Insights

\$159.62B The Global Video on Demand (VOD) market in 2027

at a CAGR of 16.92% over the forecast period 2020–2025

POLAR CODEC:

Same broadcasting channel with

5x

faster encoding

Up to

30%

better compression



Faster encoding



Longer battery life
via light decoding



8k content on 4k
infrastructure



High quality live
content in rural areas

Machine Vision codec industry

How does this industry currently work?

The Machine Vision industry spans across cloud video surveillance, autonomous vehicles, robotics, and bioinformatics. These are radically different industries but the flow of video transmission and processing is identical. The unifying factor is the transmission of a large data stream, the volume of which continues to grow every year. The most common codecs used in this industry are H.264 and H.265.

What this industry needs?

BEST COMPRESSION

BEST QUALITY

LOWER COMPLEXITY

Possibility to transfer data using current infrastructure.

Possibility to operate in unfavorable conditions.

Fit more data in one stream.

Market Insights

\$18.24B

Machine Vision Market
Size by 2025

at a CAGR of 22.17% over the forecast period 2020–2028

POLAR CODEC:

Up to

30%

lower bandwidth
consumption

Up to

5x

faster decoding



Faster encoding



On-camera
encoding



Unbuffered
video

Image integrity at
extreme compression

Texture codec industry

How does this industry currently work?

In graphics processing, texture compression is one of the core stages. Texture access consumes a lot of memory bandwidth and overloads the buffer in graphics systems to the point that the amount of bandwidth available for fetching textures limits GPU performance. On mobile devices, bandwidth is even more important because reading from RAM is energy intensive.

What this industry needs?

FAST PROCESSING

LOWER COMPLEXITY

LOW LATENCY

Reduce the complexity of processing, which will speed up the transfer time and free the buffer faster.

Market Insights

\$295B The global video game market in 2026

at a CAGR of 10.5% over the forecast period 2021– 2026

POLAR CODEC:

Processing textures

5x

Faster

Up to

2x

Lower GPU load



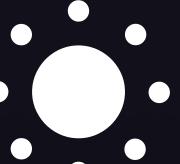
Process textures
faster



Lower latency in
games



Highly adaptive for
various hardware



Lower power
consumption

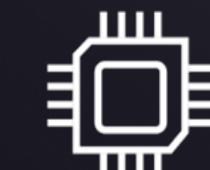
Polar Technology & Know-How



Embedded live
error control



Versatile block size



FLEXIBILITY → EFFICIENCY

Our algorithms can be effectively executed
on CPUs, GPUs, FPGAs, and ASICs

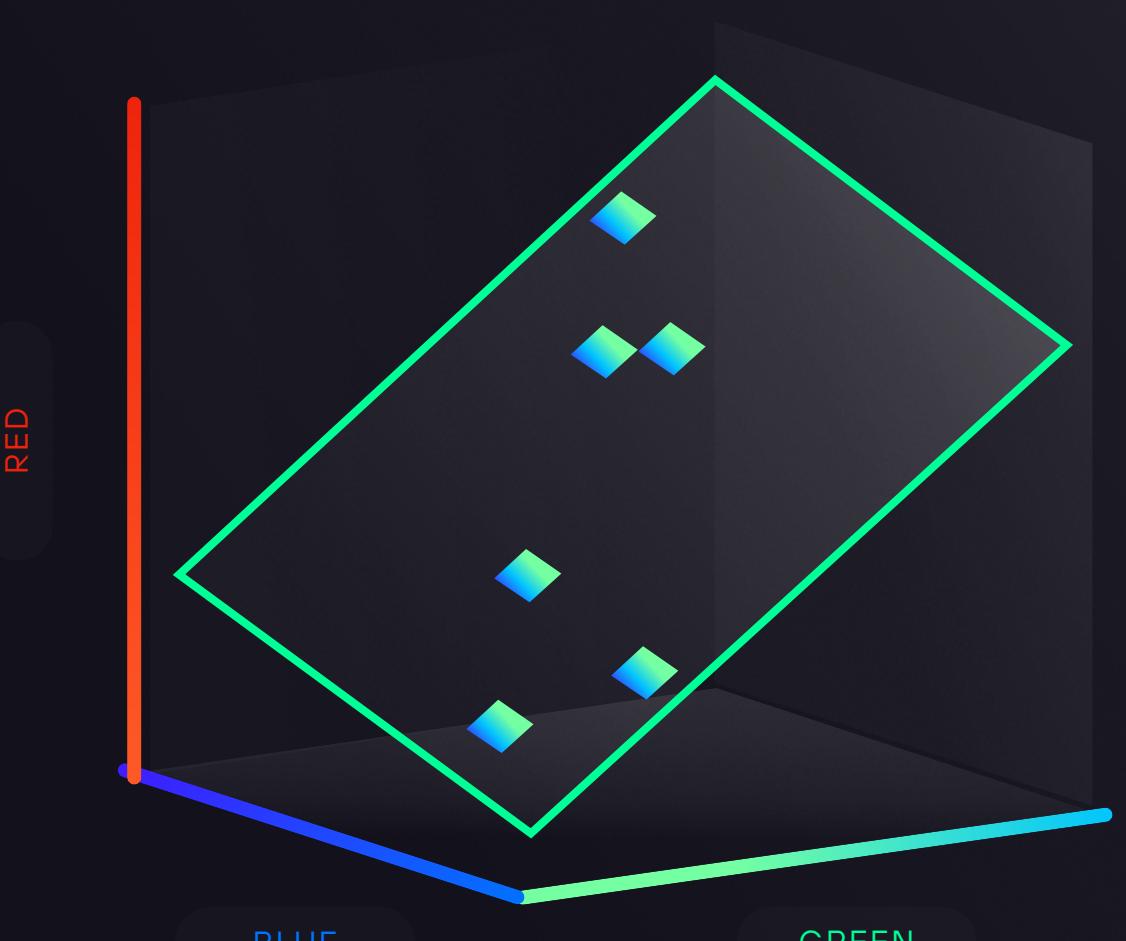


AR/VR compatible



Up to 16K support

Proprietary
compression methods:
approximation, interpolation, scalar engines



We've developed
own color correlation method

Up to

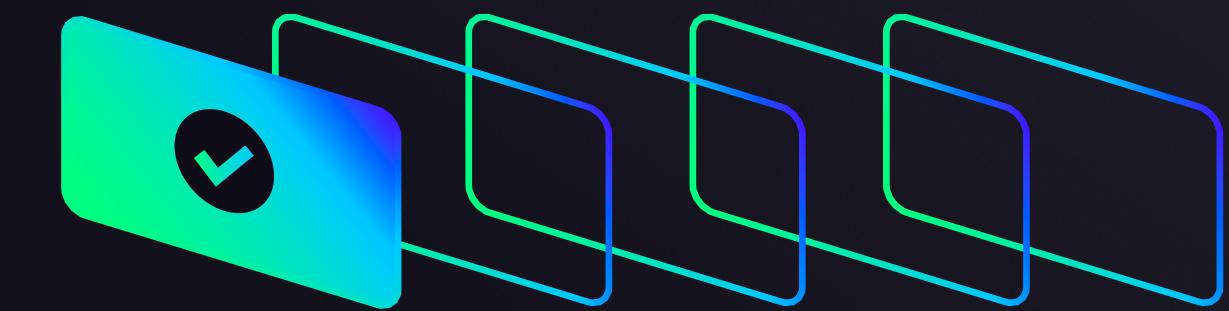
30%

better compression

Up to

5x

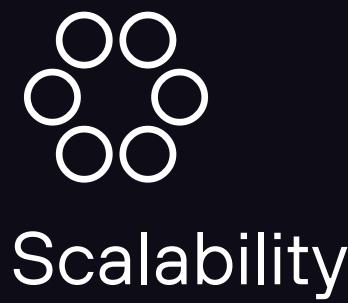
lower complexity
vs industry standards



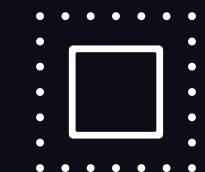
Industry standard quality

Low hardware
requirements

Polar vs Other codecs



Scalability



Complexity



Quality-
compression
balance

DCT-EMPOWERED

HEVC AV1 VVC

✗ Block segmentation algorithmically limited

The limitation has a direct impact on processing high-resolution videos. At the same time, the block is square, which gives additional distortion during processing.

✗ DCT-based codecs require a lot of computation

Which requires powerful hardware and high energy consumption. One of the best software implementations of DCT 8x8 uses 160 multiplications and 466 additions.

✗ Limited in adjusting quality to compression range

During RGB processing, DCT can't identify separate components to further adjust the balance of quality to compression. The adjustment occurs after the processing and influences the results' quality.

POLAR

✓ No algorithmic limits

The use of piecewise-defined function doesn't limit the block size. The fragmentation process is versatile, which minimizes the distortion during processing.

✓ At least 2x energy savings per unit

Our 8x8 codec consumes 120 sifts and 120 additional. For x86/x64 architecture that's approximately 1 to 4 in computation costs. The gap increases even more on FPGA.

✓ Versatile change levels

On the color processing stage, POLAR evaluates which is the most effective component for compression. Both factors grant a higher compression rate without sacrificing the quality.

Development Potential

AR/VR

\$97.9B

Market in 2025

AUTOMOTIVE

REAL ESTATE

ENTERTAINMENT

The new spherical adaptive codec's development will apply POLAR's approaches to balancing quality and compression in AR / VR content. A new codec will reduce response delays and dynamically adapt to the user's field of view.

Matrix chip

\$142.76B

Market in 2025

SMARTPHONES

CAMERAS

We plan to create a codec for light-sensitive matrix chips as a media processor for real-time data compression. The goal is to increase the efficiency of data transmission without significant hardware changes while increasing energy efficiency.

Binocular vision

\$1.4B

Market in 2025

HEALTH CARE

AUTONOMOUS

The development of advanced stereo-vision technology with minimal delays and high frequency rates will improve standard approaches to remote control of various vehicles (cars, agricultural and mining machinery, drones, medicine, etc.) and hardware.

Hyperspectral imaging

\$323M

Market in 2026

DRUG DESIGN

AGRICULTURE

ART

Polar technologies work not only in visible light spectrum. Our compression and analysis methodologies show great potential in various application including hyper spectral quality control and 3d molecular modelings post spectral analysis.

AI Powered Codec

\$2.6B

Market in 2026

MACHINE LEARNING

NEURAL NETWORK

POLAR plans to design a codec that based on neural networks. The codec will be able to analyze the input task and decide which codec's preset to use for encoding and decoding. This will simplify the process for implementing new codec in various markets.

3D modelling and Holograms

\$7.6B

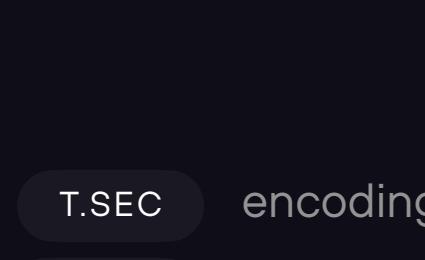
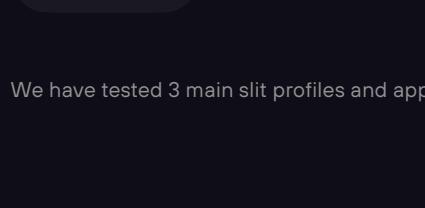
Market in 2025

GEOLOGY

CONSTRUCTION

Considering the massive amount of computation required for encoding 3D content, POLAR plans to create a 3D codec based on a low complexity technology. Later on, a more complex version will be developed using the adaptive codec for three-dimensional visualization.

Comparative testing

	Prores				Polar				Prores				Polar				Prores				Polar								
	422 HQ				M				422				L				422 LT				LM								
SIZE WxHxC	T.SEC	S.MB	SSIM	PSNR	T.SEC	S.MB	SSIM	PSNR	T.SEC	S.MB	SSIM	PSNR	T.SEC	S.MB	SSIM	PSNR	T.SEC	S.MB	SSIM	PSNR	T.SEC	S.MB	SSIM	PSNR					
 5120x2560x190	141	1129	0,995	45	 4608x2160x196	56	600	0,991	45	 4096x2304x553	121	703	0,995	44,8	 6144x2592x556	52	364	0,987	42,7	 5120x2560x190	109	542	0,994	44,4	 4608x2160x196	50	276	0,984	40,7
	163	1075	0,993	41		52	986	0,991	43		126	537	0,991	40		45	590	0,985	39,5		117	384	0,988	39		40	377	0,978	36,6
	380	2259	0,997	42,6		141	2539	0,996	43,2		312	1467	0,995	41,4		123	1667	0,992	39,7		282	994	0,993	39,9		115	1142	0,985	36,3
	351	3407	0,995	45		187	1736	0,992	46,3		309	2553	0,994	45		168	1189	0,992	46		315	1564	0,994	44,7		168	1124	0,992	46

T.SEC encoding time in seconds lower is better
S.MB the size of the encoded file in megabytes lower is better

SSIM Structural Similarity index closer to "1" is better
PSNR Peak signal-to-noise ratio higher is better quality

Color gradient - DCT bottleneck



Both photos are at maximum compression level, with almost the same file size. The picture on the left (using DCT) shows poor gradient processing and, as a result, visual distortion.



The image on the right (using the codebase of the POLAR's light codec) shows the absence of color distortions during color transitions.

Polar team



Igor Kovryga [in](#)

CHO & CHIP Architect



Sergey Rokhvarg [in](#)

CTO, DIRECTOR



Daniel Korogodski [in](#)

CHAIRMAN, CO-FOUNDER



Peter Wielgosz [in](#)

CEO, DIRECTOR



George Dzyncharadze [in](#)

COO, CO-FOUNDER



Viktor Konovalov [in](#)

CMO, DIRECTOR

ALTERA®

EGG
TOKEN - AS - A - SERVICE

BITFURY

FIRST
BRIDGE

VIMANA™

EXTENSIVE EXPERIENCE

Benchmarks showing Exit Returns

\$100M*



The company specializes on optimization of H.264, H.265 encoders to produce high video quality with low bitrate.

In 2018 Beamr Buys [Vanguard Video](#) a vendor that counts Netflix, Microsoft and QuickFire Networks among its customers.

\$3B



In 2010, [DivX](#) was acquired by Sonic Solutions for \$41.5 Million which was subsequently acquired in 2011 by Rovi Corp (now called TiVo Corp).

2019 it was announced [TiVo Will Merge with Xperi](#) in \$3 Billion Deal.

\$100M*



[V-Nova Ltd.](#) a leading provider of video compression solutions acquires Video Processing Patents from Faroudja Enterprises

\$125M*



[Wowza® Media Systems, LLC](#), provider of Simply Powerful Streaming™ media server software, announced that the company has acquired Camfoo GmbH, a leading solution for managing cloud-based media streaming.

\$124M



[On2 Technologies](#) created a series of video codecs called TrueMotion.

In February 2010, On2 Technologies was acquired by Google for an estimated \$124.6 million. On2's VP8 technology became the core of Google's WebM video file format.

\$50*



[CineForm Intermediate](#) is an open source video codec. On March 30, 2011, the company was acquired by GoPro which in particular wanted to use the 3D film capabilities of the CineForm 444 Codec for its 3D HERO System.

Fundraising history and Future needs

NOV 2020 - FEB 2021

Initial Round Objectives:

Self-funding \$2.35M

- ✓ Company incorporation
- ✓ Bank account opening
- ✓ Proof of concept development
- ✓ Commencing negotiations with Intel and various component manufacturers
- ✓ Developing POLAR ONE prototypes

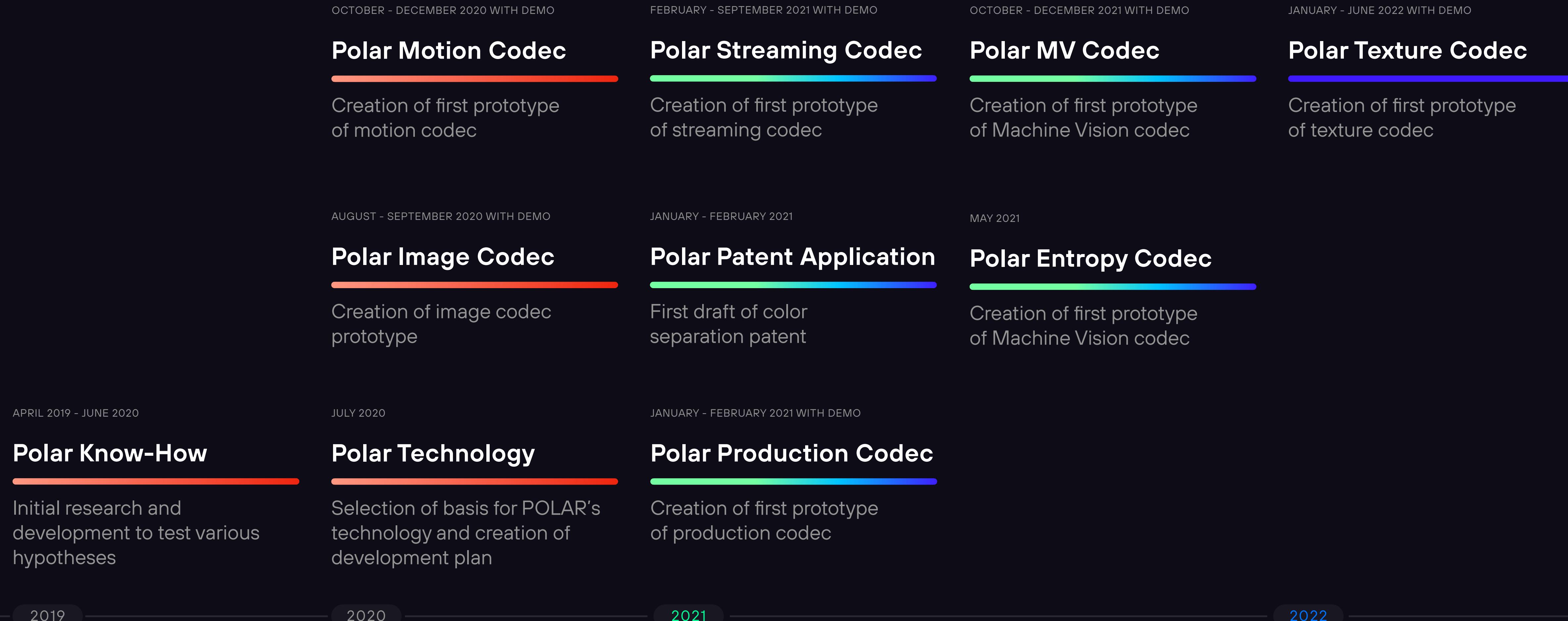
NOV 2020 - FEB 2021

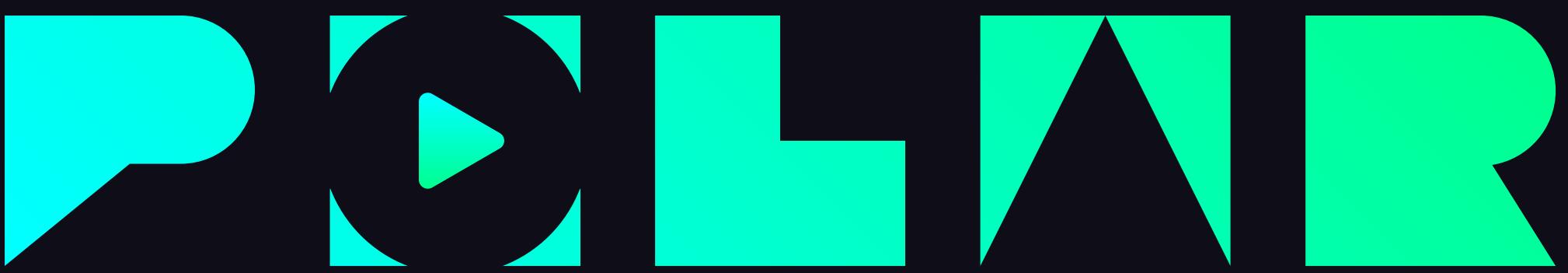
Seed Round Objectives:

Seeking \$5M for 10% equity

- ✓ Finishing the development of codecs
- ✓ Finalising working prototypes for both projects and creation of large-scale production plan
- ✓ Commencing discussions with potential clients to offer and develop bespoke solutions
- ✓ Marketing at industry specific events

Our accomplishments and future plans





Streaming a Better Tomorrow. Together.

Chairman: daniel@polarhpc.com

CEO: peter@polarhpc.com

CMO: viktor@polarhpc.com