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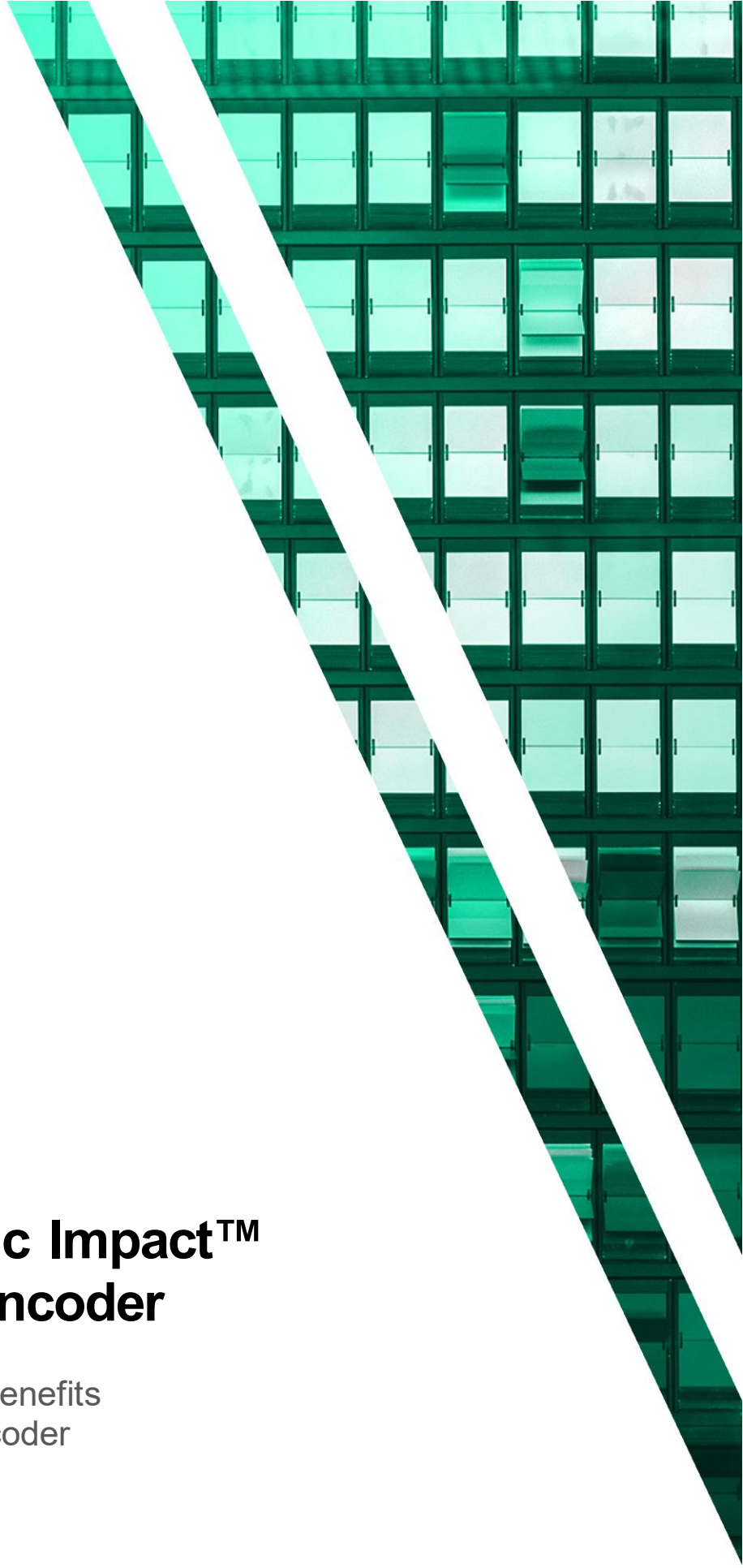

The Total Economic Impact™ Of The Bitmovin Encoder

Cost Savings And Business Benefits Enabled By The Bitmovin Encoder

NOVEMBER 2021

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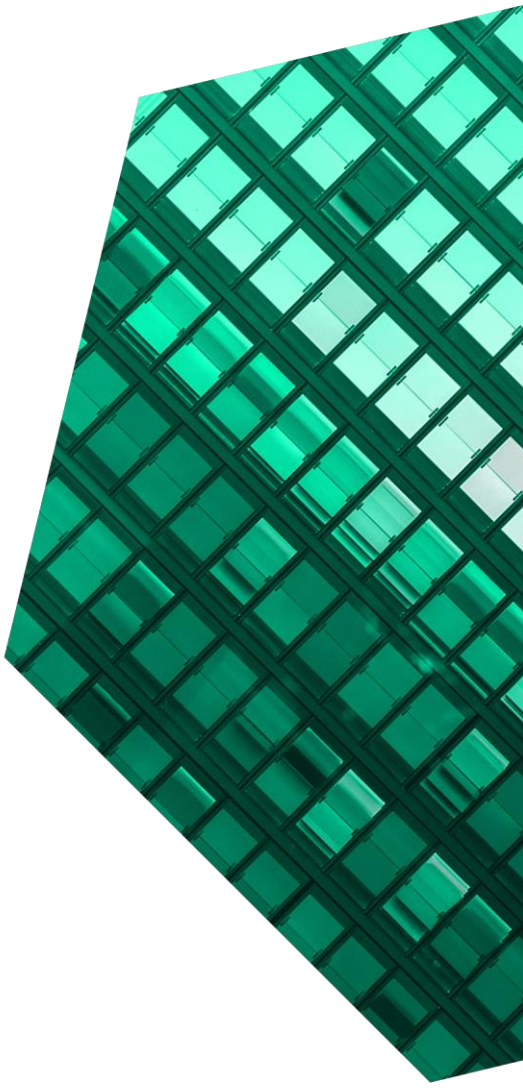
Project Lead: *Mary Barton*



Executive Summary

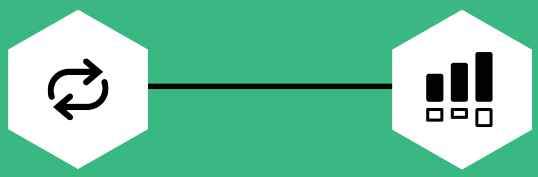
Online video services that want to remain competitive must be agile in how they balance video quality, cost, and innovation. A cloud-based solution that allows a provider to scale encoding efforts to meet time to market requirements, respond quickly to changing demand for content, and reduce costs can provide the solution to that challenge. Bitmovin frees up resources to work on core business goals (e.g., content, growth, retention), while still maintaining strong technical expertise and knowledge of emerging trends.

For many people, online streaming is now the preferred method for viewing shows, movies, sports, events, classes, and more. As internet bandwidth and speed increase, so does the volume of streaming video. Optimizing encoding in the right format based on network parameters is critical to the success of any streaming service provider.

The Bitmovin Encoder is a cloud-based video encoding service, deployed as a managed cloud solution or in a cloud-agnostic way where customers can use their existing cloud provider (called Cloud Connect).

Bitmovin commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying the cloud-based Encoder.[1] The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of using a commercial video encoding solution for their video-streaming workflows.

KEY STATISTICS



Return on investment (ROI)
355%

Net present value (NPV)
$4.05M

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed four decision-makers with experience using Bitmovin's Encoder and deploying video encoding workflows. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results into a single composite organization.

Prior to using the Bitmovin Encoder, these interviewees noted how their organizations struggled with:

- Providing streaming service to all devices.
- Providing streaming service on limited bandwidth.
- On-premises encoding solutions. One interviewee had a cloud-based solution that was not able to produce digital rights management (DRM) files that would playback on all devices.

Prior attempts to solve these issues yielded limited success, leaving organizations with unacceptable

Net Benefit Per Output Minute

Year 1 ¢¢¢¢¢ $0.047
Year 2 ¢¢¢¢¢ $0.049
Year 3 ¢¢¢¢¢ $0.052

encoding failure rates and difficulty delivering content according to business needs.

After the investment in the Bitmovin Encoder, the interviewees saw efficiencies in encoding accompanied with improved quality of video streaming. Key results from the investment included reduced personnel costs for encoding and reduced storage and delivery costs associated with smaller files.

"The way we make our services more profitable is by lowering our operating expense — our opex. Every penny of opex is very, very important when you have millions of subscribers."
Executive vice president, technology, premium TV network

KEY FINDINGS

Quantified benefits. Risk-adjusted present value (PV) quantified benefits include:

- **Reduced personnel costs for encoding by almost $1.92 million over three years.** Moving to a cloud-based solution allowed the interviewees' organizations to scale at will without imposing an undue burden on personnel cost. With the Bitmovin encoding solution, interviewees noted their organizations automated many workflows and processes, allowing personnel to pursue other efforts.

  The product manager at a media and entertainment organization said: "We have this repository in the cloud, in our storage where we always know how to encode that. We know where it starts; we know where it ends; we know what audio tracks are available; what languages; and some other metadata within the file. So, we can just programmatically start experimenting and do different versions of it as many times as we want. That was a big win when moving to the **Savings from smaller file sizes of $3.26 million over three years.** Producing smaller package sizes of their assets allowed the organization to reduce both content delivery network (CDN) and storage costs.

Unquantified benefits. Benefits that are not quantified for this study include:

- Scalability.
- Increased viewer experience.
- Faster time-to-market.
- Faster time-to-publishing.
- Bitmovin customer support.

Costs. Risk-adjusted PV costs include:

- **Bitmovin fees of just under $1.4 million over three years.** Bitmovin offered the interviewees' organizations three license plans, including technical support, from Basic+ to Enterprise. Bitmovin charged usage fees based on the annual output minutes produced. Volume discounts are applied.

The decision-maker interviews and financial analysis found that the composite organization experiences benefits of $5.19 million over three years versus costs of $1.14 million, adding up to a net present value (NPV) of $4.05 million and an ROI of 355%. The net benefit per output minute grew from $.047 in Year 1 to $.052 in Year 3.

“The quality that they deliver is superior. We did a study comparing the quality of the assets, considering the same bitrates, the same encoding settings among multiple different vendors, both on-prem and in the cloud. Bitmovin excelled in that. They use less bit rate and they have better end quality.”

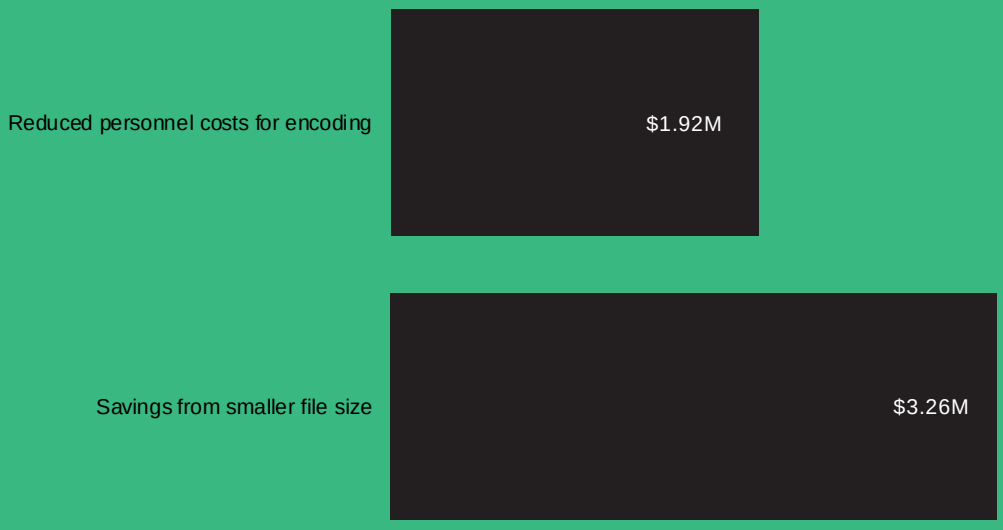
— Director of engineering, media/TV

ROI
355%

BENEFITS PV
$5.19M

NPV
$4.05M

Benefits (Three-Year)



TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in the Bitmovin Encoder.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that the Bitmovin Encoder can have on an organization.

DUE DILIGENCE

Interviewed Bitmovin stakeholders and Forrester analysts to gather data relative to the Bitmovin Encoder.

DECISION-MAKER INTERVIEWS

Interviewed four decision-makers at organizations using the Bitmovin Encoder to obtain data with respect to costs, benefits, and risks.

COMPOSITE ORGANIZATION

Designed a composite organization based on characteristics of the interviewees' organizations.

FINANCIAL MODEL FRAMEWORK

Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the decision-makers.

CASE STUDY

Employed four fundamental elements of TEI in modeling the investment impact: benefits, costs, flexibility, and risks. Given the increasing sophistication of ROI analyses related to IT investments, Forrester's TEI methodology provides a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Bitmovin and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the study to determine the appropriateness of an investment in the Bitmovin Encoder.

Bitmovin reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

Bitmovin provided the customer names for the interviews but did not participate in the interviews.

The Bitmovin Encoder Customer Journey

Drivers leading to the Encoder investment

Interviewed Decision-Makers

Interviewee	Industry	Region	Output minutes per year
Director of product and engineering	TV network	South America	1.4 million
Product manager	Media and entertainment	Europe	18 million
Director of engineering	Media/TV	US headquarters, global operations	80 million
Executive vice president, technology	Premium TV network	US headquarters, global operations	95 million

KEY CHALLENGES

The interviewees described an industry that demands service providers stream videos across a multitude of devices and varying quality of internet access. Prior to adopting the Bitmovin Encoder, the interviewees noted their organizations used a variety of solutions including on-premises and cloud deployments.

"It works or it just doesn't work. If the DRM package doesn't work on those devices, you wasted all your time and money, not only from the creation of the package and the delivery, but also the money that you spent acquiring the subscriber, direct response marketing, you just wasted everything. With Bitmovin, there's a level of assurance that it's going to work."

Executive vice president, technology, premium TV network

The interviewees described unacceptable rates of failure, an inability to encode assets quickly enough to meet the business needs, an inability to scale, and burdensome approval processes and management of legacy encoding hardware. Interviewees noted that the costs of failure far exceeded the cost of encoding time lost, including:

- Lost subscriptions.
- Lost advertising and marketing spend.
- Degraded viewer experience.
- Negative reputational impact.

The interviewees noted how their organizations struggled with common challenges, including:

- **Inability to scale.** On-premises based systems were fixed and scaling was unrealistic both in terms of staffing and hardware investment. The product manager at a media and entertainment organization said: "When we realized that having hardware on-prem would not scale to our needs, we started looking at a cloud-based solution. We evaluated three vendors and eventually chose Bitmovin as the best deal and I'm really happy with that choice."
- **Inability to deliver to all devices.** Interviewees described the difficulty of providing reliable

streaming experience to viewers across a constantly changing set of devices. Reliable delivery to all devices was a problem for both the interviewees' organizations that worked on-premises and for the interviewee's organization that deployed on a cloud service.

The executive vice president, technology at the premium TV network said: "It was only a subset of the devices, but it was a meaningful subset of devices where the [provider] produced files that would not play, would not work because it was malformed from what the client was expecting to see. So, the video would fail. The consumers would not be able to play back the video."

- **Varying internet quality across regions.** Interviewees struggled to deliver to the wide variety of devices on varying bandwidths. The challenge was to encode and transcode content that was successfully streamed even on low bandwidth without a noticeable degradation in quality.

  The executive vice president, technology at the premium TV network said, "There is a very nuanced, detailed level of understanding that Bitmovin seems to have about that consumer electronic device footprint particularly as it relates to how you support that footprint or how you build your files to actually affect the way it runs on that footprint across the globe."

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and a ROI analysis that illustrates the areas financially affected. The composite organization is representative of the four decision-makers that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The composite organization is a global media and entertainment streaming video service that has a large customer base of about 20 million customers.

Deployment characteristics. The composite organization deploys the Bitmovin Encoder as Cloud Connect with the Encoding Enterprise Plan.

Key assumptions

- **Media and entertainment streaming video service**
- **20 million customers**
- **Global distribution**
- **Deploys the Bitmovin Encoder as Cloud Connect with the Encoding Enterprise Plan**

Analysis Of Benefits

Quantified benefit data as applied to the composite

Total Benefits						
Ref.	**Benefit**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Atr	Reduced personnel costs for encoding	$491,400	$702,000	$1,193,400	$2,386,800	$1,923,512
Btr	Savings from smaller file size	$810,000	$1,215,000	$2,025,000	$4,050,000	$3,261,908
	Total benefits (risk-adjusted)	$1,301,400	$1,917,000	$3,218,400	$6,436,800	$5,185,420

REDUCED PERSONNEL COSTS FOR ENCODING

Evidence and data. Prior to adopting the Bitmovin Encoder, interviewees described their organizations' on-premises solution as burdensome and prone to failure. Moreover, the inability to scale was an impediment to growth and competitive advantage.

- The product manager at a media and entertainment organization said: "There was a team of maybe seven or eight people. They performed every single file manually on the [previous] set up. Now that we are using Bitmovin, that is automated."
- The director of product and engineering at a TV network said: "We had run-ins with recording problems constantly. Let's say, it took like 12 to 20 hours to encode a full episode, imagine if the encoding job fails, close to the 18-hour mark. You have to start over again."

Modeling and assumptions. For the composite organization, Forrester assumes:

- The fully loaded cost of a video engineer, including annual salary, benefits, and overhead, is $78,000.
- Ten FTEs are required in Year 1, growing to 25 in Year 3 to achieve the same growth with the prior solution.

> **"It's the feature set that they deliver and the top features are the chunked encoding, where you can break a file into small chunks and encode them in parallel. This significantly reduces the time it takes you to encode."**
> *Director of engineering, media/TV*

- With Bitmovin, the composite organization only requires 3 FTEs in Year 1, growing to eight in Year 3 to achieve that growth.

Risks. Savings from reduced personnel costs for encoding may vary due to:

- The growth of the organization.
- Local labor rates for encoding personnel.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $1.92 million.

Reduced Personnel Costs For Encoding					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
A1	Annual cost per data encoder FTE, fully loaded	Assumption	$78,000	$78,000	$78,000
A2	Number of FTEs required to manage on-premises encoding	Interviews	10	15	25
A3	Number of FTEs required to manage encoding with Bitmovin	Interviews	3	5	8
At	Reduced personnel costs for encoding	A1*(A2-A3)	$546,000	$780,000	$1,326,000
	Risk adjustment	↓10%			
Atr	Reduced personnel costs for encoding (risk-adjusted)		$491,400	$702,000	$1,193,400
	Three-year total: $2,386,800			**Three-year present value: $1,923,512**	

SAVINGS FROM SMALLER FILE SIZE

Evidence and data. Interviewees noted that the Bitmovin Encoder allowed their organizations to produce smaller package sizes of their assets. This allowed the organizations to reduce both CDN and storage costs.

- The product manager at a media and entertainment company said, "When we talk to product about why we are encoding the way we do, it's that we don't want to provide more pixels, we want to provide better pixels, and that's what we're doing with Bitmovin."
- The executive vice president, technology at a premium TV network said, "If you can create a more efficient package, you have lower CDN cost and storage, which has a material effect on your operating expense."

"[Our previous solution] created these really big fat packages that wasted a lot of bits and wouldn't play back on all of the devices whereas, Bitmovin creates a very small efficient package that plays back on all of our devices. I mean pretty simple story really."
Executive vice president, technology, premium TV network

Modeling and assumptions. For the composite organization, Forrester assumes:

- A savings of $600,000 in Year 1, growing to $1.5 million in Year 3 in CDN costs.
- A savings of $300,000 in Year 1, growing to $750,000 in Year 3 in storage costs.
- The savings calculated were determined by scaling these savings as the interviewees reported to reflect the size of the composite organization.

Risks. Savings from smaller file size may vary due to:

- The organizational ability to negotiate with CDN and storage providers.
- The number and size of assets in the organization's portfolio.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $3.26 million.

Savings From Smaller File Size					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
B1	Reduced CDN cost	Interviews	$600,000	$900,000	$1,500,000
B2	Reduced storage costs	Interviews	$300,000	$450,000	$750,000
Bt	Savings from smaller file size	B1+B2	$900,000	$1,350,000	$2,250,000
	Risk adjustment	↓10%			
Btr	Savings from smaller file size (risk-adjusted)		$810,000	$1,215,000	$2,025,000
	Three-year total: $4,050,000			**Three-year present value: $3,261,908**	

UNQUANTIFIED BENEFITS

Additional benefits that customers experienced but were not able to quantify include:

- **Scalability.** After adopting the Bitmovin Encoder, providers stored large numbers of assets in basic formats and encoded when demand warranted. The product manager at a media and entertainment organization said: "We are creating some sort of plain, simple, quite ugly encoding that is shipped to process and store in the cloud. But as soon as the interest with that specific asset picks up, and you can see that people start watching it in real time. We encode it as quickly as possible because it is worth it to spend the money on that asset because people are already watching it. There are multiple ways of making money rather than just saving money."
- **Improved viewer experience.** Smaller files not only save on storage but also stream more efficiently, providing a better viewer experience.
    - The executive vice president, technology at a premium TV network said: "Per title encoding, it makes the overall package smaller. That lowers video startup time and lowers time to first frame and improvement across all the video KPIs that we use." So, in addition to financial improvements, there are also consumer experience improvements as well.
    - The director of engineering at a media/TV company said: "Before we even talk about cost, smaller packages enable customers to get the best quality even in low bandwidth conditions. So, if customers are streaming this and they don't have a good internet connection, they would still be able to get a better quality because the files are smaller and can still get through over a flaky Internet."
- **Faster time-to-publishing.** Interviewees reported the need to provide the on-demand version of live broadcast content as quickly as possible to increase the viewer experience and relevance of their content.

  The director of engineering at a media/TV company said: "It's lower latency to publishing. So, if I have, let's say, a soccer match that just ended and now, I want to publish a 15-minute highlight of that soccer match. The time that it will take me to make it live to customers is faster because the encoding is happening faster."
- **Bitmovin customer support.** Interviewees all reported that the Bitmovin team was integral to their success.

- The product manager at a media and entertainment company reported: "Bitmovin does a lot of the groundwork for us when it comes to what's the next codec and the next thing we should do. We have great contact with them. We are talking regularly during our quarterly business meetings."
- The executive vice president, technology at a premium TV network related a particular incident: "One of our studios flagged us as being in violation of our content protection rules for some of their content because of a misunderstanding. But that meant we had a very short window to correct this technical issue. We had to have the solution up and in place by early January and so there was work that had to happen over the holidays to make that happen. The Bitmovin team actually worked over the holidays to help us implement the fix. They released a special version out of their code line just for us to help us get a fix in place over their holidays."

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement the Bitmovin Encoder and later realize additional uses and business opportunities, including:

- **Ability to scale CPUs.** The ability to scale CPUs is important whenever a large catalog of assets must be encoded quickly. Interviewees described two instances when they encountered that situation, and Bitmovin provided a solution.

  The product manager at a media and entertainment organization said: "Say you get a lucky deal with a studio and they just send you a print out of 2,000 movies and it has to be available within a week then speed is of course important. We have way more CPUs [central processing units] available for one movie, so it is faster. So, we went from I think it was twice the running time to encode. A 60-minute clip would take at least two hours to encode on-prem. Now, I think it's roughly 45 minutes so it's faster than real time."

  The director of engineering at a media/TV company said: "We were preparing for launch in a new country. And for that, we needed to encode a large number of videos and like with every project, things were delayed. So, the time we had left for the encoding itself was significantly shortened than what we originally planned. Therefore, we needed to be more flexible — we needed to scale up our capacity to encode in a shorter period of time. Bitmovin enabled us to do that."
- **Ability to provide service to new devices using the latest codec technology.** The landscape of devices for video streaming is ever expanding and updating. This requires streaming providers to adopt new technologies as they enter the market.

  The executive vice president, technology at a premium TV network said: "As we encounter new and different devices that support more efficient codecs, Bitmovin is really ahead of it. They are already exploring and starting to build solutions to support these future devices that are coming. By the time we need to support the device, we are already set. I'm pretty sure Bitmovin is already going to have or already has a solution in place."

Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

Analysis Of Costs

Quantified cost data as applied to the composite

Total Costs						
Ref.	**Cost**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Ctr	Bitmovin fees	$357,000	$441,000	$598,500	$1,396,500	$1,138,670
	Total costs (risk-adjusted)	$357,000	$441,000	$598,500	$1,396,500	$1,138,670

BITMOVIN FEES

Evidence and data. Bitmovin offered the interviewees' organizations several options for licensing its Encoder solution: Base+, Professional, and Enterprise.

All Encoder pricing consists of two individual parts:

- **Solutions license fee.** The solution license fee is included in deals that leveraged advanced feature sets. Different feature and service levels are included at the three different tiers.
- **Volume-based pricing based on output minutes.** As the volume of output minutes increased, Bitmovin offered discounted user fees.

Modeling and assumptions. For the composite organization, Forrester assumes:

- The composite organization has chosen the most comprehensive license package, which is the Enterprise plan.
- The composite organization contracts for 20 million output minutes per year in Year 1 and grows to 50 million output minutes per year in Year 3, allowing them to achieve greater volume discounts.

Risks. Usage fees are contracted on expected output minutes per year. If an organization varies from that projected amount, there may be a cost difference.

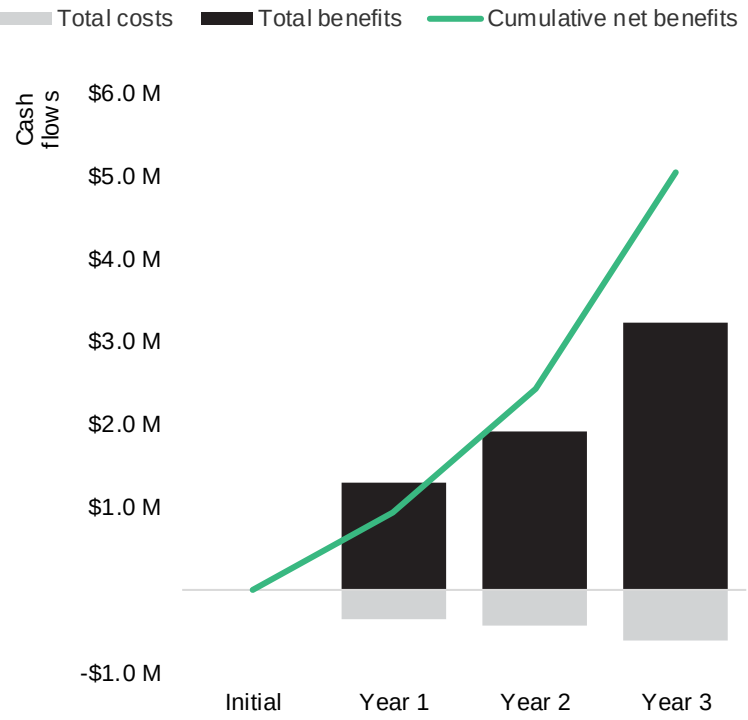
Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $1.14 million.

Bitmovin Fees					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
C1	Solution license fee	Client materials	$120,000	$120,000	$120,000
C2	Price per output minute	Client materials	0.011	0.010	0.009
C3	Output minutes per year	Client materials	20,000,000	30,000,000	50,000,000
C4	Usage fee	C2*C3	$220,000	$300,000	$450,000
Ct	Bitmovin fees	C1+C4	$340,000	$420,000	$570,000
	Risk adjustment	↑5%			
Ctr	Bitmovin fees (risk-adjusted)		$357,000	$441,000	$598,500
	Three-year total: $1,396,500		**Three-year present value: $1,138,670**		

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

These risk-adjusted ROI, NPV, and payback period values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

Cash Flow Analysis (Risk-Adjusted Estimates)

	Year 1	Year 2	Year 3	Total	Present Value
Total costs	($357,000)	($441,000)	($598,500)	($1,396,500)	($1,138,670)
Total benefits	$1,301,400	$1,917,000	$3,218,400	$6,436,800	$5,185,420
Net benefits	$944,400	$1,476,000	$2,619,900	$5,040,300	$4,046,750
ROI					355%

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

TOTAL ECONOMIC IMPACT APPROACH

Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.

Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.

Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.

Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.

PRESENT VALUE (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.

NET PRESENT VALUE (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made unless other projects have higher NPVs.

RETURN ON INVESTMENT (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.

DISCOUNT RATE

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.

PAYBACK PERIOD

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Appendix B: Endnotes

[1] Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.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