



# 5 **Pivotal Mistakes** in Video Streaming **to Avoid** in 2023





# Everyone Makes Mistakes

Mistakes are part of life. Minimizing them is one of the reasons that businesses depend on **cutting-edge analytics**.

That said, there are some issues so prevalent in the streaming industry that people don't even notice them.

This book looks at five of the biggest:




**Underestimating 4K UHD migrations**




**Oversimplifying multi-CDN strategies**



**Depending too much on data warehouses**

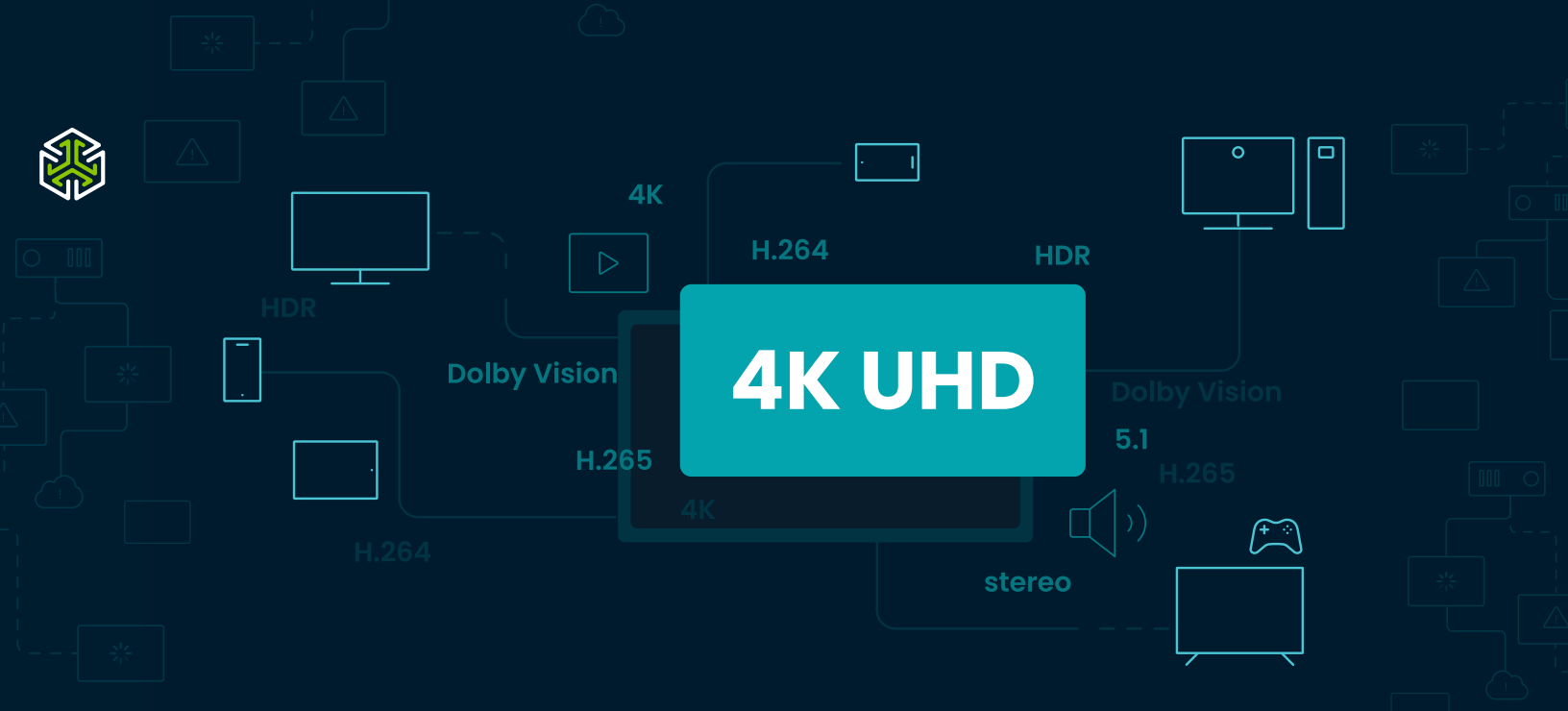


**Making decisions based on anecdotal evidence**



**Fragmenting experience analytics**

In about ten or fifteen minutes of reading, you should have a grasp of these issues. You should also gain some actionable insights about how to minimize their impact on your organization — or eliminate the problems completely.



## Mistake 1: Underestimating the Complexity of 4K Migration

Whether you're doing it for brand hygiene or quality of experience, your migration will face a number of business and technical challenges. Don't underestimate them; deliver on your Ultra High Definition promises.

### Key Takeaways

- You need to deliver UHD content despite diverse device capabilities.
- Business challenges can include everything from quality control to contract compliance.
- Public adoption of 4K is on track; the trend is led by cheaper devices.
- **Every-user, every-second, multi-dimensional analytics** help identify migration pain points and meet various goals including those for cost of ownership, QoE and device support.



## Understanding Technical Complexity During 4K Migration

Complexity is a given with any type of data migration. Whether the migration involves a new productivity suite or a core business process, the combination of tech and human factors can get messy.

With 4K, the complexity comes from a few different sources. The usual suspects include:

- Video and audio encoding
- End-user device capabilities
- Licensing agreements

Your major technical hurdle is likely to be audiovisual encoding and compression, specifically the level of dimensionality beyond what your organization is probably used to. You'll probably have to deliver:

- H.264 and H.265 4K streams in parallel
- Multiple sound options, such as stereo and 5.1
- Multiple color ranges, such as Dolby Vision and HDR

Why bother? The main reason you have to satisfy all of these different formats is the fragmentation of audience device capabilities. Some users simply won't have compatibility with certain codecs, color ranges, or audio profiles. **Low-level analytics** combined with fine-tuned multi-CDN configuration can help you laser-target regional user capacities and lower the cost of ownership of 4K.

There's more: You probably have licensing agreements that bury UHD rights deep in the fine print. Failing to review your contracts before serving content could quickly turn your competitive advantage into a legal risk.

## Gauging 4K Delivery Performance

Your current quality control processes should apply well to 4K. The key is to use analytics and isolate patterns. This avoids overgeneralizing in a complex environment, which, in turn, helps you allocate resources efficiently.



In the case of systemic failures, packet loss can of course seriously diminish QoE in a UHD stream just as it can in Standard Definition or High Definition. That means maintaining an overview of network performance and fine-tuning content delivery networks is still important.

There's more to it, though. Ultra HD 4K is transitioning from a luxury perk to a core service. You need individual data on viewer-experience impact – and exactly what your audience is doing in response to stream degradation – to help guide your decisions about service.

## Evaluating 4K Adoption Trends

At this point, 4K might seem like more trouble than it's worth. Should you even pursue migration? Trends indicate that UHD is coming to the wider streaming market, complexity or not

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One major indicator is that UHD devices started gaining steam a few years ago. Consumers started seeing much lower prices, especially in terms of screens.

Cheap UHD screens and **budget 4K streaming equipment** options are obviously good signs in this context. At the very least, this trend indicates that many users have the capability to receive higher-quality streams.

There's a lot that needs to happen for general 4K streaming adoption other than just end-user device availability:

- Target regions need adequate infrastructure and technology to transmit UHD signals.
- Customers need to choose to buy services that enable high-bandwidth transmission.
- Service providers, such as ISPs, need to empower broadcasters with tools to maintain QoE.

The question then becomes when all of these factors will come together and solidify 4K's place in the market. The answer seems to be "soon."



## Looking Beyond Bitrate Benchmarks: Navigating Multi-Dimensional Complexities

People like sharper pictures more. It seems simple on the face of it.

Higher definitions have better opinion baselines. The opinion scores increase with higher bitrates. It seems like all you have to do is increase your bitrate and serve everything in UHD, but that's not the case. At least, it's more complex than that when it comes to tracking the performance of a 4K migration.

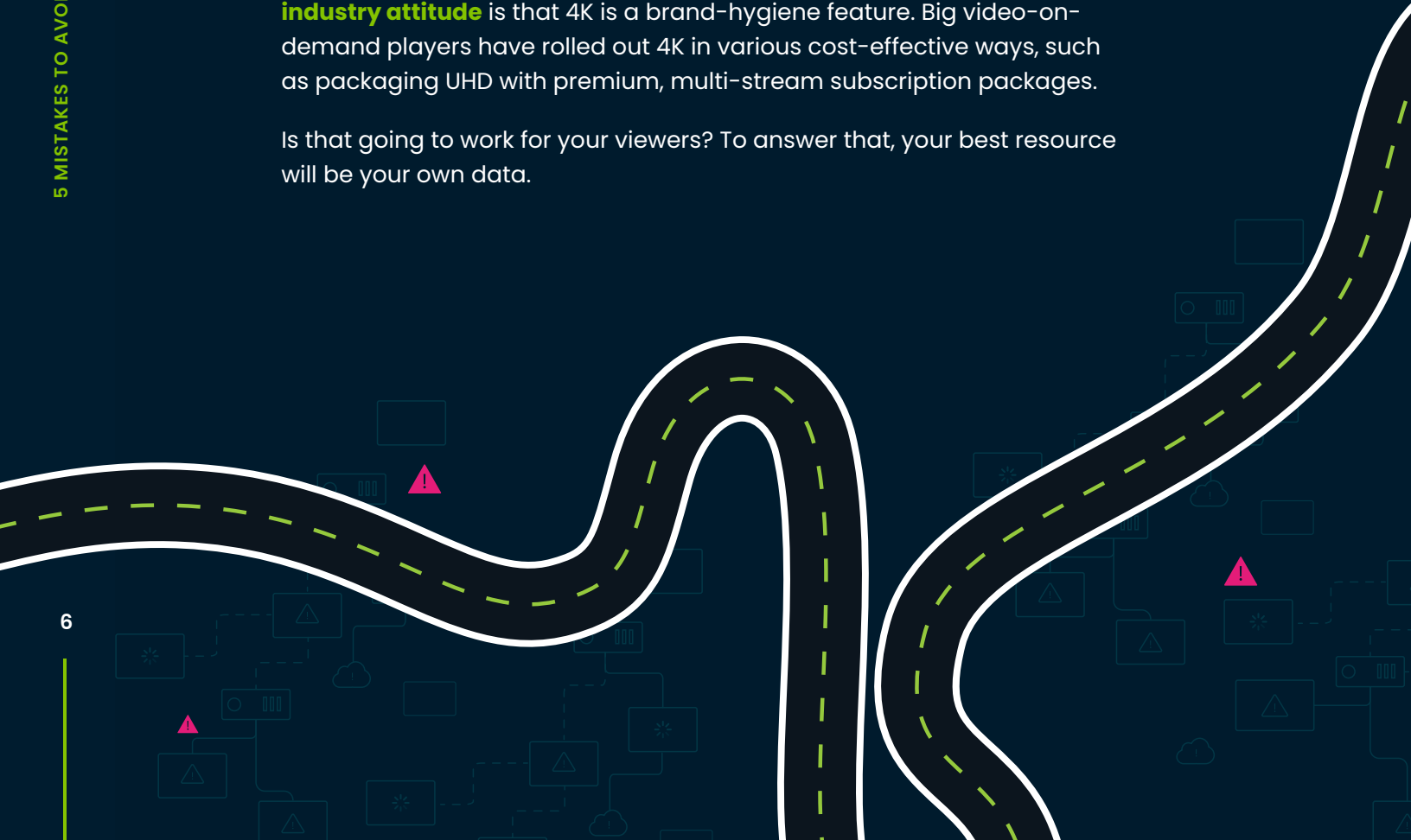
For example, are your analytics set up to show H.264 and H.265 sessions separately? These two codecs can (essentially) deliver the same UHD video quality at significantly different network loads: 32 Mbps for 4K with H.264 vs. about 19 Mbps with H.265. You'll need to track **streaming metrics** other than bitrate when delivery cost and a fragmented device landscape are in the equation.

### Recognizing the Type of Demand for 4K

On a strategic level, customer demand drives the change to 4K. How do you satisfy that demand on a tactical level?

Even some of the highest-demand streaming applications, such as live sports, have adopted 4K. In the on-demand arena, the **prevailing industry attitude** is that 4K is a brand-hygiene feature. Big video-on-demand players have rolled out 4K in various cost-effective ways, such as packaging UHD with premium, multi-stream subscription packages.

Is that going to work for your viewers? To answer that, your best resource will be your own data.





## Mistake 2: Oversimplifying Your Multi-CDN Strategy

When it comes to optimizing your content delivery network, the multi-CDN model is complex and far from failure-proof. Oversimplification leads to a high cost of ownership, inefficient latency mitigation, and late, potentially counterproductive responses to a higher-than-average number of service issues.

Multi-CDN can't really be simple, but you can use **strategy and analytics** to make it easy to manage and configure. Learn how to start balancing the resources of your organization against the realities of these complex network architectures.

### Key Takeaways

- Multi-CDN is the industry standard, but enterprises don't usually build to take full advantage.
- Making smart decisions requires lots of data — and accountability through **closed-loop feedback**.
- Rerouting in particular demands close attention to detail; otherwise, it can cause more problems than it solves.



## Set Up Real-Time Monitoring and Workflows

Multi-CDN architectures are the norm for online media, especially when it comes to applications such as video on demand and live broadcasting. The higher you go in terms of bandwidth requirements, the more essential these types of techniques are to quality of experience.

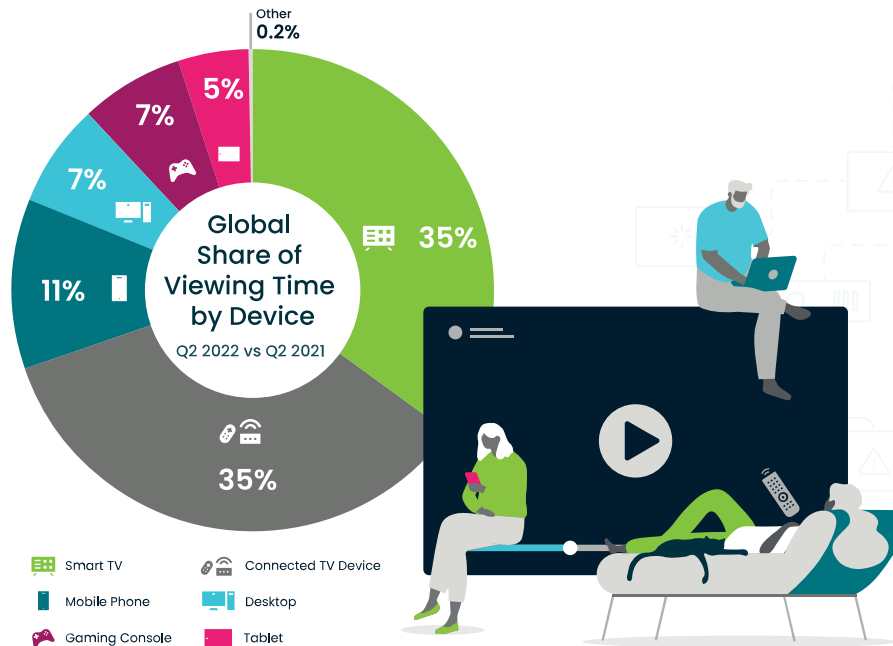


Image Source: <https://www.conviva.com/state-of-streaming/convivas-state-of-streaming-q2-2022/>

To be competitive, your service has to think beyond planning ahead for standard indicators of high network traffic, such as peak usage times and publication or broadcast schedules. You need a real-time view of network performance.

## Know Everything About the Client Experience

Your ability to analyze and dissect **every aspect of the audience experience** is directly related to the effectiveness of your multi-CDN strategy. Here are some general tips on how to manage this analysis:

- Collect every dimension you can
- Use AI-assisted services to hone in on key insights
- Prefer census over sample data
- Investigate correlations with other key elements, such as end-user devices and video quality





The reason you need analytics directly from the client is simple. The only practical way you can currently manage or even understand such a complex architecture is through a full census measurement.

## Secure Your Routes – and Secure Your Routing

Possibly the easiest mistake to make in terms of oversimplifying your CDN strategy is depending on unsafe pathways. In other words, a publisher can create single points of failure through which the entire resilient, scalable CDN strategy can fail.

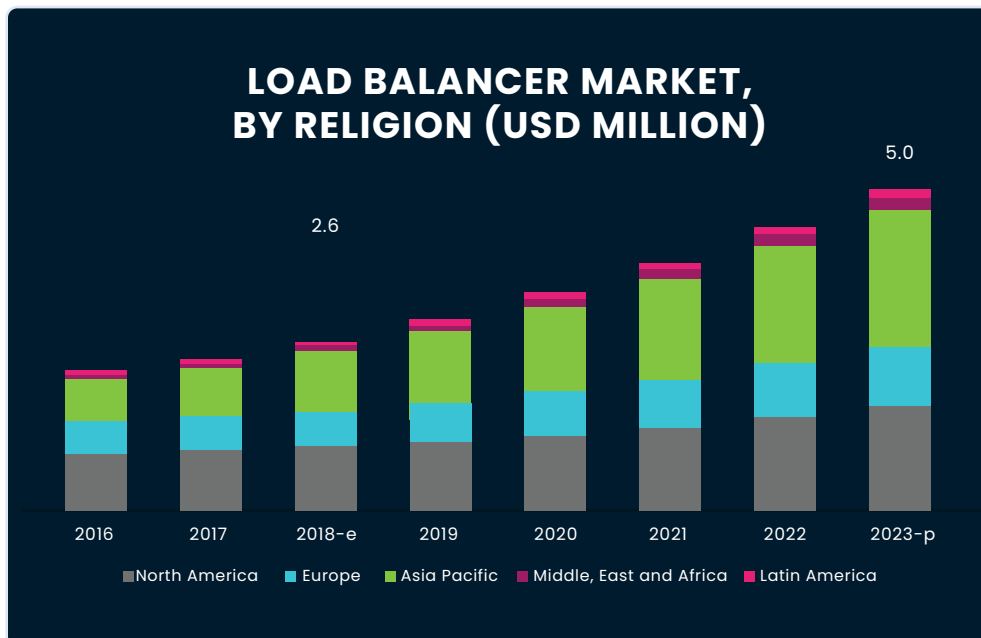


Image Source: <https://www.marketsandmarkets.com/Market-Reports/load-balancer-market-236964606.html>



**DNS dependence leaves all network routes vulnerable to DNS issues, basically negating the failover benefit of the multi-CDN architecture**



One major example is the choice of method for CDN load balancing. Nearly all VoD services could benefit from load balancing, and many streaming applications depend heavily, or even exclusively, on **layer-4 load balancing** via the Domain Name System. DNS dependence leaves all network routes vulnerable to DNS issues, basically negating the failover benefit of the multi-CDN architecture.

An alternative in this case would be an API layer behind your web service. Besides removing the risk associated with depending on the accrued DNS layer, this approach would also let you capture more data than a transport-layer-only routing method. That in turn would help you make better, more granular decisions.

With a closed feedback loop and your granular audience experience data, you'll be able to tell whether you made the best possible routing choices. You can then use that information as the foundation for future success, whether through automation, issue prevention, resource allocations, or even vendor negotiations.

## Keep a Future-Focused Mindset

The multi-CDN approach can increase the resiliency of your network. You have to build it correctly, configure it well, and monitor it in real time. Even then, you'll probably still have issues.

The key is a closed-loop system that shows you the results of your decisions. Each routing decision you make has consequences. Track those consequences and use them as benchmarks to compare the results of various alternate decisions.

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## Mistake 3: Overdependence on Data Warehouses

Love them or hate them — or maybe both — but there’s an industry-wide dependence on data warehouses. Most streaming enterprises depend on them too much when it comes to analytics.

### Key Takeaways

- It’s not worth it to relentlessly hack the data warehouse when there’s a purpose-built solution.
- Different underlying logics make a huge difference in efficiency between data warehouses and streaming analytics.
- Data warehouses remain essential — they’re just not the holy grail.
- Contemporary analytics let organizations dig down into census-level QoE metrics with speed, scalability, and flexibility.



## What Do You Expect of Your Data Warehouse?

Data warehouse architecture has its place in nearly every corporation. But where exactly is that place?

The answer: Data warehouses belong in the decision-making toolbox along with a variety of **other specialized analytics tools**. That way, executives will be able to make use of the most efficient tool for the job.

## The Data Warehouse: A Decades-Old Solution

Data warehouses are solutions from around 40 years ago. The technology has improved since then, but the fact remains that the basic underlying logic was not built to satisfy all of the core requirements of actionable analytics for a major VoD enterprise:

- Real-time (or at least very low latency) observation
- Complex operations
- Census-level measurements
- Continuous reporting
- Contextual metrics

Data warehouse technology was undeniably built to support decision-making at the executive level. It continues to be popular because of its effectiveness in that role. Still, it's far from the holy grail of decision support – especially in the streaming and publishing arenas.

## Streaming-Specific Questions

There are certain complex video QoE metrics that data warehouses fail to answer efficiently. A common example is buffering.

Clients experience buffering events for various reasons. Unfortunately, it's usually not efficient to take information from a data warehouse and dig down into the types of metrics that could help uncover root causes.



How can an operation with millions of concurrent viewers determine how much time their audience spends buffering due to network issues on a single CDN? Executives need to ask complex questions like this to make informed decisions — and the exact question might change from one day to the next.



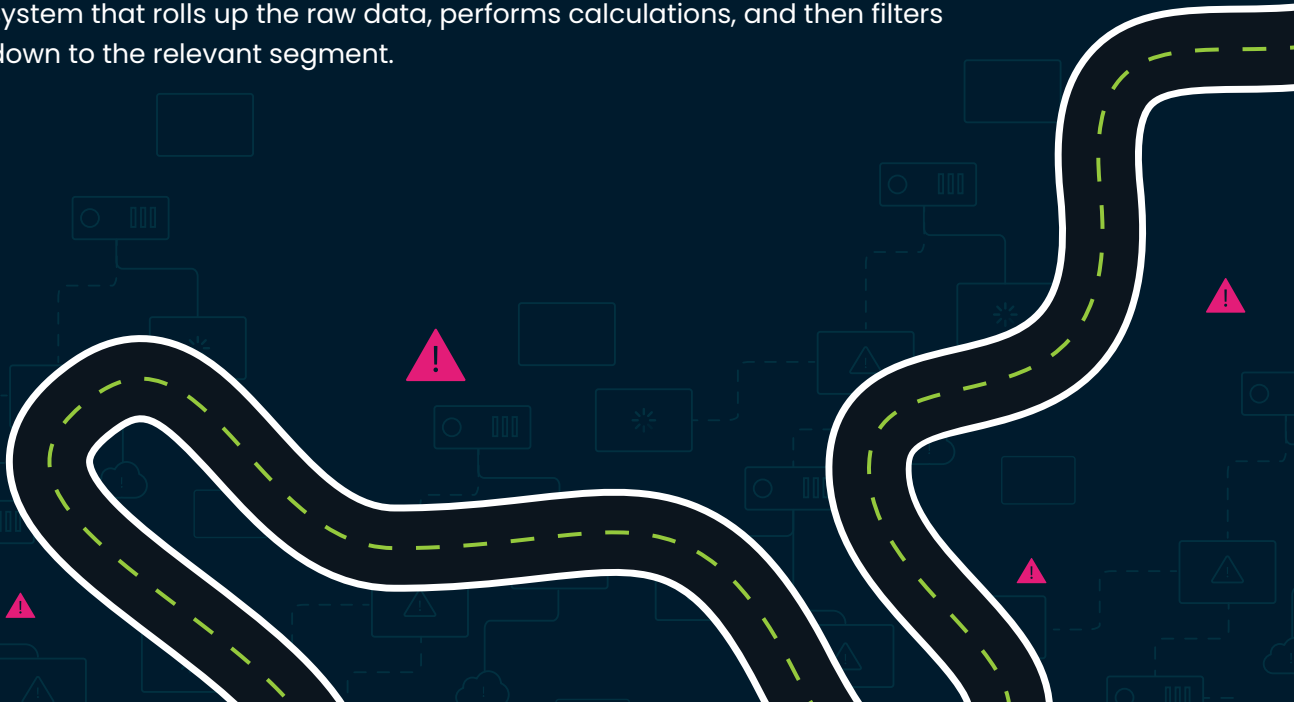
**How can an operation with millions of concurrent viewers determine how much time their audience spends buffering due to network issues on a single CDN?**

## Developing Answers

Organizations are operating at a disadvantage when they attempt to tease apart data into usable metrics using a data-warehouse architecture only. To calculate a single complex streaming QoE metric:

- There needs to be visibility on potentially hundreds of questions
- Engineering teams need to build and maintain huge libraries of operators
- Additional work needs to go into connecting the information to the

The logic integral to a traditional data warehouse was not made to operate at scale, with low latency, and with that type of abstraction. To perform this type of task, the most efficient possible way would be a system that rolls up the raw data, performs calculations, and then filters down to the relevant segment.





## Getting to Actionability

The goal should never be to know everything. It's to get the right insight at the right time — the insight that lets an organization outperform the competition.

Data warehouses work. They provide insight. So what's the issue? The issue is that, to be truly competitive, a streaming analytics system needs three things at once:

- **Speed:** Any insight available with at least sub-60-second latency
- **Flexibility:** Unlimited ability to provide key analytics
- **Scale:** Oversight on every session simultaneously

That's just not practical with a data warehouse. Luckily, there's a **no-compromises** solution available.



## Mistake 4: Anecdotal Decision Making

When push comes to shove, **anecdotal evidence is more persuasive than statistics**. That applies most to decisions that affect you directly – the types of decisions you make every day at the C-suite and VP levels.

### Key Takeaways

- You probably use more anecdotal evidence than you realize.
- Implementing an optimization system can free up your time and get better results.
- Robust, multi-viewpoint benchmarking is the foundation of actionable roadmaps.
- Potential for improvement, audience reach, and engagement impact are the three key factors to look for when optimizing.



## Examples of Anecdotal Decisions

Do you make anecdotal decisions? Probably not — at least not entirely. Think for a moment about how these factors might impact your choices as a leader:

- Personal experience
- Word of mouth and rumors
- Advertising
- Biased or incomplete samples

Your personal experiences aren't universal. People you trust aren't necessarily experts. Advertising is only worthwhile when the advertiser's objectives align with yours. Incomplete or cherry-picked data lead to a skewed picture of performance. All leaders know this, but these factors still influence decisions sometimes.

## Optimizing Your Optimization Process

The scariest part of anecdotal decision-making is that your choices may work out. The thing to remember is that they won't work out consistently. For consistency, you need a system:

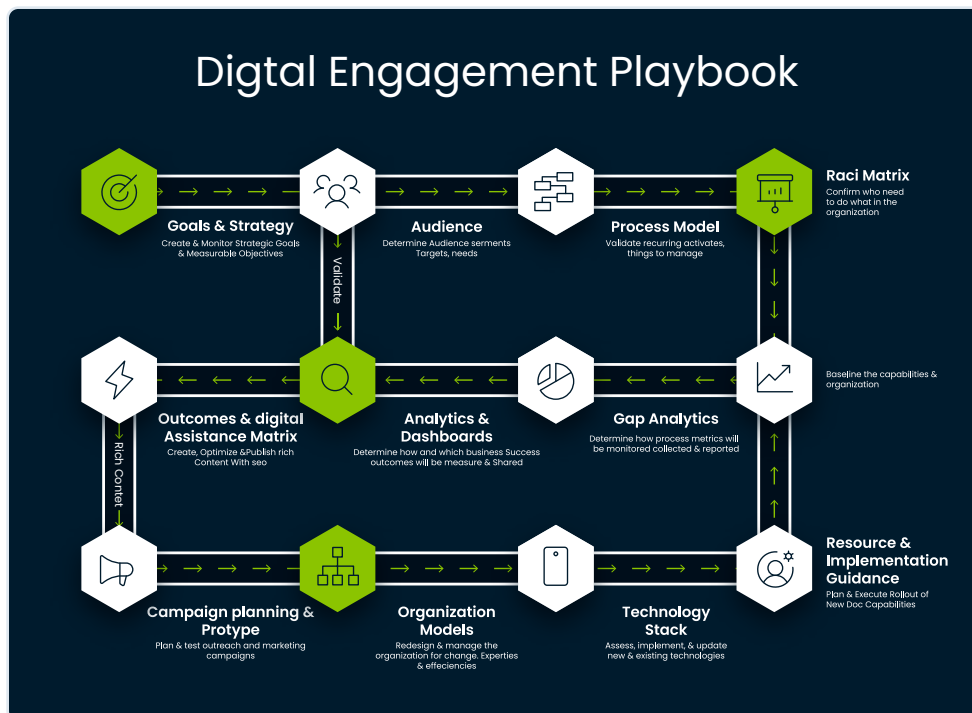


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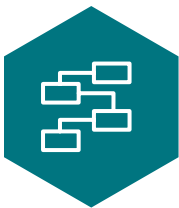
### **Establish clear business objectives**

It almost goes without saying that you need goals. However, you also need clarity and specificity in those goals. For example, if you want to increase revenue, are you aiming for ad revenue or subscriptions?



### **Select a set of relevant audience engagement KPIs**

Your key performance indicators will be different for each objective. Continuing the example: You would want more plays and more viewer minutes if you wanted to increase advertising revenue.



### **Connect QoE metrics to KPIs:**

This is the main step that makes your optimization process predictable and actionable. You have to connect any business growth or cost reduction to measurable QoE metrics such as video start times, playback failures, bitrates, or buffering times. You do this by linking your relevant QoE metrics to KPIs, which, in turn, you have already linked to your business objectives.



### **Benchmark performance**

The next step is to determine what's normal for the QoE metrics you selected. Benchmarking leads progress by balancing realistic expectations and ambitious goal setting. Check out the following section on benchmarks for an in-depth discussion.



### **Make a roadmap**

Once you know where you stand, it's time to work out where you're going. Plot out the path to improving KPIs based on benchmarks, audience data, and current QoE analytics.



### **Analyze root causes**

Get into the where, what, who, and how of solving any issues.



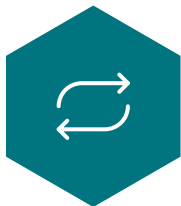
### Optimize services

This is the execution part of the process. Mobilize your team to resolve the root of your issue, informed by any guidance and insight you developed in the previous steps.



### Validate actions

It's not over until it's over. Confirm that you met the technical requirements necessary to achieve your business objectives. Do this through systematic validation of operations.



### Repeat

Set new, clear objectives in line with your organization's overall vision of success.

Drilling down into key metrics is the only way to make this process work. Focus on the metrics that matter for your goals and your operations, improve performance, confirm the effect, and repeat.

## Benchmarking as a Core Optimization Concern

**Benchmarking is essential** if you want to direct your organization's resources toward practical, impactful goals.



**The first step to effective benchmarking is to standardize your measurements. You need apples-to-apples comparisons.**

The first step to effective benchmarking is to standardize your measurements. You need apples-to-apples comparisons. Especially if you're comparing metrics from different sources, you need to execute the same sanitization and standardization processes on all data.



## Moving from Standardization to Action

Once you have a standardized point of view, you can start looking at things in a more objective way. You will also probably have a leg up on your competition.

- Personal experience
- Word of mouth and rumors
- Advertising
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Your personal experiences aren't universal. People you trust aren't necessarily experts. Advertising is only worthwhile when the advertiser's objectives align with yours. Incomplete or cherry-picked data lead to a skewed picture of performance. All leaders know this, but these factors still influence decisions sometimes.

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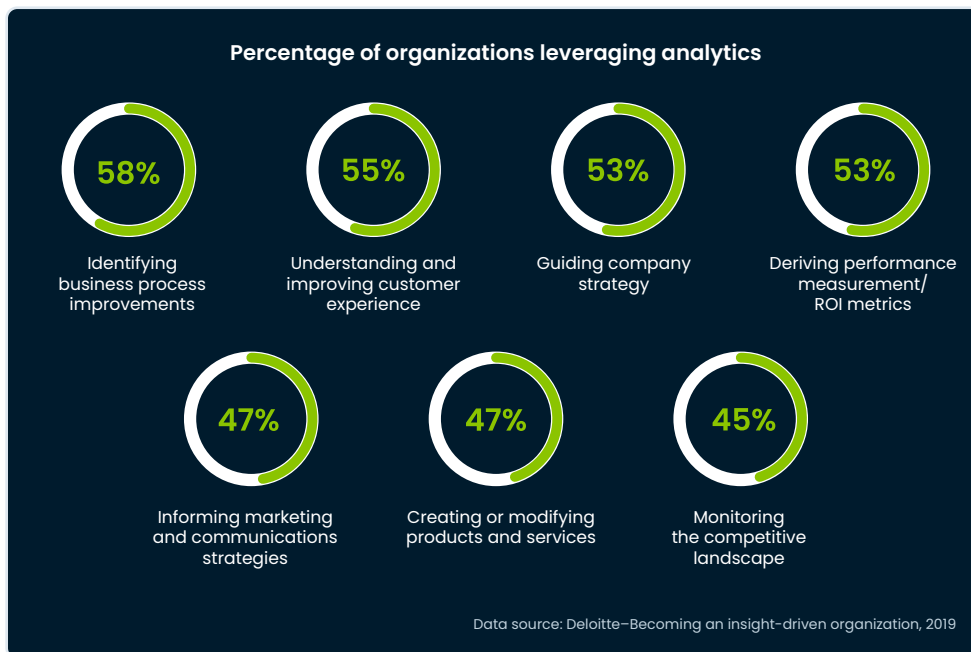


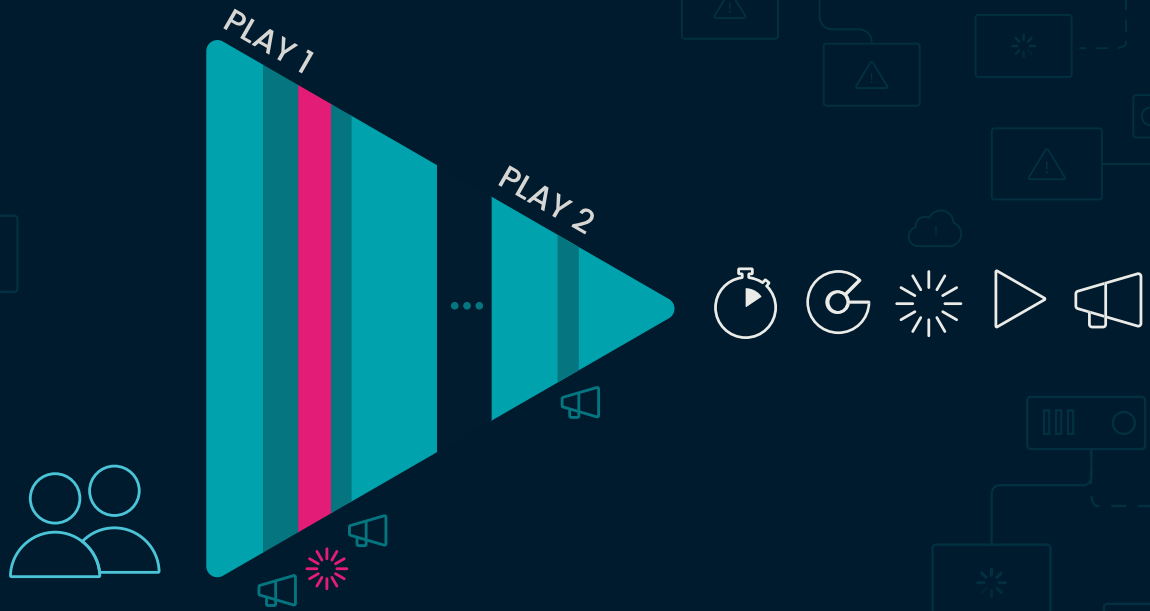
Image Source: <https://www.itransition.com/blog/data-driven-decision-making>



For example, you can see which of your many QoE metrics that impact a KPI are underperforming the industry. From there, you can select the metrics that:

- Have the greatest potential for improvement
- Affect the largest number of audience members
- **Impact engagement the most**

These are the foundations of an efficient roadmap. Of course, the entire optimization process builds on **granular data** about the user experience.



## Mistake 5: Fragmented Experience Measurement

Zoom out from the video viewer. It's time to take a look at how you approach the entire audience experience.

### Key Takeaways

- Traditional analytics look at a fragmented version of events.
- Viewer experience is a continuous journey that includes non-video aspects of your service.
- A holistic, start-to-finish view of audience QoE provides better insight when pursuing your business objectives.





## What Is Viewer Experience, Really?

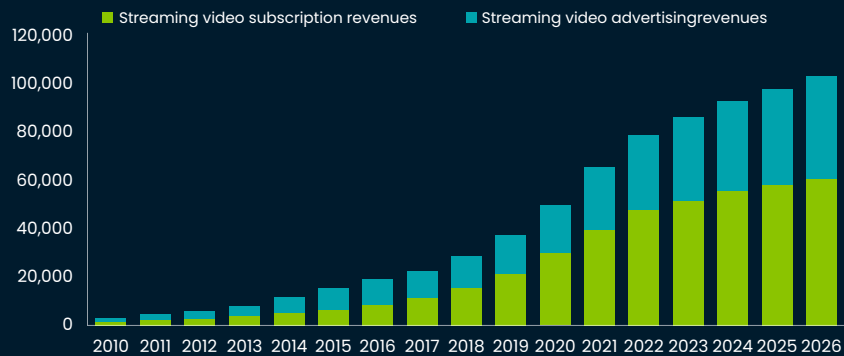
There is so much that goes into a viewer's experience. It starts happening even before they tap that play button.

There's a reason executives care about QoE. Knowing it — measuring it, specifically — is necessary to make good decisions. That's why it's important to understand the big picture of what your viewers are experiencing.

## The Fragmented Approach

Publishers used to target the question of audience experience with metrics that came from a single source: the video player. You would have plenty of relevant data, but you wouldn't get the entire story.

US streaming video subscription and advertising revenues, 2010–2026 (\$M)



Data compiled November 2022.  
Streaming subscription video and video advertising totals include subscription and advertising revenues generated by virtual multichannel services such as Hulu + Live TV, YouTube TV, DIRECTV Stream and Sling TV.  
Streaming video advertising revenues are for in-stream video ad revenues generated by pre-roll, mid-roll, and end-roll ad inventory and do not include banner overlays and brand sponsorships.  
Sources: Kagan estimates; company data; industry data.  
Kaga, a media research group within the TMT offering of S&P Global Market Intelligence.  
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Image Source: <https://www.spglobal.com/marketintelligence/en/news-insights/research/streaming-video-revolution-traditional-media-adapts-to-a-digital-shift>

## The Audience Journey

A streaming video is a continuous experience. It's a journey. It has a start, there are events that take place, and there's an endpoint.

It's easy to equate that video playback with the audience experience. However, when you're trying to **make complex business decisions**, that equation doesn't balance.



The fragmented approach to audience experience measurement inevitably leaves you with mysteries. You don't want to have to guess when the future of your organization is on the line.

## Taking a Holistic View

Imagine you run a VoD service and you're optimizing for higher engagement in your ad-supported subscriber tier. You've benchmarked your current performance and found that it's lacking compared to your competition. Specifically, you're seeing a high number of streaming attempts with some kind of early termination.

This is a **key streaming metric**, but you can't seem to explain the failures with any of your existing analytics. There are no technical issues or deliberate blocks that would create these events. The app isn't crashing, either, according to your separate analytics stack.

You still want to keep eyes on your content to improve ad revenue, and you don't want to get into a trial-and-error situation. It's time to take a step back.

This was a common case that led to one of the earlier innovations in analytics: Ad performance tracking. If you had visibility into the pre-roll ad, you might notice that it buffered excessively, had extremely low quality, or even failed to play entirely, blocking playback. All of those events could push your audience away from the video — and potentially toward your competitors

## Looking at the Entire Journey

If you're already taking census-level measurements of your video experience, you're on the right track. You're looking at arguably the most important aspect of the user journey.



**Video isn't everything. It's just the most important thing. Each user has their own complex journey.**

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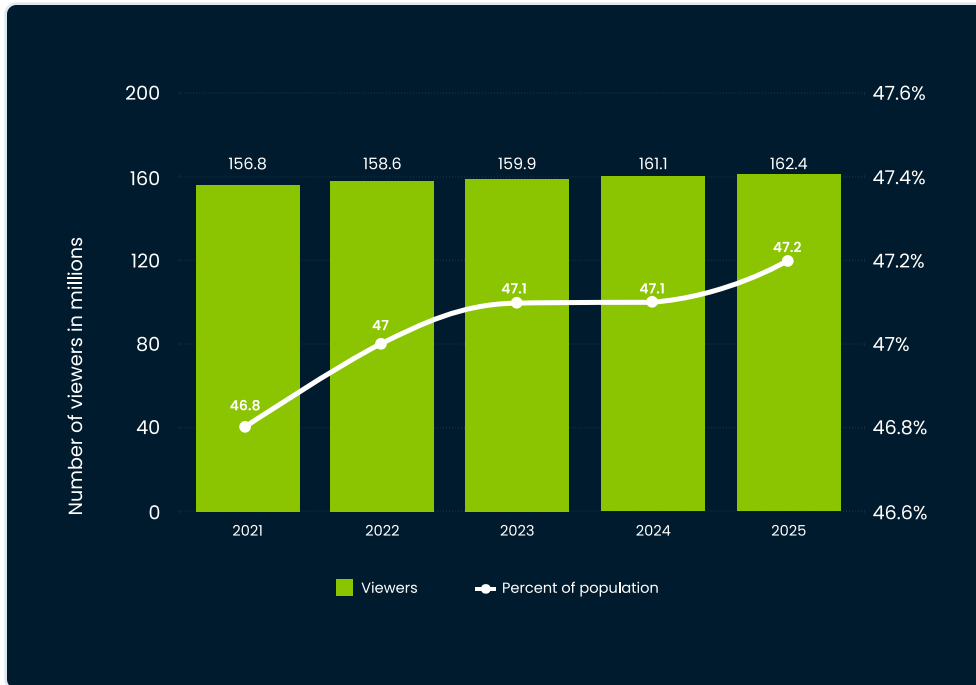


Image Source: <https://www.statista.com/statistics/1310558/live-sports-viewers-us>

Even if you're focusing on video-based KPIs, you can optimize based on non-video behavior. Do fewer clicks through your library result in more hours of playback for your ad-supported subscribers? Do viewers of certain sports streams have a higher chance to dig down into your statistics pages?

If you had end-to-end visibility on what was happening during each user's journey, you could answer these types of questions. Then, you could take action that serves those audience sections. This could help you double down on specific target markets, such as **live sports**.





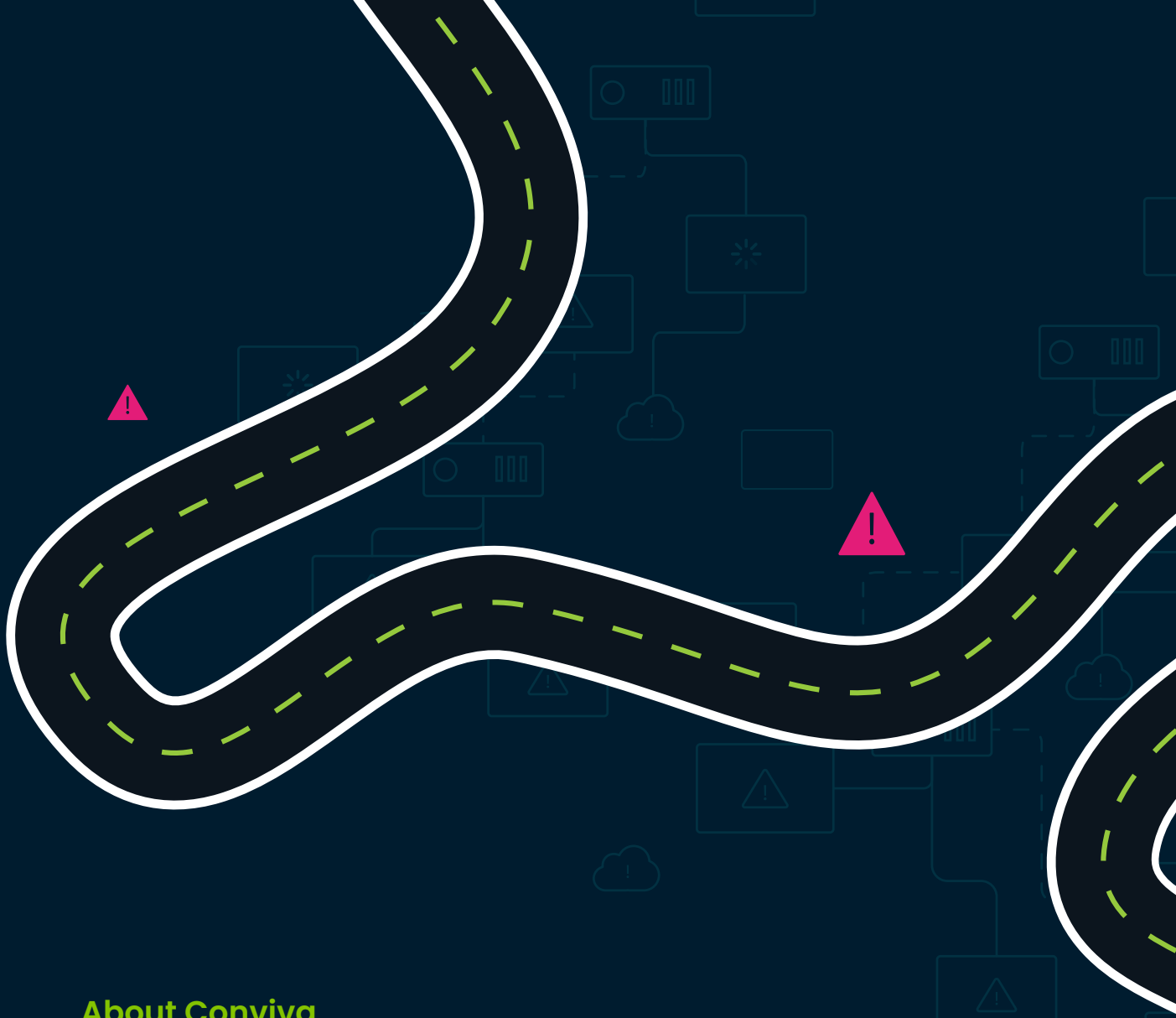
## Avoid the Mistakes: Upgrade Your Streaming Analytics

If you're like most organizations in the streaming arena, you have a system that more or less works. If you've made it this far in reading, you also believe that things could work better. You're right.

Overengineering on top of legacy or non-purpose-built systems increases your cost of ownership. It increases complexity without adding value. Above all, it keeps you from seeing the big picture.

There's a better way. There's a way that's built from the ground up, specifically for your type of operation. You really can get the entire audience experience — apps included — for every viewer, every minute, every metric you care about.

Check out our **analytics technology** or **click here** to see Conviva in action.



## About Conviva

Conviva is the leader in streaming media intelligence, powered by its real-time platform. More than 250 industry leaders and brands – including CBS, CCTV, Cirque Du Soleil, DAZN, HBO, Sky, Sling TV, TED, Univision, and WarnerMedia – rely on Conviva to maximize their consumer engagement, deliver the quality experiences viewers expect, and drive revenue growth. With a global footprint of more than 500 million unique viewers watching 150 billion streams per year across 3 billion applications streaming on devices, Conviva offers streaming providers unmatched scale for continuous video measurement, intelligence, and benchmarking across every stream, every screen, every second.

## Any Questions?

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