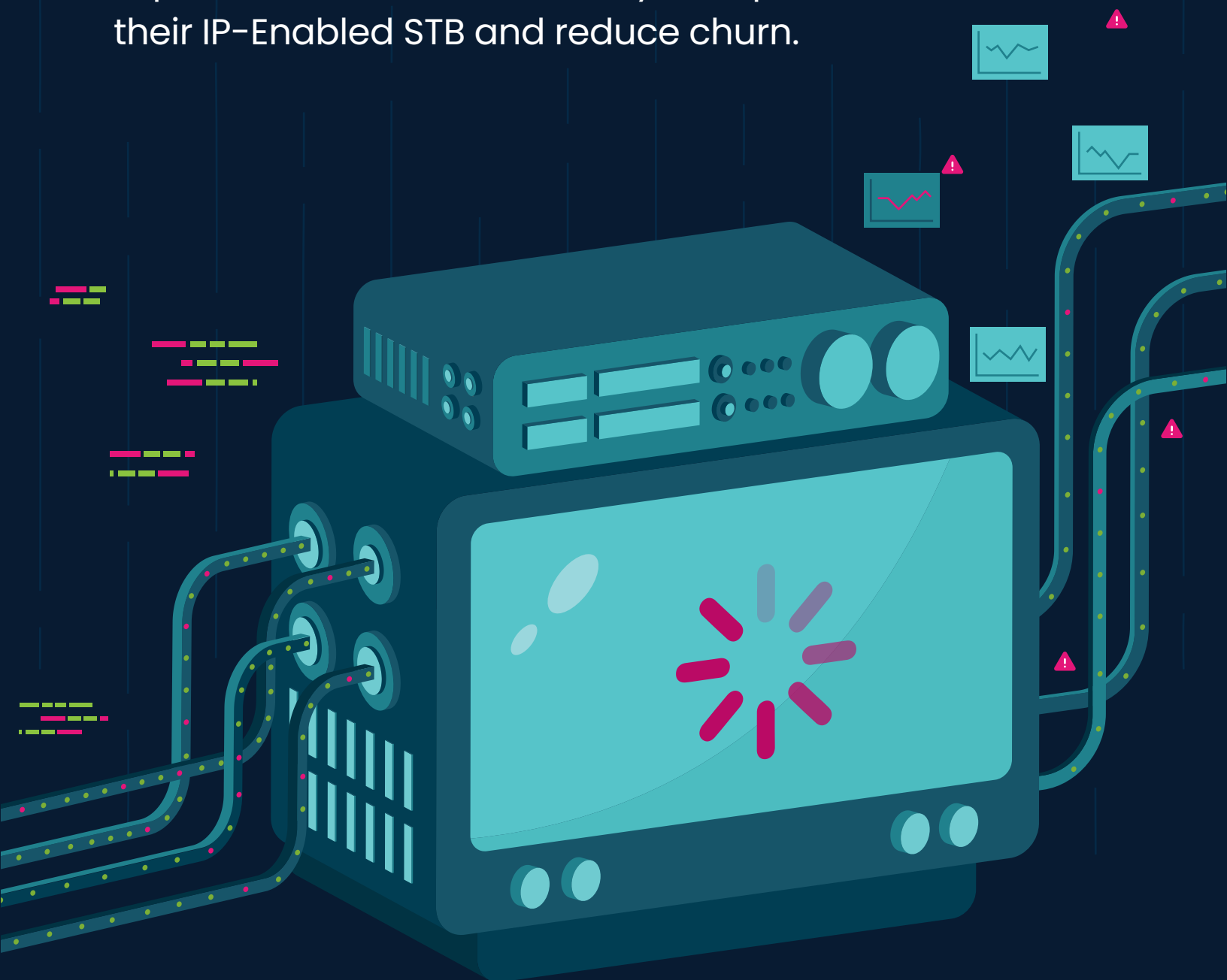# Eliminating the Set-Top Box Blind Spot

How service providers use Conviva to calculate experience metrics across any end-point within their IP-Enabled STB and reduce churn.

Real-time Experience Metrics, only from Conviva

Users with STB reboots within X minutes after firmware update

Sessions with play failure after firmware update

STB reboot after video failures

Video failures after WIFI connection loss

Users with failed DVR completion

Sessions with packet loss bursts

Distribution of "add to favorites" per channel ID (most / least favorite channels)

Average time from STB wakeup to first play

Video play after source change

Time from source change to video play

User active time per signal source / mode

% Time spent in partner streaming applications

% of reboots that turn into a support call

% of support calls that result in a truck roll

% of plays with decode issues

% of devices exceeding mandated temperature thresholds

Avg time since last reboot & avg energy draw

You are blind to how subscribers experience your IP-enabled set-top box

As service providers enter the OTT market with IP-enabled set-top boxes (STBs), they find themselves losing subscribers to cord cutting and the proliferation of IP streaming services, including off-the-shelf streaming sticks and Smart TVs. These newer OTT entrants are not burdened by their legacy services, enabling them to move quickly and offer headline-grabbing features.

On the other hand, providers with IP-enabled STBs face unique challenges because of unprecedented costs, the complexities of providing TV-like quality across multi-modal delivery mechanisms, and the demand for ever-richer viewing experiences such as low latency, high frame rate, and personalized ads. Delivering to the lowest common denominator is no longer an option; Service Providers must cater to multiple device generations, further complicating their operations. One mistake could very well become front page news, yet the budget indispensable for successful expansion is constantly being cut.

Consider these Quality of Experience (QoE) statistics:

App Start Time

Almost
20%
of users abandon
if your app doesn't
launch in 12 seconds

Content Search

More than
25%
will not watch
video if search takes
more than 11 mins

Video Playback

63%
less video hours
if subscribers
experience poor
video playback

These QoE statistics are more than numbers; they represent missed opportunities to increase your subscriber base and, ultimately, your revenue. QoE measures how a product meets your customers' expectations, giving it the *biggest*, but also *least visible* impact on your business. Conviva uses an Experience-Centric approach to Observability (ECO) to illuminate QoE blind spots, measuring and instantly computing experience metrics across any end point within your IP-enabled STB, from application launch to video playback, and everything in between.

Service providers leverage ECO to overcome IP-enabled set-top box QoE challenges and enhance their operational efficiency, improve viewer engagement, and maximize revenue generation by delivering high-quality OTT experiences.

Service providers are fighting a losing battle against OTT

Today's streaming businesses live or die based on their audience. A loyal, engaged audience translates into ad and subscriber revenue, and the ability to attract more users means steady growth in the face of constant, fierce competition. But service providers face unique challenges that can't be solved without significant financial costs to their business, including supplying IP-enabled STBs, expensive truck rolls, aging hardware, and migrating content delivery to IP.

Despite these unique challenges, providers see the IP-enabled STB as a primary tool for fostering an engaged audience and protecting against churn, because they manage out the complexity. Ideally, IP-enabled STBs act like a one-stop shop where customers can immediately access any content or service they want to watch.

However, collecting meaningful data from the IP-enabled STB environment poses a significant challenge for service providers, leaving them blind to true user experience:

Limited Root-Cause Understanding:
Service providers struggle to identify the root causes (RCA) of experience issues on owned and 3rd party applications. This makes it difficult for service providers to diagnose and resolve technical issues affecting QoE.

Measurement Fragmentation
Operators face fragmented & uncorrelated measurement of user journeys, experience, and engagement within their IP-enabled STB.

Blind to External Apps
Providers cannot answer questions like *"What was my customer's experience when they launched a 3rd-party app? How much did they use it and what is my ROI?"*

Heavy Tech Stacks
Despite having multiple monitoring and analytics tools, service providers struggle with the immense volume of raw event data, which often fails to represent what the customer is seeing; e.g., a back end memory leak might have no customer impact, whereas a personalisation service taking the customer to the wrong content might not show up at all. Moreover, the impact of multiple sensors degrades IP-enabled STB performance, further eroding QoE and creating blowback on social media.
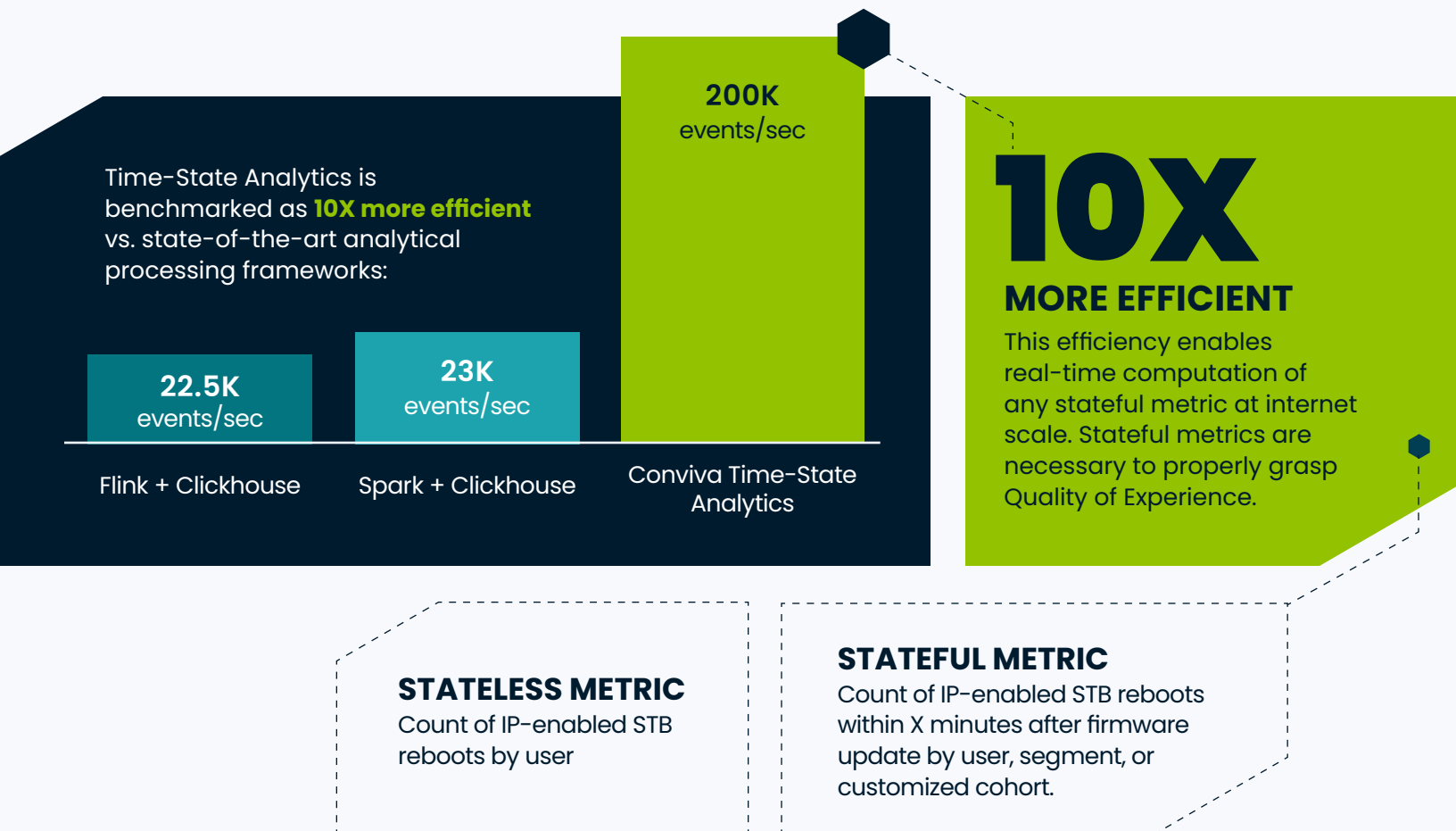
Inefficient Development
Service providers face long development cycles for new IP-enabled STBs, and the entire world is watching each release. If something goes wrong, it's a front-page news story and subscribers churn.

Conviva revolutionizes how service providers monitor and improve QoE on their IP-enabled STBs by solving these challenges through an Experience-Centric approach to Observability.
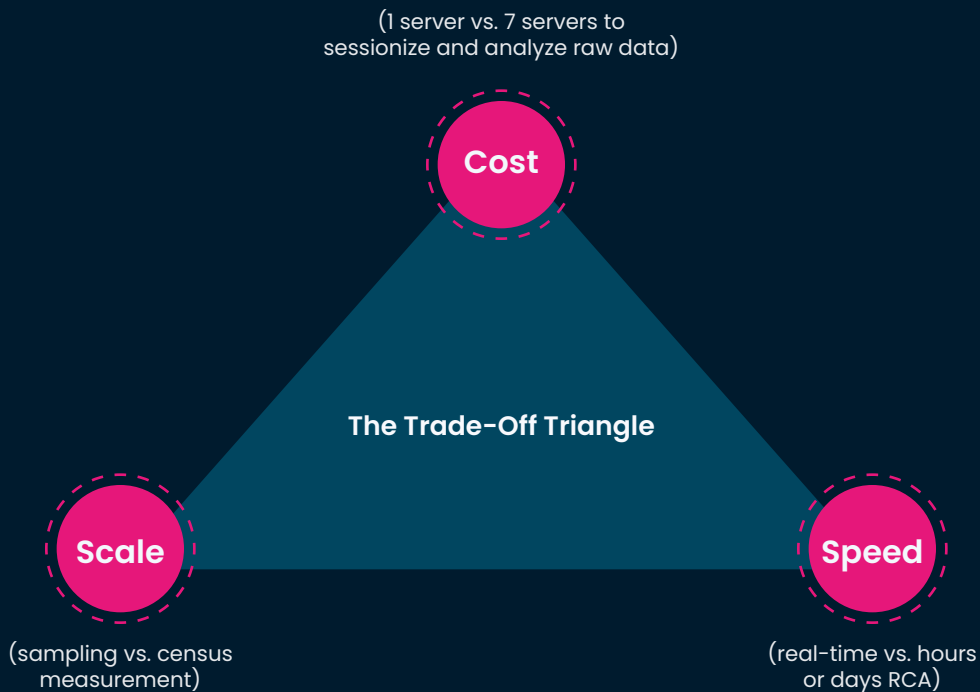
Experience-Centric Observability eliminates IP-enabled STB blind spots

Without a complete understanding of experience and performance, service providers are essentially reduced to guesswork when it comes to identifying how they improve Quality of Experience on IP-enabled STBs.

Conviva's Operational Data Platform is the first to offer Operators total visibility into the IP-enabled set-top box through its ECO service. Powered by proprietary Time-State Analytics Technology, ECO is built on top of a non-tabular data abstraction and a time-line query language that provides instant understanding of cause-and-effect relationships between front- and back-end systems.

Time-State Analytics is benchmarked as **10X more efficient** vs. state-of-the-art analytical processing frameworks:

22.5K
events/sec

Flink + Clickhouse

23K
events/sec

Spark + Clickhouse

200K
events/sec

Conviva Time-State Analytics

10X
MORE EFFICIENT

This efficiency enables real-time computation of any stateful metric at internet scale. Stateful metrics are necessary to properly grasp Quality of Experience.

STATELESS METRIC
Count of IP-enabled STB reboots by user

STATEFUL METRIC
Count of IP-enabled STB reboots within X minutes after firmware update by user, segment, or customized cohort.

Stateless Metrics will give you counts, but Stateful Metrics give you the context of what your user is experiencing and why. Although it is possible for other analytical processing frameworks to calculate Stateful Metrics, there is always a trade-off between Scale (sampling vs. census measurement), Speed (real-time vs. hours or days RCA), and Cost (1 server vs. 7 servers to sessionize and analyze raw data).

Conviva's Experience-Centric Observability is the only solution on the market that does not sacrifice scalability, speed, or cost. Not only does it ingest census-level data without sampling, but it also computes Stateful Metrics instantly at a fraction of the cost, giving service providers 360-degree visibility into IP-enabled STB QoE.

Service providers leverage ECO to overcome challenges specific to IP-enabled STBs and enhance their operational efficiency, improve viewer engagement, and maximize revenue generation by delivering high-quality OTT experiences.

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Here are the concrete ways that Conviva demystifies the IP-enabled STB environment for service providers:

- **Ingest and explore all data at minimal cost**
  Being blind to what's happening within your IP-enabled STB is a primary obstacle for service providers in need of comprehensive insights into QoE. Conviva addresses this in several ways:

  1. **Census-Level Data Ingestion**: Conviva removes the need for data sampling, which only captures a subset of user interactions and risks overlooking important issues, patterns, or trends.

  2. **Event Blacklisting**: Conviva gives you the flexibility to decide which data matters to your organization, and to pay for that data only. This lets you optimize your resource allocation.

- **Build and activate only the events and metrics you need**
  Conviva understands that traditional operational approaches can make it harder to respond promptly to changing customer demands. Conviva's No-Code Server-Side Metric Builder simplifies the metric creation process, enabling product, operations, and development teams to be responsive, knowing that business-critical metrics are being tracked effectively. With time and attention freed up, teams can prioritize user-centric initiatives.

  1. **Event Mapping**: With Conviva's Semantic Mapper, you overcome data fragmentation and inconsistency. Event Mapping takes data from diverse sources and creates a cohesive dataset for analysis, which is especially useful when you have a mix of IP-enabled STBs in the market from different generations and different manufacturers.

  2. **No-Code, Server-Side Metric Builder**: With Conviva's user-friendly interface, your team can easily create metrics unique to your business. Monitor and manage the user flows and experiences that are most critical to your success—without needing to prioritize new development efforts.

- **Monitor and act on QoE instantly**
  Service providers have struggled to meet customer service expectations because of a persistent lack of visibility into the IP-enabled STB environment. Conviva's comprehensive data ingestion and ECO approach make it possible for teams to address problems for customers in real time.

  1. **Issue Prioritization Based on Cumulative QoE Impact**: With Conviva, service providers can surface and resolve IP-enabled-STB-environment issues as they happen, protecting their customers' ability to use products or services, from application launch to video playback, and everything in between.

  2. **Clicks, Not Queries on Live Data**: The Conviva UI enables operators to double-click into any underperforming dimension, such as device manufacturer, models & specifications, firmware version, and storage capacity, and drill down into an issue without needing to write a single line of code or query.

- **Automate detection, root-cause analysis, and actions**
  One of the challenges facing IT teams is the glut of noisy alerts and false positives, which can impede timely troubleshooting and resolution of incidents. With Conviva, teams can easily prioritize issues based on the cumulative QoE impact.

  1. **Artificial Intelligence Alerting and Instant Root-Cause Analysis**: Save your business more than 30,000 labor hours and millions of dollars in lost revenue with AI-driven alerts that surface anomalous events and point out issues you may not even know you should be looking for, delivering industry-leading MTTR and MTTI.

  2. **QoE CDN Switching**: Conviva Precision optimizes both live and on-demand content for viewers across multiple network resources, including origins, on-net and off-net CDNs, in 190 countries. By monitoring real-time global and local internet patterns, Precision detects, locates, and resolves failures before they impact the end viewer, while keeping video delivery costs in check.

- **Server-side compute of session data**
Service providers have historically had to resort to expensive and inefficient workarounds in their attempt to surface data and metrics from the IP-enabled STB environment. The result is heavy, costly tech stacks that still don't deliver the information providers need when they need it. The more data they try to collect, the slower the performance. Conviva solves that problem by collecting data through a feather-weight SDK and computing all metrics with a powerful server-side backend.

- **Answers to questions you did not know to ask**
If IP-enabled STBs have been notoriously opaque to service providers thus far, it's no surprise that companies often don't even know what to aim for when building their IP-enabled STB experience, leading to inefficient development processes. Conviva's intuitive UI empowers development teams to be more productive.

  1. **No-Code, Server-Side Metric Builder**: Anyone can easily create Stateful Metrics, such as the time it takes users to subscribe, the number of users able to log in under 2 minutes, and more. Conviva empowers teams to monitor and manage user experiences they know are important to the business without needing to update the SDK or prioritize new development.

  2. **Dynamic Historical Dashboards**: Conviva retains all Experience Data for 13 months, allowing operators to explore long-term trends and better understand how customers experience a product or service, including deployment tracking, usage data, demographics, and more, at no additional cost. Historical data gives platforms insight into seasonality effects and long-term trends, helping teams improve their decision making and strategic planning.

Supported IP-enabled STB Use Cases

Conviva provides service providers with real-time visibility into how IP-enabled STB system performance is impacting QoE, helping teams find and quickly resolve issues that affect customer satisfaction. Organizations can leverage Conviva's platform to overcome IP-enabled STB challenges and capitalize on opportunities in the industry.

→ **Troubleshooting the biggest customer-facing problems**

End-to-end visibility and real-time insights empower providers to understand viewer journeys, segment audiences effectively, mitigate churn risks, and address quality issues. Finding and resolving problems faster improves mean-time-to-identification (MTTI) and mean-time-to-resolution (MTTR). Better reliability and faster incident response increase user satisfaction. Tangible business outcomes include fewer technicians to fix IP-enabled STBs, increased viewer engagement, higher customer retention, and improved ROI for service providers, with Conviva customers avoiding losses of tens of millions of dollars from user churn.

Real-time QoE Monitoring

AI Alerting

Instant Root-Cause Analysis

Deployment Tracking
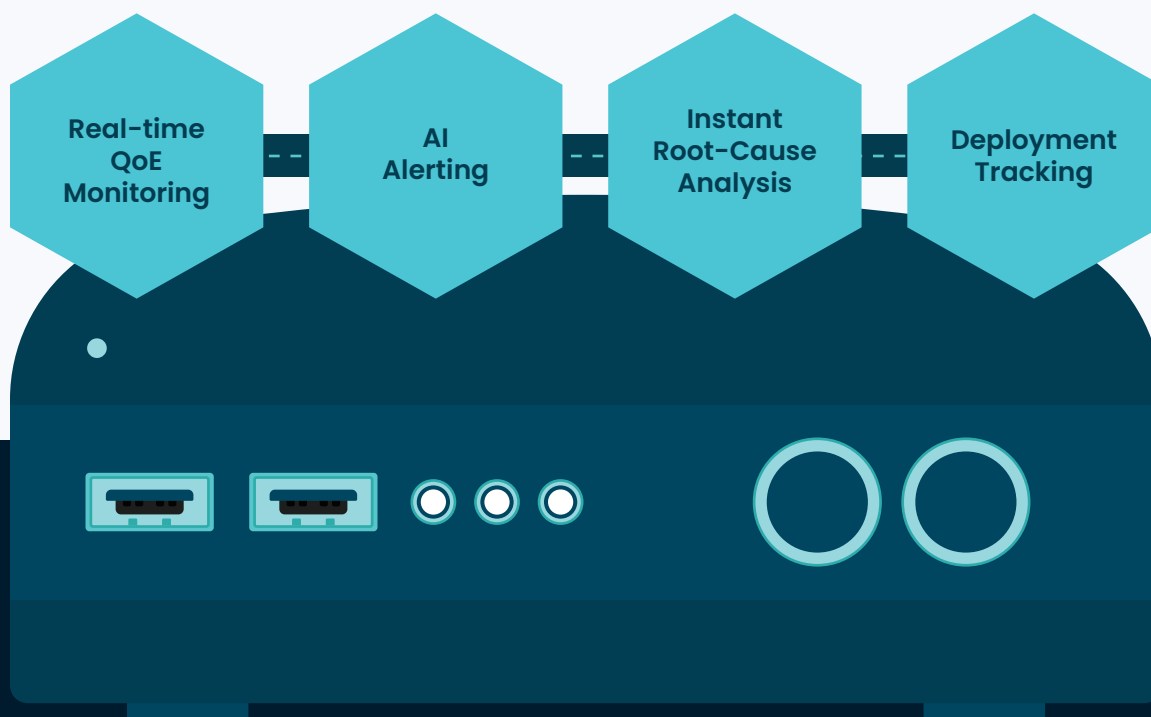
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→ **Prioritizing improvements to boost experience and engagement**
Conviva's Experience-Centric Observability allows companies to manage and monitor their own devices and apps, as well as third-party applications and streaming experiences, with a focus on improving metrics that impact the bottom line. This helps companies deliver value-added features and enhancements, improving agility, productivity, and time-to-market for digital products and services. With Conviva, clients have seen at least 10% increases in watch time, resulting in billions of additional streaming minutes thanks to streaming improvements.

📈 QoE Benchmarking	KPI KPI Tracking	A/B A/B Testing

Historical Usage Segmentation	Live and On-demand OTT optimization

→ **Aligning teams and tools to drive business efficiency**
Conviva's comprehensive data ingestion, intelligent event mapping, and no-code metric builder—all available after a one-time setup for a lifetime of business-relevant value—support teams across streaming businesses in focusing on common outcomes for customer satisfaction and business results, with reduced tool sprawl and team silos, and simple cost management for monitoring bills. Conviva customers have been able to put their focus where it matters most, instead of on engineering needs, allowing them to add millions in revenue.

Comprehensive and Unified Data across Teams

Engineering	Product	IT Ops

Customer Service Cost Reduction

Reduced calls to support teams	Fewer truck rolls

Key Takeaways for IP-enabled STB Service Providers

Conviva uses an Experience-Centric approach to Observability to illuminate blind spots in IP-enabled set-top boxes, measuring and instantly computing QoE across any end point within the IP-enabled STB. Service providers can leverage ECO to overcome set-top box QoE challenges and enhance their operational efficiency, improve viewer engagement, and maximize revenue generation by delivering high-quality OTT experiences.

Subscribers don't know the complexity behind their expectations—and they shouldn't have to. Conviva helps companies deliver seamless experiences across any endpoint on IP-enabled STBs. Achieving industry-leading outcomes in today's competitive digital landscape means using the right data to deliver the best Quality of Experience.
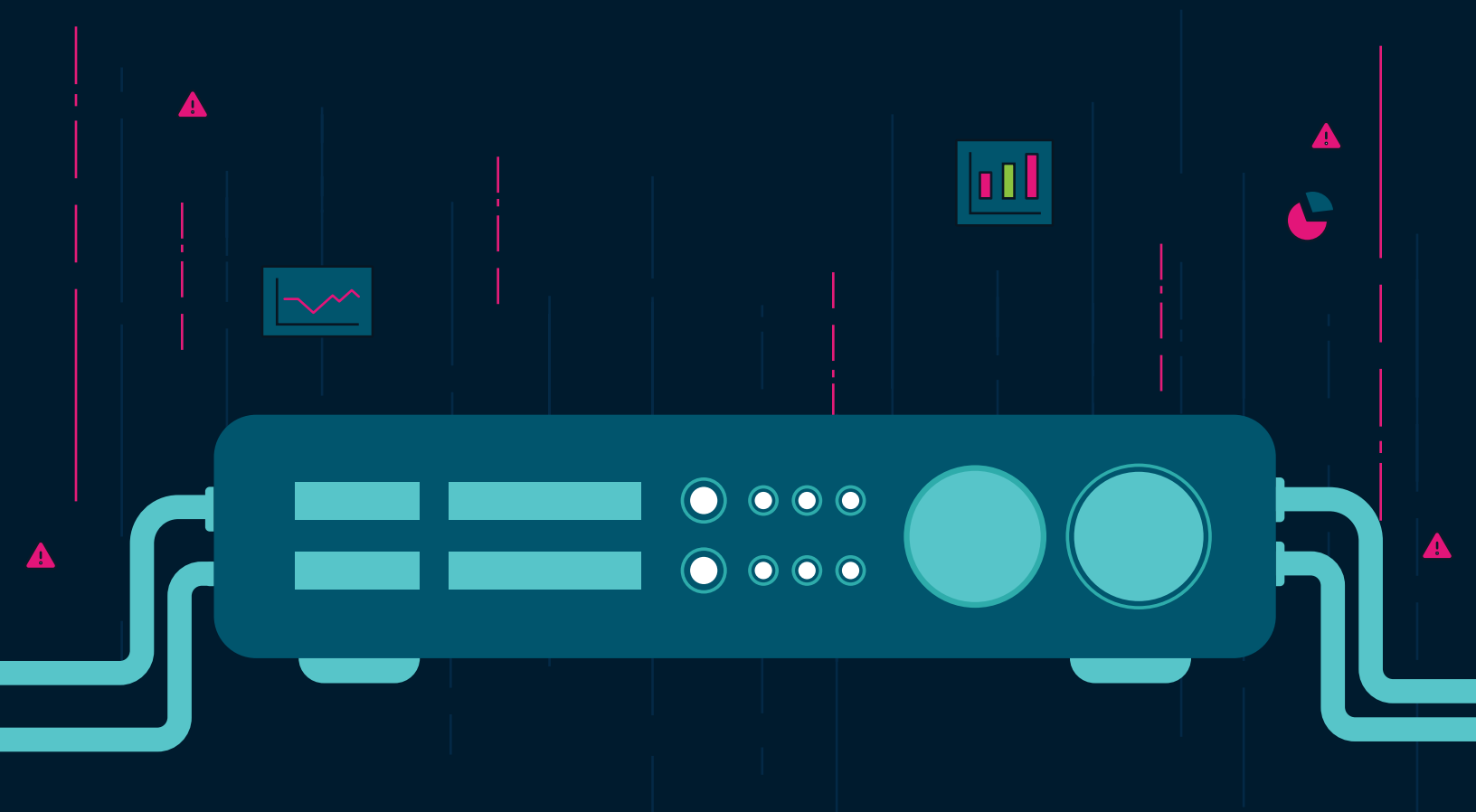
MEO
Success Story

MEO leads the Portuguese OTT Market
MEO is a leading telecommunications and entertainment company in Portugal, known for providing a wide range of services including mobile and fixed telephone services, broadband internet, and television. MEO plays a pivotal role in the Portuguese market by offering innovative services and technology solutions, including IPTV (Internet Protocol Television), OTT (Over-The-Top content), and advanced mobile services. MEO maintains its leadership position through constant innovation and a focus on customer experience.

MEO's Obsession with Customer Experience
MEO is famous for how much it cares about delivering best-in-class customer experiences. In addition to offering a wide variety of channels across sports, entertainment, and news, they also offer packages that include high-definition live content, Video-on-Demand (VoD), and exclusive channels. MEO also owns a range of apps and platforms to enhance the customer experience, allowing users to watch content on different devices and on-the-go.

The OTT Opportunity
As MEO prepared to introduce their OTT service in a highly competitive market, they were optimistic that their mix of engaging content and excellent video quality would secure their top spot in the OTT industry.

However, transitioning to OTT posed significant challenges, especially with an influx of new customers excited by MEO's new OTT offering. Mitigating these challenges required thorough preparation across both streaming and backend operations to ensure customers would have a great experience accessing and viewing MEO content. This preparation meant learning how to monitor, measure, and manage trillions of unique data points, in real-time, across a wide range of end-point devices like Smart TVs, mobile devices, and IP-enabled set-top boxes.

Partnership with Conviva
MEO tested Conviva's Experience-Centric Observability solution to harden its new OTT service, including streaming through IP-enabled STBs. Not only was Conviva able to collect, normalize, and make sense of data from millions of viewer sessions, but MEO operations teams were also able to monitor every viewer session in real-time at census level and prioritize fixes based on how performance issues impacted Quality of Experience.

Business Outcomes

→ **67% fewer** customer support calls.
→ **98 NPS** on 4K OTT content.

Conviva's technology also empowered MEO to personalize content recommendations based on viewer preferences, further enhancing the overall viewing experience and solidifying MEO's position in the telecommunications industry.

Ready to demystify the set-top box environment and reduce customer churn?

Talk to Conviva.

CONVIVA