

WHITE PAPER

THE FUTURE OF VIEWER ENGAGEMENT

WITH NATIVEWAVES EXP

Creating the Perfect Event Watching Experience



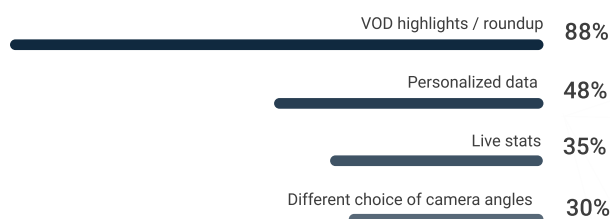
Consumer Behaviour Is Changing

Streaming is rapidly becoming the major choice for entertainment and engagement with content among people of all ages. The live streaming market is expected to grow at a rate of 28.2% ¹

However, this market is highly competitive, especially when it comes to live events including sports. To attract and retain viewers, rights holders and broadcasters need to anticipate and apply a variety of strategies based on evolving consumer viewing habits, their preferred platforms, time spent engaging with content, content interests and the overall viewing experience. The most important question here is: **How do I successfully design and deploy an incremental direct-to-consumer (D2C) offering, that complements the existing linear service while increasing engagement and consequently driving higher and more diversified revenues?**

28.2%
growth rate of
the streaming
market

Most Relevant Fan Engagement Features

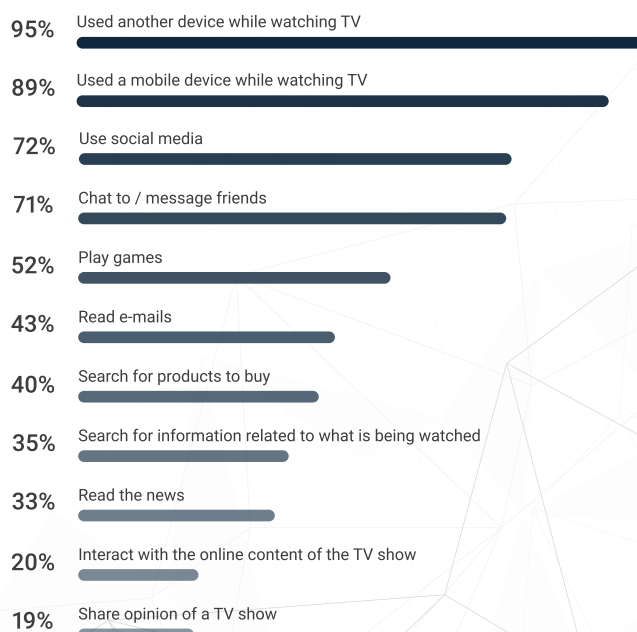


In addition, a recent survey³ of UK football fans has highlighted further demand for personalised TV channels and offerings, with audiences willing to pay extra for access.

The survey shows that 96% of viewers would use a personalised channel if offered by television broadcasters. Survey respondents were also willing to pay an extra UK£14.30 (~17 Euros). This is even higher than the average annual subscription price that most US-based services are able to achieve at around US\$96 (~84 Euros).

On the flip side, although nearly all viewers (especially in the Gen Z demographic) use a connected device as a second screen while watching TV (primarily smartphones), today only about one third of them are engaged with the linear content playing on the TV. The opportunity and the risks are clear: Offering an engaging “+” experience for the connected device is key to shore up advertising revenue and to reduce churn. Otherwise, current customers and viewers may soon be looking for their entertainment sources elsewhere.

Second screen usage of Gen Z internet users worldwide while watching TV as of 4th quarter 2018⁴



¹ <https://www.databridgemarketresearch.com/reports/global-live-streaming-market>

² <https://www.mediakind.com/2021SportsD2CForecast/>
Second Screen Sync Patent No: US 11,570,506

³ <https://www.sportspromedia.com/news/uk-soccer-fans-personalised-tv-channels-subscription-premier-league-study/>

⁴ <https://www.statista.com/statistics/295016/teens-tv-internet-second-screen-usage>

In this **competitive market**, the cost of doing nothing is very high. Once viewers identify alternative sources for their entertainment that are doing a better job of meeting their needs by offering better engagement opportunities, it will be costly to win them back. **Upgrading an existing broadcast or streaming service** to offer a fan engagement experience that speaks to the audience does not have to be complex or expensive.

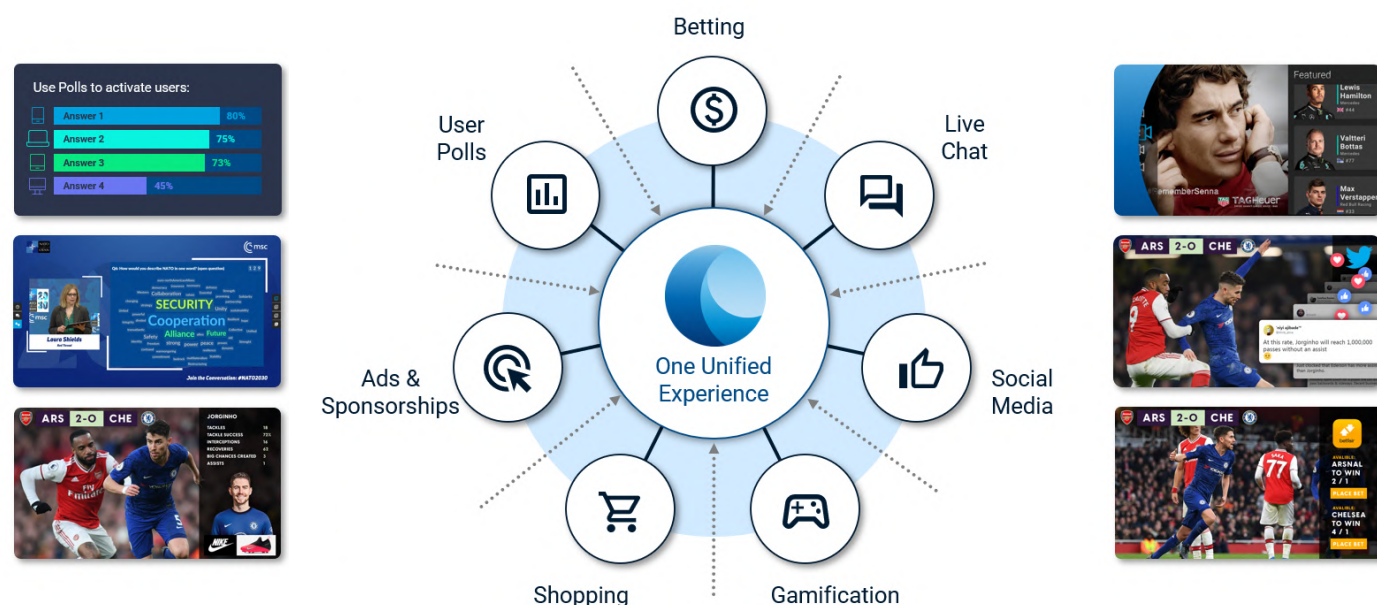
NativeWaves **EXP** is designed to offer just that. Get started with NativeWaves **EXP Basic** instantly while identifying and securing availability of additional camera feeds and data sources for upcoming events. Switch to more advanced integration options such as **Pro** or **Enterprise** at any time to really **drive engagement and loyalty** while offering better value to users, viewers and subscribers.

Creating the Perfect Experience

One of the key challenges is to master the transition from linear digital delivery to personalised on demand experiences (live to time-delayed), that viewers have come to expect for feature and episodic scripted content. Simply offering all live content also on demand foregoes multiple opportunities for interactivity and incremental monetisation. Keeping fans engaged in real time has distinctive value and accomplishing this requires a vastly different approach.

At NativeWaves, our goal is to create the perfect event watching experience, regardless of whether the viewer prefers sports, esports or entertainment. Our approach is completely driven by the user experience:

When watching TV today, everyone gets the same experience. If a viewer would like to see the tactical camera over the football field to rewatch a goal shot instantly, right after it happened, this is currently not an option. The reason for this limitation of course is the concept of traditional broadcast television: one to many. Streaming technologies do not have this limitation, yet the experience today is still hampered by these historic limitations.



With the rise of streaming services like Netflix or Amazon Video, one key thing has changed: Audiences today prefer to watch everything on demand. Live Sports is somewhat different, but the same desires translate to real-time viewing experience: Viewers demand the content they care about whenever they want it.

We believe that audiences, when offered an on-demand experience during a live event, will not want to go back to today's lacking experience. And this is not about overloading them with additional camera feeds, but instead providing them with a user experience that packages this content in a meaningful and personalised way. For this, we have created a product offering that we call NativeWaves EXP: A new and unified experience that accompanies users with the goal to deepen the fan experience, whether they enjoy their favourite event at home, on the go or live in-venue.

Introducing NativeWaves EXP

NativeWaves EXP is a new offering that complements today's standard broadcast and streaming experience by giving audiences the chance to explore a wealth of additional content at their leisure.

Powered by a dedicated low-latency streaming platform, NativeWaves EXP enables deeper fan and audience engagement across numerous types of programming and live events. Viewers can choose an enhanced single screen experience on smartphone, tablet or mirrored to the TV, offering additional camera angles, audio tracks, instant replays, social media integration etc. including full on-screen navigation.

Additionally, NativeWaves EXP can be used and configured as a second screen companion experience. This complements the main TV screen by offering additional personalised content and data on the mobile screen – all perfectly synchronised to the main screen via the broadcast audio without requiring watermarking or any other modification of the original content on the main broadcast feed.

By combining the proven NativeWaves streaming platform with a new experience framework for web or direct app integration, that allows broadcasters and streaming providers to easily integrate new features into their existing streaming offering, NativeWaves EXP addresses a gap in the strategy of these companies: Deciding whether to stay with an existing product that works, but misses the market on new fan engagement experiences, or completely redeveloping a new product represents a key dilemma of this time. NativeWaves EXP is here to help.

The combination of our streaming platform with the new experience framework adds these much-needed new features, while integrating into the existing workflow with minimum friction. NativeWaves EXP is also a plan for the future. Adding next-generation AR/VR features or expanding the fan engagement experiences to different types of sports, or other events leveraging AI capabilities to deliver hyper-personalisation capabilities is already built into the architecture.

One Unified Experience



Platform

Easy End-to-End Integration
Synced HTTP Low-Latency Streaming
Automated Multiview Event Production



Framework

Open And Flexible UX framework
Next-Level Event Watching Experiences
Dynamically Adapts to Different Sports

Following a favourite football player, F1 driver, eSports event or while being in the crowd during a live event longing for a close-up of a musician, player etc. NativeWaves EXP will deliver beyond viewers' expectations. Instantly and on demand, to maximise the enjoyment. It is no longer about simply watching an event, but instead NativeWaves EXP immerses viewers in the experience.

3 Different Integration Options

A vastly improved streaming experience that starts from an existing broadcast program feed and adds interactivity, data integration in combination with incredibly powerful low-latency streaming. The goal is to get customers up and running within a very short timeframe, completely independently and incrementally to existing distribution paths. Start from a single broadcast PGM stream and expand to multi-camera, multi-view and multi-screen:

Features	NativeWaves EXP Basic	NativeWaves EXP Pro	NativeWaves EXP Enterprise
Live event scheduling and synchronisation backend with easy console access enabling self-management of events	✓	✓	✓
Extremely short time-to-market through a simple, web-based implementation that requires only the existing broadcast program feed, ideal for underserved markets	✓	✓	✓
Integration option into existing app platform via SDK incl. adoption of branding, look & feel etc.	✓	✓	✓
Fast, reliable low-latency streaming, integrates with any major CDN provider	✓	✓	✓
Next-level experience framework for easy adoption across different types of sports and events	✓	✓	✓
Data integration leveraging our partners such as StatsPerform for interactive live match/race/event data & stats incl. heat maps and activity highlights	✓	✓	✓
Live and library (on-Demand) playback of events at feature parity	✓	✓	✓
Fast on-demand replays of events highlights directly from the timeline	✓	✓	✓
Expanded monetisation opportunities (e.g. banner ads, affiliate links) for super-fans and premium markets	✓	✓	✓
"Watch Together" Capability to allow groups to watch on same exact timeline regardless of their location or device	✓	✓	✓
Multi-camera integration that drives an interactive multi-view experience with constantly updated and tailored suggestions for viewers for easy navigation	✗	✓	✓
Seamless transition of the experience depending on environment: in-venue, standalone on the go or second screen in the home	✗	✓	✓
Second screen expansion that allows mobile devices to be synchronised to main program playing on a TV	✗	✓	✓
Replay compilations leveraging multiple camera feeds for an unparalleled fan experience	✗	✓	✓
Synchronised remote production tools to simplify acquisition and distribution of multiple camera feeds	✗	✓	✓
Custom integration of NativeWaves EXP features into existing app architecture via shared libraries and customised integration options	✗	✗	✓
Engineering support from NativeWaves for integration work	✗	✗	✓

Second Screen Sync Patent No: US 11,570,506



Benefits

At the highest level, NativeWaves EXP provides a platform that drives deeper fan and viewer engagement. Customisable viewing experiences for sports and non-sports applications, in-home and in-venue link the user to the main event. The result is lower churn, higher retention, increased ARPU or ad revenue.

Today's event coverage is still tied to the concept of relaying all the dimensions of a major event through a single screen.

NativeWaves EXP breaks this bottleneck and opens up any event to deliver an experience that truly values its fans and followers: additional camera feeds, new commentary tracks, data and information that helps the user follow the action. All orchestrated, synchronised and delivered to whichever screen is preferred.

Production Flow

NativeWaves EXP begins by ingesting all available camera feeds, audio, and data feeds into an event scheduling backend that is easily controlled through a web console enabling our customers to self-manage the creating and management of events. Feeds are inserted at the OB truck or at the broadcast/data centre. The optional NativeWaves AVCoder can intercept up to 12 HD or 4 UHD feeds (incl. embedded audio) per unit via SDI or SRT, Low-latency AVC or HEVC encoding incl. ABR ladder for optimised cloud distribution via any CDN with timeline management for synchronised delivery is available but can also be combined with external SRT or RTMP sources.

This is an open encoding platform that is performant while being very cost-effective using off-the-shelf hardware components. The encoder management stack can be applied to other hardware if preferred. Full control of this encoder simplifies timeline management of ancillary camera feeds for delivery to the user experience.

Use of our NativeWaves AVCoder is optional, but in most situations is the pragmatic choice for ease of integration including remote management capabilities for NativeWaves EXP Pro and Enterprise.

In addition, our platform includes the following functions:

- Content distribution using **low-latency-HTTPS live streaming** (LL-HLS⁵ with 2-3 seconds incl. CDN available today) including **multi-region failover**.
- Local on-prem live streaming for in-venue events delivers at **around 1 second of latency**.
- **Patented second-screen sync** including audio sample analysis **without need for watermarking** of main broadcast audio playing on the TV (available in NativeWaves EXP Pro and Enterprise).
- **Multi-view event production** component provides orchestration and timeline management of all available content (audio, video, data) via **NativeWaves EXP manifest file** that allows for **maximum flexibility** on the client side. For **data integration**, we are partnered with Stats Perform but can integrate other data sources.
- **Web console** will offer easy management of the platform using **REST APIs** to facilitate integration.

Operation of the console is intended to be low-maintenance and low-friction. For our platform, we take a cloud-native approach, leveraging existing services from major cloud service providers such as AWS and Azure to handle the scaling and availability requirements of professional broadcasting and streaming. However, deployment of certain services on other cloud services or dedicated on-premises deployments are possible.

⁵ <https://www.nativewaves.com/news/press-releases-and-articles/whats-the-delay-pushing-the-limits-of-ultra-low-latency-hls-streaming/>

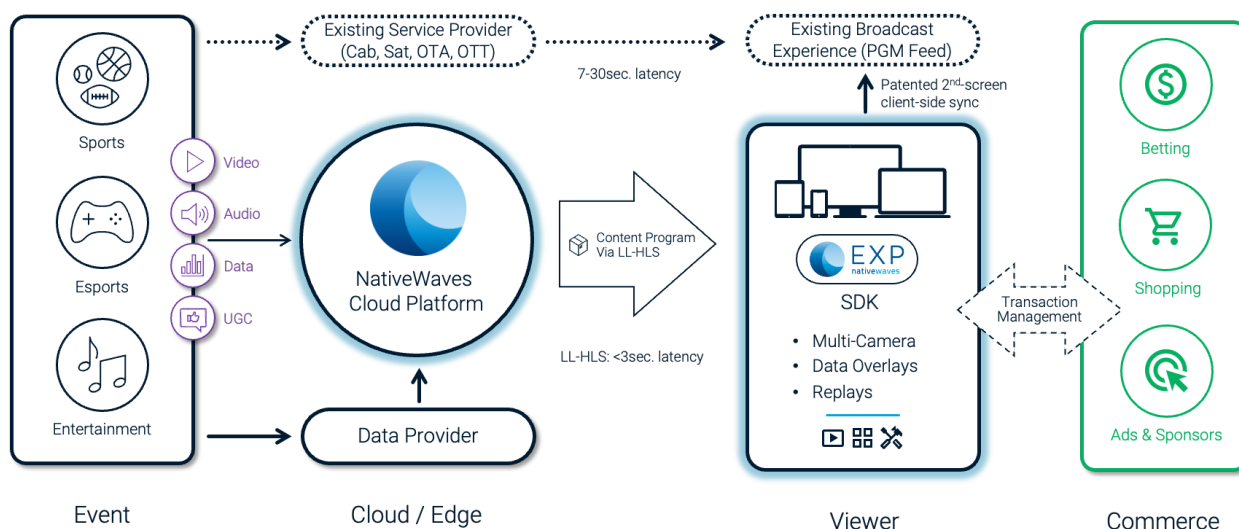
Delivery

To get the best experience, NativeWaves EXP Pro supports app integration via a customised mobile integration SDK (iframe for web), enabling client-specific bespoke look & feel and features. NativeWaves EXP Enterprise then adds the ability to fully customise and adopt the feature set into an existing app architecture for the most seamless fan engagement experience.

This is the maximum feature set leveraging our Dynamic UX:

- **Low-latency streaming:** 2-3 seconds to get rid of today's streaming lag of one minute or more
- Choice of **all available camera angles** either by user or **in-app recommendations** to dive deeper into the action
- Access to **events & highlights at any time**, regardless of whether watching live or **on-demand**
- **Personalised camera views** for easy user navigation
- Option to add **replay compilations created or enhanced by AI** from all involved camera angles incl. **user-adjustable slow-motion**
- **Resume live timeline** at any time
- Full support for **on-demand playback of full event** incl. same features as during live streaming
- Option for **customisable integration of user generated media feeds**, for example an influencer camera while maintaining time sync with main screen
- **Advanced monetisation opportunities** (banner ads, affiliate marketing)

All these features can be available for the standalone (mobile-only or mirrored to a larger display) use case as well as the multiscreen use case with the main TV displaying the linear broadcast feed while the connected mobile device synchronises itself to the TV via microphone and acts as second screen offering all of the above features and capabilities.



In the figure above, we describe a typical example of an event that is leveraging the NativeWaves Cloud platform to deliver a NativeWaves EXP Pro or Enterprise experience. The event production requires minor to no change. In general, a rich availability of various camera feeds including the traditional program feed as well as new types of camera feeds such as player cams, referee cams, spidercam®, fan cams from the venue, pre-show, post-show, etc. vastly enhances the resulting experience. All content is then encoded either via the NativeWaves low-latency AVCoder or third-party encoders on site or at the broadcast/data centre and sent to the NativeWaves Cloud where it is orchestrated and time-aligned for delivery via any major CDN to the final user experience.

User Experience

Here is where our Dynamic UX comes in to deliver an unparalleled user experience enabling deeper fan engagement. Users can take advantage of enriched data delivered by third-party data providers such as StatsPerform and augmented by NativeWaves, they can choose to have a standalone experience while on the go or a second screen experience when they have the main TV playing back the broadcast feed. Another key benefit includes on-demand replay compilations that show each event on the timeline from the most exciting camera angles, fully controllable by the user. All of this is enabled through a single production that can be used to cater to audiences in all these environments.



At the Venue: NativeWaves EXP at the live event venue will use 5G installation on-site to deliver an enhanced viewer experience to the fans' mobile devices with minimum latency. This enhanced experience can include delivery of multiple camera angles from the action, instant replays of key moments from the live action, providing live data, social media integration all done using the same broadcast production.

On-the-Go: This solution will enhance current streaming experiences for live events, especially live sports. Today, most streaming services simply show the same production that is used for the linear TV broadcast on their OTT platform. NativeWaves EXP will enhance this experience by offering the viewer the opportunity to select the camera angle, audio tracks, ability to watch instant replays from the key moments in the game, get live data at their fingertips, social media and e-commerce integration. NativeWaves EXP will deliver true personalisation possibilities to viewers.

At Home: In addition to all the features delivered "On-The-Go", NativeWaves EXP will deliver the perfect 2nd screen companion experience at home. Today, linear TV broadcast usually delivers the picture to the home in about 5-7 seconds while delivery via streaming services can take between 30-60 seconds or more to deliver the signal to a mobile device. This latency is the main reason why viewers often get notifications of a goal or other game events on Twitter or by hearing their neighbours cheer before they see it on their own device. NativeWaves EXP uses Ultra low Latency streaming to deliver the content from the venue to the viewers mobile device faster than the linear broadcast and then uses the broadcast audio to perfectly sync the different video feeds, audio signals, data feeds and all other features to the viewers TV allowing the viewers to watch the broadcast on the main TV while following a favourite player on the mobile device – spoiler-free and in perfect sync...

Conclusion

Audiences are looking for personalised content-centric experiences, therefore simply 'watching TV' or 'being there' is no longer good enough. These new experiences drive engagement which will ultimately strengthen subscriber retention and advertising growth.

NativeWaves EXP features can be seamlessly combined into a fan viewing experience offered by a team, a sports league, federation, broadcaster, or streaming service without modifications to the existing service. To get the best experience, dedicated app integration is facilitated through an SDK that integrates the NativeWaves EXP functionality with an existing look and feel. NativeWaves EXP is available now for easy integration into existing broadcast and OTT streaming ecosystems. The Basic option provides an effortless way to instantly offer a vastly improved fan engagement experience over today's streaming offerings. NativeWaves EXP expands the capabilities and offers incremental monetization opportunities for broadcasters, content rights holders and their affiliates to maximize the experience for users while offering economic benefits. With the Basic and Pro options, the streaming experience can begin within a week for a web-based implementation.

Next Steps

More Information

For more information, video demonstrations and updates on where to experience NativeWaves EXP first hand, please go to nativewaves.com/exp

About Us

NativeWaves provides its partners with a platform that drives deeper fan and viewer engagement through customisable viewing experiences for sports and non-sports applications. It enhances the viewing experience by delivering multiple streams of audio, video and data to the mobile device enabling an immersive first and second screen experience.

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