Analyzing Watch Party Feature In Aviation With Case Study

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Abstract

Over the years, In-Flight Entertainment (IFE), a crucial part of airlines, has evolved from simple overhead monitors with speakers showing the same content for all the passengers to complex personalized content delivered to the seats of each passenger. One such recent development is the watch party feature, which gained traction worldwide during COVID-19. As airlines look to adapt to this technology in aircraft, allowing multiple passengers to stream and watch video content together, we look at the technology stack behind it and take a use case to look at the features, challenges, and future of this feature in aviation. The paper also looks at the Jetblue implementation of the feature in its In-Flight Entertainment (IFE) and discusses challenges, potential directions for innovation, collaboration, and future.

Keywords: Watch Party, Adaptive Bitrate, Webrtc, HLS, MPEG-DASH, Latency, Synchronization, Edge Computing

I. INTRODUCTION

One crucial component for the aviation industry and airlines is In-Flight Entertainment (IFE). This has grown from basic movie screenings on overhead projectors to cutting-edge personalized streaming systems that provide an array of on-demand media to individual seats across the aircraft. As passenger expectations for in-flight amenities rise, airlines have begun offering more interactive and socially engaging experiences, with the watch party feature emerging as one of the most notable advancements.

A watch party allows multiple passengers to synchronize video playback on their devices, enabling shared viewing experiences across an entire aircraft. Long-haul flights can often feel isolating, but the introduction of Watch Parties will allow passengers to connect while enjoying movies, TV shows, or documentaries together. JetBlue is leading the charge by integrating this feature into its in-flight entertainment system.

The following sections will explore the technology stack that powers Watch Parties, delving into how it differs from traditional live TV systems. We will also examine the challenges in implementing this feature and how JetBlue has embraced and fine-tuned it. Additionally, we will propose solutions to overcome the challenges that aviation might face when adopting this feature. This will also examine how the watch party can evolve with newer technologies adopted in the aviation industry.

II. EVOLUTION OF IN-FLIGHT ENTERTAINMENT (IFE)

In-Flight Entertainment (IFE) has undergone a radical transformation since its inception. In the early days of aviation, the concept of entertainment during flights was non-existent. In the early days of air travel, passengers had to endure long flights without any distractions. However, as commercial aviation grew,

airlines began to realize that offering entertainment services could enhance the passenger experience, making long journeys more enjoyable and less stressful. This would, in turn, drive the number of passengers selecting a particular aircraft over others not offering such services.

1. Early Developments: Audio and Video Systems

The first significant milestone in in-flight entertainment came in the 1960s when airlines introduced audio systems that allowed passengers to listen to music during their flight. Limited selection and sound quality aside, this marked the beginning of in-flight entertainment.

In the 1970s, video entertainment began appearing on commercial flights, with large overhead screens showing movies and announcements, mostly on long-haul routes. Passengers had no control over the content scheduled by the airline. The basic systems introduced the concept of watching movies together with other passengers, like a movie theatre experience but in the sky. Passengers could relate to this experience as it tried to mimic the theatre-going experience.

2. Personal Screens and On-Demand Content

The real game-changer occurred in the 1990s with the hairline's position on personal seatback screens. This meant passengers did not have to watch the same content the airline showed over the same main screen. Now, they could choose movies, TV shows, and video games that they liked directly on personal seatback monitors. This offered greater personalization, control, and variety to passengers. The 2000s also introduced in-flight Wi-Fi, which transformed the streaming experience.

As the 2000s progressed, the introduction of in-flight Wi-Fi and the rise of streaming services completely transformed the in-flight entertainment experience. By 2010, accessing social media and keeping in touch with family and friends using in-flight Wi-Fi became commonplace. In recent years, it has also been possible to download content on personal devices and watch these streaming apps during flights.

3. Interactive and Social Features in Modern IFE

As airlines increasingly adopted high-speed Wi-Fi and robust in-flight connectivity, the ability to deliver interactive and socially engaging experiences became possible. Passengers were no longer passive viewers; they could participate in social features such as live chatting, multiplayer games, and, more recently, Watch Parties. The ability to watch the same content together—no matter where passengers are seated—has significantly enhanced the social aspect of in-flight entertainment.

III. WHAT IS A WATCH PARTY?

A watch party is a shared viewing experience that allows multiple users to stream the same content simultaneously. Initially popularized by streaming platforms, this concept has been adapted for the aviation industry. On a plane, passengers can join a connected "virtual room" to synchronize their playback, watch movies or shows together, and even interact with each other through chat or voice messages, creating a more social and connected in-flight experience.

1. Social Connectivity During Flights

The social aspect of watch party technology is transformative for in-flight entertainment. Traditionally, passengers on long-haul flights often feel isolated, with little to do but watch content individually on their

seatback monitors. Watch Parties solves this issue by providing a shared, communal experience where passengers can comment on scenes, share reactions, or even play games together. This shared experience can significantly improve the passenger experience, especially during long flights or when traveling on flights with friends and family.

2. Key Features of Watch Party

- Synchronized Playback: The most crucial feature of a watch party is the ability to sync content across devices, ensuring that all participants are watching the same content simultaneously, regardless of their location

- Real-Time Chat and Interaction: In addition to synchronized playback, consumers can communicate through chat or voice messages. This provides interaction that distinguishes Watch Parties from more traditional viewing experiences.

- Content Selection: The system must allow passengers to choose from a catalog of content that supports watch party functionality. This can include movies, TV shows, and other pre-selected or recommended media based on the consumer's preferences.

3. The Technology Stack Behind Watch Party

The watch party technology stack involves multiple components to ensure a seamless user experience. These include adaptive streaming protocols and cloud synchronization servers.

- Adaptive Streaming Protocols

The watch party technology stack relies on adaptive streaming protocols to ensure smooth, uninterrupted playback for users. These protocols manage how video content is delivered to users, adjusting in real-time to network conditions.

  o HLS (HTTP Live Streaming): HLS breaks the content into small, manageable chunks and then delivers it to the device based on available bandwidth. It allows for adaptive bitrate streaming, meaning the quality of the video adjusts dynamically based on the strength of the Wi-Fi connection [3].

  o MPEG-DASH (Dynamic Adaptive Streaming over HTTP): This protocol is similar to HLS but is an open-source alternative. Like HLS, it adjusts the video stream's quality based on the available bandwidth to ensure smooth playback [2].

- Cloud Synchronization

A centralized server or cloud system synchronizes video playback to keep all passengers watching the same content simultaneously. This system is responsible for:

  o Time synchronization: Keeping all devices synchronized to the same playback point ensures that no device is out of sync [6].

    o   Latency Management: Addressing issues that arise from varying network speeds by compensating for delays in the system.

- Real-Time Communication

Watch party technology also includes real-time communication features, enabling passengers to chat or interact with each other through voice messages. This is made possible by protocols such as:

    o   WebRTC (Web Real-Time Communication): This open-source technology supports peer-to-peer communication, allowing consumers to chat via voice or video without additional software or plugins [5].

- Edge Computing

In aviation, one of the challenges with streaming content is the latency caused by satellite-based communication. Edge computing helps address this by processing data closer to the user (on the plane) rather than relying entirely on remote cloud servers. This reduces the time it takes for data to travel to and from the aircraft, helping to minimize buffering and improve synchronization.

4. How Watch Party Differs from Live TV Technology Stack

Although both watch party and live TV rely on video streaming, the technology behind them is fundamentally different. Live TV broadcasting operates on a different scale and uses a different set of protocols, particularly when it comes to delivering live content to large audiences. Below is a comparison between the two systems highlighted in table 1.

Feature	Watch Party	Live TV
Content Delivery	Streaming via HLS or MPEG-DASH	Broadcast signal
Synchronization	Synchronization across devices	Real time synchronization
Interactivity	Chat, comments and reactions	Viewing only
Latency	Low latency through adaptive protocols and edge computing	High latency in broadcast
Bandwidth and Scalability	Adaptive bitrate streaming for limited bandwidth usage	Static bitrate based on broadcast signal strength
Content	On-demand selection of movies and shows	Scheduled limited options

Table 1: Comparison of watch party and live tv

ɪᴠ.JetBlue Case Study: Implementing Watch Party Technology

JetBlue, known for its commitment to enhancing the passenger experience, has taken a significant step forward in transforming in-flight entertainment by integrating the watch party feature into its IFE (In-Flight Entertainment) system. This feature allows passengers to connect and enjoy synchronized movie and TV show viewing, creating a shared, social experience while flying.

1. Introduction of Watch Party by JetBlue

By leveraging the airline's in-flight network and adaptive streaming technology, passengers can join a virtual room via their seatback screen or personal device, synchronize their content, and interact with each other using text chat or voice messages.

The feature is part of JetBlue's Blueprint initiative, which aims to enhance the in-flight experience by providing passengers with more entertainment choices and improved connectivity [6]. By integrating social viewing into its entertainment offerings, JetBlue is taking in-flight entertainment to the next level, making long flights less isolating and more engaging. Currently, this feature is restricted to sharing with five companions [1].

2. Challenges Faced by JetBlue

While JetBlue has successfully rolled out the watchparty feature, it faces several challenges in ensuring the system operates smoothly:

- Bandwidth Limitations: As with many in-flight services, network bandwidth is limited. Streaming video content for multiple passengers simultaneously can strain the available bandwidth, especially on longer flights. To address this, JetBlue must use efficient adaptive bitrate streaming to adjust video quality based on the available connection speed, ensuring smooth playback even in less optimal network conditions.

- Latency and Synchronization: One of the most significant challenges in providing a watch party experience is ensuring that all participant content stays synchronized. In an environment where network speed and performance fluctuate, latency can cause delays, disrupting the shared viewing experience. JetBlue could be using multiple redundant server-based synchronization, which allows the system to keep video and audio streams aligned in real time despite any minor delays in data transmission.

- User Behavior and Engagement: Many passengers are accustomed to personal, individual entertainment experiences, and introducing a social component like a watch party may take some time for passengers to embrace fully. Some passengers may be hesitant to use the feature due to unfamiliarity or a lack of interest in social viewing. To encourage adoption, tutorials and user guides can be included to help passengers understand how to join and interact in Watch Parties. Additionally, the airline can explore ways to personalize content recommendations for the whole group, which could increase engagement.

3. Impact and Future of Watch Parties at JetBlue

JetBlue's implementation of watchparties feature has opened up new possibilities for in-flight social interaction. Sharing an entertainment experience with others during long flights can make travel feel less isolating and enhance the overall passenger experience. Looking forward, the airline plans to expand on this feature, refining the technology behind it and exploring additional ways to integrate social engagement into its IFE system.

As technology continues to evolve, the potential of 5G connectivity and edge computing could enhance the quality and speed of in-flight streaming, reducing latency and improving bandwidth management. Looking ahead, AI-driven content personalization and immersive entertainment options, like AR/VR experiences, could take the watch party feature to the next level, making it even more interactive and engaging. These advancements would offer passengers greater flexibility, allowing them to enjoy a customized and dynamic in-flight entertainment experience.

In conclusion, JetBlue's introduction of Watch Parties into its in-flight entertainment system showcases how airlines adapt to meet passengers' evolving needs. By harnessing technology to create a more social, connected, and personalized experience, JetBlue is setting a new benchmark in the industry, helping make long-haul flights more enjoyable and less isolating for passengers.Nevertheless, there are still several challenges to address in the feature, including dynamic community building, media synchronization (sync), Quality of Service/Experience (QoS/E), scalability, presence awareness, privacy concerns, and the integration of social networking elements.

V. Conclusion

Watch party technology in aviation has the potential to revolutionize in-flight entertainment. While challenges like bandwidth limitations, latency, and user behavior exist, technological advancements are helping airlines like JetBlue overcome these obstacles. The future of in-flight social viewing looks bright, with the integration of 5G, AI, and immersive experiences poised to enhance the passenger experience. By investing in these technologies and addressing the challenges, airlines can continue improving passengers' engagement with in-flight entertainment.

VI. References

1. PCMag. (2024). JetBlue Adds watch party Feature Price, E. (2024, April 25). *JetBlue Adds 'Watch Party' Feature to In-Flight Entertainment System*. Https://www.Pcmag.com. https://www.pcmag.com/news/jetblue-adds-watch-party-feature-to-in-flight-entertainment-system

2. S. Lee, H. Roh and N. Lee, "Enhanced quality adaptation scheme for improving QoE of MPEG DASH," *2017 International Conference on Information and Communication Technology Convergence (ICTC)*, Jeju, Korea (South), 2017, pp. 357-362, doi: 10.1109/ICTC.2017.8191002. keywords: {Hafnium; DASH;QoE;VBR;HTTP 2.0;adaptive streaming},Zhang, H., & Lin, L. Passengers' Adaptive Streaming Techniques for Video Over Wireless Networks. *IEEE Transactions on Broadcasting, 66*(2), 328-340.

3. Yang, S., & Zhang, X. (2019). Synchronization Algorithms for Multi-device Streaming in Mobile Applications. *IEEE Access, 7*, 103122-103130.

4. B. Sredojev, D. Samardzija and D. Posarac, "WebRTC technology overview and signaling solution design and implementation," *2015 38th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)*, Opatija, Croatia, 2015, pp. 1006-1009,doi:10.1109/MIPRO.2015.7160422. keywords: {WebRTC; Servers; Media; Peer-to-peer computing; Ice; Protocols; Browsers},

5. T. Beke, E. Dijk, T. Ozcelebi and R. Verhoeven, "Time Synchronization in IoT Mesh Networks," *2020 International Symposium on Networks, Computers and Communications (ISNCC)*, Montreal, QC, Canada, 2020, pp. 1-8, doi: 10.1109/ISNCC49221.2020.9297296. keywords:{Synchronization; Protocols; Servers; Internet of Things; Clocks; Mesh networks; Delays; Clock synchronization; Internet of Things; time synchronization protocol; wireless mesh networks; SNTP},

6. (2024, April 24). *JetBlue Elevates Seamless Living in the Sky with Blueprint by JetBlue™: A Personalized Inflight Experience*. Https://News.Jetblue.com/Overview/Default.Aspx. https://news.jetblue.com/latest-news/press-release-details/2024/JetBlue-Elevates-Seamless-Living-in-the-Sky-with-Blueprint-by-JetBlue-A-Personalized-Inflight-Experience/default.aspx