

Arena Defender

Red Bull MR Game

01 Task

A Brand Experience for an entire Stadium

Red Bull gave us the task of developing a concept for an immersive experience in their brand-new stadium “SAP Garden,” which should use state-of-the-art technology and allow every one of the 10,000 fans in the stadium to participate. In particular, the following points were to be considered:

- Every participating fan should have a chance to win loyalty points.
- There should be a possibility to give away main prizes to some fans.
- The game must be accessible to all age groups and require minimal explanation.
- The total gameplay duration, including explanation, had to be 5 minutes due to the short third breaks.
- The game concept had to be unique, engaging, while also impressing fans technologically.



02 Idea

Basic Idea

The idea of the game is as follows::

The entire arena competes against four players on the ice, who wear Mixed Reality (MR) headsets. To achieve this, all fans in the audience can use the Red Bulls app to configure balls of different shapes and colors, which the four players on the ice must defend. The players use virtual shields in their hands to block the balls. The defense mechanism is highly intuitive and requires full-body movement.

At the center of the stadium, there is a large portal on the ice, into which the balls fly if they are not blocked, thus generating points for the fans in the audience, essentially, the arena. For every blocked ball, the Defender players on the ice earn points. This is why the game is called "Arena Defender".

Apart from the central portal where the balls enter, there are four additional moving portals in the air around the stadium, which are seen through the MR headsets. Balls come out of these portals and fly toward the players, ensuring that they stay active throughout the game. A further challenge comes from lasers, which can be triggered by the moderator. These lasers move towards the players, forcing them to dodge.

To keep the game fair, all balls created by the audience must first pass through a virtual pinball-style "Pachinko" board. The ball must land in one of nine goal slots to appear on the ice. If it misses, the ball does not get thrown at the Defenders.



An Arcade Pachinko machine

02 Idea

First Concept

- It quickly became clear that the Meta Quest 3 Mixed Reality headset was the perfect technology for this game. It allows players to engage in an interactive experience without disconnecting from the real-world stadium environment.
- To include all 10,000 fans, an easy and intuitive method of participation was necessary. Since the Red Bulls app was already in development and the stadium had ice projection technology, it was important to find interactive features that worked with existing infrastructure while providing real value.
- By allowing fans to design their own balls, choosing shape, color, and texture, a personal emotional connection is created between the fan and their ball. This also keeps fans engaged with the playing field, as their ball is visible and has the potential to win them rewards.
- The integration of loyalty points, Red Bull's own gamification system for stadium visits, not only strengthens the bond between the participants and the brand and stadium but also motivates them to continue collecting points after the game and redeem them later.



02 Idea

Game Flow

- As soon as the countdown starts, all fans will have the opportunity to configure their balls in the Red Bulls app.
- After each run, you return to this point and can either configure a new ball or throw the previous ball again.

- If too many players press "Roll Ball" at the same time, the balls are temporarily stored in a queue and a countdown is displayed until the ball appears

- The balls thrown pass through the pachinko board and have the option of either winning points/prizes, and thus progressing or missing and thus being reset.
- Pachinko is based on real physical principles and is therefore completely random.

- The winnings are immediately displayed in the app as soon as the configured ball has passed through the board. The message that the ball is now on the ice also appears.

- The balls are thrown randomly from one of four moving portals towards the players on the ice.
- The balls can be seen through the MR glasses as well as through the projection on the ice surface.

- As soon as the countdown is over, a summary of the loyalty points or prizes achieved is displayed in the app.
- In the MR glasses, the players see their personal score based on the balls they have defended against.

- Prizes and points are now distributed to all players via the AWS server. Points are automatically credited and displayed via in-app notification. Prizes are sent to the respective end device via push notification and can be redeemed immediately in the fan store.

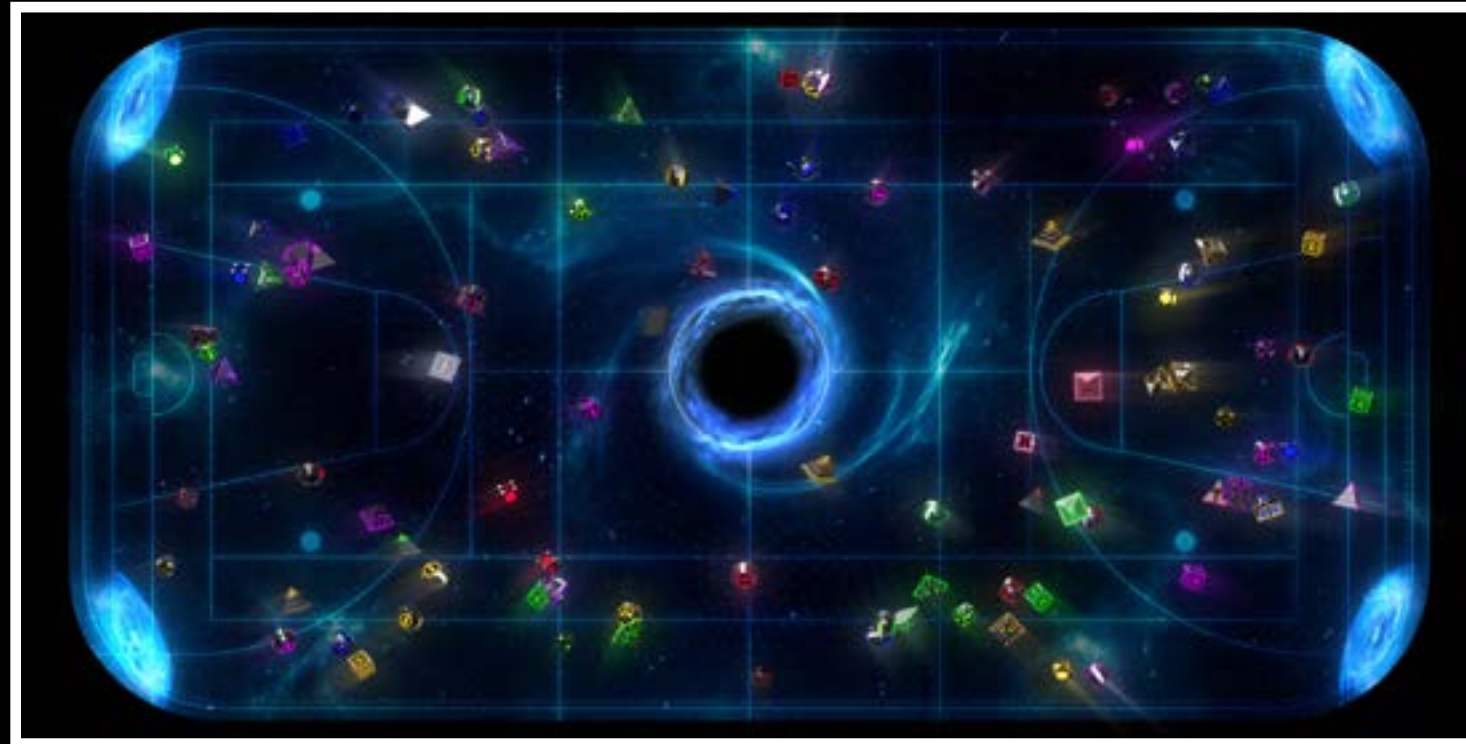


02 Idea

Concept Graphics



First concept of the Pachinko board, still quite overloaded.



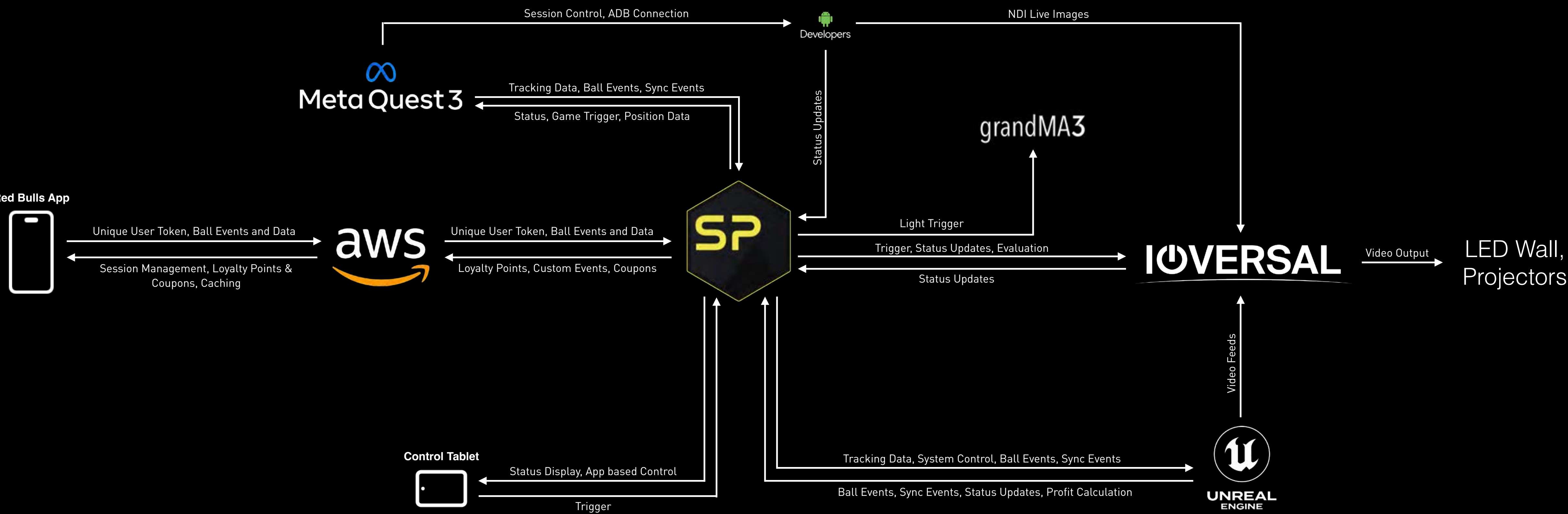
Visualization of the floor projection



The MR View with the two defense shields

03 Technical Details

System overview



03 Technical Details

Technical Equipment

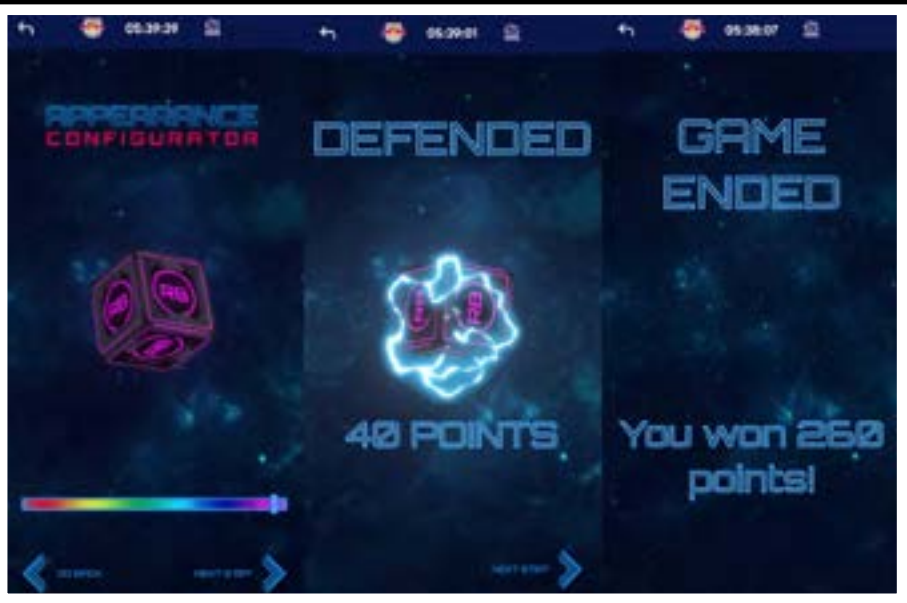
- **SP from Stage Precision** serves as the central control unit, connecting various elements such as lighting and video, as well as all data-driven connections between AWS, the Meta Quest 3 headsets, and the Unreal Engine instances. Through the integrated web server and a custom-designed control interface, the game can be started and stopped, all necessary information can be displayed at a glance, and various actions can be activated or deactivated.
- **Unreal Engine from Epic Games** is used as the game platform for various aspects of Arena Defender. It is used to accurately simulate in real time the path of user-generated balls through an obstacle course similar to an arcade Pachinko machine, as well as to determine which ball can win loyalty points or a grand prize depending on the goal it hits. Additionally, Unreal Engine synchronizes the four Mixed Reality headsets and the floor projection to launch these "winning balls" towards the four players on the ice, where they must be blocked using the Mixed Reality headset.
- **Amazon Web Services AWS** is the server platform where the custom-developed web application runs, allowing stadium visitors to configure their balls and participate in the game. The AWS backend also ensures the distribution of loyalty points and coupons through the API interface of the Red Bulls app at the end of the game. In addition to essential features such as automatic load balancing, which enables up to 10,000 visitors to play simultaneously, AWS also manages a queue system that temporarily stores the balls and releases them only when there is enough space on the Pachinko board.



SP app based control interface



Pachinko board, which is displayed next to the MR live images on the video cube

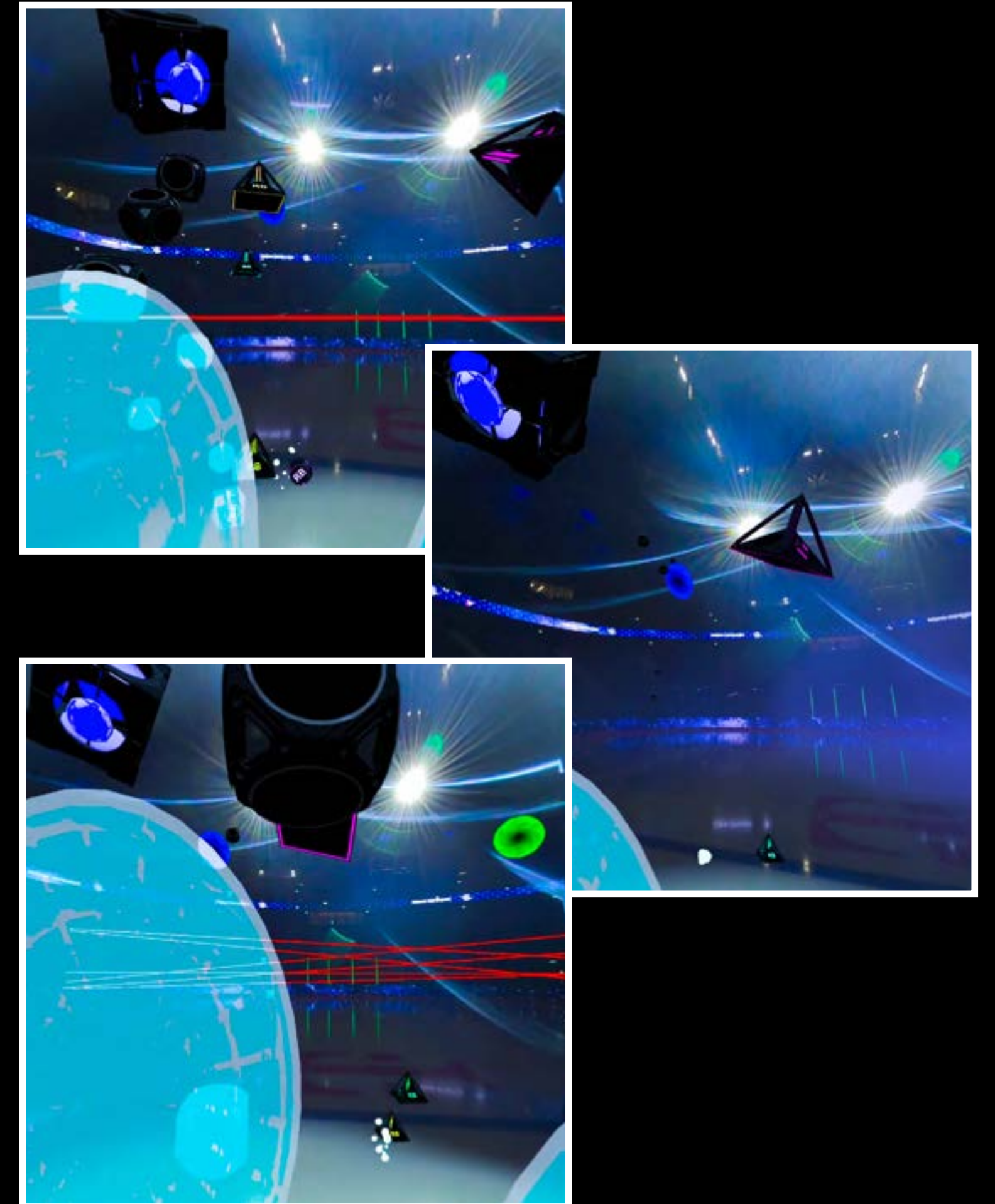


Various front-end statuses from the AWS integration in the Red Bulls app

03 Technical Details

Technical Equipment

- **Meta Quest 3 Mixed Reality headsets from Meta** serve as the immersive game controllers used by the four players on the ice as they attempt to protect the portal in the center of the ice surface from incoming balls using virtual shields in their hands. In addition to the user-generated balls, lasers frequently move toward the four players, requiring them to dodge. The headsets track which balls have been blocked or have entered the portal and send this data back to SP. As soon as the players put on the headsets, they automatically configure themselves and position themselves on the ice surface.
- **Vertex Mediaserver from Ioversal** function as the stadium's central playback engine, playing various video assets such as intros and show content, as well as real-time generated Unreal video feeds on LED walls and ice projections. Due to the flexibility of the Vertex system, the graphics can not only be easily adjusted but can also display scoreboards that are continuously updated from a real-time database.
- **GradMA 3 from MA Lighting** receives sACN commands from SP and immerses the entire stadium in an appropriate lighting atmosphere. The combination of LED effects, projections, and lighting transforms the game into an engaging experience for the entire stadium.



Impressions from the Mixed Reality view of the four players on the ice

04 Realization

First use in SAP Garden



04 Realization

First use in SAP Garden

Around 30%
participation at
the first event
(approx. 6000
stadium visitors)

Over 100 prizes
paid out

1000 balls
launched
onto the ice

Thank you!
