

A HTML5 game developed
with Scalar Vector Graphics



Executive Summary

Developing a game which can be played in the browser as well as on mobile devices, including iPhone and iPad, was the basic reason why the client for this project came to Mindfire Solutions. The intent was clear – develop a multi-player scalable game which is easily accessible, which renders correctly in all devices, which is stable enough to accommodate thousands of people playing it online and which is fast to keep the players engaged. Rich graphics, rich sound which can lead the player to a state of trance as he played the game and for sure, addictive to the core. This is exactly what Mindfire created and delivered to the client. Mindfire used Socket based programming in HTML5 and developed the game. This case study illustrates use of Scalar Vector Graphics (SVG) and HTML5 with a node.js backend to create the game.

Business Situation

The primary goal of the client was to create a multiplayer board game where players could choose their car and number of laps and race on the track. Players would roll dice and the number outcome of the dice throw would move their cars that many steps forward/backward as per the player's choice. Each step/box would have rules which would be generated dynamically at random from the array of rules. The client was concerned about the performance of game and also needed something which would have attractive graphics.

The requirement from the client's end was to find an able outsourcing company, who would be able to understand his core requirements, his idea of the game, match the objectives and create something which would be in sync with his concept.

The game needed a race track and there had to be a provision for the player to pick his car. The number of players in the game who can play together needed to be limited to 6 in one group, while there could be ideally speaking unlimited number of groups which could play the game at the same time. There needed to be an option for virtual players so that at least two people could play the game.

The player can start the game by rolling the dice and the number on the dice then reflects the number of places the car can move to. And based on the position of the car on the track boxes, rules would pop up automatically and be applied to the car. Accordingly, the car moved up, down, skipped three chances of throwing the dice etc. It was a huge list of rules which needed to be applied as the car moved and stopped at a block on the path. And the game would proceed till there was a winner.



About our Client

Client Game Design
Location California US
Industry Gaming



Online Game for Entertainment Industry

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Solution Details: The Mindfire Solution

Mindfire designed and developed an HTML5 browser based multi-player board game which could be played in all devices alike.

The team started analyzing the requirements in detail. For the purpose of the case study, the entire rule book which led to the business rules of the game is not being discussed here respecting the confidentiality of the game and honoring the intellectual property rights, has not been discussed here. However, some of the rules have been explained.

First, the basic requirement was to have a simplistic and engaging user interface where we needed to simulate the real world scenario with choosing the car, a virtual player, creating a group of players to play in multi-player mode and the dice roll. Even the movement of the car needed to be simulated to move around a curved track based on the number rolled on the dice. We also needed to consider data size and database design to capture the large volume of players who would be playing simultaneously and the need for scaling and data redundancy.

The technology which Mindfire drilled down on was HTML5. The sole reason was to give a Flash like finish while still being able to play the game on iPhone and iPad. The database chosen was **MongoDB**, which is a noSQL database. Node.js and Websockets were used to make the data exchange between the players seamless. and stopped at a block on the path. And the game would proceed till there was a winner.

Canvas and Scalar Vector Graphics were used to trace the path and map the pixels for the boxes for the car movement.

Technologies

HTML5, Javascript, SVG, node.js, mongoDB, AWS, EC2, S3, Cloudfront, SVN

Final Results Software System



Portion of the Path where the car moves

The Mindfire team started work with the canvas tag first, mapping the pixels of the boxes which together comprised the path. Scalar Vector Graphics were used to trace the path where the cars would race. Coordinates of each of the boxes were stored in the database as attributes of the box for message ordering. Since simple HTML could not have drawn polygons, HTML5 was used to create that Smooth Angle movement in the corner areas of the path, along the curves of the race track. This made the car movement natural along the traced path trajectory.

The application was implemented to support 10 virtual players which the real-player can choose from to play with. A maximum of six players could be invited to play as one group. This six player group could have any mix of real and virtual players. The image above shows a portion of the path. The path comprises of a large number of boxes as these. Each box had its own rules which would dynamically select a rule from set of underlying rules. In addition, each box also had a set of underlying cards and cards have more rules.

So for example, after rolling the dice, player-1 stops at Box-3. And Box-3 has 10 underlying rules and 7 underlying cards. And dynamically card-6 for the Box-3 was selected by the application, then whatever rule would be present on the card, would be applied to the car and the car would accordingly move forward or backwards and implement



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Future Relationship

The client was pleased with Mindfire's effort and reckoned that they were happy to have discovered a professional offshore IT unit. We shall continue to be the service provider for the next versions of the client's product. They have not only allocated the support and maintenance work of the current system to Mindfire but have also chosen us for subsequent ongoing work on the face book version of the game.



ALEXANDER THE GREAT



The king of clubs is thought to be based on Alexander the Great. He's the most successful military commander of all time, going undefeated in hundreds of battles. He challenges you to a battle! Bad news... you can't win. Go backward 12 spaces .

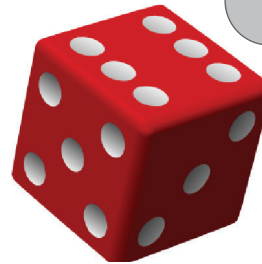
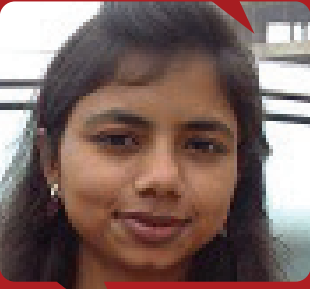
Sample Card with the Rule

The entire path had about 70+ boxes, which stored over 400+ rules and cards. The challenge was to retrieve all this from the database, quickly and then doing the calculations and storing the dynamic rules for the players before passing on the dice to the next player within the group. We had to design storage structures for each player in the group. The database design had to take into consideration load time and had to be robust and very fast.

We decided to go in with Mongo DB, a popular noSQL database. The name comes from the word "Humongous" (huge & tremendous). It is an open-source, document-oriented database system which allowed us to easily store entire result sets and state for each player and then game???? at any given time.

Data in MongoDB is stored in JSON-like documents with dynamic schemas, indexing and query language support providing flexibility during the development process. It is derived from the JavaScript scripting language for representing simple data structures and associative arrays. MongoDB provides greater agility and scalability for many applications by eliminating joins and relational modeling. That is the basic reason why Mindfire chose this database for this application development.

We leveraged on Amazon EC2 replication for dynamic scaling and used Amazon S3 to host all the static content for the application (all HTML/JS/CSS and Media).



Development Team

About us

Mindfire Solutions is amongst the leading providers of Software & IT services encompassing development and delivery of complex projects for enhancing business growth of its customers.

Mindfire has added value to more than 200 clients in US, Europe, Africa, Australia and Asia in the 12 years of its operations. The company has over 650 people, spread across 3 Advanced Development Centers (ADCs) in India which are equipped with ultra-modern facilities, and where Mindfireans strive round the clock to delight the customer.