3D Meister Planner: The simplest floor planner worldwide

Ivan Moreno
ivan@plus360degrees.com
Plus 360 Degrees GmbH
Berlin, Berlin, Germany

Delia Otetea
delia@plus360degrees.com
Plus 360 Degrees GmbH
Berlin, Berlin, Germany

ABSTRACT

3D Meister Planner is the simplest real time floor planner worldwide. It is a Progressive Web App in which users are able to define and customize their room in 2D and 3D. Users can position and select which elements are present and choose from the catalogue of products that the client offers, including wall and floor designs. Objects can be visualized independently using the 3D Product Viewer, and in the room using the 3D Room Viewer. 3D meister Planner is based on WebGL API which allows fast real time hardware accelerated computer graphics on mobile devices and home computers.

CCS CONCEPTS

• **Computing methodologies** → *Physical simulation*; **Rasterization**.

KEYWORDS

realtime, rasterization, visualization, floor plan

ACM Reference Format:
Ivan Moreno and Delia Otetea. 2021. 3D Meister Planner: The simplest floor planner worldwide. In *Special Interest Group on Computer Graphics and Interactive Techniques Conference Appy Hour (SIGGRAPH '21 Appy Hour), August 09-13, 2021.* ACM, New York, NY, USA, 2 pages. https://doi.org/10.1145/3450415.3464405

1 INTRODUCTION

3D Meister Planner is the simplest real time floor planner worldwide. Easy to use, with an intuitive interface, it allows users to start planning all their rooms from any device. The users are able to define their room in 2D, position and select which elements are present and choose from the catalogue of products that the client offers, including wall and floor designs. It is able to integrate entire catalogues of products and create a quote at the end of each customization. The software can be used on the website of the clients as a Progressive Web Application, or directly in showrooms as a Stand Alone Application.

2 ACCESSIBILITY

We have built the application using modern Web technologies making the user's accessibility a priority for us. By using browser modern development standards we give the user automatic access without the need of installing any plugin or application in their mobile devices. Users can access the app with any modern device using any modern browser.

3 APP USAGE AND USE CASE SCENARIO

The application has been developed after seeing a market opportunity in the construction industry. The fact that users have access to smartphones at all time and after careful analysis of what currently exists on the market, has made us develop the application being fully focused on user experience and fast decision making process. Therefore the application is structured in a way that allows end users to create and customize a room in a matter of minutes without a long and deep learning curve. As 3D experiences are more and more introduced to the end consumer, 3D Meister Planner brings to the market a better and faster way to create and visualize beautiful spaces.

The application consists of five steps. First the user can choose which room she wants to customize. In the current state, there are five rooms available: living room, bedroom, kitchen, bathroom and children's room. After selecting the room type, the next step is to select the room shape. The application has pre-designed room shapes: rectangle, L shape, pentagonal, cross, T shape and C shape. In the next step the user can start to define the room size based on real measurements. The walls can be dragged and corners too, giving full freedom to create almost any room shape and size. After this step the user can choose which objects are in the room. By default we add a number of objects, which the user can remove if needed from the room. In the next step the application takes the user to the 3D view. Here they are able to customize the materials for the walls and floor, as well as all the other objects. Full catalogues of products from wholesalers or manufacturers can be integrated with the application. After selecting all products, the user can finish the customization by downloading a PDF of the final screens, together with a list of products included in the configuration.

4 TECHNICAL CONTEXT

3D Meister Planner is fully developed on WebGL. WebGL is a Javascript API (Application Programming Interface) based on OpenGL ES 2.0/3.0 that allows developers to have Hardware Accelerated computer graphics and computations on a Web browser directly in the GPU (Graphics Processing Unit). Over the last decade the specification has been in constant development and improvements, currently in stable version 2.0 (OpenGL ES 3.0). Running a highly computational and visually enriched software is now accessible due to the capabilities exposed of parallel computing. Using Web technical content distribution features as occasional accessibility, instant content reach without third party authentication, or no installation requirements, allow us to introduce friction-less user experiences. 3D Meister Planner is being thought to take advantage

SIGGRAPH '21 Appy Hour, August 09-13, 2021, Virtual Event, USA

ACM ISBN 978-1-4503-8358-5/21/08.
https://doi.org/10.1145/3450415.3464405

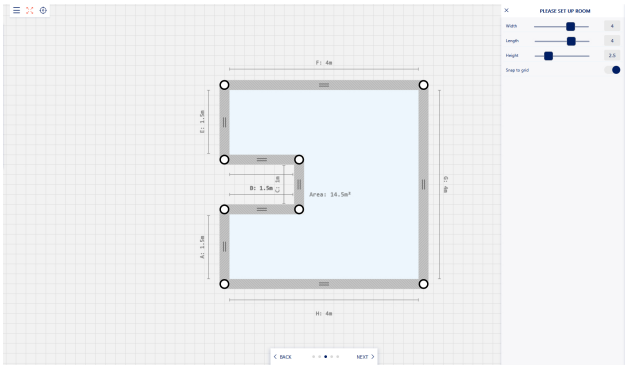

Figure 1: 2D room plan - 3D Meister Planner

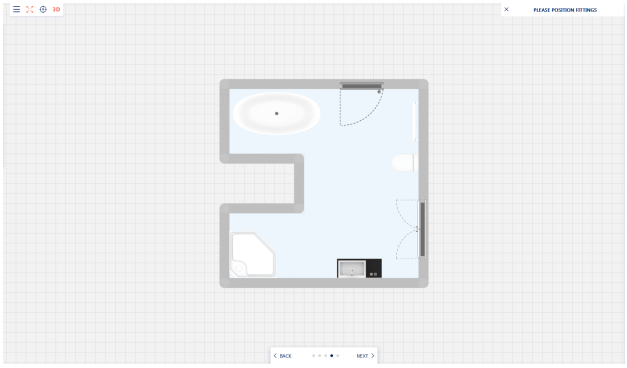

Figure 2: 2D room plan - 3D Meister Planner

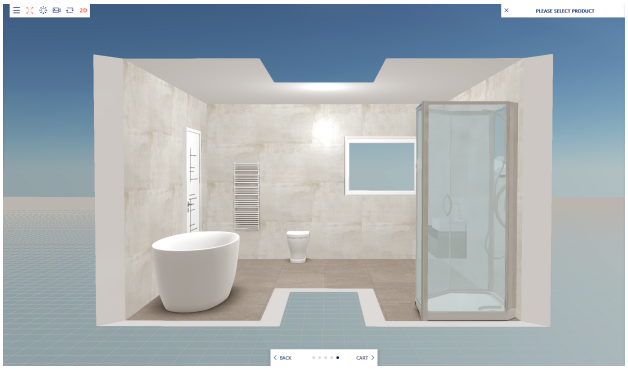

Figure 3: 2D room plan - 3D Meister Planner

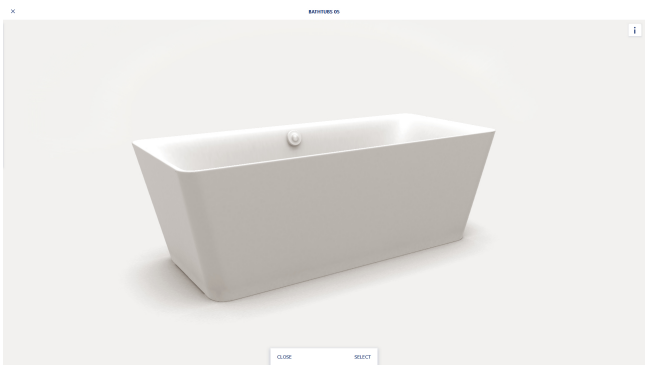

Figure 4: 3D room plan - 3D Meister Planner

of all these technical capabilities to improve the user satisfaction and productivity and reduce costs in the construction industry.

5 TECHNICAL SPECIFICATIONS

The basic layer in use is HTML5 and WebGL to compute the planning of the room in 2D (Fig. 1, 2), the 3D rendering of the room (Fig. 3), and the 3D viewer (Fig. 4). We developed our own computational framework for the 2D planning based on Blueprint.js and the basic physics related to the customization of the rooms is custom developed, how the fittings behave within the room planning module, and when the fittings behave within the room limits. These physics calculations are done in the CPU at the moment, with plans to migrate them to a GPU compute shader with a depth texture in the future. For the floor planner 2D and the 3D rendering we use Three.js engine with some added custom shaders to enhance visual improvements.

The server side is created with Node.js, Webpack and Python scripts to scan the data bases and their organization. The communications API from the server to client and vice versa is done with standard JSON format or can be accessed via GraphQL. For the interface we developed our own UI components in Javascript using SCSS to maximize control, gain performance and integration with other external API's.

6 CONCLUSION

Simplifying complex planning and visualization tools on a Web browser is achievable. The level of detail and performance can differ between hardware specifications, but configurations are solid. This is expected to happen.

Physics computations on the CPU are ineffective because double trajectories of rays are needed to allocate in order to identify the balance point of a rigid body on screen, due to the nature of how CPU's read data. Using GPU computations wouldn't require this step since the hardware draws from the center fulfilling each pixel and semiconductor at once. We expect to add higher performance improvements by using GPU computed shaders.

The application will be constantly updated to comply with standardization bodies. Further developments in research will be directed to WebGPU features, where we will improve our current pipeline and add new capabilities based on progress made.

Hardware Accelerated databases can be supported, and clients with this setup could get better performance and data transfer results using current and state of the art mobile networking technologies.