

M.A.N.G.O. | Online Game Design 2022-2023



# DRAGON'S FAITH

## Technical Design Document



## Dragon's Faith

Team M.A.N.G.O.

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## Change Log

User	Date	Note
Domenico Montereale	05/05/2023	Document Creation, Staff, External contractors, Location
Mattia Carini	08/05/2023	Project Goal and Provided Services
Domenico Montereale	08/05/2023	Staff, External contractors, Location, Estimated Delivery Time
Niccolò Bottazzi	08/05/2023	Workload Estimation
Domenico Montereale	09/05/2023	Hardware Cost Estimation, Software Cost Estimation
Mattia Carini	09/05/2023	Client Side - Frontend
Mattia Carini	10/05/2023	General Architecture, Backend
Mattia Carini	14/05/2023	General Architecture, Connection
Domenico Montereale	14/05/2023	Backend Cost Estimation, Minor Fix
Domenico Montereale	15/05/2023	Front Cover, Cost Estimation, Summary and Changelog, Layout

## 1 - Project Goal

Dragon's Faith is a 2 player cooperative game in which players must explore dungeons in order to find better equipment and become powerful enough to face challenging bosses. The game does not feature an offline gameplay component, so the availability goal is to provide 24/7 access on PC and mobile. The beta version will only be released on PC.

## 2 - Provided Services

The services provided beside the game are the customer service, which consists of an operator who will be in charge of offering support to customers by answering their requests via email, a website presenting the main characteristics of the game and dedicated pages on popular social networks, mainly Facebook, Twitter and a dedicated Steam page.

## 3 - Client Side

Dragon's Faith is a 2D top down pixel art game, an estimation of system requirements is made by analyzing the requirements of similar games available on the market.

### Shovel Knight: Shovel of Hope

Steam description: Shovel Knight is a sweeping classic action-adventure game with awesome gameplay, memorable characters, and an 8-bit retro aesthetic. If you love games with perfect platforming, beautiful art, infectious music, lovable bosses, humor and levity, and real heart... Shovel Knight is for you!

#### MINIMI:

Sistema operativo: Windows 7 or later

Processore: Intel Core 2 Duo 2.1 ghz or equivalent

Memoria: 2 GB di RAM

Scheda video: 2nd Generation Intel Core HD Graphics (2000/3000), 512MB

DirectX: Versione 9.0

Memoria: 250 MB di spazio disponibile

### Enter the Gungeon

Steam description: Enter the Gungeon is a bullet hell dungeon crawler following a band of misfits seeking to shoot, loot, dodge roll and table-flip their way to personal

absolution by reaching the legendary Gungeon's ultimate treasure: the gun that can kill the past.

**MINIMI:**

Sistema operativo: Windows 7 or later

Processore: Intel Core 2 Duo E6320 (2\*1866) or equivalent

Memoria: 2 GB di RAM

Scheda video: GeForce 7600 GS (512 MB) or equivalent

Memoria: 2 GB di spazio disponibile

## Binding of Isaac: Rebirth

Steam description: The Binding of Isaac is a randomly generated action RPG shooter with heavy Rogue-like elements. Following Isaac on his journey players will find bizarre treasures that change Isaac's form giving him superhuman abilities and enabling him to fight off droves of mysterious creatures, discover secrets and fight his way to safety.

**MINIMI:**

Sistema operativo: XP

Processore: Core 2 Duo

Memoria: 2 GB di RAM

Scheda video: Discreet video card

Memoria: 449 MB di spazio disponibile

Scheda audio: Yes

## 3.1 - Hardware Requirements

Component	Minimum Requirement
Processor	2 GHz or +
Graphics	Integrated GPU or better (512 MB)
Memory	2 GB of RAM
Storage	1 GB of available disk space
Network	Broadband Internet connection

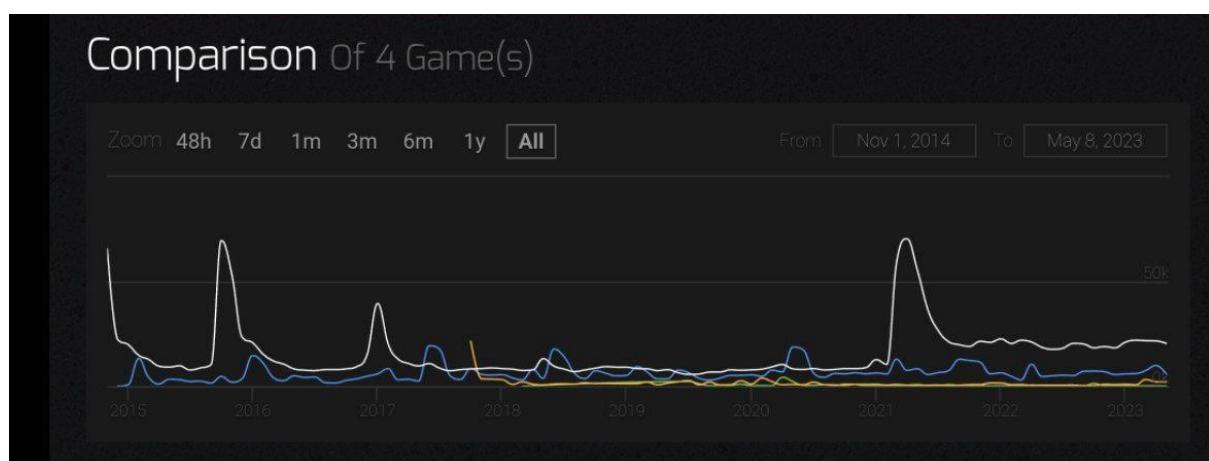
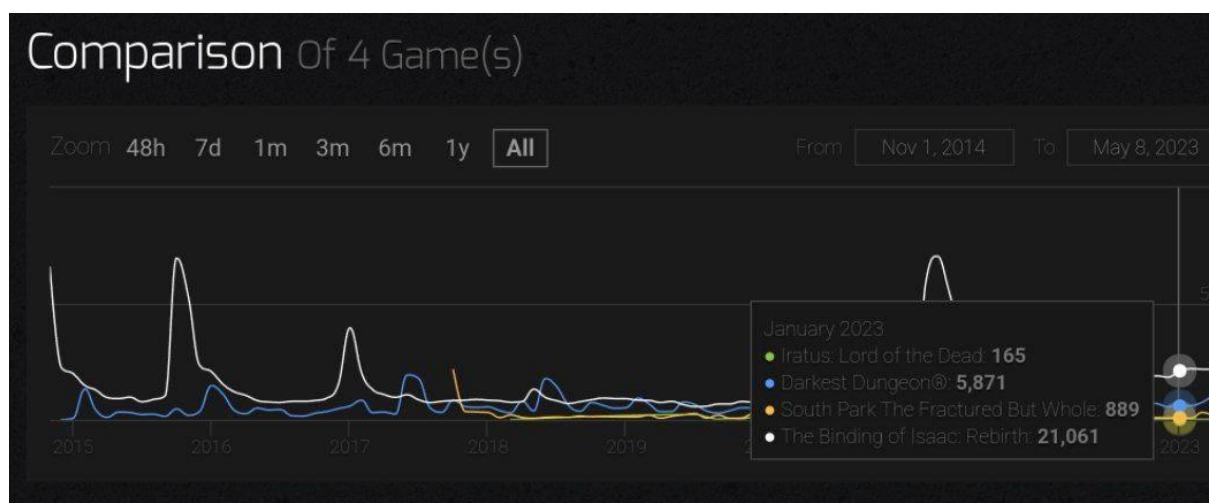
## 3.2 - Software Requirements

Apart from Steam, where the game will be available for download, these are additional software requirements:

Component	Minimum Requirement
Operating System	64-bit Windows 7 or +
DirectX	version 9 or +

## 4 - Workload Estimation

As stated in the GDD, we estimate the majority of player either being in highschool (so 14-19 years old) or employed (20+) and we found on Steam the following chart of our competitor's player base, with and without displaying number of players of january 2023:



The Binding of Isaac, Darkest Dungeon and Iratus have several peaks due to their DLCs; South Park had another spike when its DLCs came out, but not as much as when the game launched. Due to the large difference in numbers, we again show the chart without The Binding of Isaac, allowing us to more easily see both South Park and Iratus lines.



Putting aside DLCs, the most similar project in terms of budget and number of developers is Iratus and it's also one of the most similar in terms of gameplay (turn-based roguelike), so we can estimate to have a similar number of players: the chart show a little increase after the release, probably due to the game being advised by those who liked it, reaching a value of 2000 players and following that a fast decreasing. DLCs not only brought back some players, but actually made the game reach its absolute peak (about ~4200 players); nowadays the number of players is around 150, never reaching to 200.

So we could consider producing a DLC later on, if sales permit it, in order to try having a similar course; some ideas could be adding new dungeons, enemies, bosses and faiths.

## 5 - General Architecture

The core of the general architecture will be composed of the services offered by AWS (Amazon Web-Services), specifically from Amazon GameSparks to deploy and scale dedicated servers in the cloud.

### 5.1 - Front End

The Steamworks API is essential for us, as it enables us to tap into a wide range of valuable functionalities, such as Steam Overlay, friend invites, and achievement leaderboards. Additionally, Steam takes care of managing potentially challenging services such as user identities, download and patch updates, and payment processing. To release our game on Steam, we must pay a nominal fee of **\$100**, but we don't require any other specific hardware, software, or service as a frontend since Steam acts as a comprehensive platform.

### 5.2 - Back End

#### 5.2.1 - Amazon GameSparks

We intend to implement our backend infrastructure by making it serverless and entirely hosted and managed using the Amazon GameSparks service. GameSparks provides a hassle-free way to get started with game backend features, as its standard features require minimal configuration and little experience with managing infrastructure. Being serverless, it manages tasks such as provisioning CPU and memory. Using GameSparks can reduce the cost and time needed to launch a game since it handles backend services and updates, allowing game developers to concentrate on the unique aspects of their game. Furthermore, it offers automatic continuous improvements without requiring manual upgrades when new AWS technology is added.

#### 5.2.2 - Workload Estimation

With GameSparks, we don't have to estimate our workload capacity needed as the game grows, since the service entirely takes care of scalability using the highly scalable and reliable AWS global infrastructure. Game developers can customize the backend and implement game logic in cloud code, making round trip changes and

tests in their browser using a test harness. GameSparks also offers secure native integrations with other AWS services like AWS Lambda and Amazon DynamoDB to develop custom features. GameSparks also provides an easy integration with Unity by installing the client SDK for ready-to-use authentication, connection, and communication with the backend.

The Amazon GameSparks service is currently in Preview version, which requires no additional charge to use, but is also not recommended for production workloads. Considering our workload estimations, we don't foresee workload problems with the currently available system.

The prototype version does not involve the use of AWS so we cannot yet estimate the number of API calls and the bandwidth required, as soon as we start the development of the closed beta we can estimate its uses and costs. Despite this, as stated in the [pricing website](#) we can expect a reduction in costs in the first year.

USAGE DIMENSION	US EAST (€)	ASIA PACIFIC (€)
Cloud Code API Calls (per million requests)	2,76	4,44
Client API Calls (per million requests)	2,76	4,44
Storage (GB/mo)	0,44	0,54

### 5.2.3 - Amazon GameLift

Additionally to Amazon GameSparks, we intend to use Amazon GameLift Realtime Servers as our game server hosting platform. Realtime Servers are lightweight, customizable ready-to-go game servers that GameLift provides for use with multiplayer games that don't need custom game servers for complex computations and physics. GameLift Realtime Servers support a Client SDK allowing easy integration between game and game server.

Gamelift cost depends on the instances needed to handle all players simultaneously and the data transfer. Gamelift allows us to activate the Auto-scaling in order to use only the instances that are really needed, this allows us to save money in the periods of time when the players are not - or less - active. For our needs a c4.8xlarge may be sufficient, we will need at least three servers:

Instance	€/mo
US EAST	223
LONDON	332
TOKYO	204
TOTAL	€ 759

Additionally, there are charges for data transfer out of the instances. We have considered an average, further insights will be available only after the start of the closed beta development. We have estimated a use of 30 mb/h per user, daily sessions of 3 hours and an average user of 300 players, we estimate at least a use of 810GB/h per month, of which 2/3 in OUT.

DATA TRANSFER OUT	€/mo
US EAST	43
LONDON	38
TOKYO	49
TOTAL	€ 130

#### 5.2.4 - Amazon FlexMatch

We've selected GameLift FlexMatch as our matchmaking solution. With FlexMatch, we can build a custom set of rules that defines what a multiplayer match looks like for our game, and determines how to evaluate and select compatible players for each match.

As Dragon's Faith does not have a large established player base, we intend to use a very simple matchmaking configuration with no restrictions, that matches anyone to anyone else, regardless of skill level and physical location of players. However, once the game attracts more players, we may want to modify our matchmaking to provide our players with a more balanced and fun play experience.

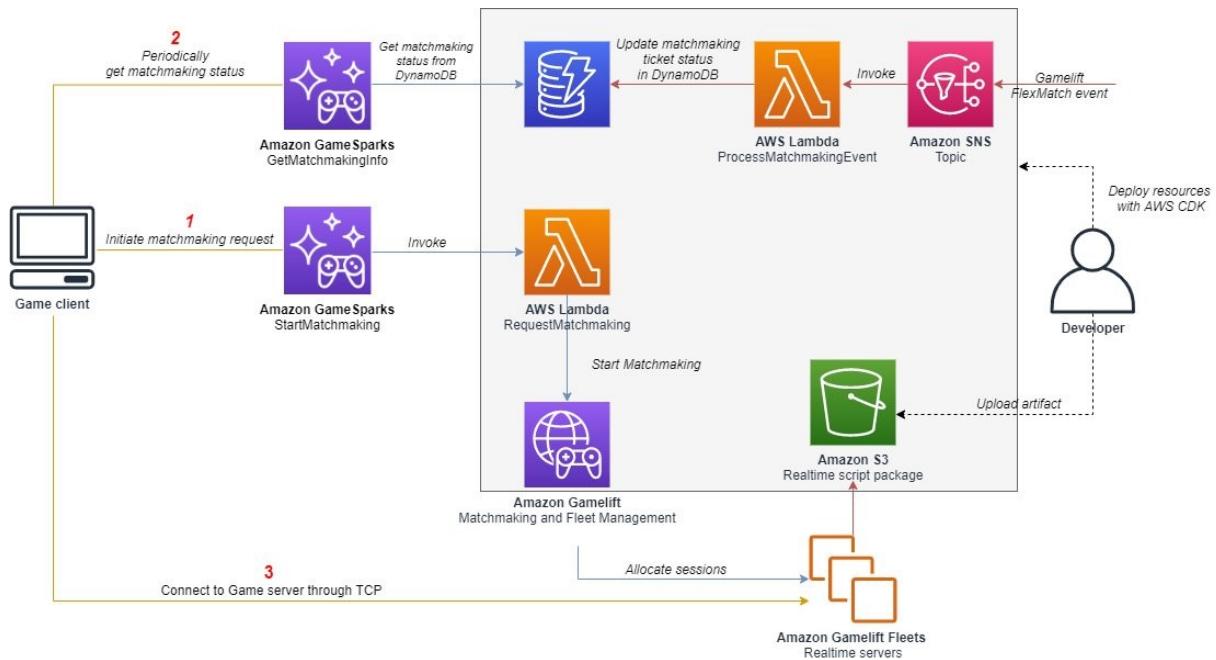
Our game will use the Amazon GameSparks SDK for the connectivity between the game and the game backend, and the GameLift Realtime Client SDK for the

real-time communication with our dedicated game server provided by GameLift Realtime.

PLAYER PACKAGES	\$20.00 per 1 million Player Packages
MATCHMAKING HOURS	\$1.00 per 1 Matchmaking Hour

## 6 - Connection

### 6.1 - Global Infrastructure



### 6.2 - Network Requirements

Given the nature of the game's combat, being turn-based, latency is not extremely important as it would be for an FPS game, although we still strive to achieve acceptable response times for players, so it made sense to utilize the powerful infrastructure of AWS to reach these goals. AWS will ensure that all players enjoy a low-latency connection, optimized for peak performance. Moreover, the system can be easily scaled up across the globe to swiftly overcome any unexpected surges in player traffic that might affect performance.

## 7 - Delivery

### 7.1 - Estimated Delivery Time

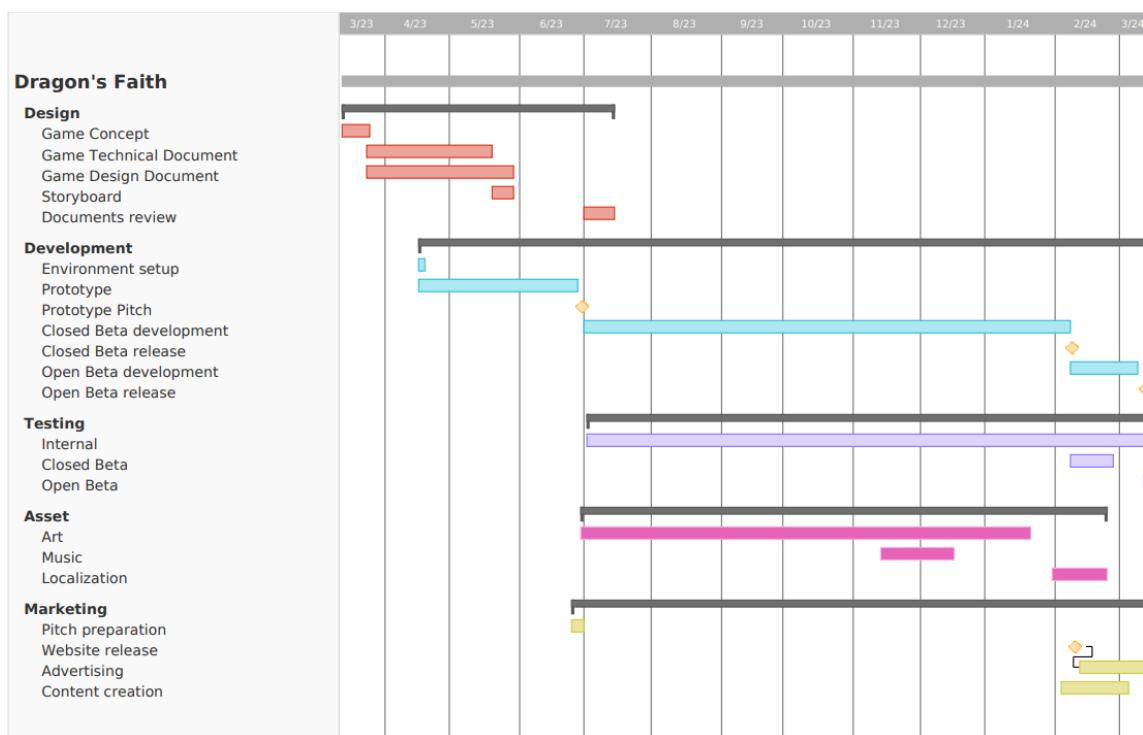
We estimate delivery of the open beta around April 2024, with a window starting from the second week of the month in order to avoid the Easter holidays and reduce the peak of workloads.

### 7.2 - Delivery Platform

We will release the open beta through the Steam Client only for Windows. Only after the Open Beta release, we will consider other platforms.

### 7.3 - Delivery Plan

Starting from the closed beta, we will open a page on Steam in order to encourage players to add our game to their wishlist. At the same time, we will make our website public and start our marketing campaign.



## 8 - Development

For development it will be necessary to have PCs available to help us throughout the release process. We can differentiate between machines needed for development and machines needed for testing, as they have different workloads.

### 8.1 Hardware

CATEGORY	NAME	COST (€)	QUANTITY	TOTAL (€)
CPU	Intel i7 12700k	340	3	1'020
CPU COOLER	Noctua 120mm	55	3	165
MOBO	Asus Prime Z690-P D4	190	3	570
RAM	Kingston Fury 2x8GB	47	3	141
GPU	Rtx 3070 Ti	540	3	1'620
PSU	Nox 750W	70	3	210
STORAGE	Crucial 2TB	100	3	300
CASE	Corsair 400D Airflow	100	3	300
MONITOR	MSI PRO 27"	140	3	420
KEYBOARD	Logitech G213	55	3	165
MOUSE	Logitech Signature	40	3	120
MOUSE PAD	Amazonbasics	15	3	45
GAMEPAD	Xbox/Playstation	40	3	120
TOTAL				€ 5'196

CATEGORY	NAME	COST (€)	QUANTITY	TOTAL (€)
CPU	Intel i5 12400F	170	2	340
CPU COOLER	Noctua 120mm	55	2	110
MOBO	MSI PRO H610M-G	90	2	180
RAM	Kingston Fury 2x8GB	47	2	94
GPU	Rtx 3050	300	2	600
PSU	Corsair 550W	68	2	136
STORAGE	Crucial 1TB	52	2	104
CASE	Corsair 400D Airflow	100	2	200
MONITOR	MSI PRO 27"	140	2	280
KEYBOARD	Logitech G213	55	2	110
MOUSE	Logitech Signature	40	2	80
MOUSE PAD	Amazonbasics	15	2	30
TOTAL				€ 2'264

DEVELOPER HW	€ 5'196
TESTER HW	€ 2'264
TOTAL	€ 7'460

## 8.2 Software

CATEGORY	COST (€)	QUANTITY	TOTAL (€)
Windows 11 Pro	100	5	500
Unity Pro	170/mo	3 x	510
GitHub Team	4/mo	3 x	12
Google Workspace	6/mo	5 x	30
Jira Standard	8/mo	5 x	40
Visual Studio Pro	45/mo	3 x	135
TOTAL			€ 2'264

## 8.3 - Staff

Our headquarters will be in Italy, costs and taxes have been included in the net salary. The staff, in addition to the three founders, will include two testers who work alongside us.

ROLE	PRICE	QUANTITY	MONTHS	TOTAL (€)
Junior Developer	3700/mo	3	10	111'000
Junior Tester	2900/mo	2	10	58'000
TOTAL			10	€ 169'000

#### Junior Developer:

The current goal is the release of an open beta but with limited functionality, so the collaboration of the current developers is considered sufficient to complete the current tasks.

#### Junior Tester:

The number of developers is sufficient for their tasks but not for full testing. Furthermore, having external opinions available could lead to an improvement in the overall quality. Being a coop experience, the minimum number necessary is two people.

## 8.4 - External Contractors

These include all third party services and external contractors that our team plans to employ and use during or after development:

ROLE	PRICE	QUANTITY	MONTHS	TOTAL (€)
Junior 2D Artist	2000/mo	1	8	16'000
Music Artist	5000	1	/	5'000
Localization QA	2500	1	/	2'500
Accountant	5000	1	/	5'000
Community Manager	1800/mo	1	2	3'600
Videomaker	3000	1	/	3'000
Web Developer	4000	1	/	4'000
TOTAL				€ 39'100

**2D Artist:**

Following the open beta it will be necessary to hire several 2D artists who take care of the UI but above all of the sprites necessary for the characters and for the items which are present in considerable numbers. At the moment it is possible to limit the number of sprites needed so it is possible not to hire all the 2d artists but have at least one as an external contractor.

**Music Artist:**

We need sounds that are consistent with the many items and skills available and a soundtrack that is consistent with the setting

**Accountant:**

We need support in accounting: tax management, cost management, salary management and bureaucratic choices to be made.

**Web Developer:**

We need a simple site that can show shared content, information, social media links and contact forms.

**Community Manager:**

We need a person able to manage social networks, create new content or ideas that increase engagement, filter user problems and reports. We must also consider the costs of the marketing campaign:

ADS	€ 6'500
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## 8.5 - Location

We plan to have a three-person workspace permanently and a space for two testers. We therefore need a main room of at least 30/40 square meters and bathroom. By carrying out a brief search, the cost of the rentals for our requirements are not less than 1000 euros. Also, we need to consider condominium fees, utility bills and a cleaning service. Finally, we need to stock a refreshment corner with drinks (water, coffee, milk or tea, etc.) and small snacks.

CATEGORY	PRICE	MONTHS	TOTAL (€)
Rent	1000/mo	10	10'000
Condominium fees	200/mo	10	2'000
Electricity, Water and Gas	200/mo	10	2'000
Internet bills (Tim Business)	5/mo (for the first 12 months)	10	50
Cleaning	300/mo	10	3'000
Food and drink	200/mo	10	2'000
Office supply	100/mo	10	1'000
Domain and Hosting	15/mo	10	150
TOTAL			€ 20'200

We also need to consider the expenses necessary for entry. Including the deposit, the furniture and what is needed to work. Barring unforeseen events these expenses can be recovered.

CATEGORY	PRICE	QUANTITY	TOTAL (€)
Deposit	1000	3	3'000
Desk (Ikea - Huvudspelare)	100	5	500
Chair (Ikea - Millberget)	140	5	700
Desk lamp (Ikea - Härte)	20	5	100
Printer (Brother)	200	1	200
Whiteboard	135	1	135
Refrigerator (Hisense)	190	1	190
Coffee Machine (De Longhi)	80	1	80
Refreshment table (Ikea - Linnmon)	40	1	40
Microwave (Candy)	100	1	100
Frtiz!Box 7530	150	1	150
TOTAL			€ 5'195

## 9 - Cost Estimation

Briefly summarizing the costs listed in the previous points:

DESCRIPTION	SUBTOTAL (€)
Steam fees	100
Gamelift	889
Development HW	7'460
Development SW	2'264
Staff	169'000
External Contractors	39'100
Location	25'395
Advertising	6'500
<b>TOTAL</b>	<b>€ 250'708</b>
<b>BUDGET</b>	<b>€ 260'000</b>

We are asking for a budget of €260,000 in order to be able to pay the AWS costs as the user estimate and related costs may increase following a more in-depth estimate after the prototype phase.