
# Project dossier: {Parameters}

*(Working Title)*

*Groep 22*

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# Preface

This document provides a summary of the analysis and high level decisions that were made prior and during the development of this game. As such it aims to clear up any possible ambiguity of what the client expects from this project.

Additionally, this document serves as a reference document during development and gives a clear overview of both architectural and game design decisions.

# Glossary

Words are fickle and it can be hard to pin down their meaning. We've compiled a list of definitions for any words that may have ambiguous meaning, especially compared to similar games, to alleviate any confusion.

***Ship***: Typically used to refer to the player ship as opposed to enemy ships, which we generally refer to as 'enemies' instead.

***Class (Ship)***: Describes what ship the player has which determines number of drones, weapon slots and other core statistics.

***Type (Ship)***: See: *Class (Ship)*

***Drones***: Helper units that assist the player by providing assistance in a variety of ways. The player selects which drones he brings into a stage and can level these up.

***Experience (Ship)***: Earned by playing the game in various modes and increases a ship's level, which grants a small performance increase.

***Experience (Drone)***: Earned by completing stages with drones. The player only earns experience with drones by using them, this experience is not transferrable.

***Power up / down***: Items that can be found during gameplay that boost or weaken the player for a set duration. These effects cannot carry over into other stages..

***Ship Upgrade***: Happens when a the player levels up with the ship type, signifying increased control over the system.

***Drone Upgrade***: A player purchased upgrade on a drone that enhances it in some way.

Currency: A temporary term used to refer to our, unsurprisingly, in-game currency.

***Fleet***: Term used for our user group system. Other common terms include: Clan, Community, Squad, etc…

***Season***: Shorthand for "Competitive season". Although they somewhat fall in line with normal seasons, this term refers to a period in time in which players compete in various competitive formats.

# Requirements analysis

## Functional Requirements

In this section we describe what is expected (and what is not expected!) of the various systems and design decisions.

### Game Design Goals

Our goal with this game is to create challenging gameplay without resolving to “bullet hell” type mechanics. Overall the game will be slowed down compared to traditional “Geometry Wars” and similarly styled games with more focused on more interactions within the physical space of the stages. We believe this will create more interesting movement and weapon systems.

**Movement** is in 2D space. Ships will have a limited turn-rate which can be affected by different upgrades and effects. Acceleration and deceleration will also not be (near) instantaneous and require more restraint on the player’s side. Outside forces can push or pull objects, be it through gravity, explosions or other special weaponry.

Note that these effects are not limited to the player alone, AI will also be subject to the same ruleset.

**Weapons** come in several different types, mainly projectile based. Each player has a primary weapon with infinite use (although it can be temporarily disabled) and one or more secondary weapons (like missiles, bombs, …)

**Scoring** is based on the game mode. Generally speaking the biggest jumps in score will be dependant on completing the primary goal of the mode as efficiently as possible whilst kills and other minor tasks will boost that score slightly. For example, in time attack-type levels the time will be the primary score factor whilst in arcade mode you will accrue most of your score by getting combos.

### Controls

The game must be able to support all the following setups:

- Mouse & Keyboard
- Keyboard only (Weapon controls on keyboard)
- (Common) Controller

Must support movement in 2 axis, weapon turning and firing, weapon switching, pausing, ...

In local co-op players it must be ensured that players avoid double mapping their keys as this can cause interference between them.

## Modes

The game supports several different modes to cater to different players.

**Arcade** is the classic freeform mode where you simply run level after level of increasing difficulty. Each time you start a new arcade run, you start with the standard basic ship (with a limited pool of customization options) and accrue upgrades as you progress.

**Campaign** follows a set story and levels and functions as the main entry point for new players. The campaign will gradually introduce the more advanced game mechanics one at a time to prevent overwhelming the player.

There will also be a hard mode that goes over the more unique effects very briefly and immediately challenges the player. This mode is intended for experienced players who want to go through the story without the classic “early stage drudge” that well-versed players often experience.

The ship that the player uses in this campaign will be unique to the campaign (and will not be usable outside of it). However, drones and currency will be carried over.

**Survival** is a single level where one tries to survive for as long as possible.

## Mechanics

**Power up/down** are objects that can be collected during the game and can have either a one-time effect, like shielding your ship, or a lasting effect, such as increased firepower. Between levels there is also a guaranteed upgrade.

**Drones** are little helper units that provide a passive effect for you throughout the level. These can vary from fighting drones that will assist you in dispatching enemies to manipulating gravity zones.

**Difficulty levels** will differ in amount of enemy spawns and how durable the player and the enemies are. Generally speaking, the game will be more forgiving to the player. Each difficulty has its own high scores (when applicable). For the competitive modes and challenges, the difficulty is preset and cannot be changed.

## Progression system

Player progression comes in several forms. Initially on a personal level the main two points of progression comes from unlockables, these are ship and drone upgrades, as well as progression through the game’s difficulty scale.

It's important to maintain the player's interest in the game, and we aim to achieve this by providing interesting stages with which the player can experiment and interact with in many different ways. Our aim is to introduce group content as the player progresses to give them an additional avenue to explore the game, once they've learned the basics.

## Multiplayer

The game will support a variety of cooperative and adversarial multiplayer modes

In terms of adversarial modes we distinguish between real-time competition, 2 players directly squaring off. As well as forms of asynchronous competition in the form of daily/weekly challenges where players compete for high scores.

**Real-time competition** will never have 2 players directly fight each other as we feel the game design doesn't really translate well in direct dueling. Instead, both players will have their own field and compete with each other indirectly through their actions, which can affect their opponents field.

Battle mode will feature levels where enemies that get killed by player 1 will trigger spawns on player 2's field. This effect gets additional strength from combos, much like single player arcade and survival.

**Asynchronous competition** will be a set of daily and weekly challenges where players are competing for the top leaderboard position. Each week the top ranked players receive a reward and are displayed prominently in the challenge section for the duration of the next week.

Every competitive season, consisting of several months, there will be an additional end-of-season reward for top performing players during that season.

Leaderboards will be kept indefinitely for people to browse through in the client or the website.

Under the cooperative mode we distinguish between our **2-player co-op** feature, which allow users to grab a friend to tackle single player modes together.

There are also larger co-op ventures which can be tackled by squadrons. These will be extremely hard boss fights that will require a group of players to work together to defeat it, in return for exclusive rewards. (See: *Fleets* below)

## Fleets

Fleets act as in-game community hubs and allow players to band together. They are designed to be the primary way people will band together to tackle some of the end-game content in the form of cooperative boss levels, aimed at 10 or more players.

Additionally, a player can earn some small perks from being in a community. This can range from a small percentage increase in experience or currency gain to some unique purchasable items, only available in large enough fleets.

They are also designed as a major currency sink where players can contribute currency to grow and strengthen their fleets.

### Monetisation

We will be adopting the freemium model, concretely this means the game is free-to-play in terms of features but with unlocks gated by in-game currency which can be bought using microtransactions. These unlocks come in the form of drone upgrades, cosmetics and unlocking ship types.

On the mobile version we will also include some ads in non-intrusive fashion where possible with an accompanying premium version with those ads removed, as well as some other perks for their account.

### Social Media integration

Besides the typical score sharing functionality, we are also planning on adding a special feature for live streamers to allow the audience to have a tangible effect on the game. They will be able to sculpt the live streamer's experience by affecting the spawn rate of enemies, type of enemies to spawn, which power up are available and so on.

## Non-functional requirements

In this section we describe several requirements that are outside of the game systems.

### Theme

Game maintains the original simple geometric space theme. Gameplay will be slowed down slightly compared to similar games of its ilk. This is to allow for more interesting interaction between the player and it's environment. This will allow for an more interesting gameplay instead of the classic bullet spam.

### Distribution platforms

Game must support both desktop (Windows, Linux, Mac) and mobile (Android). This decision was mainly reached because:

1. This game is playable in short sessions, making mobile a good fit.
2. The additional cost to deploy on mobile is very low given our development framework in comparison to a console version. The main cost comes in the form of more time spent performing additional tests for the android version.

### Performance

This game will have to be able to run on desktop and mobile (Android) comfortably at a good framerate (minimum 30 FPS). Servers must be able to handle at least 1000 concurrent players comfortably.

### Stability

Game servers must maintain high up-time, excluding scheduled weekly maintenances.

### Security

Multiplayer account credentials must be properly secured and protected. In the event of a data breach any confidential information must be held to an up-to-date secure standard. Additionally, players must be prevented from cheating the system. Both in terms of unauthorized purchases or tampering with the integrity of the competitive scoring systems.

## User requirements

This section describes requirements from an end-user’s point of view.

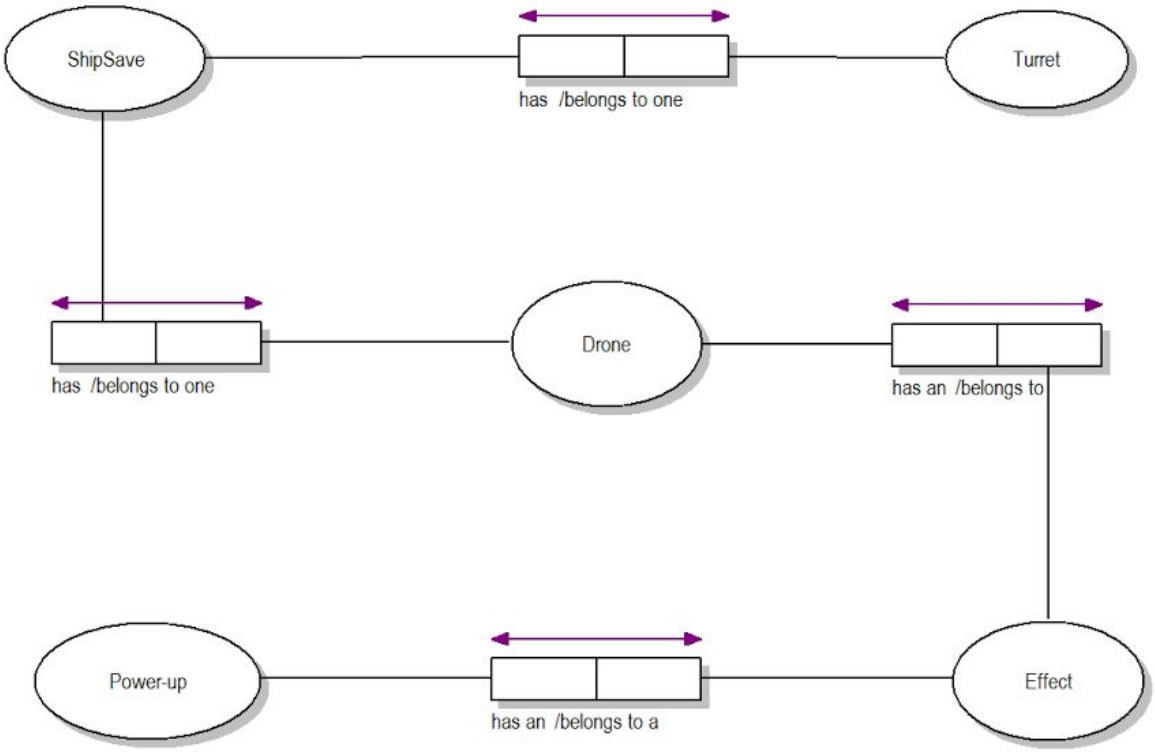
### Use case 1: WIP

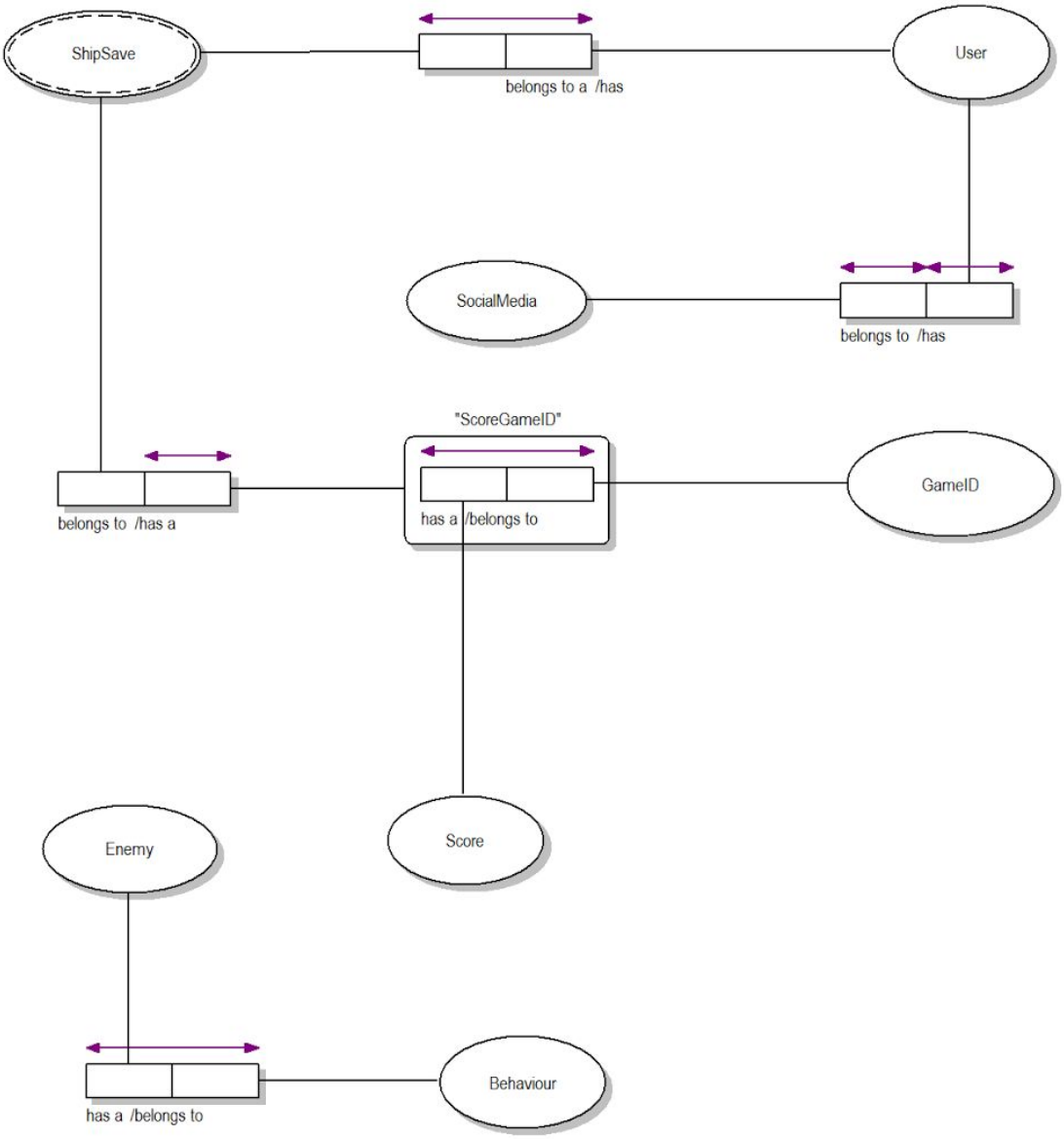
*Work in progress*

# Technical analysis

## Information analysis

### Conceptual Model (+ Extensions)

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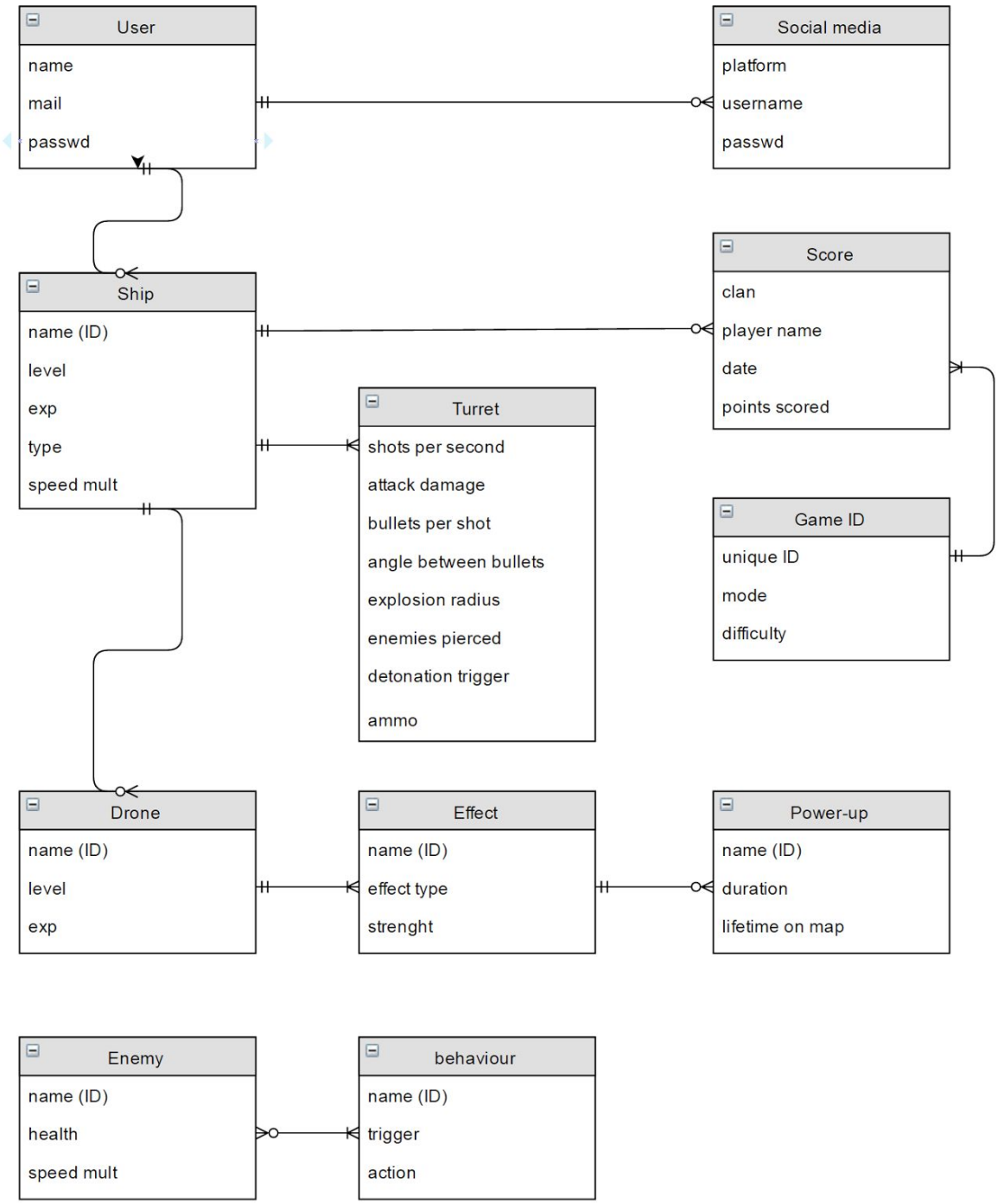
## Mapping to relational model




## MySQL implementation (Basic only)

*Required?*

# Software architecture analysis

*Work in progress*

# Appendix

## A. Space reserved

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