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Multiplayer networking framework research

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# Introduction

The project requires the use of some kind of multiplayer implementation. To find out what multiplayer networking works best for us, we’ll take a look at some of them and their advantages and disadvantages. This document will look into Photon Unity (PUN2) and mirror, and Niels’s document will describe Unity Multiplayer Networking

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## Photon

**Description**

Photon is a global cross platform multiplayer game backend as a service such as SaaS or Cloud for synchronous and asynchronous games and applications. Photon is very tightly integrated with unity to easily develop and launch multiplayer games. The service can be used for free, or bought for more capacity and power for your games. It supports any type of game, whether it be an FPS, RPG, MOBA etc. It works client to server with Reliable UDP, TCP, HTTP or Websockets making it a fast and solid foundation for your game.

**Advantages:**

* Ease of use

Photon is by far the most easy networking solution to pick up and get started with. It’s simplicity means that setting up a multiplayer game with lobbies can be done in less than an hour with barely any unity experience and just the documentation

* Does not require hosting/Client to server

This means that users can still continue a game, even after their host disconnects. This makes it very reliable in scenarios where the game doesn’t have the same ending time for all the users in that game.

* Documentation and tutorials

The easy usability of Photon made it that there are plenty of tutorials, documentation and other information available to learn from and use in your own project. Not only that but it also ups the quality of the information given and will speed up the learning process, time that can be used to develop the actual game itself.

**Disadvantages:**

* Scalability

Photon is meant for more small projects with not that many players, and thus makes it hard to scale the project with it. With this it’s also a fact that there is a maximum of 20 players using the Photon cloud service per game for free, which makes it harder to use if the user count is ever gonna be over that amount. Compare that to other networking options like unity’s own multiplayer networking, that can be done completely free, apart from maybe hosting your own server

* Cheating

It has been proven that when using Photon, you do lack some anticheat, and if you’re not coded anything against cheaters or made some kind of anticheat, it’s easily hackable. For a project this scale it might not be the biggest problem, however, if this game will go on to be used by more people and get bigger, photon is not the right networking solution when it comes to anti-cheat and cheaters.

**Testing Experience**

Photon has been tested to the point where you can move 2 different players on a screen and see them move on another through networking on a localhost. In my experience, it’s really simple for the most part, and most resources to get to this point were relatively easy to find. Plus there were many follow up tutorials that I could watch and try next after doing the basics. The overall experience was quite good, and easy to step into.

## Mirror

**Description**

Mirror is a high level Networking API for Unity, supporting different low level Transports such as Simple Web Sockets, KCP, Telepathy and many others. Mirror is built and made for large scale games such as MMO’s BR’s and big survival games, being able to handle 480 clients in a single lobby. Mirror is made to be optimized for easy use and tries making networking easy and maintainable. With Mirror, the server and the client are one project.

**Advantages**

* Compatible with over a dozen low level Transports

What is especially interesting for us in this case is that it also support Simple Web Sockets which is a WebGL transport layer for mirror that targets browser clients, which is exactly what we need for this project

* Script Templates

Mirror offers a bunch of scripts that can be used right off the bat. This is especially nice to have for beginning users such as us. Not only is it nice for beginners to have to explore and learn different variables and classes, it’s just convenient that Mirror does a bunch of work for you.

* It works on the KISS principle making it easy to use

KISS (standing for Keep-It-Simple-Stupid) makes it a more easy and accesable compared to other options. With KISS you avoid complexity wherever you find it and try to keep it as simple as possible, guaranteeing high ease of use. This will be really nice to have for this project, cause everyone is a beginner on this subject.

**Disadvantages**

* Mirror is still very new

Mirror being new brings a couple of problems with it such as limited or incomplete documentation, and little to no tutorials on some basic subjects. However, the community does seem to be very active, making it pretty easy to find people and ask for help and discuss topics related to Mirror

* No chat support

Though this is a minor inconvenience which can most likely be worked around, it’s still quite a disadvantage. In our game it’s very important to be able to communicate with others in your escape room. A chat feature would be very welcome.

* Mirror is designed for bigger lobbies than what we are gonna use

Mirror is mostly designed for big games like MMORPG’s or Battle Royale. This game has about 30 people per lobby maximum. This does mean that you can optimize your game well for that many players, but it can be a bit overkill.

**Testing Experience**

In this case the experience of getting to a minimum multiplayer game has been easier than with photon. The huge advantage Mirror has over Photon is that they offer tutorials themselves, and the tutorials that they offer are very high quality. The tutorials offered can get you up and running in no time with a lot of very clear explanations. Even though Photon offers a bunch of user made tutorials, having it made by the project officials is a lot better. This makes it very easy and a good overall experience of getting to the basics of Mirror.

**Conclusion**

Let’s quickly go over the Photon and Mirror advantages again:

* Photon

**Advantages:** Ease of use, does not require hosting/Client to server, documentation and tutorials

**Disadvantages:** Scalability, Cheating

* Mirror

**Advantages:** Compatible with over a dozen low level Transports, Script Templates, It works on the KISS principle making it easy to use

**Disadvantages:** Mirror is still very new, No chat support, Mirror is designed for bigger lobbies than what we are gonna use

* Advantages Compared

If we take a look at Photon’s advantages, it mostly comes down to the ease of use of the solution itself. Mirror’s advantages mostly lie in the quality, but also the ease of use itself. So what this concludes is that they are both quite easy to use and to step into. However, Photon has the advantage of having a host to client connection which is easy to implement. Mirror has the advantage of having many low level transports including Simple Web Sockets which is gonna be used to run the game on the website.

* Disadvantages Compared

Looking at the disadvantages, Photon has a couple very big disadvantages, which are scalability, hosting costs and a cheating issue. Photon might be easy and nice to develop with right now for a small time, but it’s not very scalable and will cost a lot of money in the future. Compare that to Mirror which is free to use, and you can set up a server yourself, meaning you can buy a server yourself or let it be hosted somewhere else, which will be cheaper.

Mirror is also more scalable than Photon. The big advantage Photon has over Mirror is that Mirror does not have chat support, which is a feature that will be implemented in the game. A disadvantage that isn’t really that of a big deal, is the fact that Mirror is designed and made for very big MMORPG or Battle Royale lobbies that have a lot of players in a single lobby. However, that doesn’t mean it won’t work well with smaller lobbies.

* Conclusion

In conclusion, Mirror seems to be the best option, even though Photon is very easy to use for a small period of time, it will be harder and harder the bigger the game gets. Mirror will be easy to use, and will have good scalability, better compared to Photon.

Photon does have more tutorials, but Mirror has enough and official tutorials, so even though Photon has a slight advantage above Mirror, it’s not worth picking the solution over.

Both are easy to use and get into, but Mirror will be better for the long run, so Mirror is the networking solution of choice for this project.

**sources**

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