# Final Project – Multiplayer Game

Introduction to Computer Networks

Autumn 2020

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# Goals

We will provide a sample of uni-player party game. The following tasks should be done by you.

- Make the uni-player game be multi-player game
- Player's scene should be updated for other players moving
- The game was designed as 6 players game, you can try to increase the player number.
- Decrease the delay(or increase game quality) when clients play

Based on our sample, you can do anything to accomplish the above tasks.

# Intro to Unity

- powerful cross-platform 3D engine
- user-friendly development environment
- pretty strong support for cloud-based solution for multi-player
- full API support for building own editor tools and scripts


Unity Download Link

- famous game
  - eg. Kerbal Space Program, Cuphead, Pokémon GO


(a) Cuphead


(b) Pokémon GO

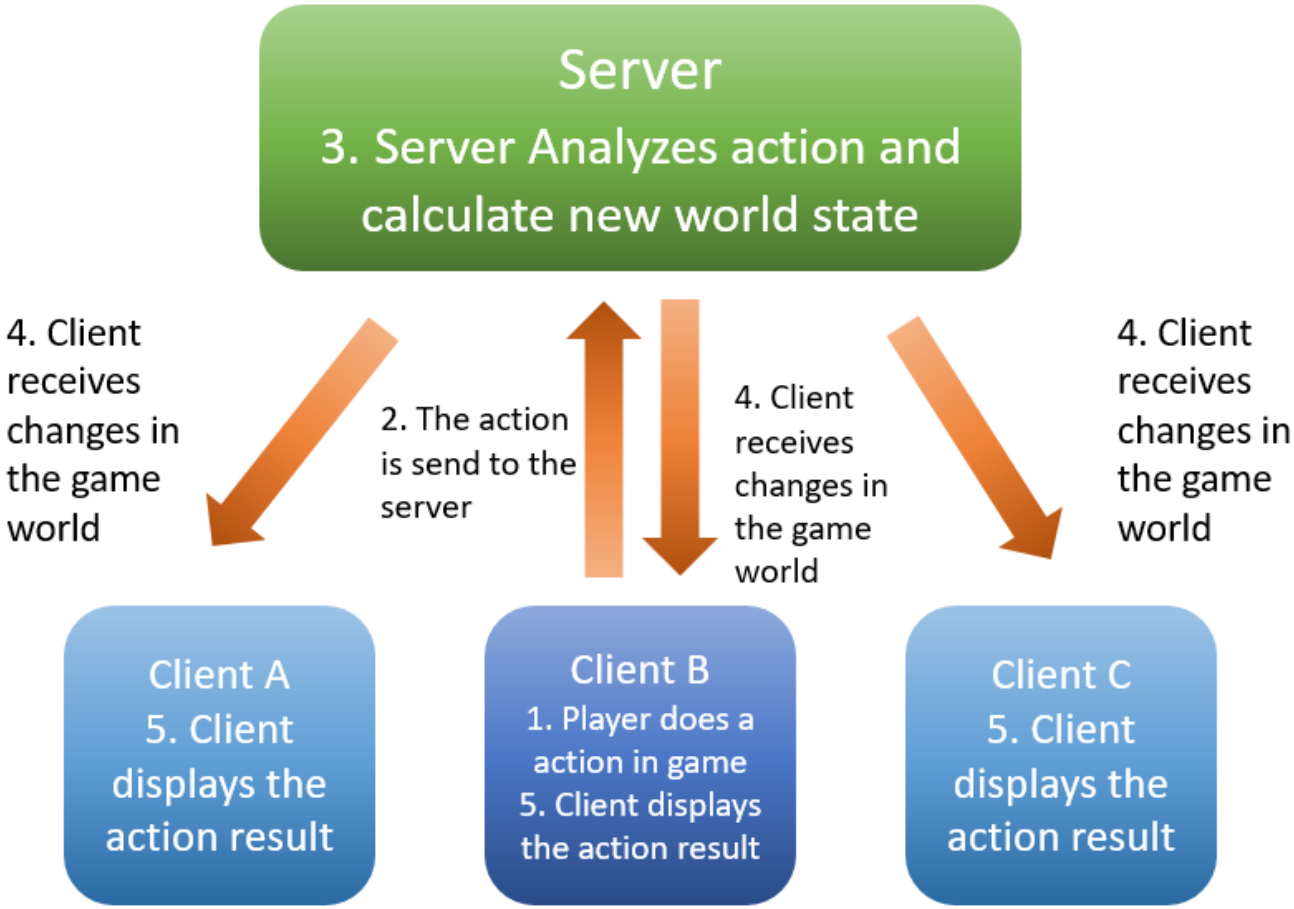
# Game Server & Client Model

In the canonical model, there is a server process and multiple client processes satisfying the following properties:

- Server process always runs in a certain socket address
- Client process can connect to this server process
- Server process takes responsibility for game logic
  - example: Moving and winning situations in karting games, shooting and dead determination in FPS games
- Server receives(or checks) the actions(commands) that players give and decide the state of game world
- Server returns the state to players' processes
- Client's process shows the result

# Work Flow

- Model:



# Game introduction

- Party game
- Resource collecting game
- 2.5D
- team which launch the rocket first win
- Will be released in few weeks

# Grading Policy

Report : 30%, Programming : 70%

The following is about the grading for programming.

## Tasks grading(100%)

- (40%)Implement basic network setting with 6 players
- (60%)Stress Test
  - delay : 20%
  - packet loss : 20%
  - more players : 20% (details will be released in few weeks)

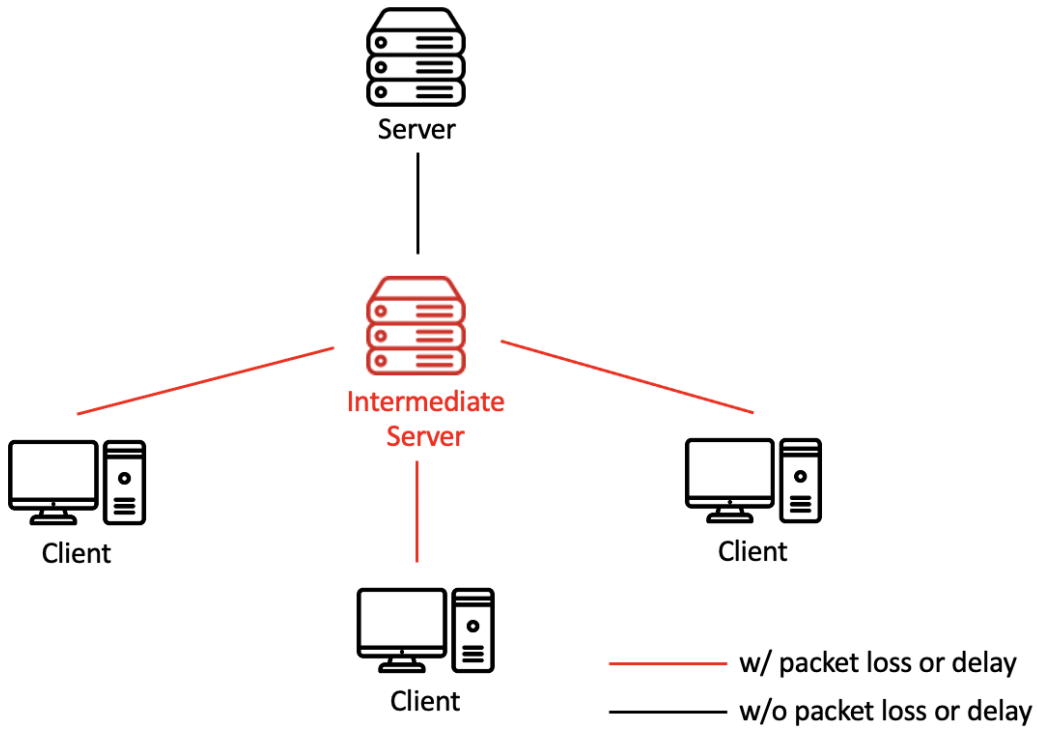
## Bonus(10%)

- Implement two conditions.

# Stress Test

To simulate the real network situation, we implement some Stress test. You have to connect to intermediate server to simulate delay and packet loss.

- Delay: between 30ms to 60ms
- Packet loss: 10% to loss the packet



# Report

The following are the basic items must be mentioned in your report:

- What do you do to finish tasks
- Other optimization design to enhance the QoS of the game
- You can including some(not all) important code segments and comments in the report
- Work Distribution Chart

Handin:(60%)

- Please save your report as [Group+Group ID]_ICN_report.pdf
- E.g. Group0_ICN_report.pdf

Presentation:(40%)

- Each group has to present their work with PowerPoint in 10 - 15 minutes

# Demo Procedure

Location:TBA
Time:1/7 13:20 - 19:00

## Presentation

Each group has to present the work in 10 minutes to the audience. This take part of the grading in Report.

## Demo

Each group has to set up a game server which allow other clients to connect with. Total time in game must be less than 5 minutes.

## Peer evaluation

Each student should bring your laptop and evaluate works done by other groups.

# Schedule

- 12/3 : Game content release
- 12/10 : Server release
- 1/6 : Submit report
- 1/10 : Final Project Presentation / demo

# Resources

- Overview of real-time multiplayer technologies [Link]
- Unity User Manual [Link]
- Unity UNet tutorial [Link1] [Link2]
- Issues in multiplayer games [Link]