

# Online Game Servers

## P2P game network analysis

Miguel Lentisco Ballesteros  
José Antonio Álvarez Ocete

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# Game servers

## Questions

- 1 How do they work?
- 2 What transport protocols do they use?
- 3 What types do they have?

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# How do game servers work?

Simplified diagram: the client and the server.

- 1** The players moves from (1,0) to (3,0)
- 2** The client sends this data to the server
- 3** How the server deals with it?

## Authoritative and non-authoritative

There are 2 approaches:

- **Authoritative**: the server has the final say.
- **Non-authoritative**: the client does not have to wait the server.

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# Problems

Two factors:

- Precision
- Latency

Trade-off between them.

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- Precision
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Trade-off between them.

Client-side prediction.

## Client-side prediction

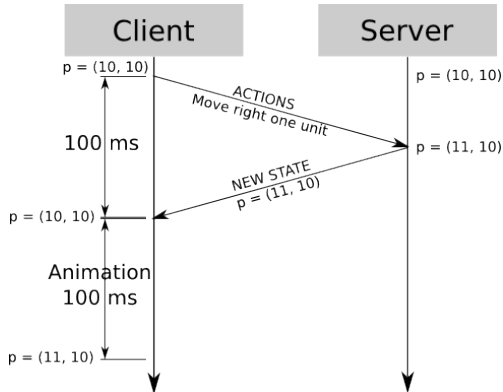


Figura 1: Without prediction

## Client-side prediction

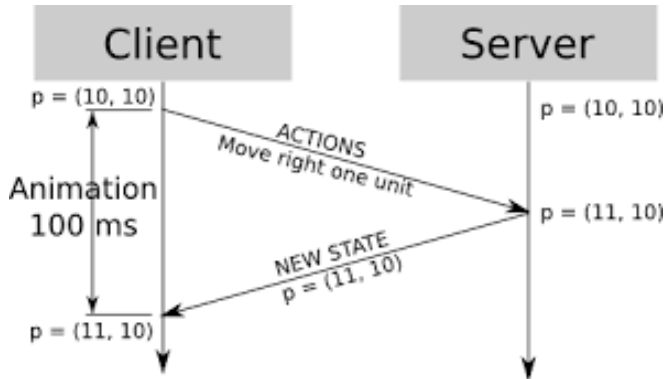


Figura 2: With prediction

## Client-side prediction

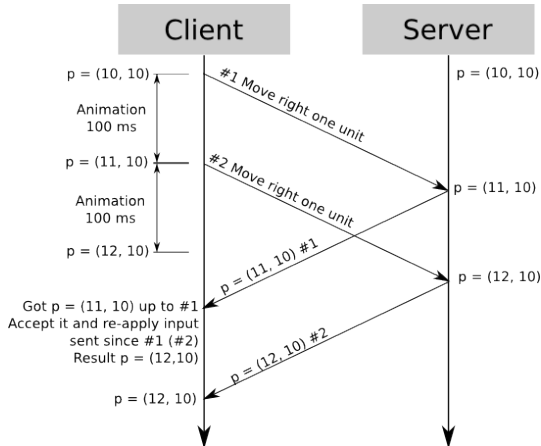


Figura 3: Prediction - server

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# UDP vs TCP

- **UDP**: FPS, MMO (occasional lag not desirable)
- **TCP**: RTS, Poker (occasional delay doesn't affect)

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# Types

- P2P.
- **Server-Client:**
  - Dedicated.
  - Listen.

## P2P

Each client receives the input of each other players. Used on RTS.

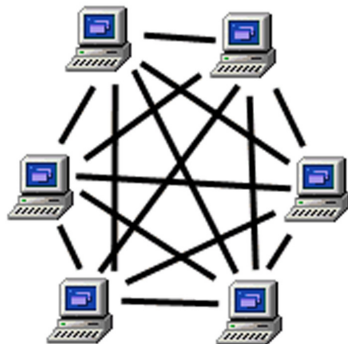


Figura 4: P2P network

# Server-Client

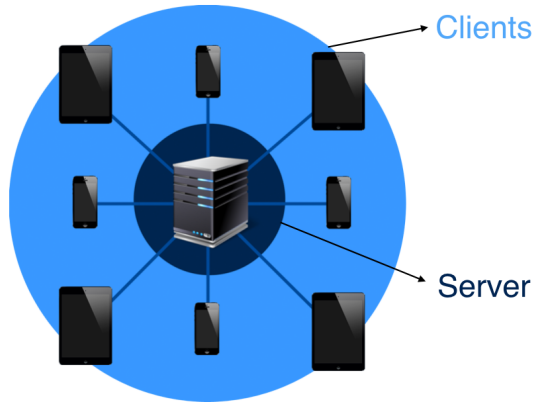


Figura 5: Client-server

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# Description

## Server

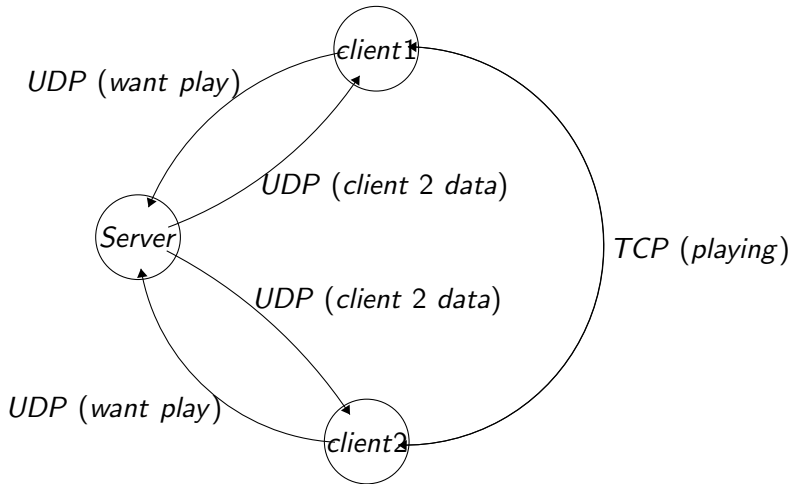
Service implementing the Tic-Tac-Toe game online.

- One concurrent server communicating with the clients via UDP.
- When there are at least 2 clients, the server matches them sending the address and port.
- The clients will play against each other via TCP.

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## Connection diagram





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## Frame server

P2P network, non-authoritative server and TCP.

Precision over latency, datacheck in the client.

Server works as database.

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# Viability

## The question

Is viable to apply this structure to real games?

# Viability

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Is viable to apply this structure to real games?

Yes, in fact it has been done already.

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# Problem

## Problem

Many old games are out of date but there are a lot of people playing them yet. How can they play online against each other?

Games:

- Age of Empires.
- Need for Speed.
- Civilization.
- Empire Earth.
- Worms.
- The Settlers.
- Call of Duty.



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# The solution

## Solution

A server saving the data of people hosting games and giving the information to the other players who wants to connect.

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A server saving the data of people hosting games and giving the information to the other players who wants to connect.

GameRanger is a Internet gaming service that has resolved this problem since 1999, running with 726 games currently. Also, it offers other features as voicechat or chatrooms.



Figura 6: GameRanger

## Example

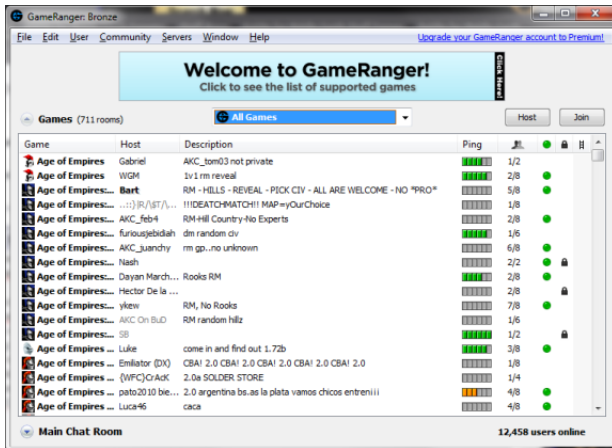


Figura 7: GameRanger app

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# Wireshark captures

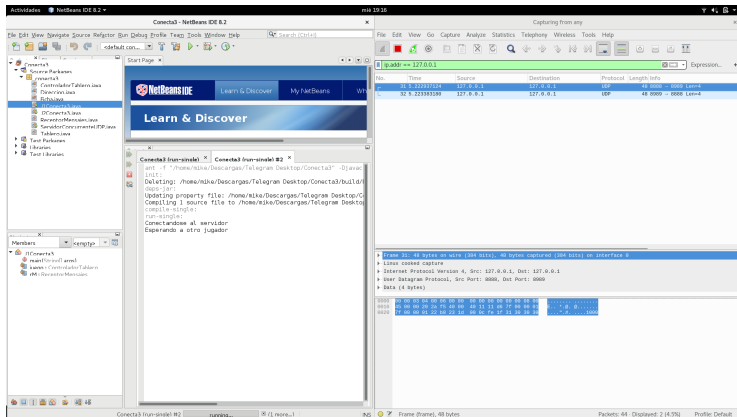
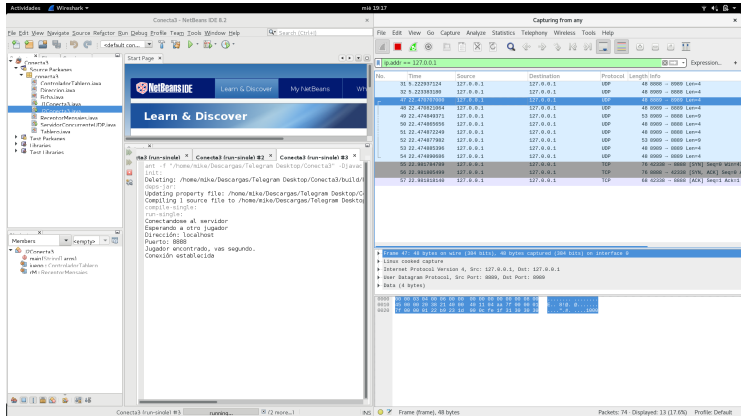


Figura 8: Client hello

# Wireshark captures



# Wireshark captures

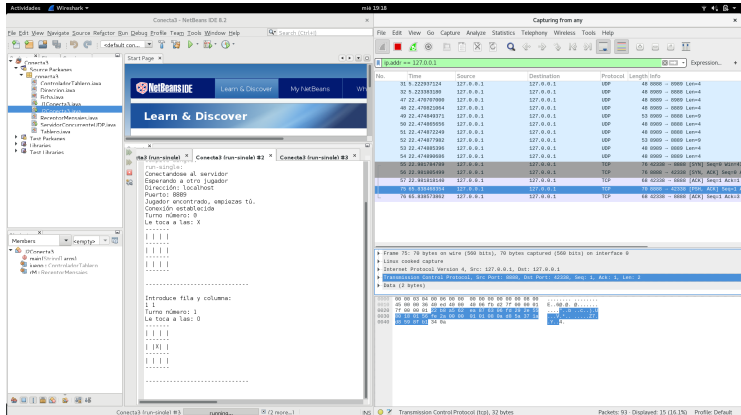


Figura 10: Position sent



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