Tic Tac Toe Revolution

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Motivation

- To use Network Centric Programming concepts in a holistic and integrated approach
- Tic Tac Toe is a game that we all played as kids □ it would be fun to implement this game over the network in an intuitive way
- Since Tic Tac Toe is a two player game, find a way to be able to incorporate more clients

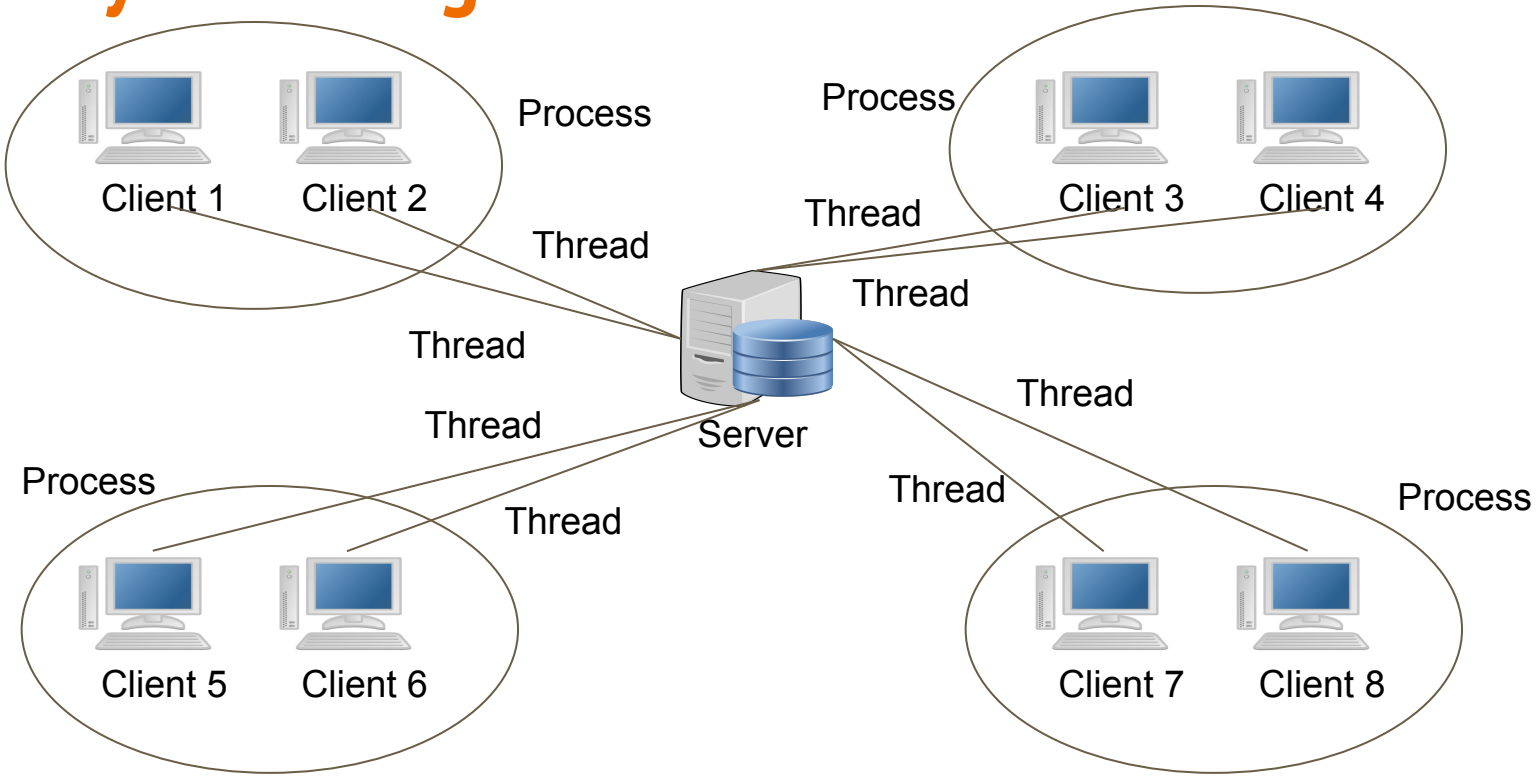
Features

- Clients can connect to the server and play a text-based Tic Tac Toe game
- Server can handle multiple games at the same time
- Server automatically checks for all winning and draw scenarios
- Server ensures that game is fair and only one player can access the game at a time

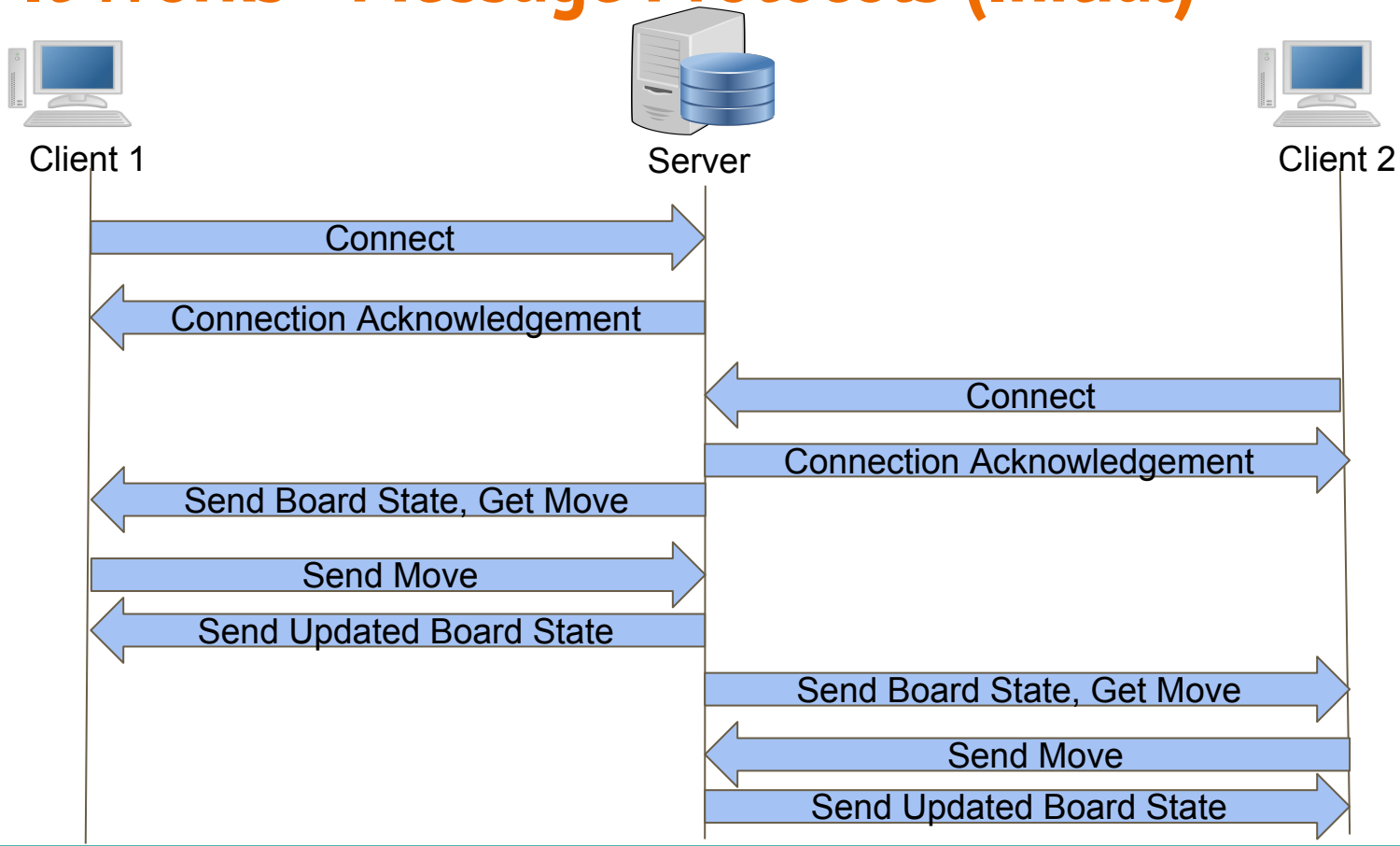
How It Works - Subsystems

1. Server-Client Communication
    a. Clients communicate with the server using the TCP protocol
2. Multithreading
    a. New thread is created by the process every time a client connects
    b. Allows new clients to join at any time
3. Multiprocessing
    a. Each game has its own dedicated process
    b. This lets each process have its own copy of the board state
    c. Ensures reliability and speed
4. Tic Tac Toe and Synchronization
    a. Server handles all rules of Tic Tac Toe, including winning and draw scenarios
    b. Ensures that only one player has access to the board at a time in a game

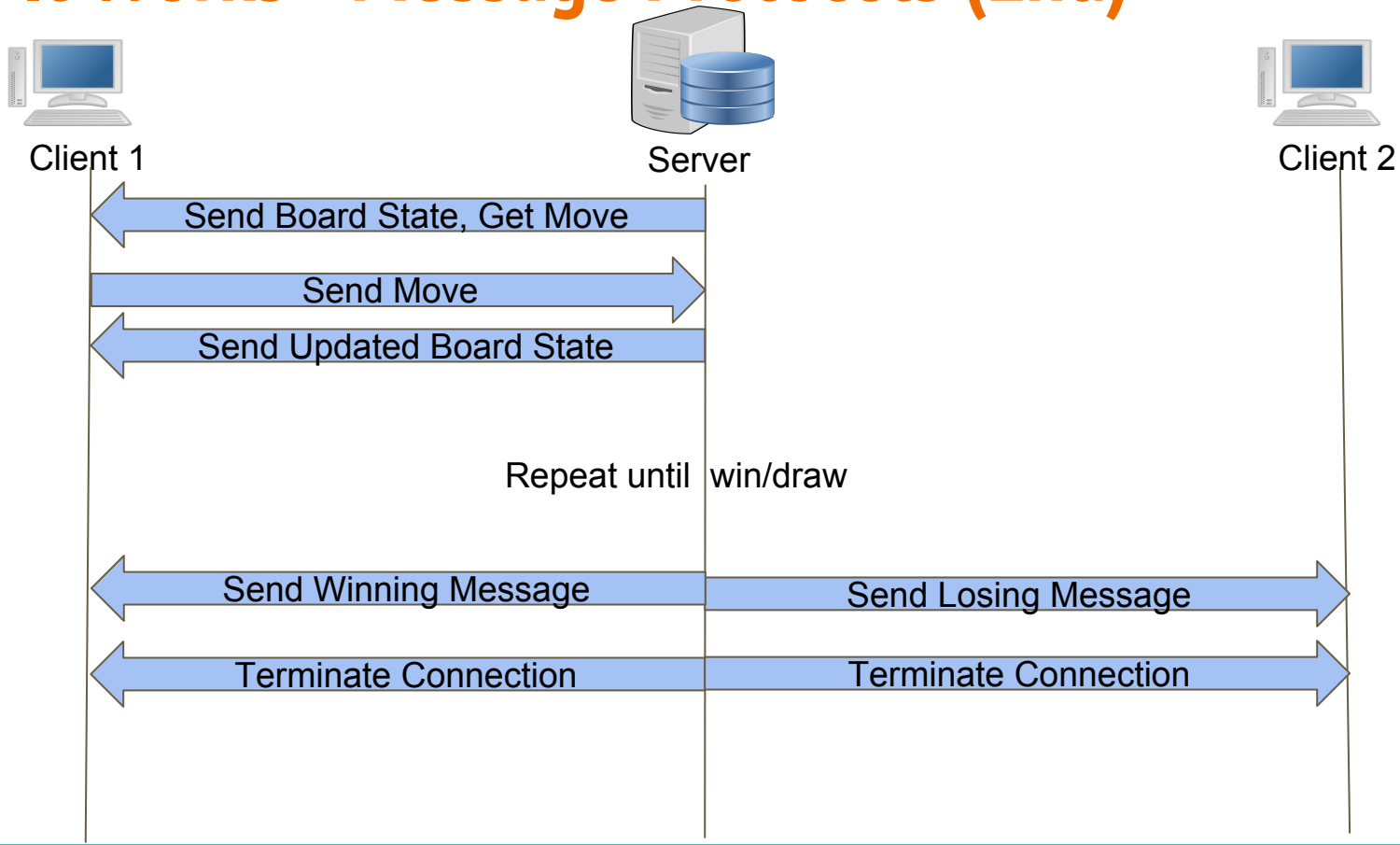
Subsystem Diagram



How It Works - Message Protocols (Initial)



How It Works - Message Protocols (End)



How It Works - User Interface

```
[rab302@ece-ssh1 TicTacToe] ./T3Client localhost 9001
You are connected to a game! You are Player 1 and play X on the board.


 1 | 2 | 3
 ---+---+---
 4 | 5 | 6
 ---+---+---
 7 | 8 | 9


Please enter the number of the square:
1


 X | 2 | 3
 ---+---+---
 4 | 5 | 6
 ---+---+---
 7 | 8 | 9

Waiting for Player 2 to make a move

```

Class Concepts Applied

- Network Server Design
  - Multithreading
  - Multiprocessing
- IO
  - Textual graphical display
- Socket Network Programming/Communication
  - TCP Protocol
  - Client-Server Model

Demo