Towers Architecture

MMO

- Massive Multiplayer Online (MMO) App
  - Typically refers to games, but can include any online app where many users interact in real time
- Today we'll see our first example where users are interacting in realtime in the same app
  - Excluding the chat app which technically met this condition

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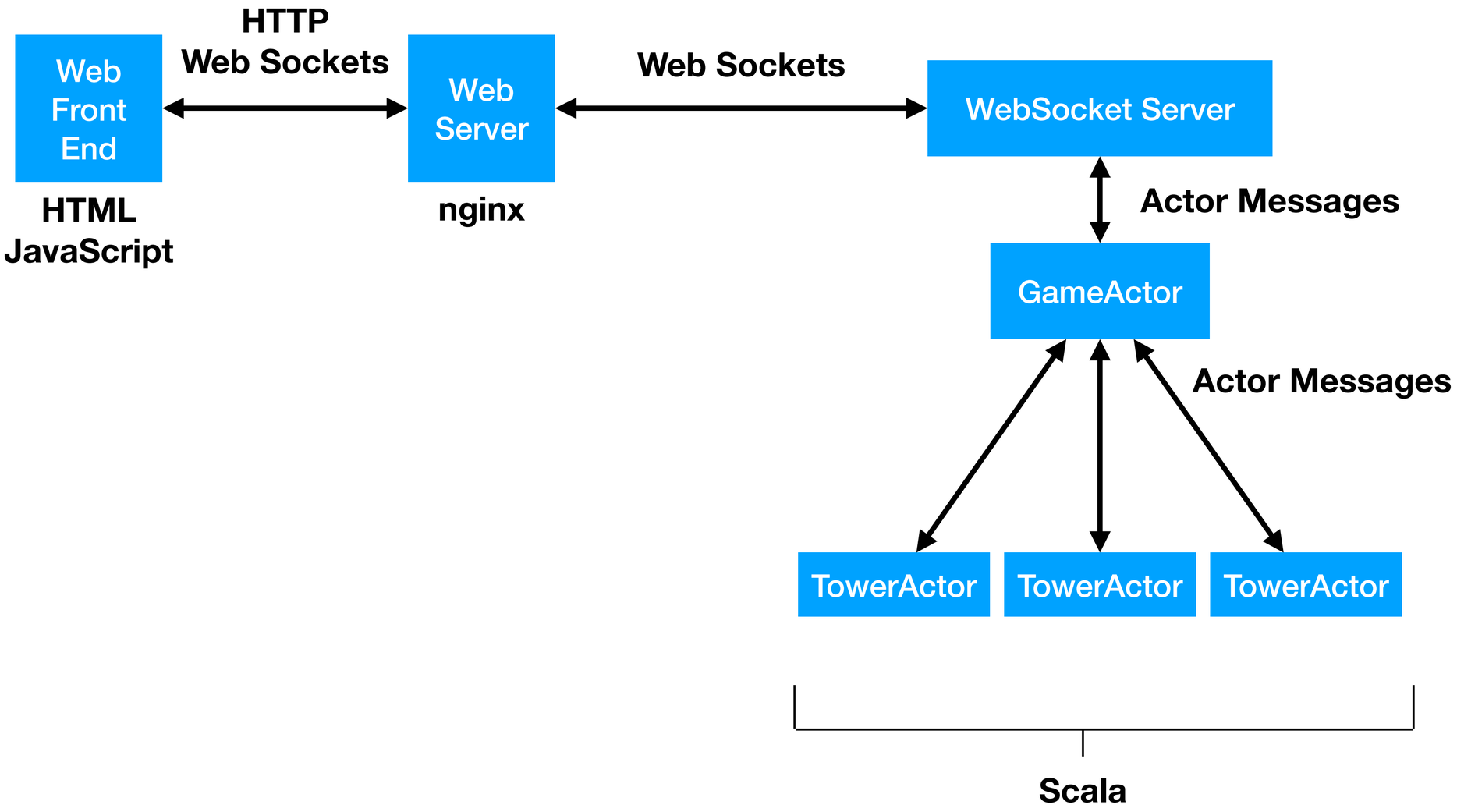

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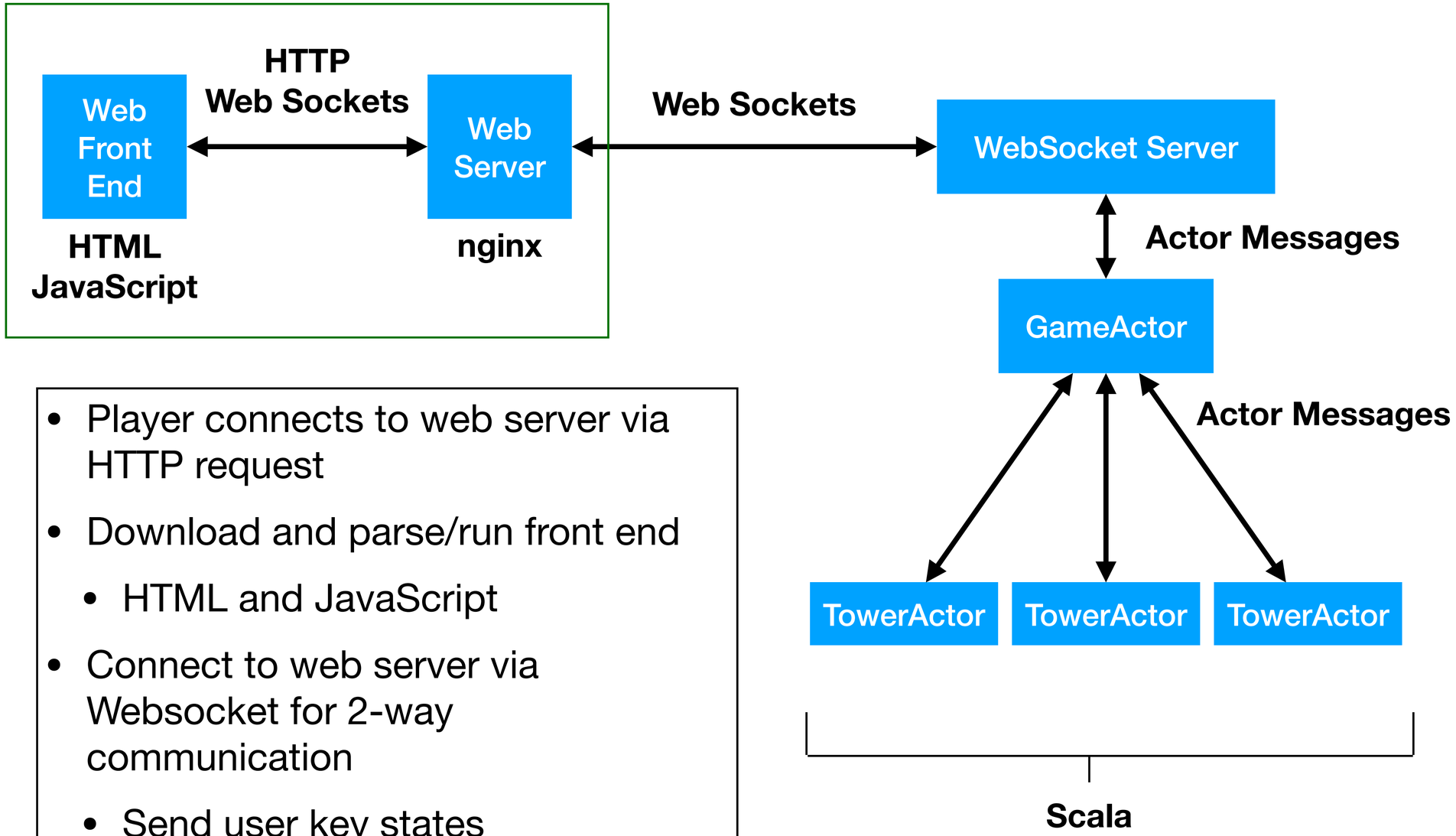

- Player connects to web server via HTTP request
- Download and parse/run front end
  - HTML and JavaScript
- Connect to web server via Websocket for 2-way communication
  - Send user key states
  - Receive and render game state

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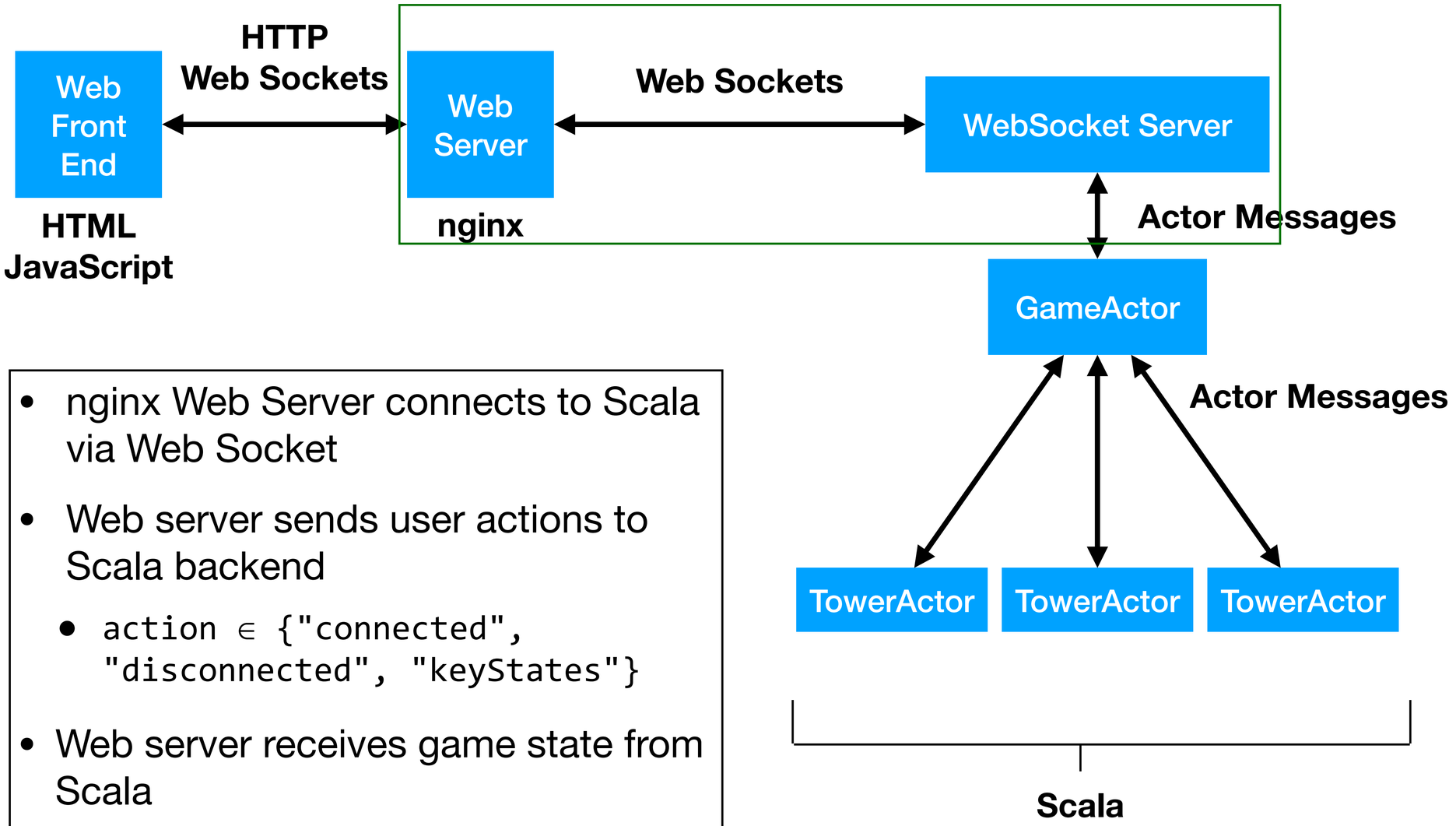

- nginx Web Server connects to Scala via Web Socket
- Web server sends user actions to Scala backend
  - `action ∈ {"connected", "disconnected", "keyStates"}`
- Web server receives game state from Scala
  - Broadcast game state to all players

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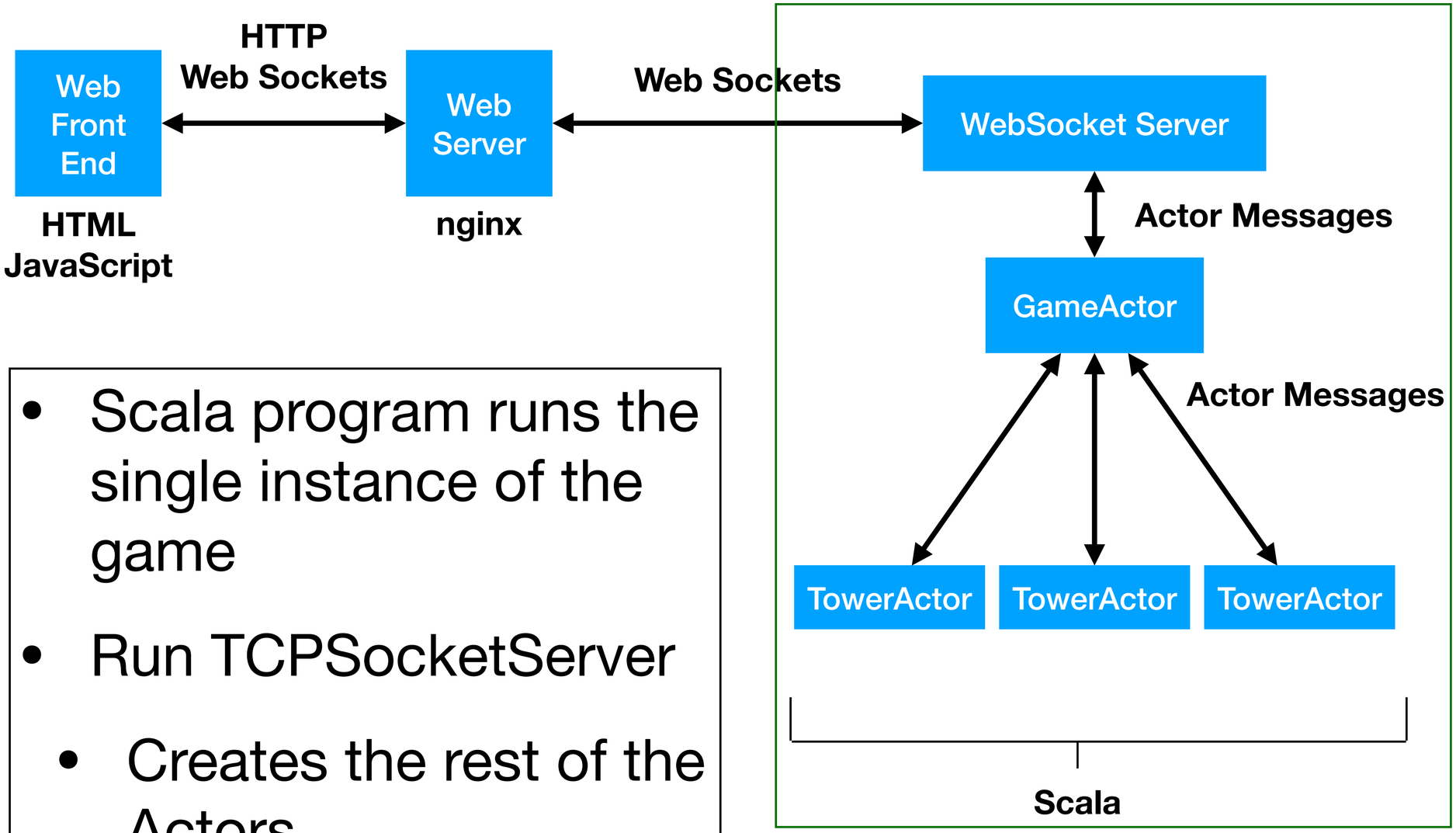

- Scala program runs the single instance of the game
- Run TCPSocketServer
  - Creates the rest of the Actors

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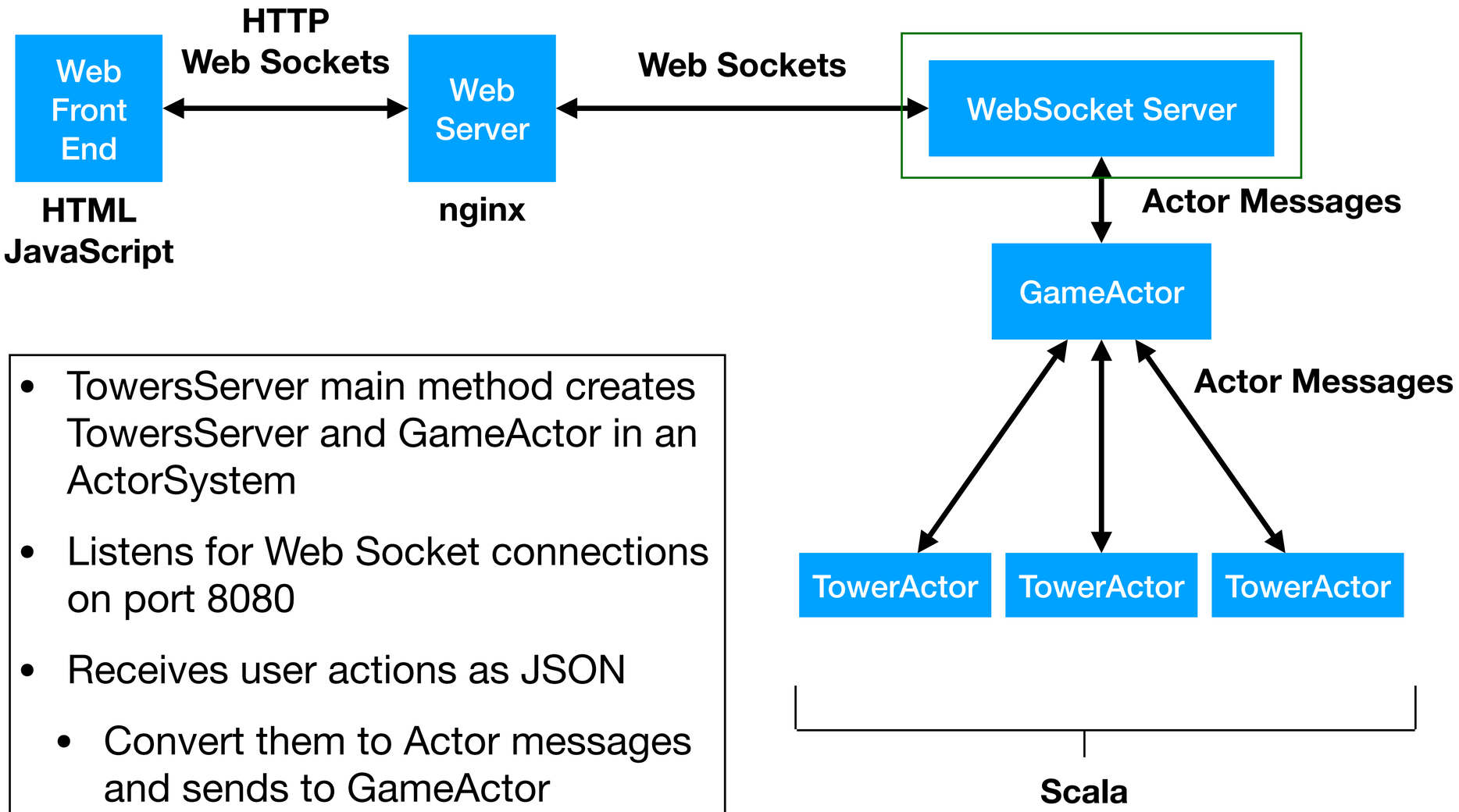

- TowersServer main method creates TowersServer and GameActor in an ActorSystem
- Listens for Web Socket connections on port 8080
- Receives user actions as JSON
  - Convert them to Actor messages and sends to GameActor
- Sends game state over Web Socket

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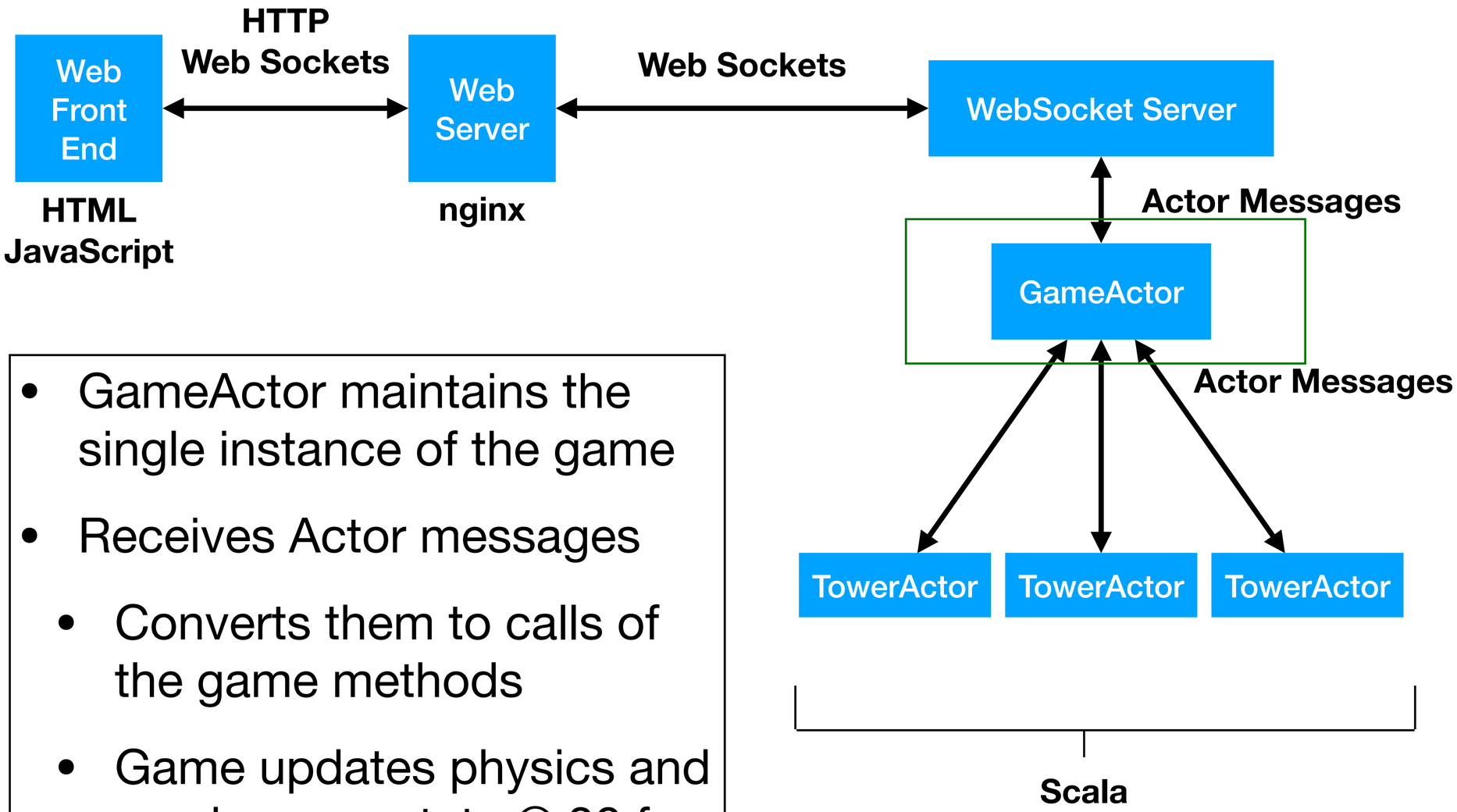

- GameActor maintains the single instance of the game
- Receives Actor messages
  - Converts them to calls of the game methods
  - Game updates physics and sends game state @ 30 fps

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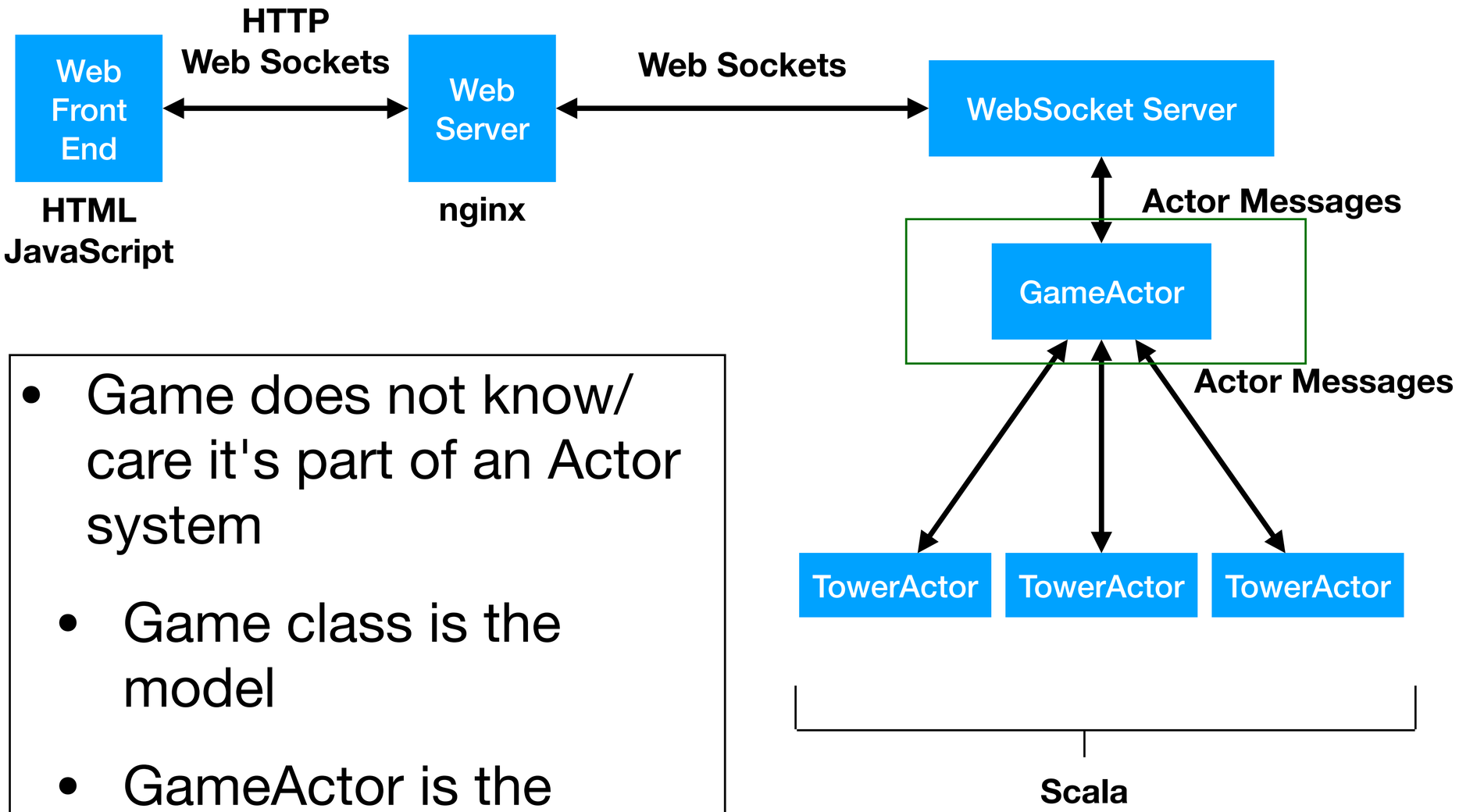

- Game does not know/ care it's part of an Actor system
  - Game class is the model
  - GameActor is the controller

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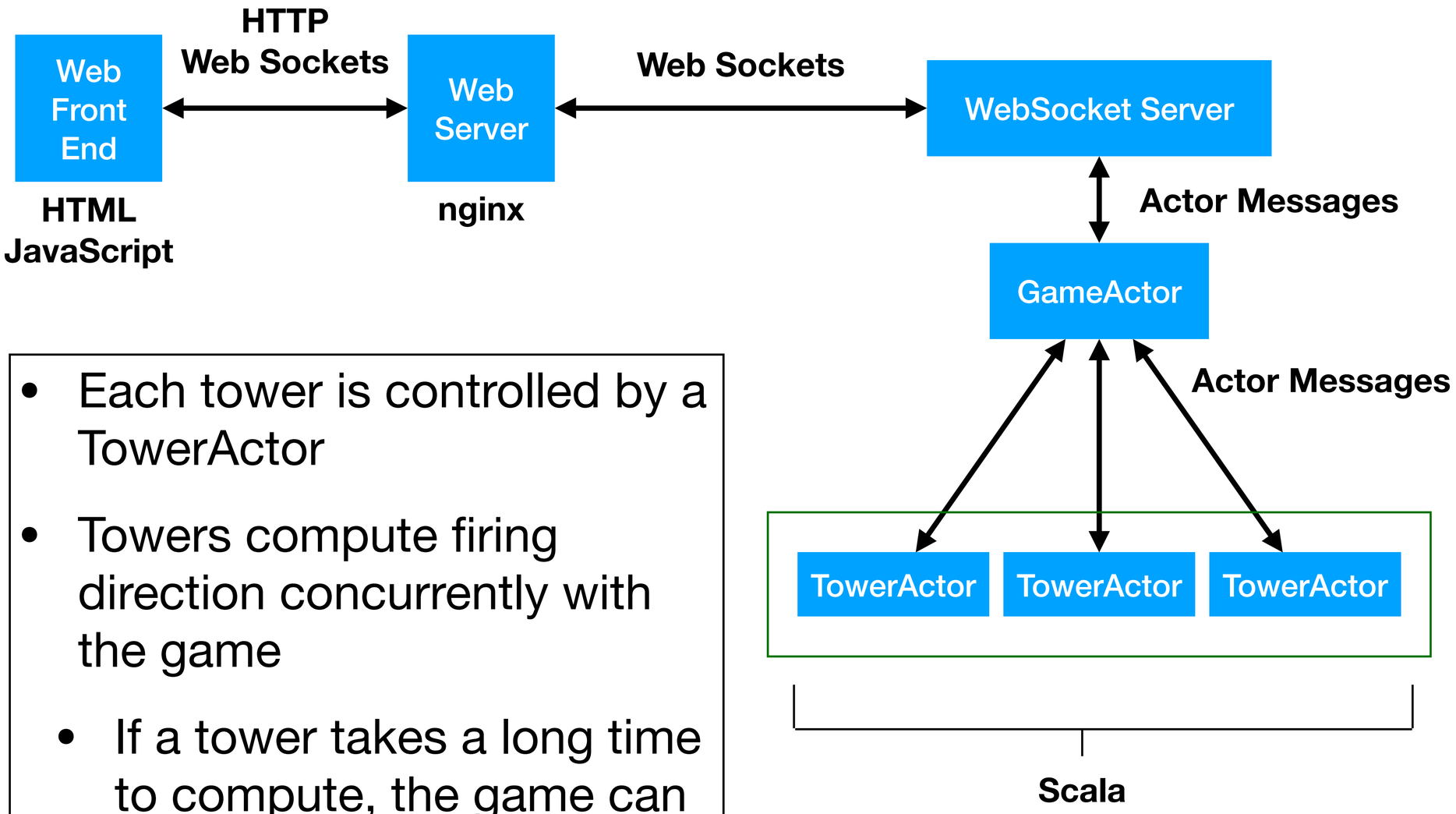

- Each tower is controlled by a TowerActor
- Towers compute firing direction concurrently with the game
  - If a tower takes a long time to compute, the game can still run without lag

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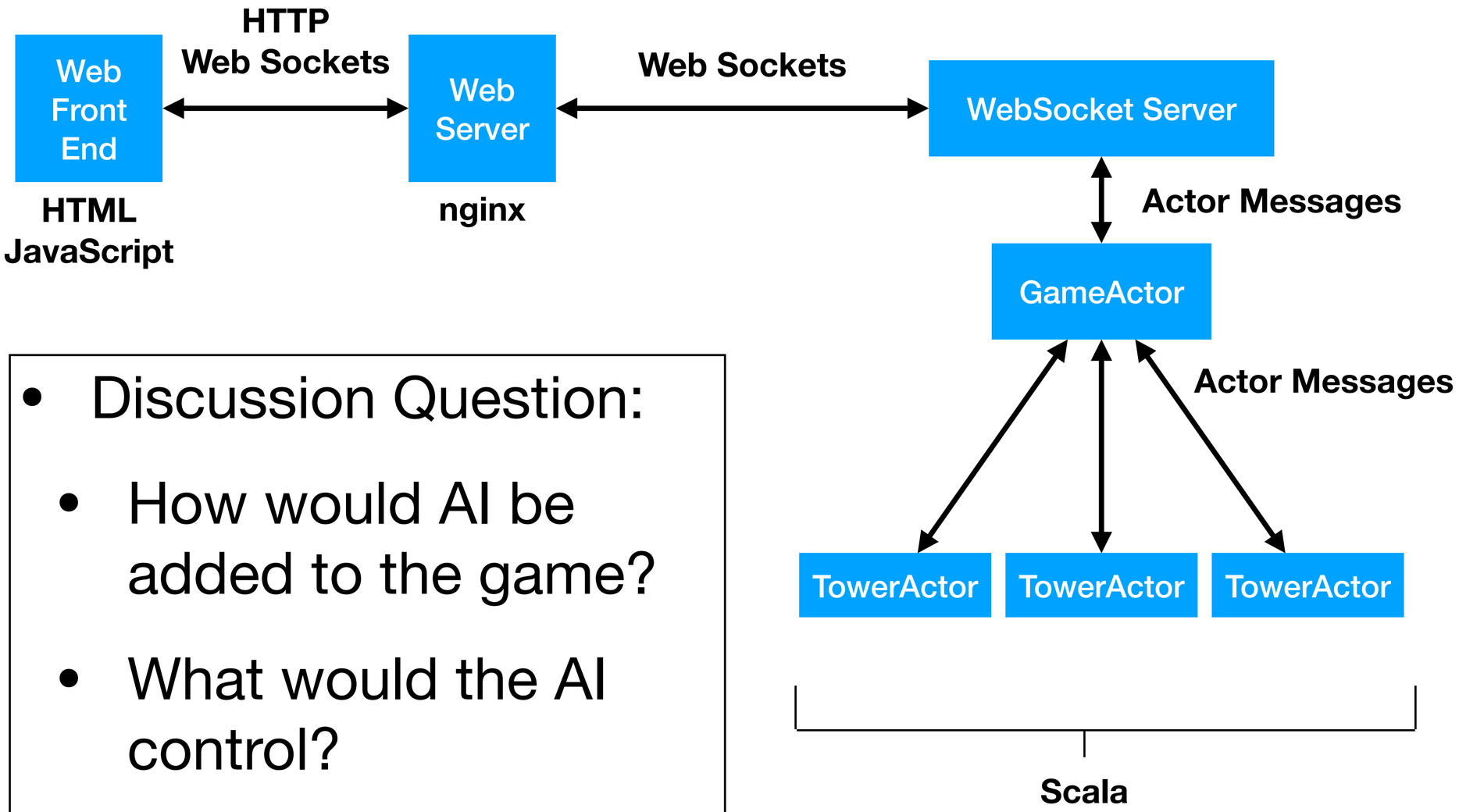

- Discussion Question:
  - How would AI be added to the game?
  - What would the AI control?
  - How would it behave?

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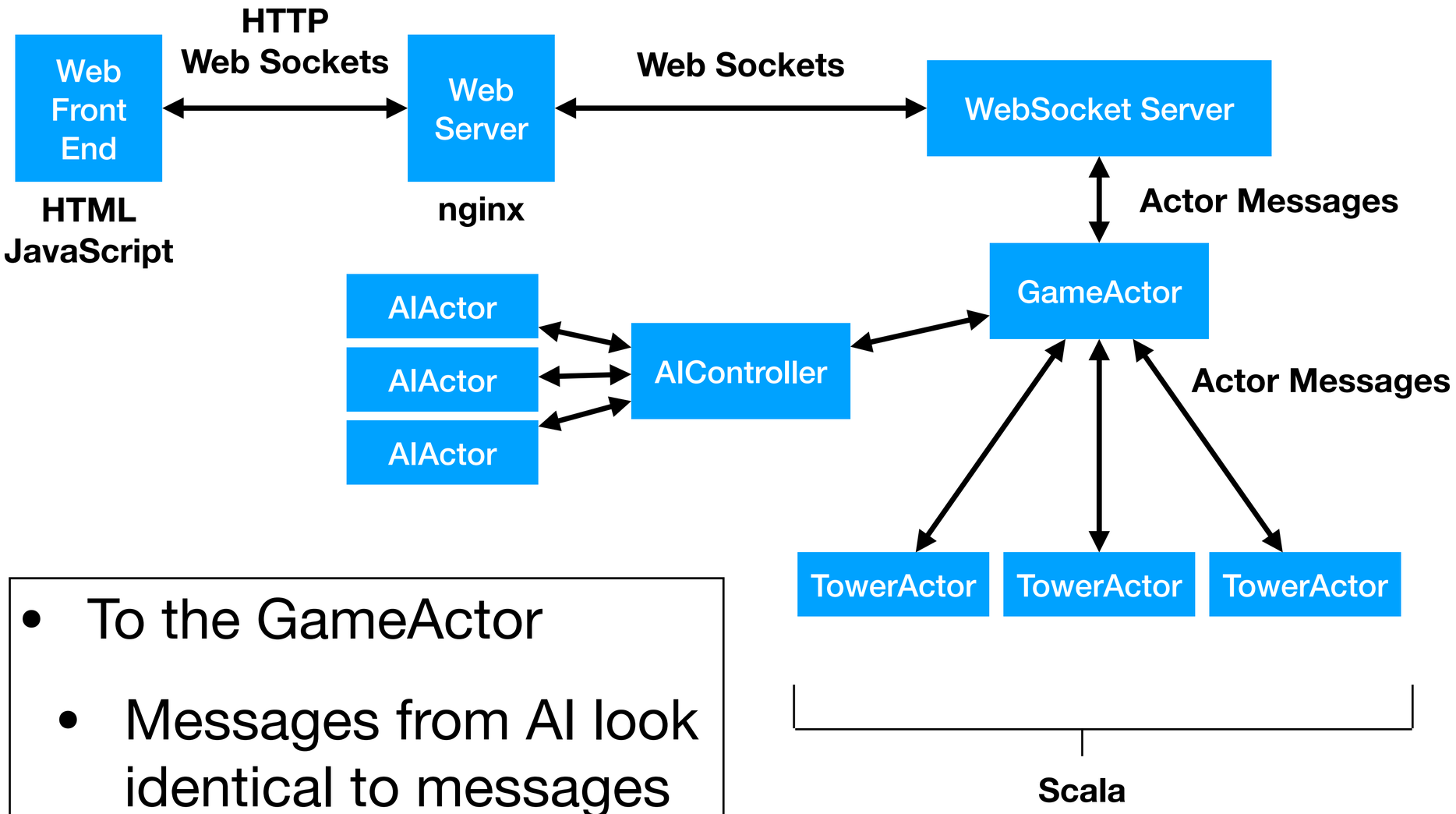

- To the GameActor
  - Messages from AI look identical to messages from human players

Example App

- We'll see a [simple] app where users can see each others mouse movements
  - Not particularly fun, but shows the technology used to build a full game

Example in IntelliJ