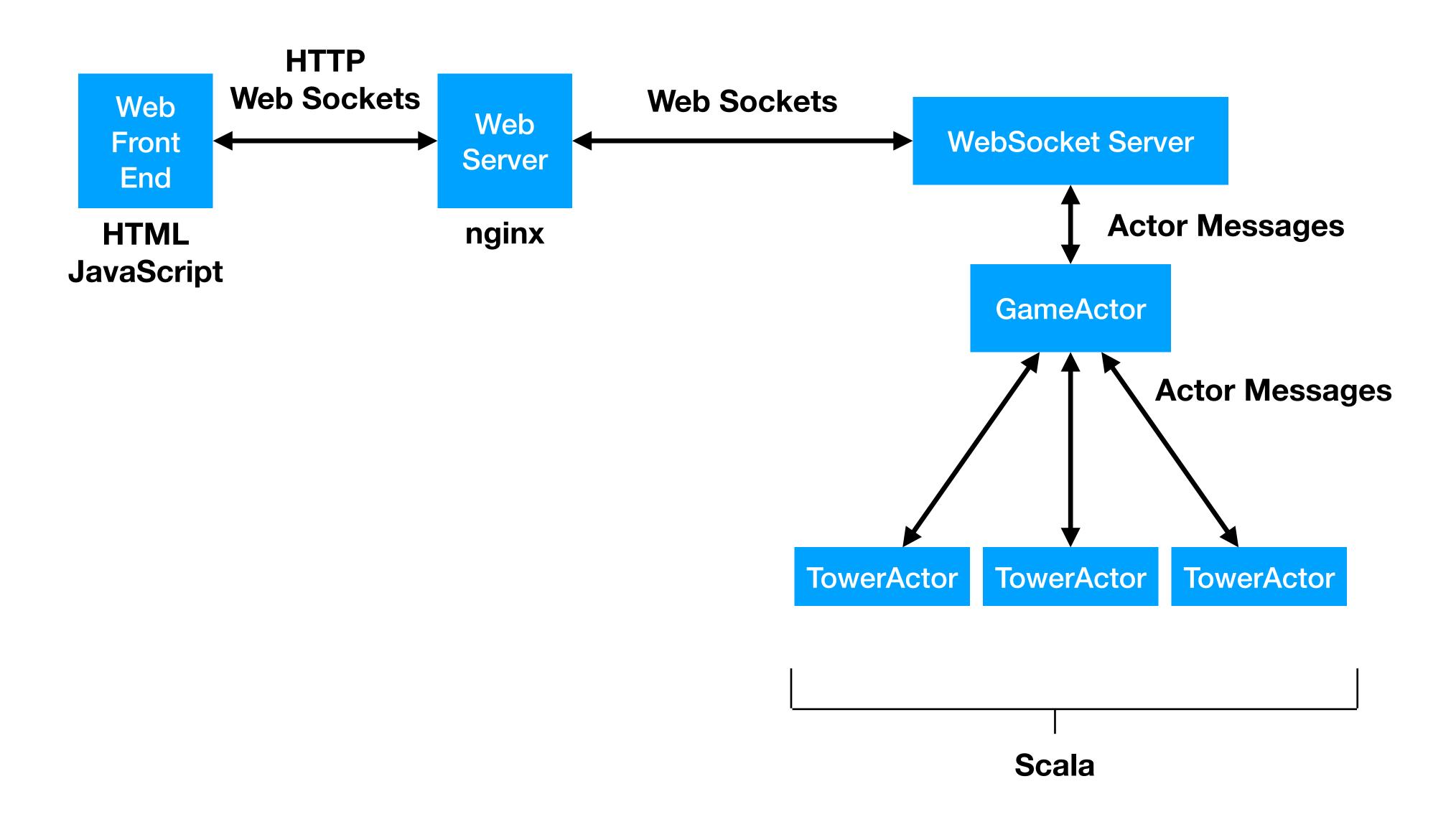
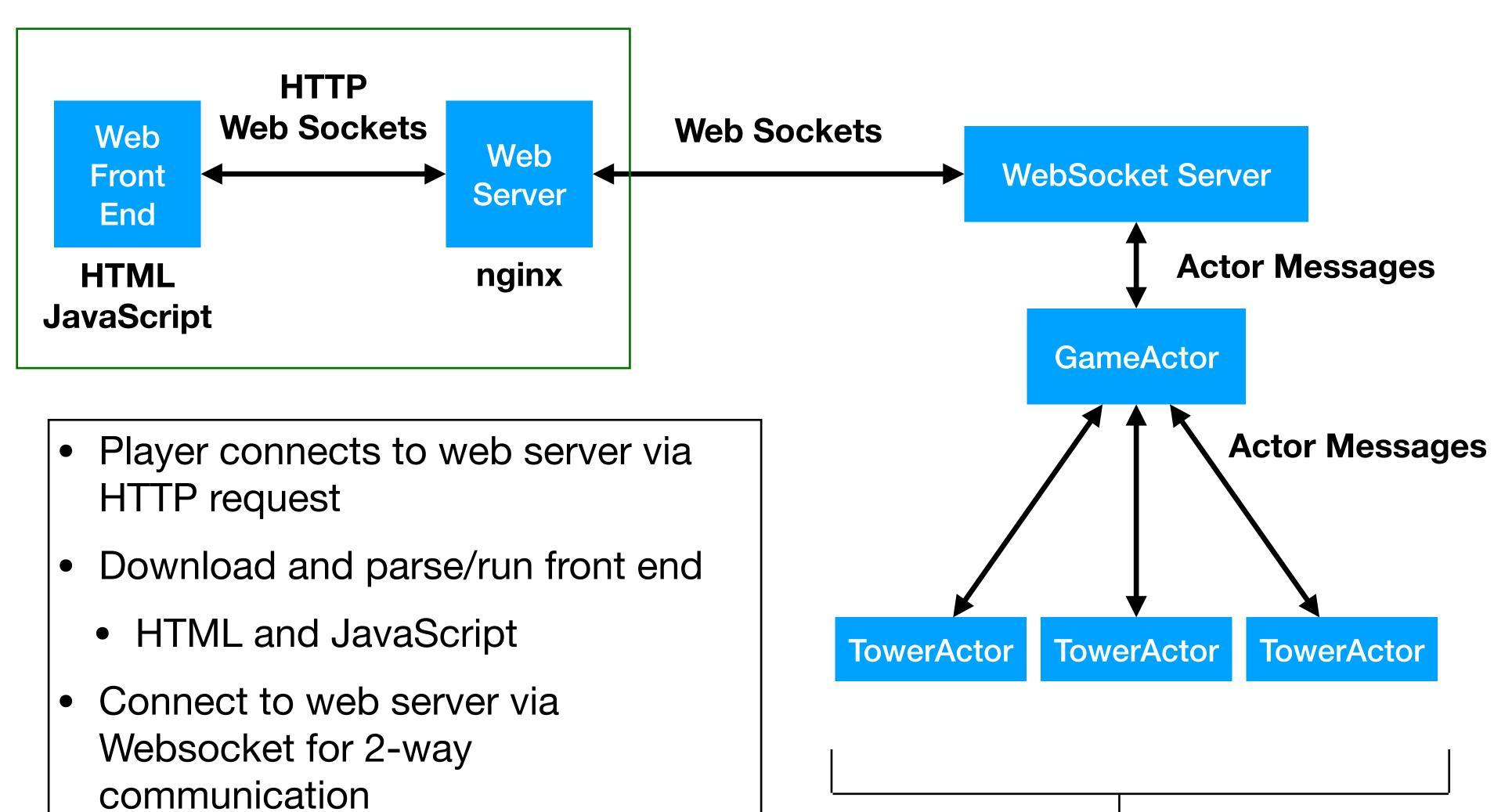
#### MMO

- 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

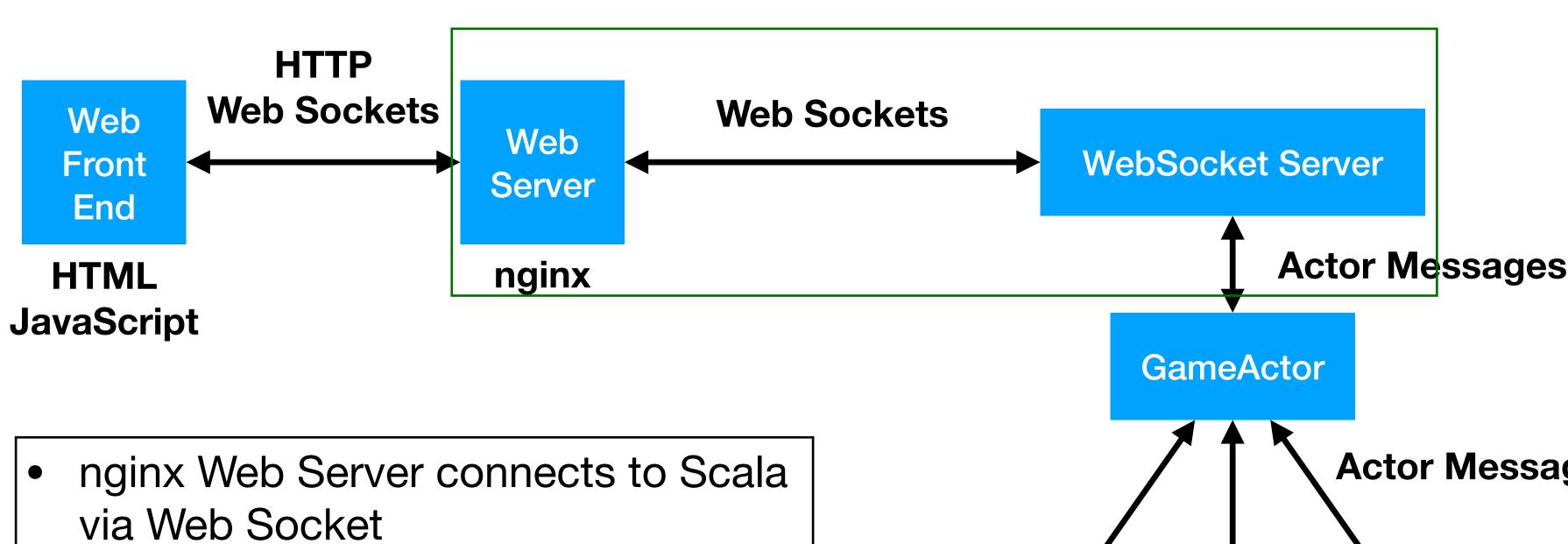




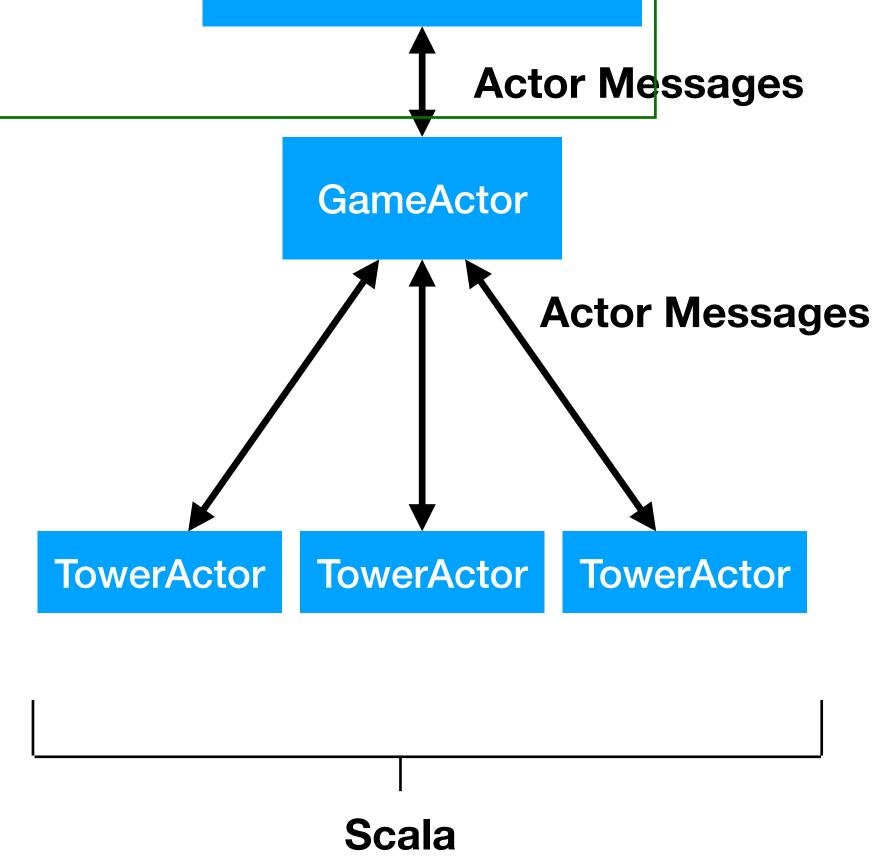
Scala

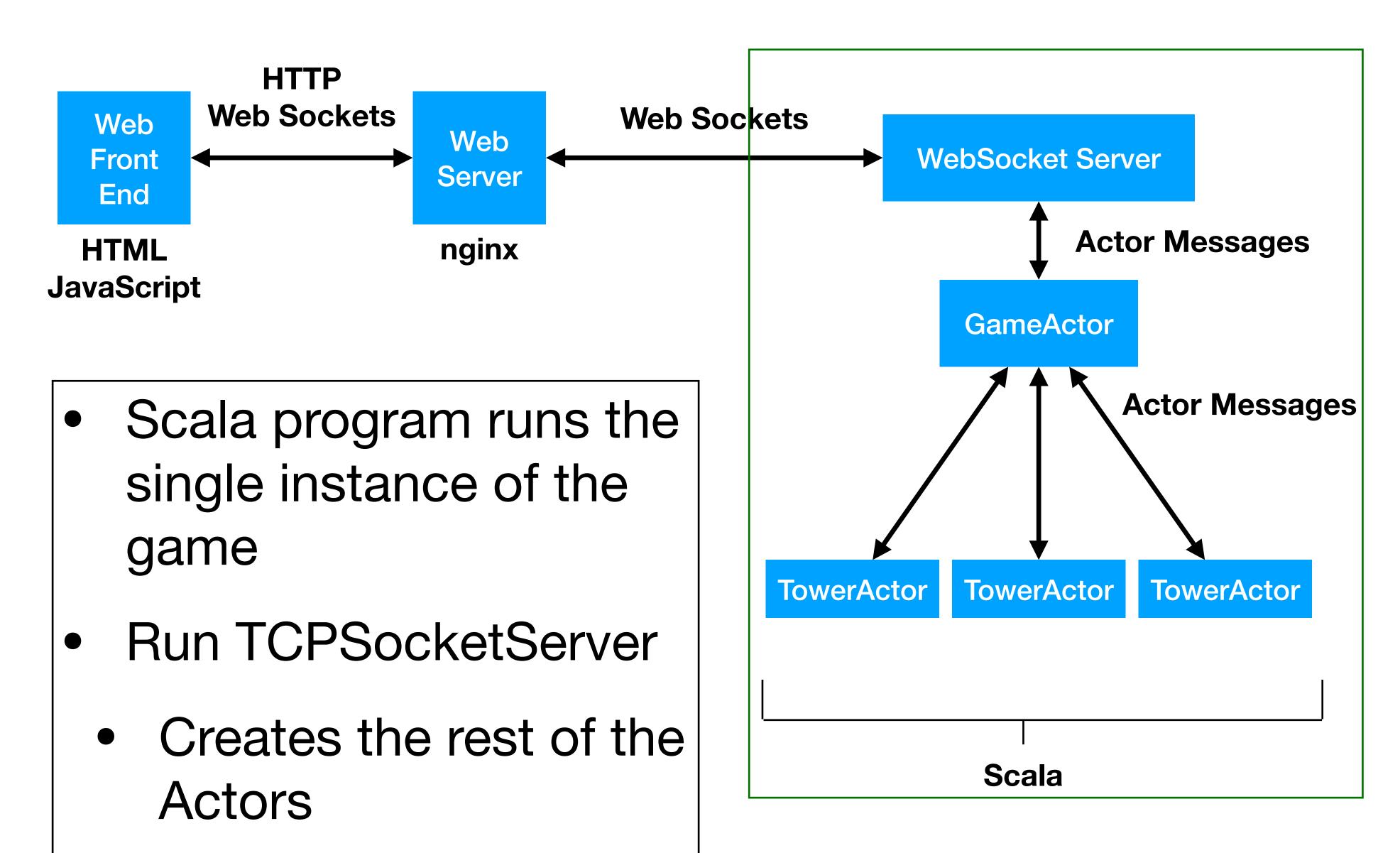
Send user key states

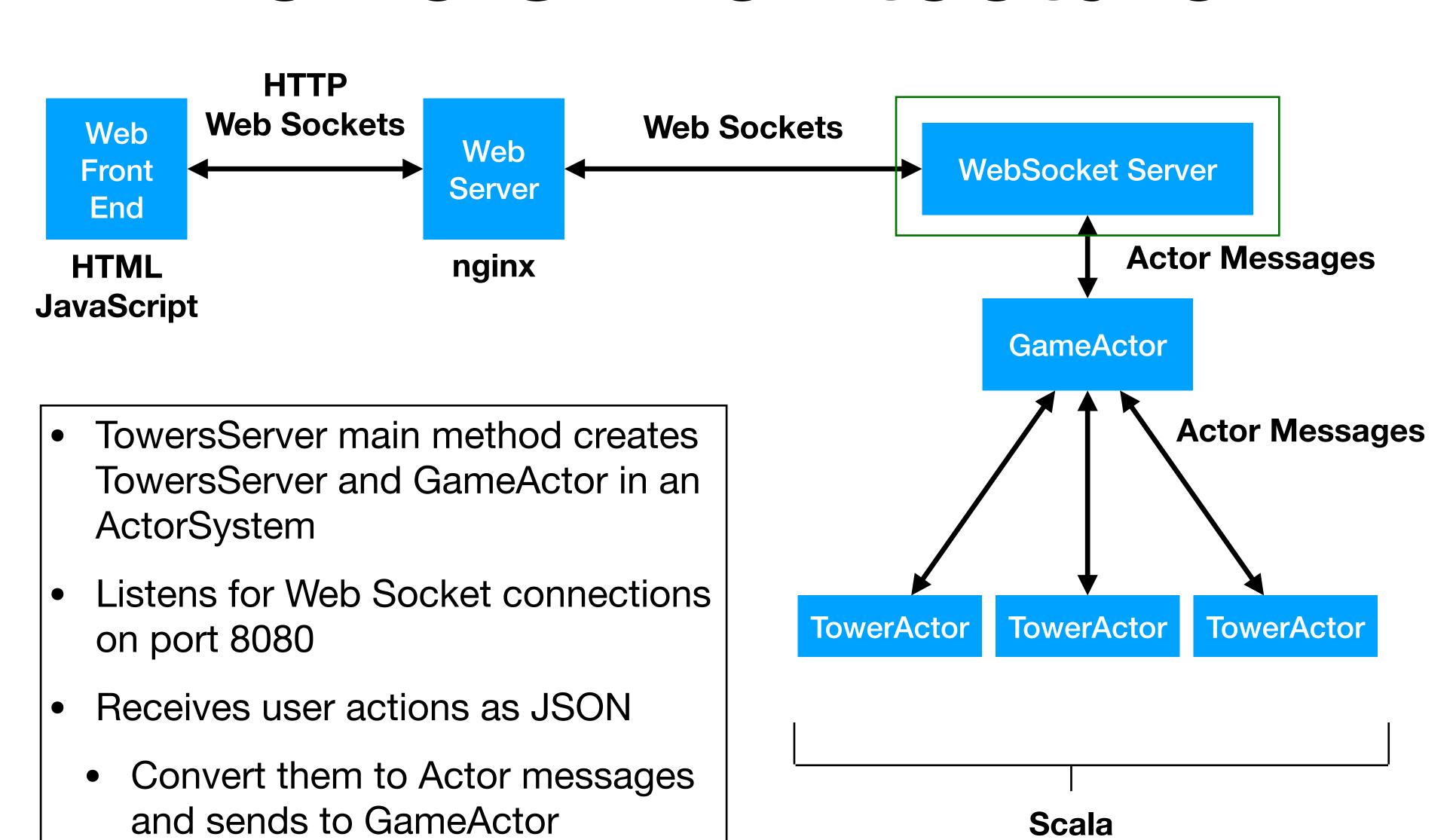
Receive and render game state



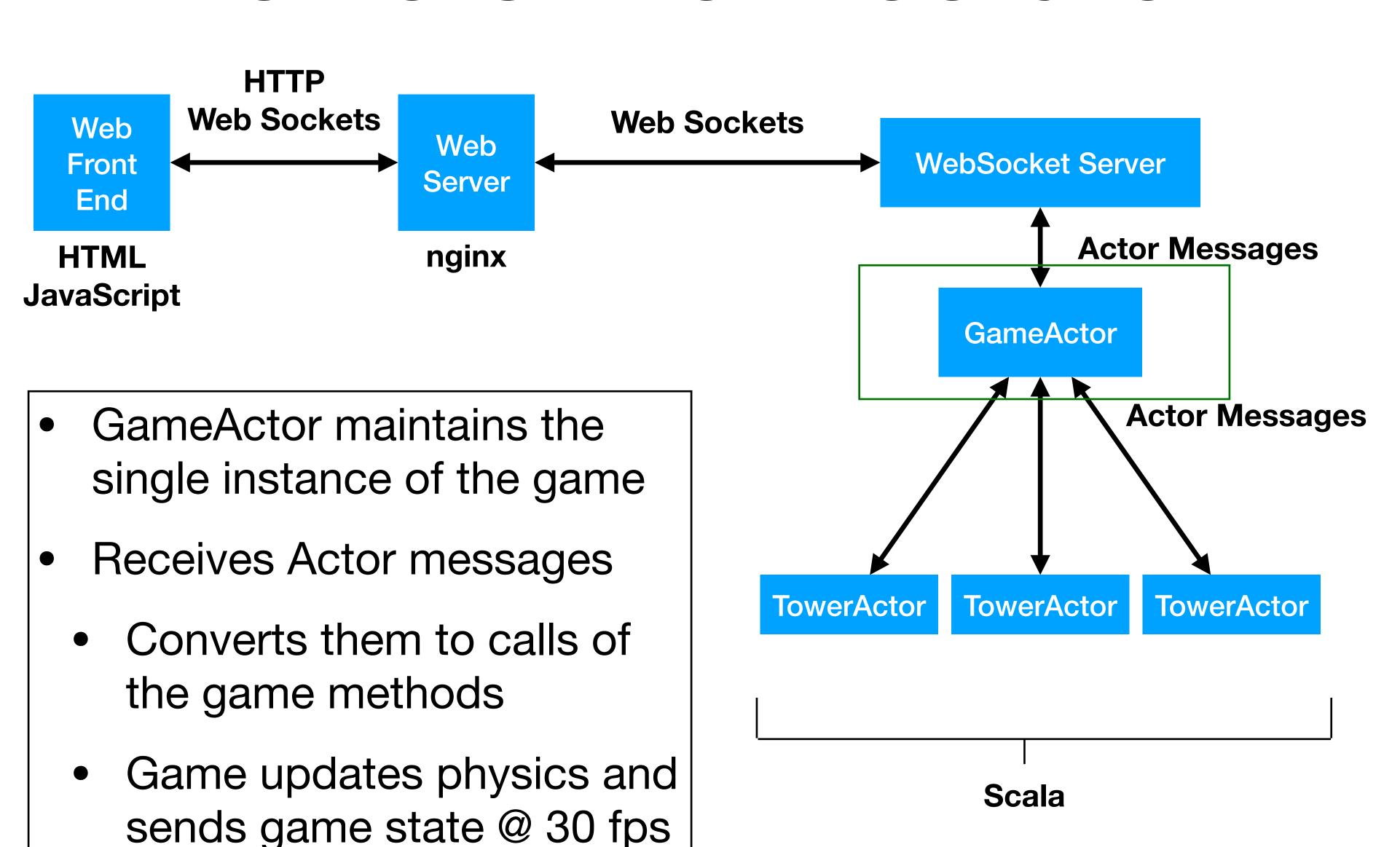
- Web server sends user actions to Scala backend
  - action ∈ {"connected",
    "disconnected", "keyStates"}
- Web server receives game state from Scala
  - Broadcast game state to all players

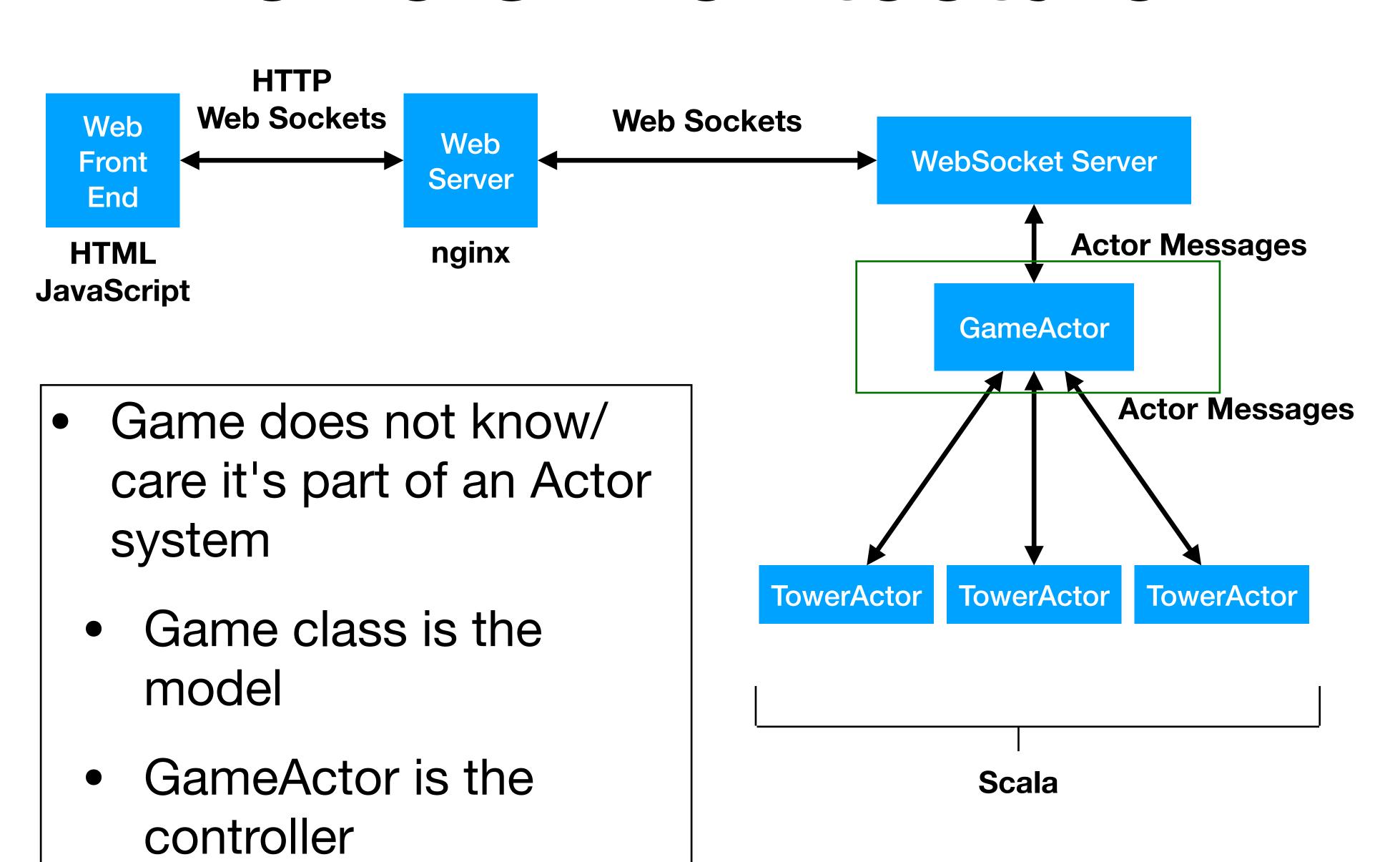


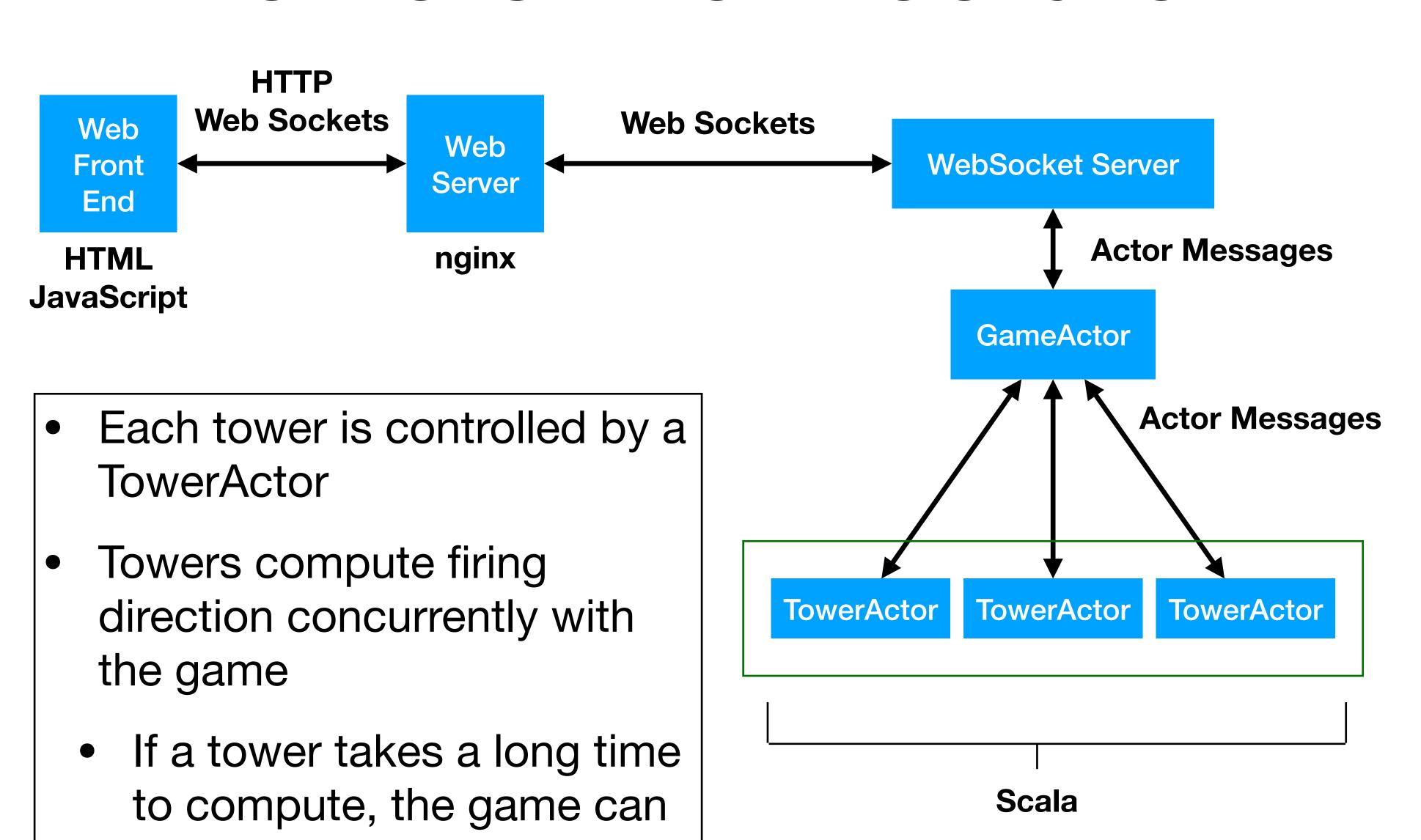




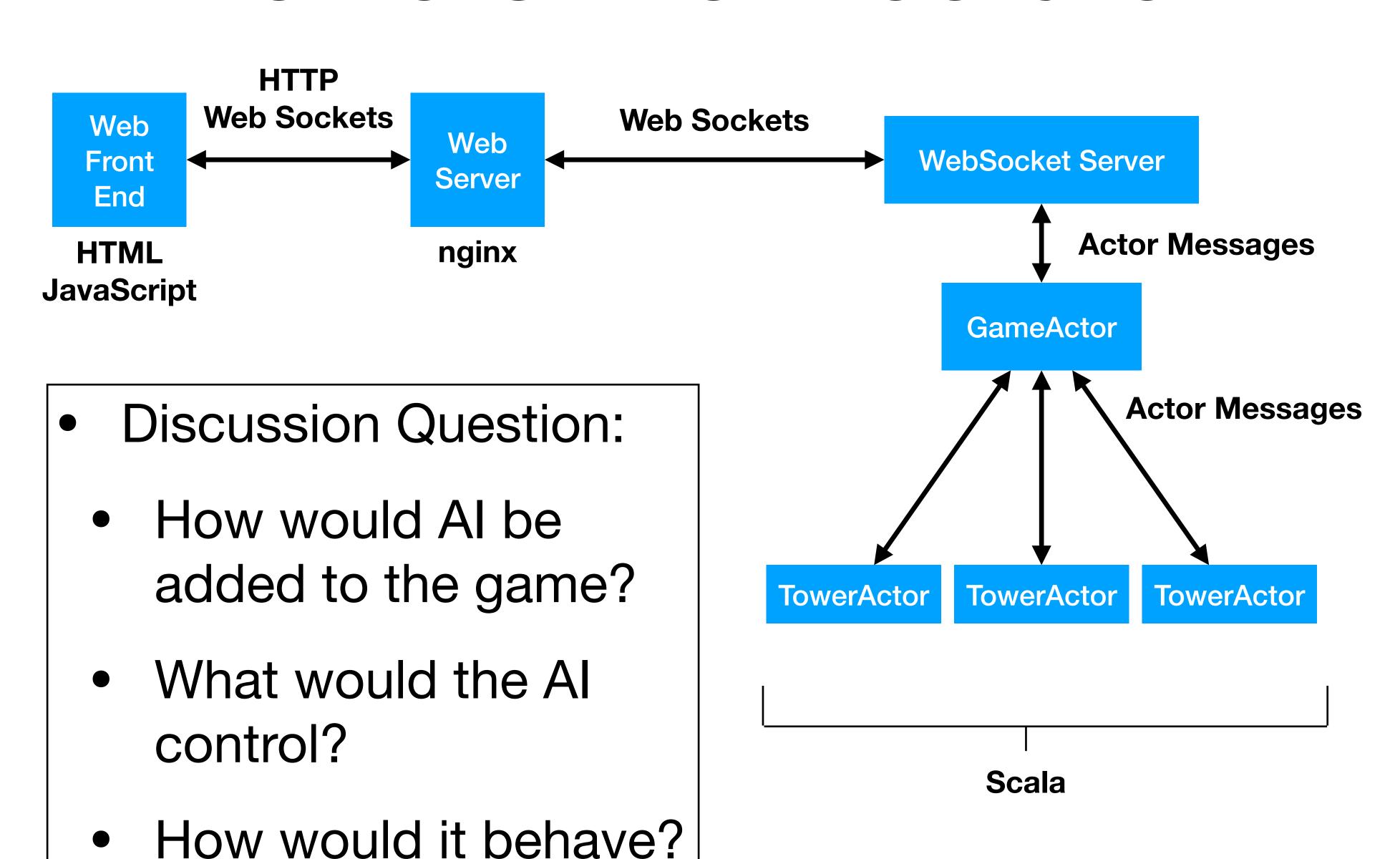
Sends game state over Web Socket

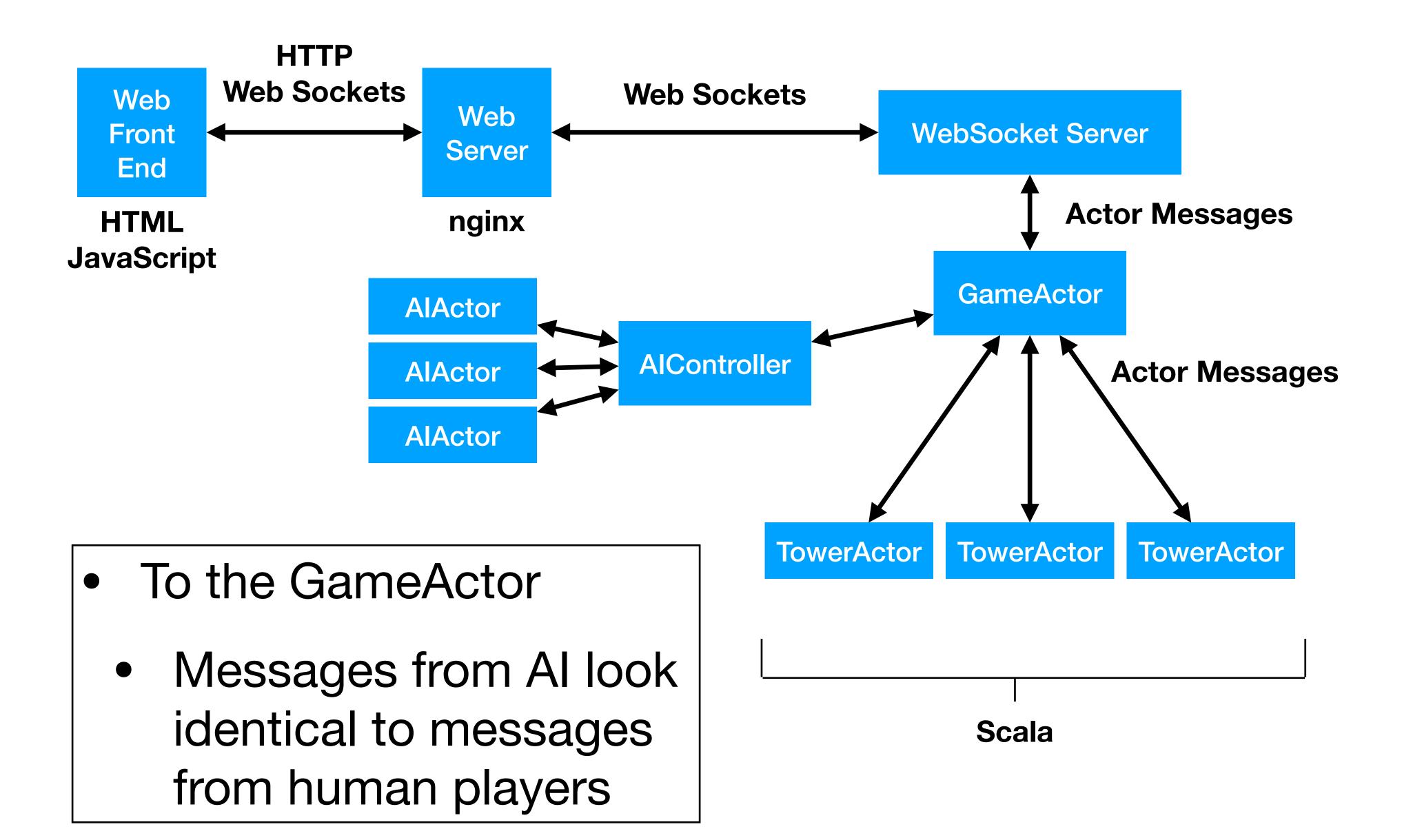






still run without lag





## 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