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# Bergmans Mechatronics LLC

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***EarthControl:***  
**A Real-Time, Multi-User**  
**Facebook Game**  
**Enabled by HTML5 WebSocket**

John Bergmans  
Bergmans Mechatronics LLC  
[www.bergmans.com](http://www.bergmans.com)

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# EarthControl Screenshot

facebook Home Profile Friends Inbox Doer Bergmans Settings

## EarthControl



The game interface features a central Earth with several rockets orbiting it. The rockets have colored tips: cyan, green, yellow, blue, purple, and grey. Scattered around the Earth are several grey oil barrels, each labeled 'OIL'. In the top right corner, there is a yellow sun with a face and a grey rocket with a red tip. A small grey rocket with a green tip is labeled with the number '3'. The background is a solid light blue.

Users - This Game ?  
All Time ?

**Rank**

**Ship Color - This Game**

**Playing How**

Score	Name
1 ✓	453 <a href="#">John Bergmans</a>
2 ✓	109 <a href="#">Doer Bergmans</a>

**Telecom**

**John:** Greetings Doer  
**Doer:** Hello J!

Doer Bergmans says...

My Ship Color  
Help Credits  
FX BG

developed by **Bergmans Mechatronics LLC**

**Share**  
Become a Fan and get info at the [EarthControl Profile Page](#)  
Follow EC on Twitter to receive a Tweet when users join EC

**CDMS inc**  
IT Services in Ottawa, Canada

**User Stats** ?  
Total Users 35  
Playing Now 2

## ***EarthControl Overview***

URL <http://apps.facebook.com/earthcontrol>

### **Objectives**

- Fly ship into space to collect oil
- Return to earth with oil on-board for points
- Shoot opponents to capture their oil on-board
- Control ship using arrow keys for movement, space bar to shoot
- Chat with opponents using “Telecom” box

### **Structure**

- Multi-player, real-time game
- Up to 8 users served by one game instance
- Upper limit on number of game instances: TBD (probably at least 100s)
- Players use conventional web browsers to access the game
- Minimal use of plug-ins (Flash 8+ required for sound support)

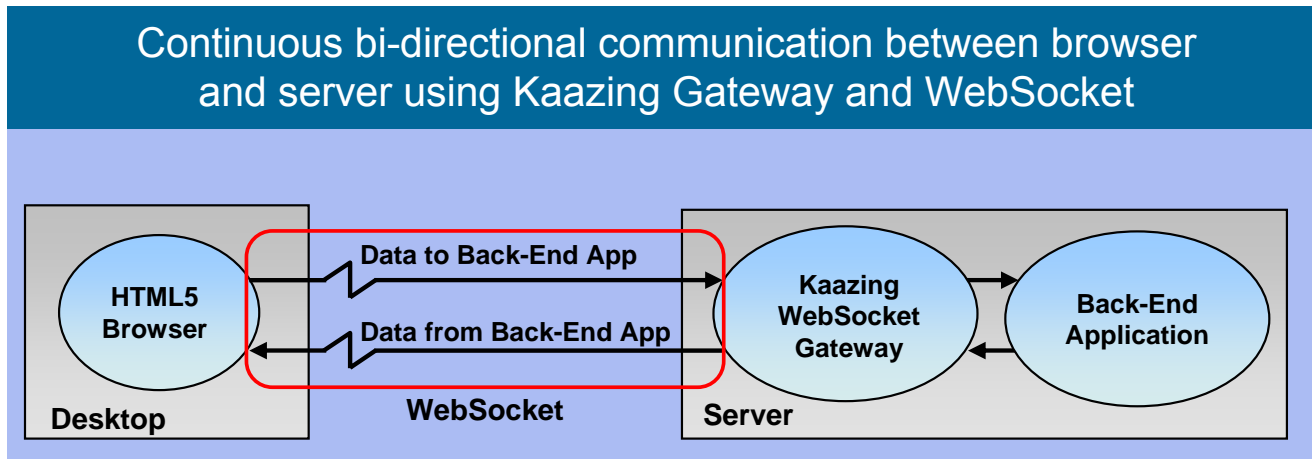
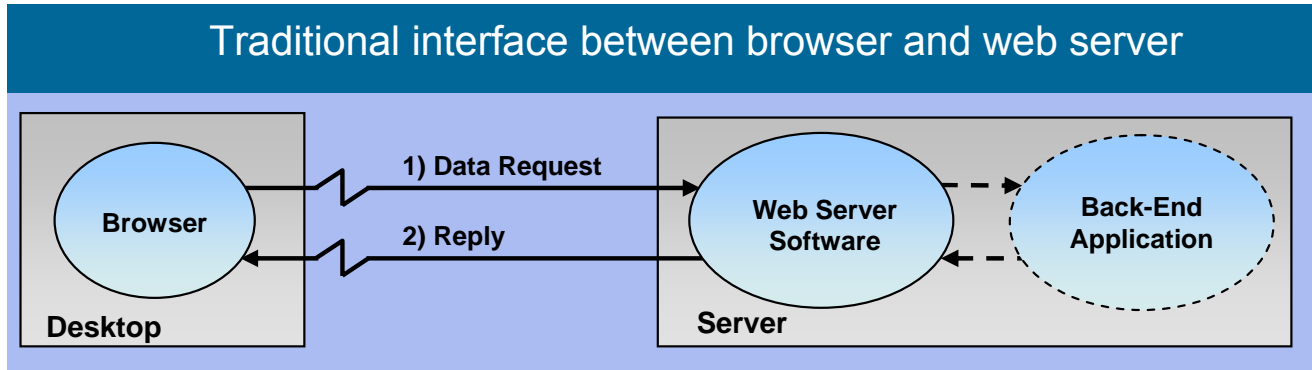
### **Technologies**

- HTML5 WebSocket and Kaazing Gateway Server
- STOMP server
- MySQL database
- Client code: JavaScript and PHP
- Server code: PHP

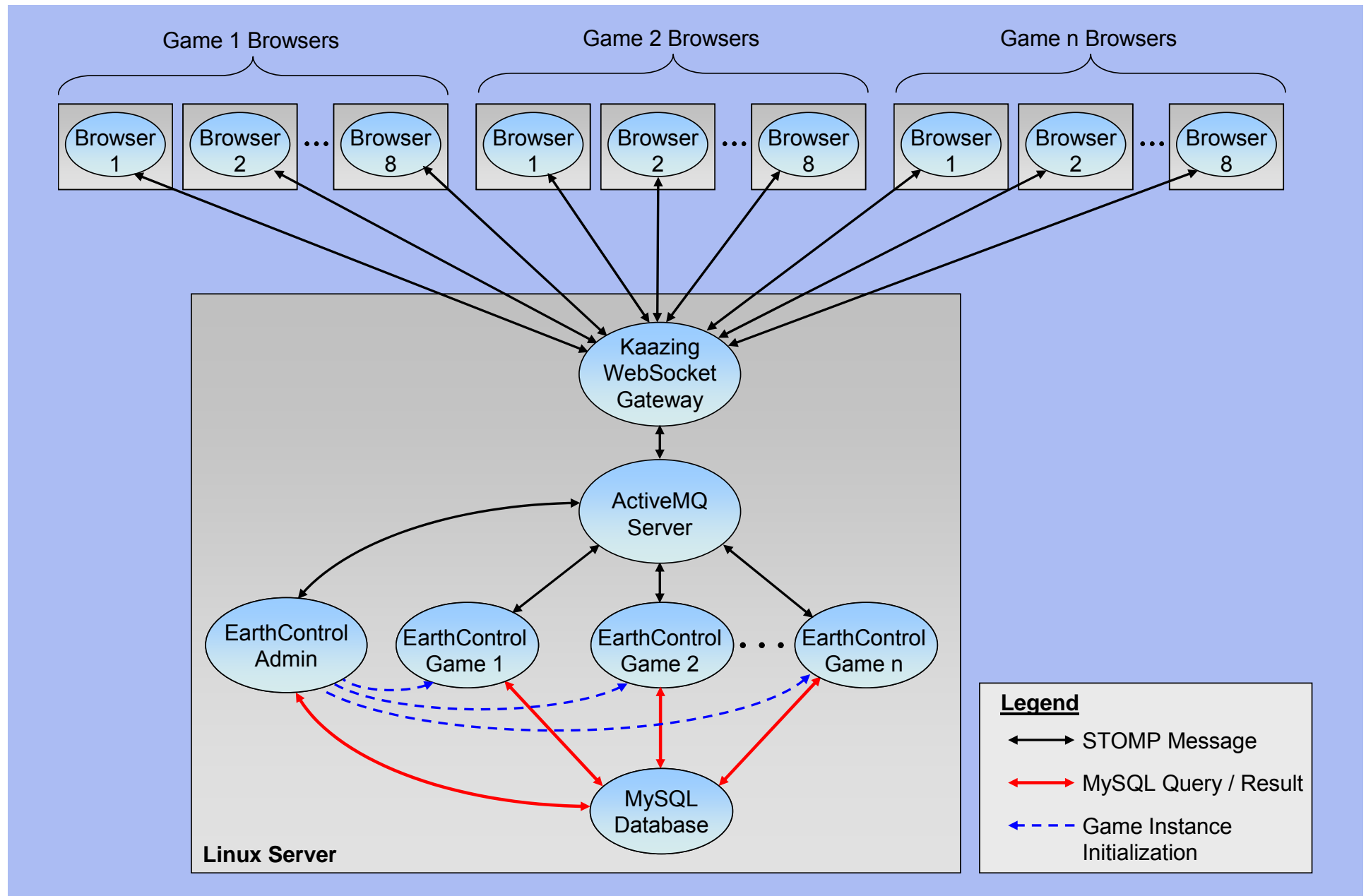
### **Why Facebook?**

- Large number of interconnected users
  - Existing user login system
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# Traditional and WebSocket Implementations of Browser/Back-End Communications



## Browser – Server Architecture for *EarthControl* Application

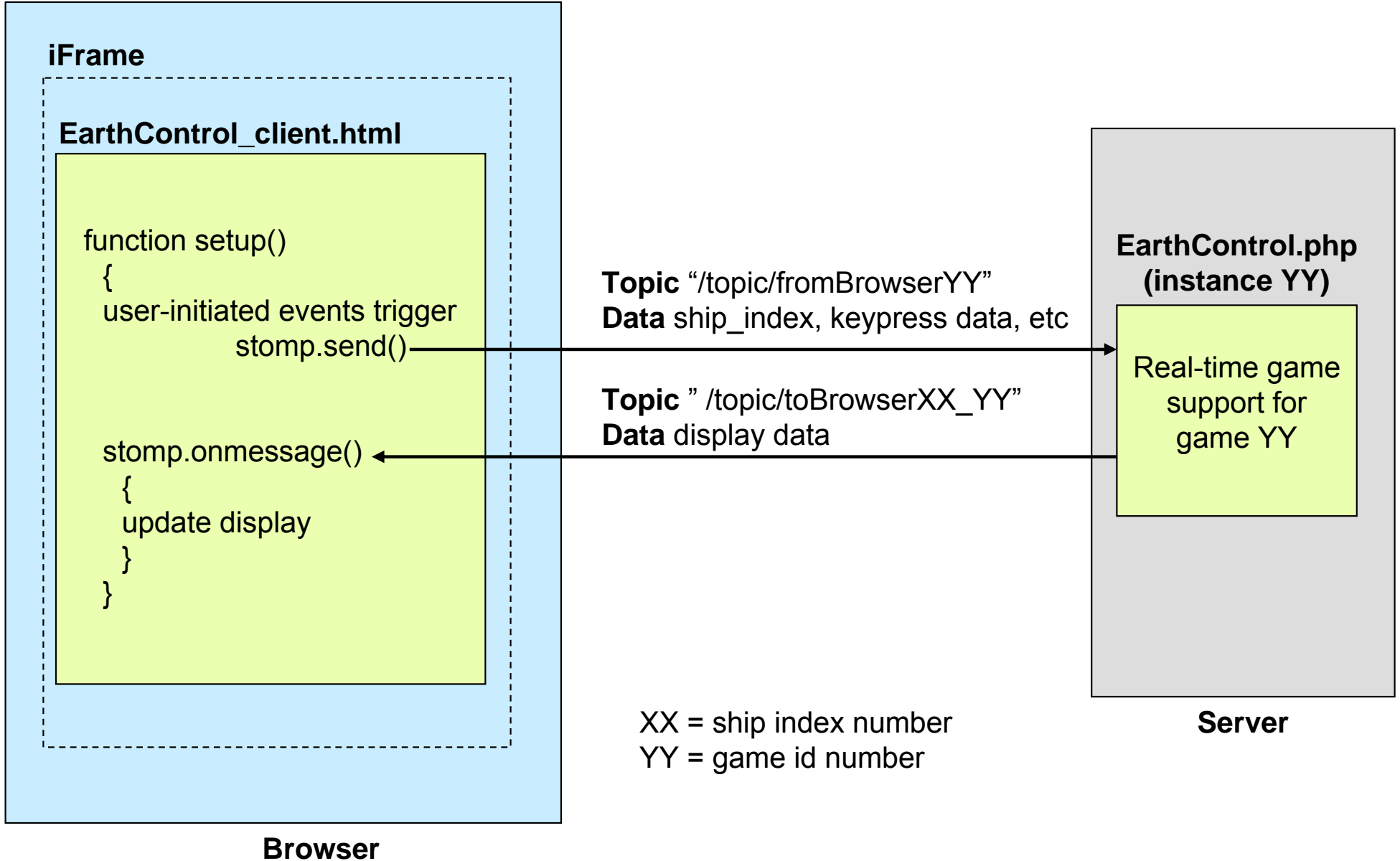


## Performance

- Typical server transmit rate to each browser:  
char string approximately 340 character in length at about 10 Hz  $\approx$  3400 bytes/sec
  - Latency between user input and display update:  $< \sim 100$  ms.
  - Kaazing's WebSocket Emulation enables WebSocket capability on current non-HTML5 browsers
  - *EarthControl* functions well using these browsers
    - Google Chrome (version 2.0 or later)
    - Safari (version 4.0 or later)
    - Firefox (version 3.0 or later)
    - Internet Explorer (version 7.0 or later)
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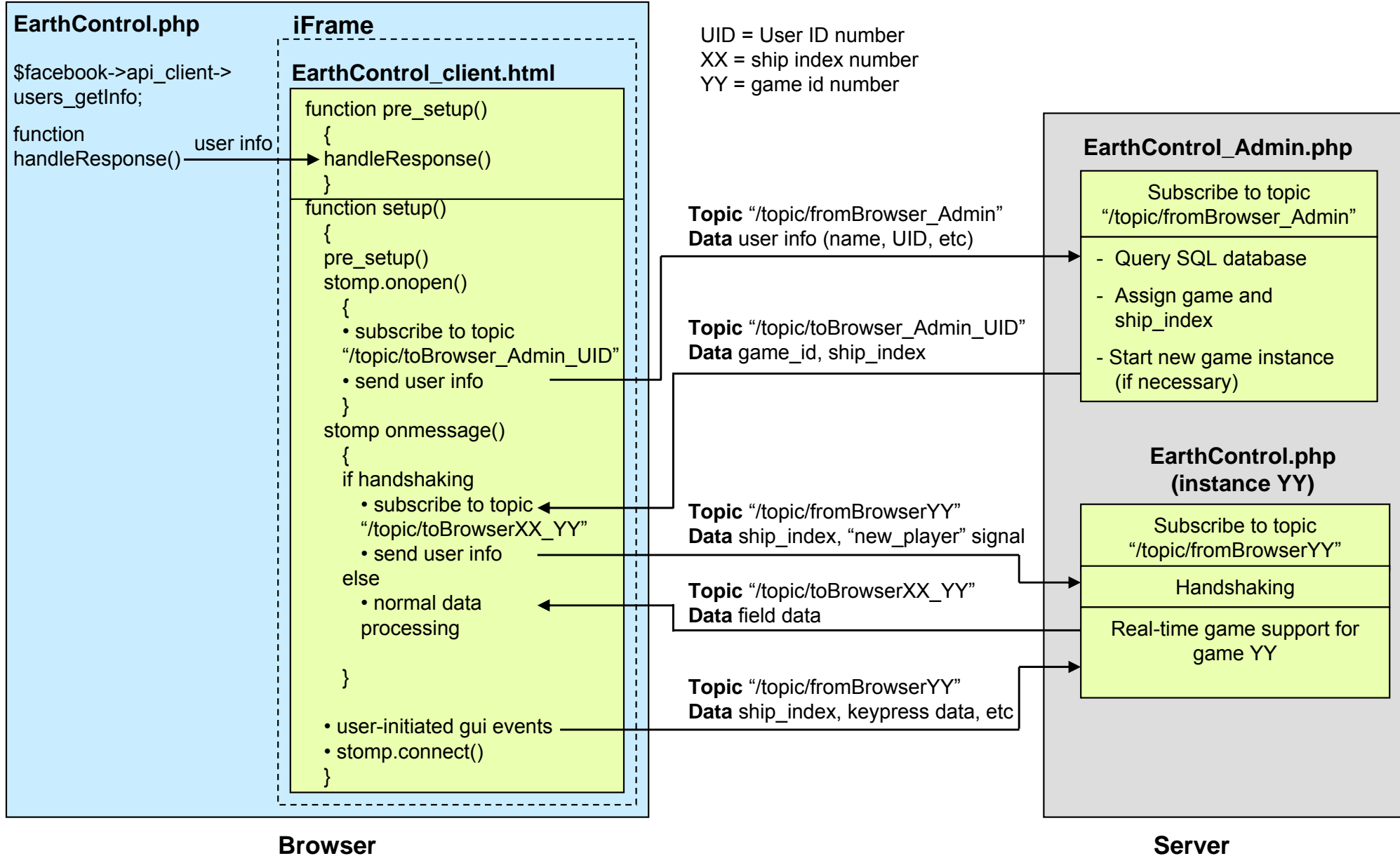
## Browser - Server Interfacing (Steady State)

### Facebook iFrame



# Browser - Server Interfacing (including Handshaking)

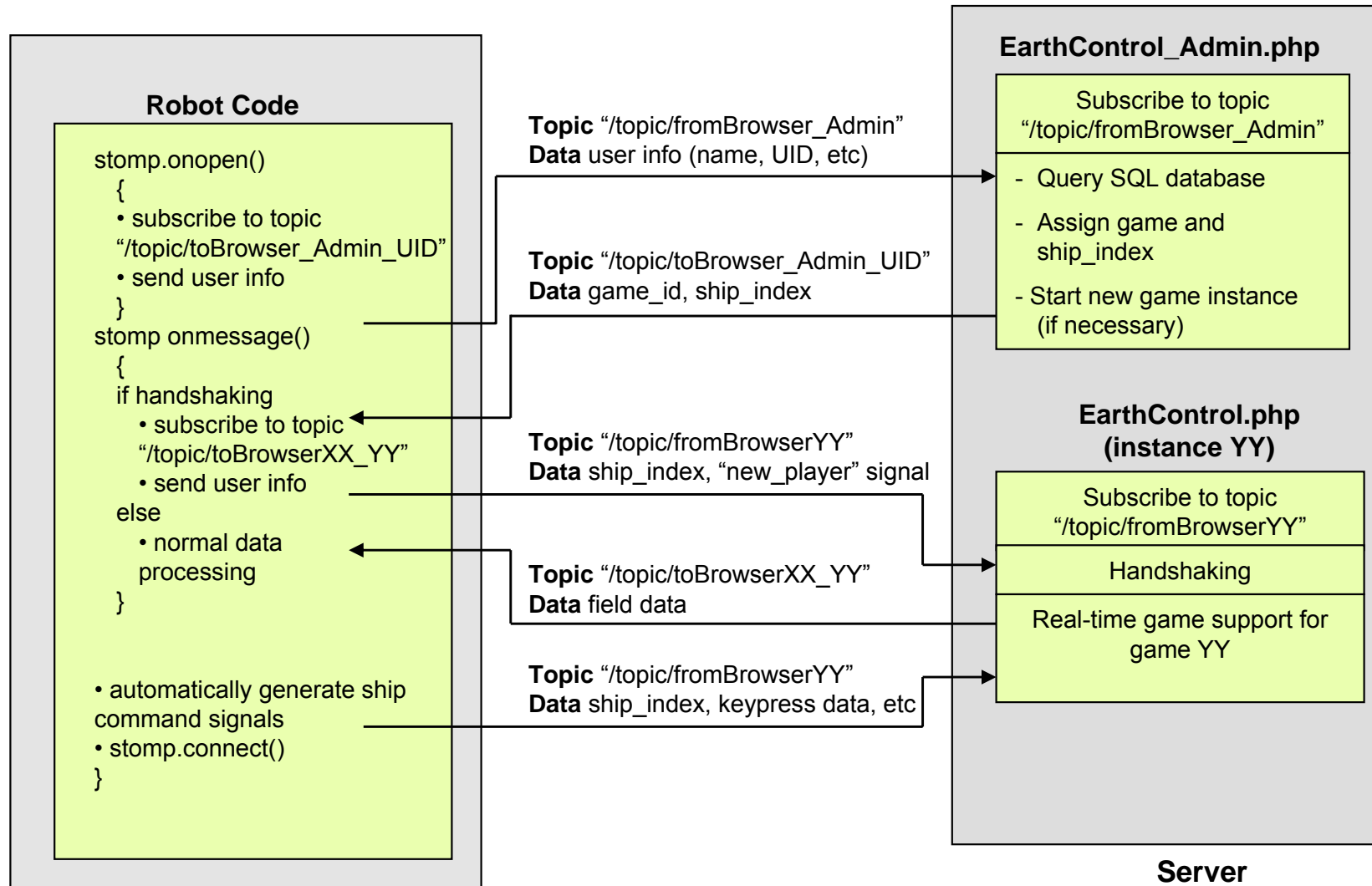
## Facebook iFrame





# Possible Future Direction – Ships Controlled by User-Developed Robots

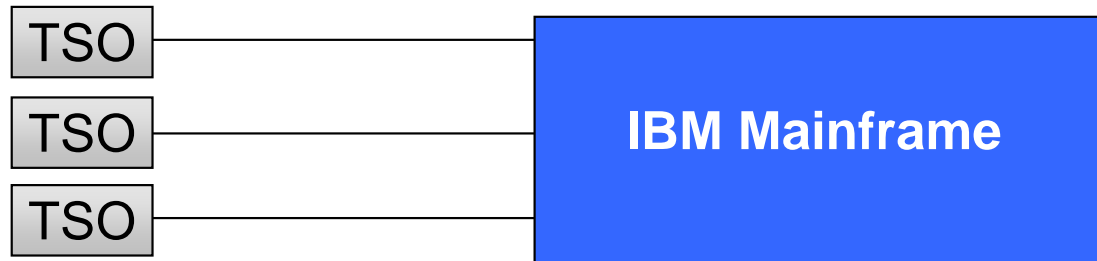
UID = User ID number  
 XX = ship index number  
 YY = game id number



## Evolution of Networking

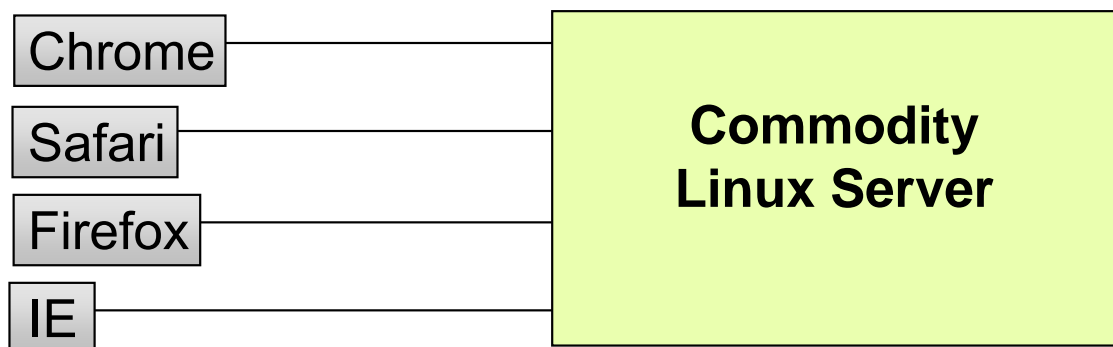
### Pre-1990's Networked Computing

- “Dumb” terminals
- Expensive mainframes



### Now

- Sophisticated browsers (desktop and mobile)
- Cheap, commodity servers
- Nearly-ubiquitous high-speed communications links
- **NEW!** – WebSocket enabling continuous bi-directional communications between browsers and servers
- Q – What types of new applications can be developed using this unique combination of technologies?



## Future Implications of Use of WebSockets

WebSocket technology enables development of entirely new type of software application

Characteristic	Implications
WebSocket connection between browser and server	<ul style="list-style-type: none"><li>• application behaves like a desktop app</li><li>• availability of nearly unlimited, low-cost computing power</li><li>• simultaneous display of data to any number of users</li><li>• inter-user communications and data transfer</li></ul>
browser-based	<ul style="list-style-type: none"><li>• ease of software distribution and maintenance</li></ul>
local and server data storage	<ul style="list-style-type: none"><li>• range of available data privacy and backup options</li></ul>

Please feel free to contact BML to discuss WebSocket-based networked applications

John Bergmans

p: 714-474-8956

e: [jbergmans@bergmans.com](mailto:jbergmans@bergmans.com)

twitter: @jbergmans

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