



TM

**KAAZING**

# The Future of the Web: HTML 5, WebSockets, Comet and Server Sent Events

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Nov. 2008

**Sidda Eraiah**

Director of Management Services

Kaazing Corporation

# Agenda

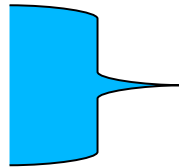
- Web Applications, where are they going?
- Real time data for Web?
- Comet techniques to real time data
- HTML 5 Communications section
  - HTML 5 Web Sockets
  - Server Sent Events
- Demonstration

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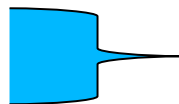
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# Future of Web Applications

- Got to be RICH
  - Presentation
  - Interaction
  - Data



**AJAX**



**toolkits**  
**Comet** (So far...)

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# DEMO – online gaming

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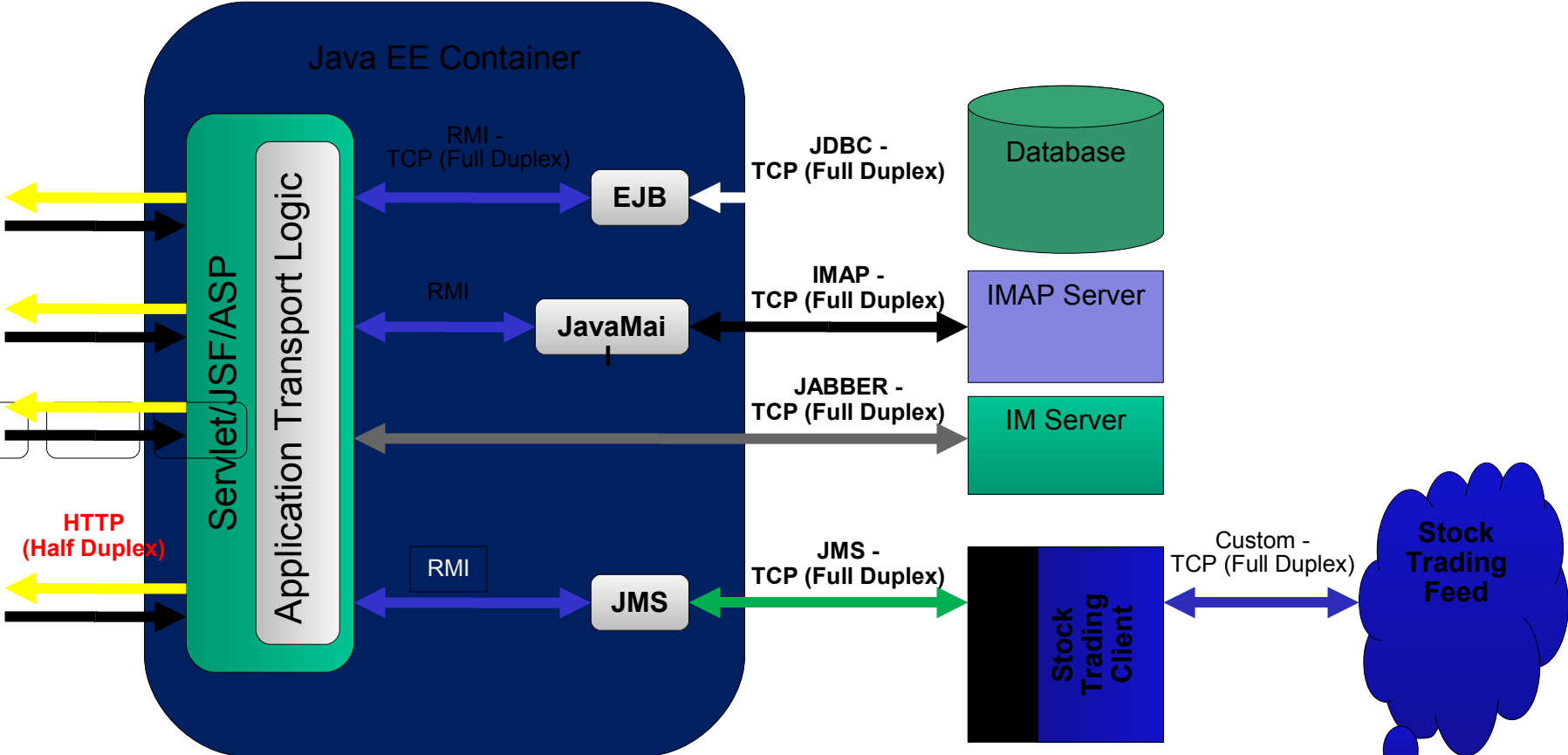
# Who needs real time data?

- Web Clients Receive Server Updates
  - Server-initiated communication
- All End Users Receive Updates Simultaneously
  - Collaboration
- Use Cases
  - Financials, Online Gaming, Betting, Auctions, Collaboration

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# Existing Web App Architecture



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# Existing Comet Programming Techniques

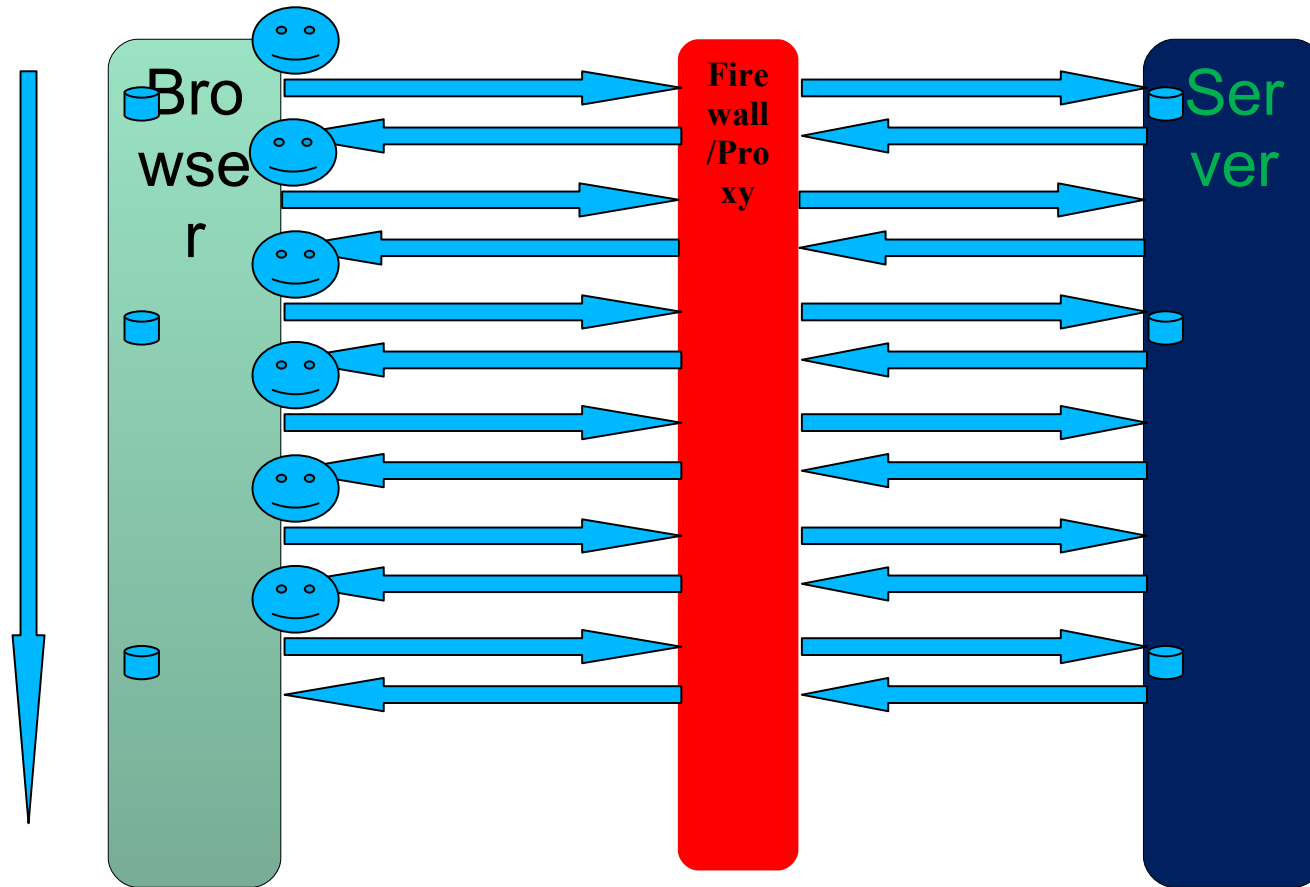
- Polling
- Long Polling
- Streaming

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# Polling



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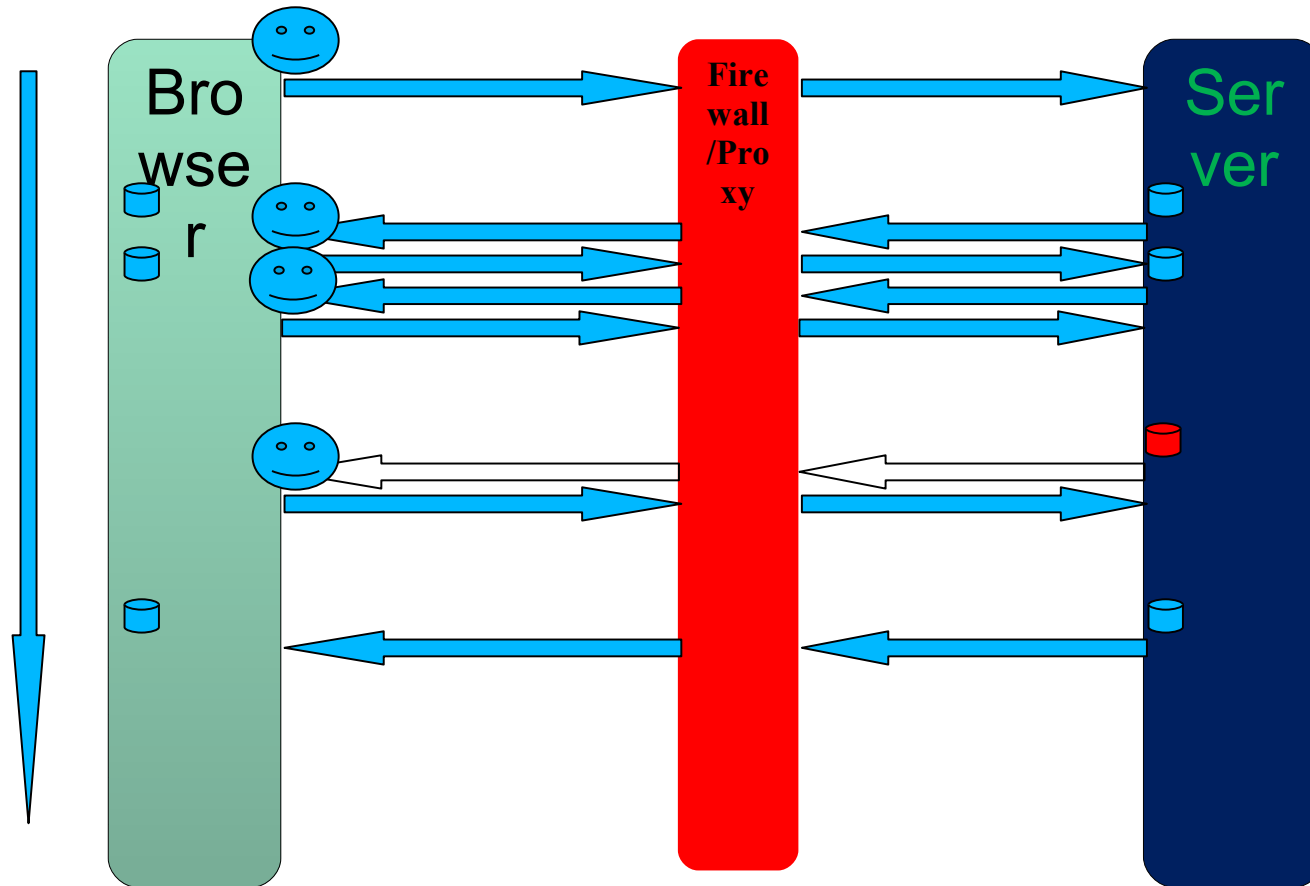
# Polling Summary

- Easiest to implement
- HTTP headers - 40% or more of traffic
- Empty Requests
- Server buffers data when not serving a request

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# Long Polling



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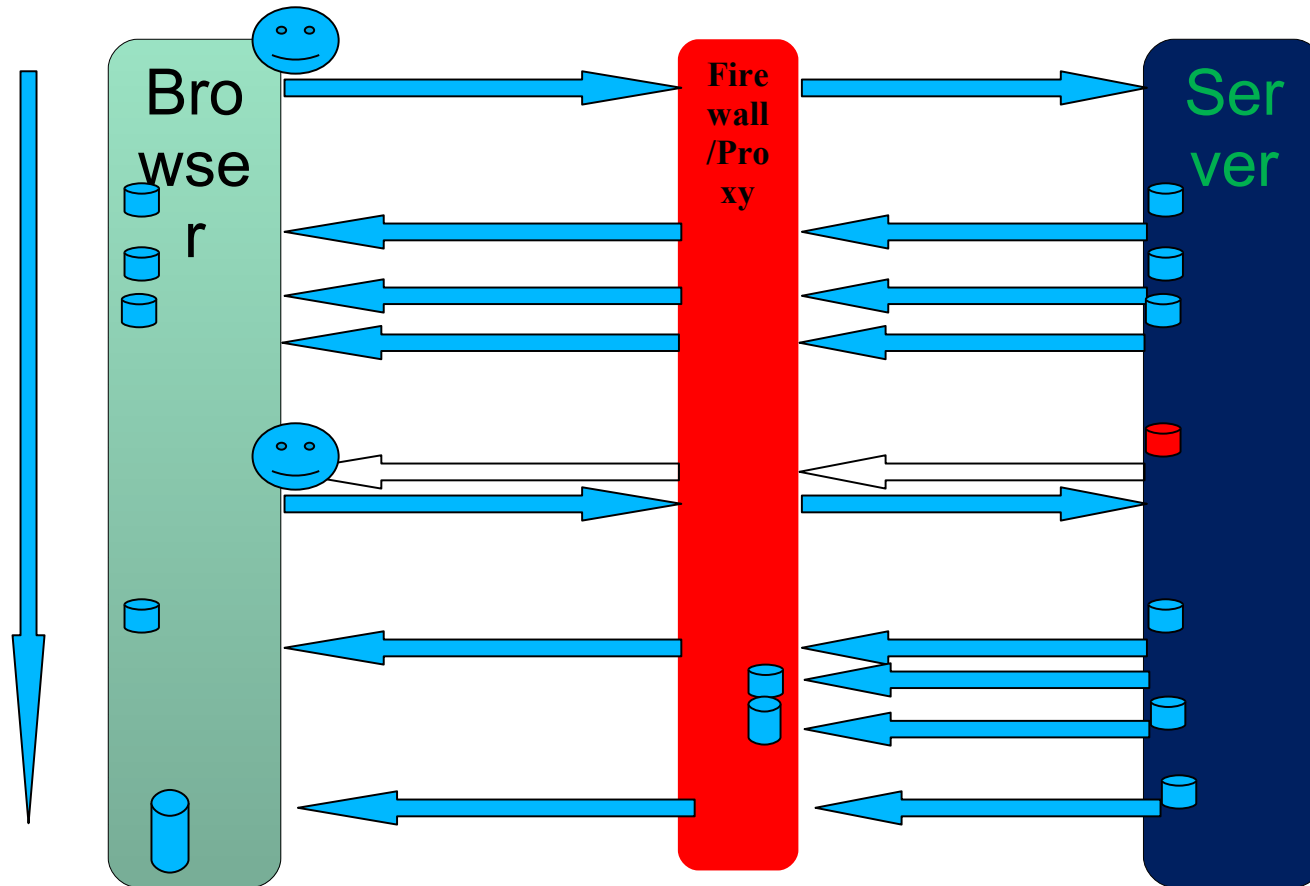
# Long Polling Summary

- Reduces empty requests
- Reconnects on timeout
- Still has headers in HTTP requests
- Network agent timeouts
- Server buffers data when not serving a request

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# Streaming



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# Streaming Summary

- Fresher data
- Connection open for long time
- Network agent buffering
- Server buffers data when not serving a request

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# What Standards?

- Each vendor has its own implementation
  - Have you tried getting your web app to work in all browsers.
- Bayeux Protocol
  - Pub/Sub model does not fit all needs

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# HTML 5 Spec - Communication Section

- Server Sent Events
  - Standardizes Comet programming techniques
- Web Sockets
  - Provides a full duplex connection in JavaScript

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# Server-Sent Events

- Standardizes **and** formalizes how a continuous stream of data can be sent from a server to a browser
- Introduces **eventsourcing**—a new DOM element

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# Server-Sent Events

- Connects to a server URL to receive an event stream:

```
<eventsourcing src=  
"http://stocks.kaazing.com"  
onmessage="alert(event.data)" >
```

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# Server Sent-Events

- Server can add the **ID** header so that clients add a **Last-Event-ID** header
- Used to guarantee message delivery
- Server specify an optional retry header as part of an event in the event stream

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# WebSockets

- Defines full-duplex communications
  - Operates over a single socket
- Traverses firewalls and routers seamlessly
- Allows authorized cross-domain communication
- Integrates with:
  - Cookie-based authentication
  - Existing HTTP load balancers

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# WebSockets

- Connection established by upgrading from the HTTP protocol to the WebSocket protocol
- WebSocket data frames can be sent back and forth between the client and the server in full-duplex mode

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# WebSockets

- Supports a diverse set of clients
- Cannot deliver raw binary data to JavaScript
  - Binary data is ignored if the client is JavaScript
- Enables direct communication with backend systems

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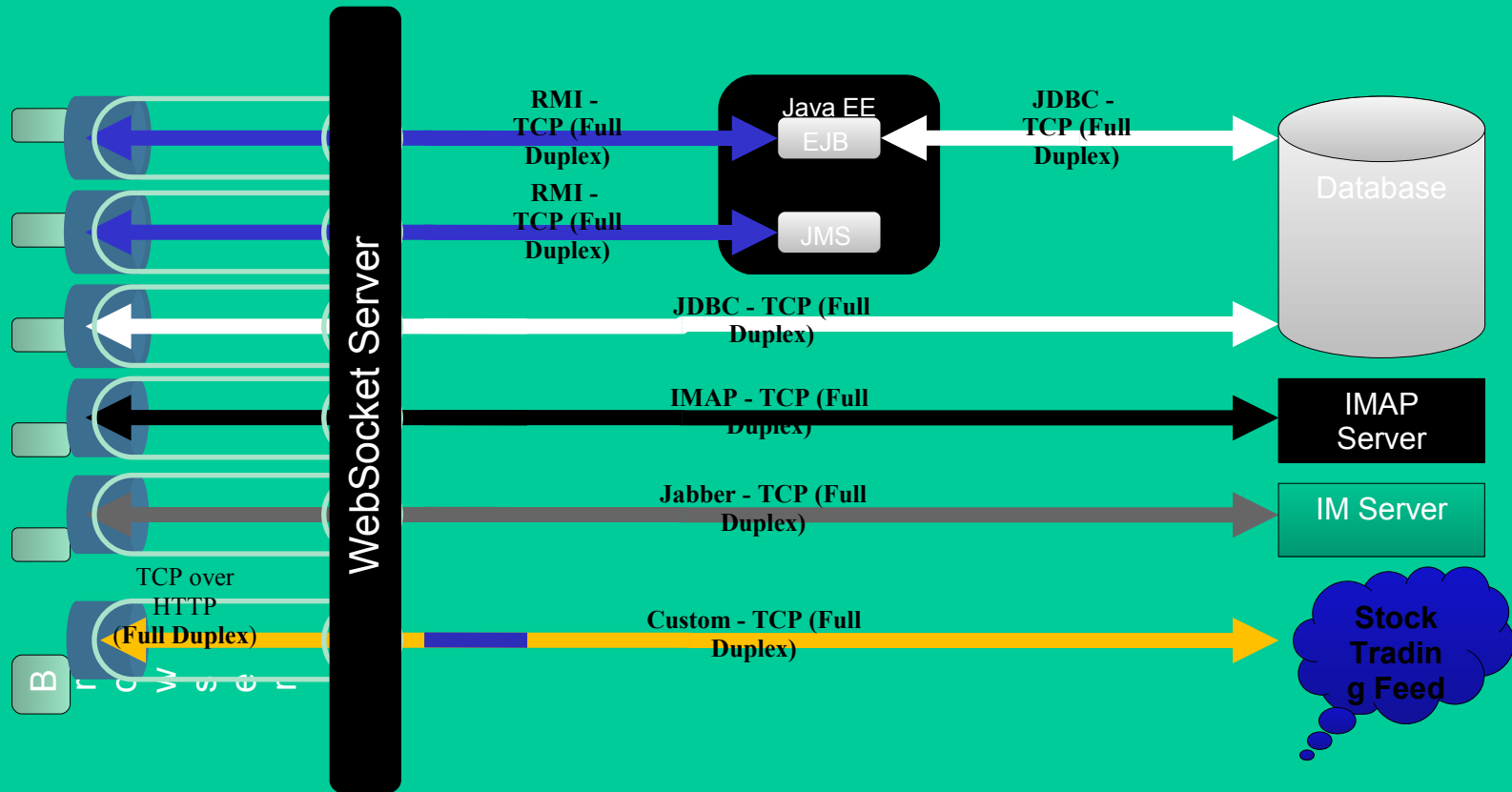
# WebSockets

- Detects presence of proxy servers
- A tunnel is established by issuing an HTTP CONNECT statement
- Secure Web sockets over SSL can leverage the same HTTP CONNECT technique

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# Simplified Architecture





# Web Sockets API

```
interface WebSocket {  
    readonly attribute DOMString URL;  
    // ready state  
    const unsigned short CONNECTING = 0;  
    const unsigned short OPEN = 1;  
    const unsigned short CLOSED = 2;  
    readonly attribute int readyState;  
    // networking  
    attribute EventListener onopen;  
    attribute EventListener onmessage;  
    attribute EventListener onclosed;  
    void postMessage(in DOMString data);  
    void disconnect();  
};
```

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# WebSockets

- Creating a WebSocket instance:

```
var myWebSocket = new WebSocket  
("ws://www.websocket.org");
```

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# WebSockets

- Associating listeners:

```
myWebSocket.onopen = function(evt)
{ alert("Connection open ..."); };
```

```
myWebSocket.onmessage = function(evt) { alert(
"Received Message: " + evt.data); };
```

```
myWebSocket.onclose = function(evt)
{ alert("Connection closed."); };
```

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# WebSockets

- Sending messages:

```
myWebSocket.postMessage("Hello Web  
Socket! Goodbye Comet!");
```

```
myWebSocket.disconnect();
```

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# WebSocket Servers

- Kaazing Gateway
  - Open source
  - Standards compliant
  - Binary and text support
  - Production Release Sept 29th, 2008
- Orbited
  - Python open source project

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# Web Sockets Servers

- Enables full-duplex communication to any TCP-based back-end service:
- JMS
- Jabber(XMPP)
- STOMP
- IMAP
- etc...

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# Demo – Stock ticker

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# HTML 5 ----- When?

- 2022 AD (Not really)
  - Opera already has Server Sent Events
  - Mozilla/Firefox patch available - **Bug 338583**
- Kaazing provides this NOW!!!
  - In your favourite browser:
    - IE 5.5+, Firefox 1.5+, Chrome 0.2+, Safari 3.1+, Opera 9.0+

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# Other session

- Hands on - Implementation of the Stock Ticker sample

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# Thank you

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