# Real time web applications

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# Agenda

- → What is real time web?
- → Requirements & Capabilities
- Choosing the right communication technology
- How to develop a real time application
- RTW Technology framework
- Web notification API
- Comet, HTML5, Web Notification API & XMPP
- → Trends



### What is real time web (RTW)? Beyond Twitter & Facebook

- "It happens with out waiting !!!"
- Kaazing (infrastructure provider), RTW is using HTML5 Web Sockets technology to push live financial information to the Web browsers of banking customers.
- Evri (semantic recommendation company) RTW is the ebbing and flowing of traffic data on Wikipedia. That data points to hot topics that Evri needs to build topic pages to serve their publisher customers.
- OneRiot (search engine), RTW is made up of the links people share on Twitter,
   Digg, Delicious and the click-streams of folks using OneRiot toolbar.
- NYU Journalism Professor Jay Rosen says the real-time Web creates a sense of flow for users that's comparable to the way television holds our attention.
- Google's Brett Slatkin, says the real-time Web is a foundation for efficient computing and use cases we can't yet even imagine.



### What is real time web (RTW)? Beyond Twitter & Facebook

The real-time web is the Web in which data is delivered to its recipients (be they human or machine) in real or near real time, as soon as it becomes available. Scope of the real-time Web, ranges from finance and medical tools, to social networking and media services.

OR

Content is pushed from a publisher to a subscriber, rather than have the subscriber poll the publisher over and over.

- •More than 50% of the links shortened by Bit.ly are now created outside of Twitter.
- •Real-time search engine Collecta, too, doesn't just index posts from Twitter, but also collects millions of post from platforms like MySpace and WordPress every day.
- •Besides these social tools, it's worth noting that a lot of real-time information is now being passed between machines and Internet-connected sensors.



### Real-time application requirements & capabilities

- •Interactivity to present real time data to clients
- Ability to maintain persistent connection to the server
- •Faster data transmission protocol (example AMF Action Message Format over JSON or XML)
- Ability to embed logic on the client to reduce server load
- •Ability to push data from multiple sources, including changes from other users



### Choosing the right communication methodology

### Consider

- Performance
- Authentication
- Concurrent connection
- Network topology
- Data management requirements

### Options

- Piggybacking & polling
- Long polling
- Streaming
- •RTMP over NIO



## Choosing the right communication methodology

Options	Applicable	Pros / Cons
Piggy backing & polling	Use Case: Sports scoreboard SLAS: 5 to 10 seconds Recommendation: Polling	Piggybacking requires no polling. Piggyback has high latency. Polling and Piggy backing can be combined.
Long polling	Use Case: Call monitoring systems for call centre, queued calls, avg. wait times, call completion %.	Ties up browser connections to server. Latency issues on server during load.
Streaming	Use Case: Stock brokerage	Works well in intranet based scenarios, in public n/w due to proxy, buffering n/w latency is introduced.  Ties up multiple connection to the server intermittently.
RTMP with NIO	Use Case: Stock brokerage	Fully duplex, TCP based protocol, apt for mission critical applications running on a private network.  NIO requires less threads to manage connections (J2SE 1.4)



### How to develop a Real time application?

- •In the past we leveraged client server architectures / 1st generation web
- •In came AJAX
- Challenge with AJAX
  - Handling large data sets
  - Supporting multiple browsers and versions
- Challenge with real time
  - Latency
    - Public network
    - Enterprise network
    - Resource constraints
      - •Web server(s)
      - Application server(s)
      - Database server(s)
      - •Client (s)



### A sample Real time application

•Let us a develop a real time stock trading application.

### Major components are

- Multiple external data feeds
- Distribution to clients according to subscription policies
- •Trader dashboard live graphs, charts, portfolio information, video feeds, and so on.
- •Trader can access client's information, including a current portfolio, desired risk levels, past trades, and available credit.

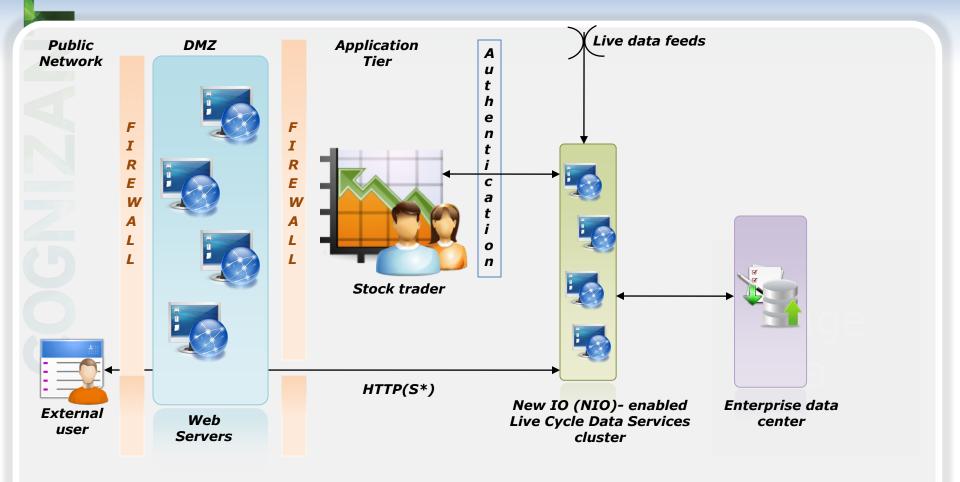
### Technology stack

- Client Flex / Flash / Adobe AIR (runtime enables developers to use HTML, JavaScript, Adobe Flash® and Flex technologies, and ActionScript®)
- •Server Adobe Live Cycle Data Services

#### •Flex

- Capable of opening a TCP binary socket with the back end
- •Can interact very well with Ajax applications (basically JavaScript) running in the same browser window





#### 1. Secure access

Users are authenticated in real-time for access to live data feeds

\*HTTP(S) provides a range of implementation choices.

#### 2. Dynamic user interface

Flash applications written in Flex display live data pushed from Livecycle data Services to clients inside and outside the firewall.

### 3. Bidirectional data synchronization

Livecycle Data Services retrieves data from multiple back-end systems and synchronizes updates to maintain data integrity.

### Real time web technology frameworks

- •Beaconpush Beaconpush changes the traditional request-response flow of the web by creating a persistent real-time message stream to each of your visitors. Enabling you to reach your visitors without requiring them to constantly poll your website.
- •WebRTC WebRTC is a free, open project that enables web browsers with Real-Time Communications (RTC) capabilities via simple JavaScript APIs. The WebRTC components have been optimized to best serve this purpose. The WebRTC initiative is a project supported by Google, Mozilla and Opera.
- •APE APE (Ajax Push Engine) is an Open Source technology allowing you to do real time data streaming through a web browser with no applets and no plugins.
- •Comet Comet is a web application model in which a long-held HTTP request allows a web server to push data to a browser, without the browser explicitly requesting it. Comet is an umbrella term, encompassing multiple techniques for achieving this interaction.



### Real time web technology frameworks

- •HTML5 Web Sockets HTML5 Web Sockets defines a full-duplex communication channel that operates through a single socket over the Web.
- •Apache Wave Apache Wave is a software framework centered on online real-time collaborative editing, originally developed by Google as Google Wave. Google Wave is a web-based computing platform and communications protocol, designed to merge key features of media like e-mail, instant messaging, wikis, and social networking.
- •beweevee Live Collaboration in your application, using .NET live collaboration framework.



### What is Comet?

- •Web application model in which web server pushes data to a browser (without any request initiated from browser)
- •All techniques rely on Java script rather than on non-default plug-in
- •AKA Ajax Push, Reverse Ajax, Two-way-web, HTTP Streaming and HTTP server push
- Leverages a persistent or long-lasting HTTP connection between the server and the client.
- •Implementation category streaming & long polling



### You should care about HTML5

Websocket This specification defines an API that enables Web pages to use the WebSocket protocol for two-way communication with a remote host. Use cases include

- Multiplayer online games
- Chat applications
- Live sports ticker
- Real-time updating social streams

Server sent events SSEs open a single unidirectional channel between server and client. Useful for one way notification from server. Use cases include

- Friends' status updates
- Stock tickers
- News feeds
- Other automated data push mechanisms



### Web notification API

- Next frontier for real-time web is to move from real-time updates to real-time notifications
- Think twitter What is the challenge?
- W3C Public draft of "<u>Web Notifications API</u>" (<a href="http://www.w3.org/TR/2011/WD-notifications-20110301/">http://www.w3.org/TR/2011/WD-notifications-20110301/</a>)
- What does the API do?
  - This specification provides an API to generate simple notifications to alert users outside of the web page
- Early adopters
  - Gmail (supported in Chrome)
- •Distributed social networks
- Chat apps
- News alert apps
- Banking apps



### **XMPP**

The Extensible Messaging and Presence Protocol (XMPP) is an open technology for real-time

entity to another in close to	real time.
Service	Description
Channel encryption	
Authortication	

entity to unformer in close to real time.		
Service	Description	
Channel encryption		
Authentication		
Presence	enables you to find out about the network availability of other entities	

between multiple participants

subscribers

enables you to send messages to another entity

enables you to store a contact list, or roster, on an XMPP server.

enables you to join a virtual chat room for the exchange of messages

enables you to generate a notification and have it delivered to multiple

enables you to find out which features are supported by another entity

the features that are supported by other entities on the network

shorthand notation for service discovery data so that you can easily cache

enables you to exchange structured but flexible forms with other entities

enables you to negotiate and manage a media session with another entity

**Contact lists** 

**Notifications** 

Service discovery

Capabilities advertisement

Structured data forms

Workflow management

Peer-to-peer media sessions

One-to-one messaging

Multi-party messaging

### XMPP – What kind of applications I can build?

**Applications Instant messaging Group chat Gaming Systems Control Geo Location Data syndication VOIP Identity Services** 



### Real-time web trends

- ✓ Real-time collaboration is ripening
- ✓ Real-time analytics will be hot
- ✓ Real-time search
- ✓ Real-time ecommerce



# Thanks !!!

### Reference

- √ Vendor sites
- ✓Blogs / Forums
- √W3C

