AJAX

FAT CLIENT-THIN SERVER MODEL

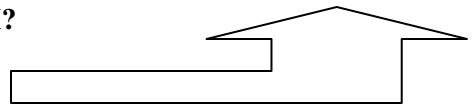
BACKED BEAN MODEL

JavaScript+CSS+DOM+XMLHttpRequest

Asynchronous Java Script and XML

Browser becomes light-weight, server becomes light-weight, client-side used technology becomes heavy-weight

What is AJAX?



Who named it as AJAX?
In Feb 2005, Jesse James Garrett of Adaptive Path, LLC published an online article entitled "AJAX a new approach to web applications" (www.adaptivepath.com/publications/essays/archives/000385.php). In this essay Garrett explained how he believed web applications were closing the gap between the web and traditional desktop applications.

Where it is used?
Google Suggest and Google Maps are two examples of a new approach to web applications that we at adaptive path have been calling AJAX he said. The name stands for Asynchronous JavaScript and XML.

Google is making a huge investment in developing the Ajax approach. All of the major products Google has introduced over the last year — Orkut, Gmail, the latest beta version of Google Groups, Google Suggest, and Google Maps — are Ajax applications. (For more on the technical nuts and bolts of these Ajax implementations, check out these excellent analyses of Gmail, Google Suggest, and Google Maps.) Others are following suit: many of the features that people love in Flickr depend on Ajax, and Amazon's A9.com search engine applies similar techniques.

These projects demonstrate that Ajax is not only technically sound, but also practical for real-world applications. This isn't another technology that only works in a laboratory. And Ajax applications can be any size, from the very simple, single-function Google Suggest to the very complex and sophisticated Google Maps.

Who will benefit from AJAX?
Those who are already involved in implementing MVC architecture like our shopping cart example given in our Digital Book Publications Servlets material. They know how to process various requests on server system such as retrieving and storing collection of Category and Product bean instances into ServletContext and HttpSession scopes and displaying on to client system. With this technology they can experience how to download such information on to client system in an asynchronous mode with out keeping client in a wait state for a longer time.

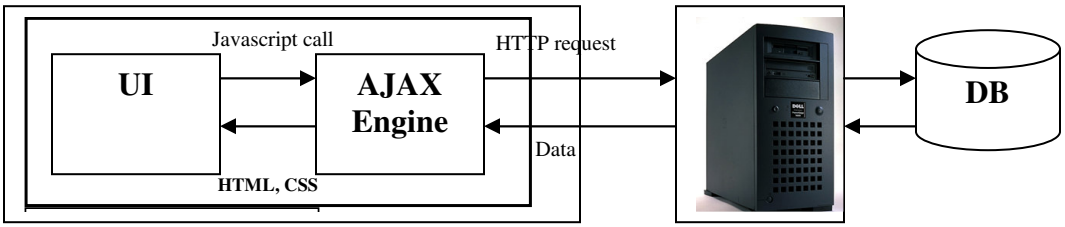
Is AJAX is an architecture/framework/pattern? – No, it's a concept
AJAX is not a architecture like MVC, nor like a design pattern or framework (prototype of the arch) rather it is a concept. Various traditional technologies combination used to develop this concept. The most surprising thing is that AJAX is also having collection of design patterns.

Web MVC Architecture & case study
Please refer our Servlet's shopping cart MVC example.

HTTP Overview
Refer our servlet's material

AJAX communication techniques
Hidden frames, iframes, HTTP POST method, CSS, XMLHttp (already discussed in the previous section

How AJAX works?



Ajax is more than an approach to web interaction. This approach involves transmitting only a small amount of information to and from the server in order to give the user the most responsiveness experience possible.

In traditional web application model browser is responsible for initiating client requests and processing requests from, the webserver, the AJAX model provides an intermediatery layer without client's involvement. This is what Garrett calls as AJAX engine.

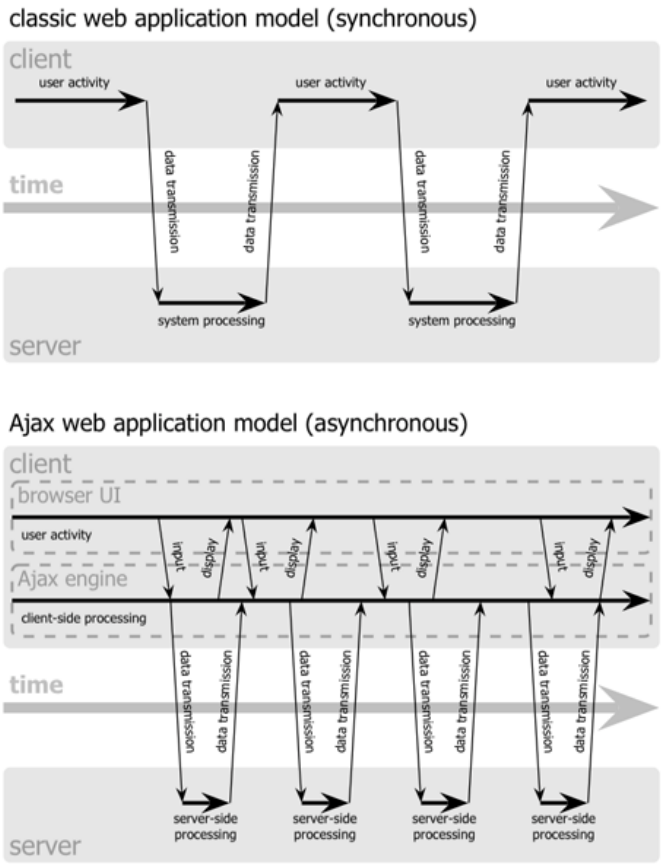
The best example I (means Surya) can describe about AJAX is when I want to go for Europe trip

- I will enter into planeuropetravletrip.com site
- Display all the countries in Europe
- Before I am selecting the country, I want to retrieve all the major cities in each country and reposited somewhere
- When I select the country all the cities in that country want to be displayed
- Before I am selecting the city AJAX engine should download all the hotels lists in each city onto client system
- By the time I select city, all the hotels in each list must be displayed
- Before iam selecting the hotel, all the information regarding the hotel want to downloaded onto client system
- By the time I select hotel, I want to be displayed all the information regarding hotel want to displayed.

That means how AJAX requires predictive nature in its mind before behaving in-front of client. Predictive fetch is one of the design pattern used here.

Like this many more other design patterns used in AJAX which are discussed in later section.

The traditional model for web applications (left) compared to the Ajax model (right)



The synchronous interaction pattern of a traditional web application (top) compared with the asynchronous pattern of an Ajax application (bottom)

AJAX Principles (Michael Mahemoff)

Minimal traffic

AJAX applications should send and receive as little information as possible to and from the server. In short AJAX can minimize the amount of traffic between the client and server. Making sure that your AJAX application doesn't send and receive unnecessary information adds to its robustness.

No surprise

AJAX applications typically introduce different user interaction models than traditional web applications. As opposed to the web standard of click-and-wait, some AJAX applications user other interfaces paradigms such as drag-and-drop or double-clicking. No matter what user interaction model you choose, be consistent so that the user knows what to do next?

Established conventions

Don't waste time inventing new user interaction models that your users will be unfamiliar with. Borrow heavily from the traditional web applications and desktop applications so there is minimal learning curve.

No distractions

Avoid unnecessary and distracting page elements such as looping animations, and blinking page sections. Such gimmicks distract the user from what he or she is trying to accomplish.

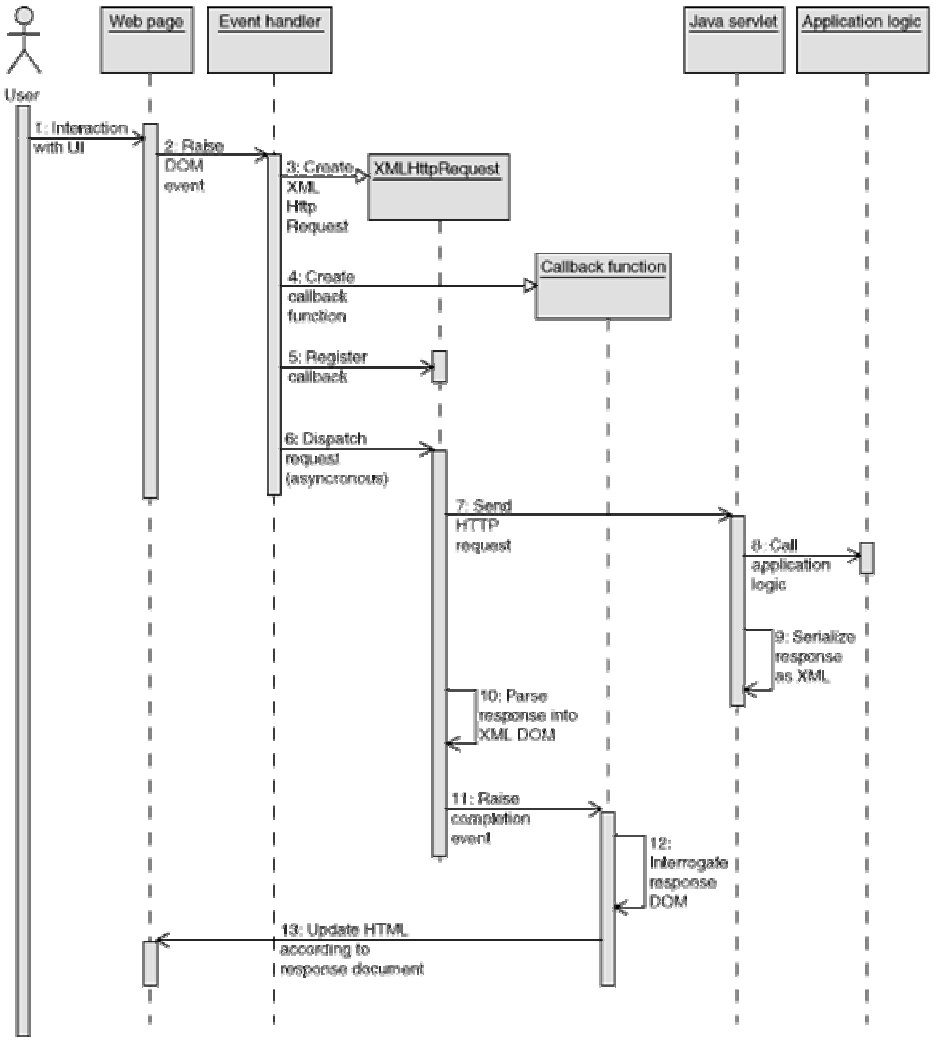
Accessibility
Consider who your primary and secondary users will be and how they most likely will access your AJAX applications. Don't program yourself in a corner so that an unexpected new audience will be completely locked out. Will your users be using older browser or special software? Make sure you know ahead of time and plan for it.

Avoid entire page downloads
All server communications after initial page download should be managed by the AJAX engine. Don't ruin the user experience by downloading small amounts of data in one place, but reloading the entire page in others.

User first
Design the AJAX application with the users in mind before anything else. Try to make the common use cases easy to accomplish and don't be caught up with you're going to fit in advertising or cool effects.

The four defining principles of Ajax

- *The browser hosts an application, not content*
- *The server delivers data, not content*
- *User interaction with the application can be fluid and continuous*
- *This is real coding and requires discipline*



Communication Control Patterns

How to communicate with the server from javascript. What is the best way to initiate and continue to make requests back to server.? It may be best to preload information from the server so that it is available immediately upon some user interactions. Perhaps everything shouldn't be downloaded at once and instead downloading should be done in a sequence.

- *Predictive Fetch*
- *Submission throttling*
- *Explicit Submission* (An alternative to Submit Throttling.)
- *Incremental form validation/Field validation*
- *Periodic refresh*
- *New Command Notifier example*
- *Multi-stage download*

Fallback patterns

- *Cancel pending requests*
- *Try Again*

AJAX Examples

- Live Sites
- Dynamic Text
- Dynamic form editing
- Table editing
- Dynamic address entry
- Populating selection lists
- Dynamic validation
- Simple chat
- Handling XML source
- A double combo script
- Type Ahead script

AJAX @ Real time

- AJAX @Yahoo
- AJAX @Google
    - Flickr
    - Google Maps
    - Google Suggest
    - Arkut