



**INTERNET & WEB  
APPLICATION DEVELOPMENT  
SWE 444**

Fall Semester 2008-2009 (081)

**Module7(2): ASP.NET AJAX**

**Dr. El-Sayed El-Alfy**

Computer Science Department  
King Fahd University of Petroleum and Minerals  
alfy@kfupm.edu.sa

## Objectives/Outline

### Objectives

- Learn what ASP.NET AJAX is and why users need something like it
- Learn about ASP.NET AJAX Architecture and Control Toolkit
- Be able to work with ASP.NET AJAX framework

### Outline

- What is ASP.NET AJAX?
- ASP.NET AJAX Architecture
  - Client and Server Components
- Pros and Cons of ASP.NET AJAX
- Bugs and Work Arounds

## Recall

- Traditional Web Applications use costly Postbacks for Server operations and UI operations



- AJAX Enabled Applications



## Recall (cont.)

- AJAX

- Asynchronous JavaScript and XML.
  - Not a “new” technology, but a specific way of using existing technologies
- User expectations are increasing.
- Need both performance and rich look.
- Need more responsiveness.
- No frequent page refreshes.
- Lesser network overhead.
- Reduced postbacks.
- Partial page updates.

## What is ASP.NET AJAX?

- A set of extensions to ASP.NET developed by Microsoft for implementing Ajax functionality
- Includes both client-side and server-side components,
- Allows the developer to create web applications in ASP.NET 2.0 which can update data on the web page without a complete reload of the page.
- A framework to build AJAX enabled application with ASP.NET.
- Enables user to create a rich UI with known controls.
- A pilot project by Atlas for Microsoft. Worked out so well that it outperformed all parallel efforts and finally got an approval from Microsoft.
  - ASP.NET AJAX is formerly named Atlas
  - Was first released as a standalone extension to ASP.NET in January 2007 after a lengthy period of beta-testing.
  - Subsequently was included with .NET Framework version 3.5 which was released alongside Visual Studio 2008 in November 2007
  - A comparison of different ASP.NET Ajax frameworks can be viewed at <http://www.daniel-zeiss.de/AJAXComparison/Results.html>

## What is ASP.NET AJAX? (cont.)

A framework for building richer, more interactive, cross-platform, standards-based Web experiences

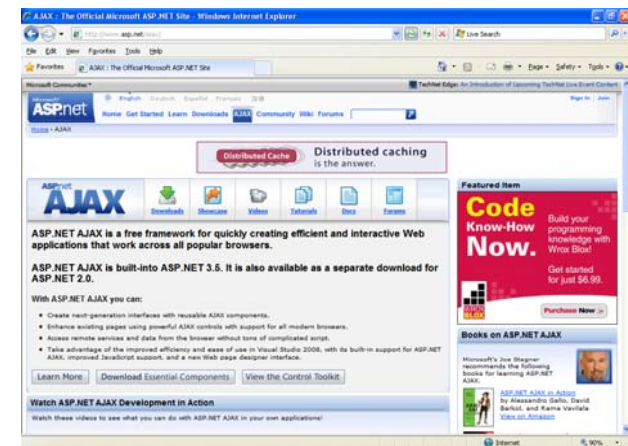
- Most-productive framework for building AJAX-enabled web applications
  - Fewer concepts, fewer lines of code
  - Application and UI building blocks for common scenarios
  - Builds on Top of ASP.NET 2.0
- Rich tool support for designer and developer workflow
  - Easy to Author, Debug, and Maintain
  - Clean separation of content, style, behavior, and code
  - Well integrated with design and development tools
- Seamlessly integrated application model
  - Works with ASP.NET pages and server controls
  - Allows access to ASP.NET web services and components
- Standards-Based: Ubiquitous, cross-platform, browser support
- No cost, free tool support, easy to use

## What is ASP.NET AJAX? (cont.)

- Based on Functionality
  - ASP.NET AJAX “Core”
    - Fully supported product on top of ASP.NET 2.0
  - ASP.NET AJAX Control Toolkit
    - Library of free ASP.NET AJAX controls/extenders
    - Client based Microsoft AJAX Library.
      - Support for creating client components, browser compatibility, networking and core services.
    - Server based Extensions.
      - Script support, web services, application services and server controls.
  - ASP.NET AJAX “Futures” CTP
    - Features not quite ready to bake into the core
    - Go-Live license for deployment

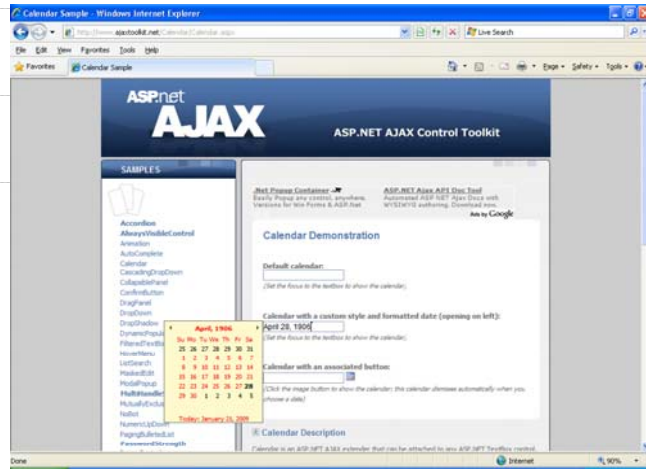
## Resources and Showcases

- <http://www.asp.net/ajax/>



## Demo

➤ <http://www.ajaxtoolkit.net/>



## Supported Browsers and OS

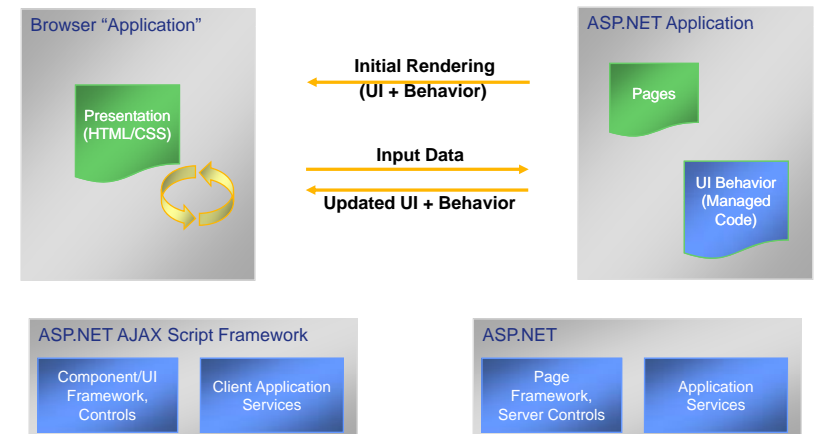
- Supported browsers:
  - IE 6.0 or later.
  - Mozilla Firefox 1.5 or later.
  - Opera 9.0 or later.
  - Apple safari 2.0 or later.
- Supported Operating Systems:
  - Microsoft windows XP with service pack 2.
  - Microsoft Vista.
  - Apple OSX (Intel Architecture only).

## ASP.NET AJAX Scenarios

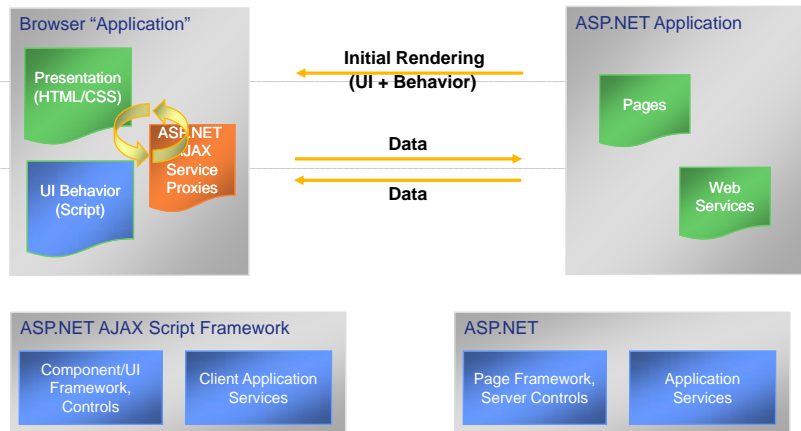
ASP.NET AJAX provides a great Ajax framework for the following scenarios

- Server-centric Ajax Web Development
  - Incremental Ajax approach to add UI enrichment
  - Enrich Applications without lots of Javascript Code
  - Keep core UI/Application logic on server (VB/C#)
- Client-centric Ajax Web Development
  - Leverage full power of script/DHTML
  - Provide richer and more interactive user experience
  - Build mash-ups, gadgets and other new immersive experiences

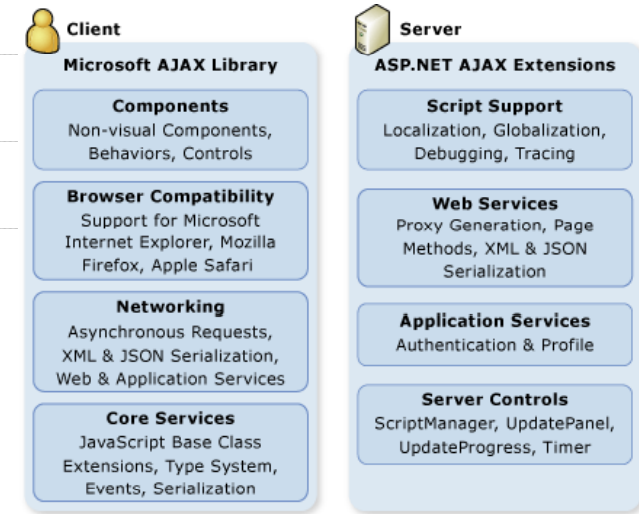
## Server-Centric Programming Model



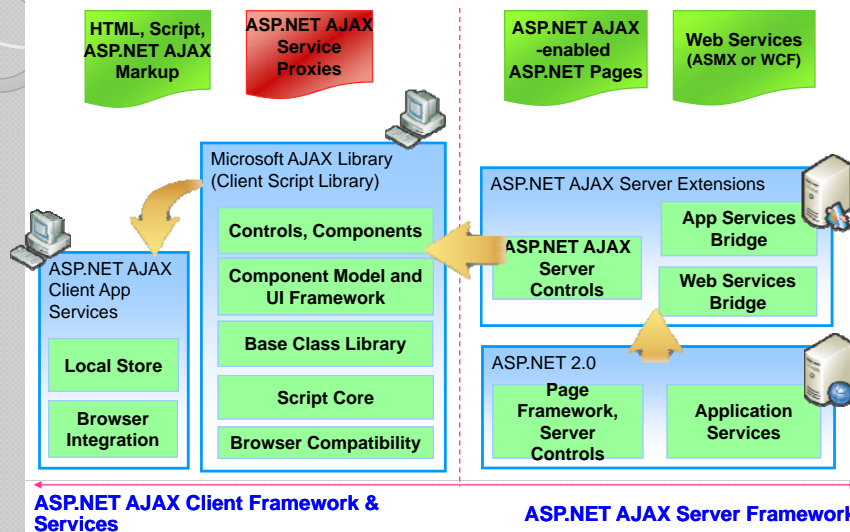
# Client-Centric Programming Model



# ASP.NET AJAX Architecture



# ASP.NET AJAX Architecture



# ASP.NET AJAX Server Architecture

- Server Components consist of server controls and components to manage the UI and flow of an application.
- Manage serialization, validation, control extensibility etc.
- ASP.NET web services available that enable you to access services like forms authentication and user profiles.

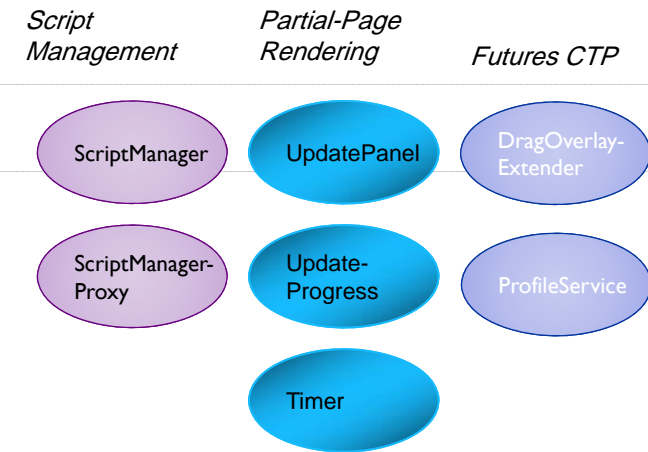
## ASP.NET AJAX Server Architecture (cont.)

### ➤ Server Controls:

- Server and Client code integrated to produce AJAX like behavior.
- Frequently used Server Controls are
  - Script Manager – one instance per page.
  - Update Panel – for partial page updates.
  - Update Progress – track progress of Asynchronous req.
  - Timer Control – set interval between requests.
- Along with these also available are Pointer control and Script Manager Proxy.

## ASP.NET AJAX Server Architecture (cont.)

### ➤ Server Controls



## Web Services and Control Extensibility

- ASP.NET AJAX provides Web services that you can use from client script to work with ASP.NET application services for *forms authentication* and *user profiles*.
  - This enables you to use client script to help protect resources by using forms authentication and to persist user-specific settings on the server.
- ASP.NET AJAX enables you to create custom server controls that include client behaviors.
  - AJAX Control Toolkit provides a number of extenders along with source code.
  - Users can extend the code more if they wish.

## ASP.NET AJAX Client Architecture

- ASP.NET AJAX client side libraries consist of JavaScript files that provide features for object-oriented development.
- Enable a high level of consistency and modularity in client scripting.
- Layers included in script libraries are
  - A Browser compatibility layer to support all modern browsers.
  - Core services to empower JavaScript with Object Oriented features.

## ASP.NET AJAX Client Architecture (cont.)

- Base Class Library includes string builders and extended error handling.
- A networking layer to communicate with web services and handle asynchronous remote calls.
- Support for JavaScript libraries embedded in an assembly or added externally (standalone).
- Support for accessing server based forms authentication and user profile. (without page refresh)
- Support for release and debug modes.

## Localization and Globalization

- Provides a model for localizing and globalizing a client script.
- Enables you to design applications that use single code base to provide UI for different locales.
  - Example : Enables JavaScript code to format date or Number Objects automatically depending upon the browser's culture settings without post back to server.
- Provides additional support for localized script files embedded in an assembly.
  - Hub and spoke model. (Main Assembly and Satellite Assemblies)

## ASP.NET AJAX Control Toolkit

- The ASP.NET AJAX Control Toolkit is a collection of samples and components that show you some of the experiences you can create with rich client ASP.NET AJAX controls and extenders.
- The Control Toolkit provides samples and a powerful SDK to make it simple to create and reuse custom controls and extenders.
- More up to date information can be obtained from  
<http://www.codeplex.com/AtlasControlToolkit/Release/ProjectReleases.aspx?ReleaseId=1425>

## Some of the AJAX Control Toolkit Extenders

- AutoCompleteTextBoxExtender
- CollapsiblePanelExtender
- AnimationExtender
- ConfirmButtonExtender
- DragPanelExtender
- DropShadowExtender
- AlwaysVisibleExtender
- DynamicPopulateExtender
- FilteredTextBoxExtender
- HoverMenuExtender
- MutuallyExclusiveCheckboxExtender
- ModalPopupExtender
- NumericUpDownExtender
- PasswordStrengthExtender
- PopUpControlExtender
- ResizableControlExtender
- RoundedCornersExtender
- SliderExtender
- TextBoxWaterMarkExtender
- UpdatePanelAnimationExtender
- ValidatorCalloutExtender

## Pros

- Integration between (Atlas) AJAX and ASP.NET is wonderful !! Was designed for it.
- AJAX Control Toolkit contains around 28 extenders allowing cool effects like drag and drop and collapsible menus.
- Generates JavaScript web service proxy class allowing easy integration with web services.
- Server side Exceptions are effectively caught and thrown onto client side for JavaScript to handle them.
- Integrated nicely with ASP.NET Membership and Profile API's supporting client side authentication without postbacks.
- Supports all well known Browsers.

## Issues and Work Arounds

- Batch calls are not always faster.
  - Know when to use Batch calls and when not to.
- Bad calls may cause good calls timeout.
  - Write down a custom “**onFailure**” callback function and a retry occurs when there is a timeout.
- Browsers allow two calls at a time and don't expect any order.
  - ??? It's Unpredictable..
- Browsers do not respond when there are more than two calls in queue.
  - Write your own implementation of queue.

## Issues and Work Arounds

- “THIS” is not always “THIS”.
  - Unfortunately no documentation for this. But you need to know yourself what “this” refers to under given context.
- HTTP POST is slower than HTTP GET but it is default in ASP.NET AJAX.
  - In order to enable HTTP GET on a web service method, you need to decorate the web method with the following attribute [ScriptMethod(UseHttpGet=true)]
- JavaScript should be enabled for AJAX to work.
- Browser back button behavior doesn't work well with AJAX calls.

### Conclusion:

- Despite all, it can be considered as one of the best frameworks available to build new Ajax enabled websites or easily Ajax enable any existing ASP.NET website with lot of readily available code and support through communities.

## Q & A



## Resources

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- PPT Presentation by R.V. Nalla
- Other web resources:
  - Downloads  
<http://ajax.asp.net/downloads/default.aspx?tabid=47>
  - Online Documentation.  
<http://ajax.asp.net/docs/>
  - Video Tutorials  
<http://ajax.asp.net/documentation/default.aspx?tabid=47>
  - Communities and forums.  
<http://forums.asp.net/default.aspx?GroupID=34>