CGT 353 Lecture 1

Introduction to Rich Internet Applications, Background, and Possibilities

Acknowledgments

- This course has been developed over a series of years. It began with James Mohler, who contributed much content. It was then built vastly upon by Kellen Maicher, who contributed even more content. As time goes on, it will change more to keep up with industry expectations.

Introduction

- The Web is and has been changing - away from static, boring pages…
- With **Rich Internet Applications (RIAs)**, developers now have an option…
- All the interfaces in the Adobe line are nearly identical… We will use Adobe Flash as a tool to create some RIAs
- We need to see how Flash fits in with other technologies…
- Flash should not be utilized by itself (use with Javascript, HTML, etc…)

Rich Internet Applications (RIAs)

- Rich Internet Applications (RIAs) are web applications that have most of the characteristics of desktop applications, typically delivered either by way of a standards based web browser, via a browser plug-in, or independently via sandboxes or virtual machines.
- Examples of RIA frameworks include Ajax, Curl, GWT, Adobe Flash/Adobe Flex/AIR, Java/JavaFX, Mozilla's XUL, OpenLaszlo and Microsoft Silverlight.

Rich Internet Applications (RIAs)

- These are web application that have characteristics of desktop applications.
- Rich Internet applications (RIAs) offer a rich, engaging experience that improves user satisfaction and increases productivity.
- Using the broad reach of the Internet, RIAs can be deployed across browsers and desktops.

Difference between RIAs & other Web Apps

- The key difference between RIAs and other Internet applications is the amount of interaction in the interface. In a traditional page-based Internet application, interaction is limited to a small set of standard controls such as checkboxes, radio buttons, form fields and buttons.
- This severely limits our ability to create usable and engaging applications, and most Internet applications have been clumsier and more difficult to use than their desktop counterparts.

What Flash Really Is

- **A sophisticated interactive media authoring program with a powerful and adaptable native scripting language.**

Brief History of Flash

- **Jonathan Gay, Charlie Jackson, and Michelle Welsh** founded **FutureWave Software** (1993)
- Created their first product - **SmartSketch,** originally designed for sketching graphics
- SmartSketch failed and was transformed into **Future Splash Animator** in 1995 to compete with Macromedia's Shockwave technology
- In **1996**, Macromedia acquired **Future Splash,** and renamed it **Flash,** integrating basic vector animations…
- **1997 - Flash 2**: added the object library
- **1998 - Flash 3**: made interactivity much easier (movieclips, JavaScript plug-in integration, transparency and an external stand alone player)
- **1999 - Flash 4:** improved interactivity and dynamic generation, but Actionscript was still drag-and-drop (internal variables, an input field, advanced ActionScript, and streaming MP3)
- **2000 - Flash 5:** incorporated XML data and full-blown object-oriented ActionScript (ActionScript 1.0 (Smartclips- which would become components, HTML text formatting)

Brief History of Flash

- **2002 - Flash MX**: video codec (Sorenson Spark), UI Components, compression, ActionScript vector drawing API
- **Late 2003 - Flash MX 2004** and **2004 Professional:** Actionscript 2.0, behaviors, extensibility layer (JSAPI), alias text support, timeline effects, screens, web services integration, video import wizard, Media Playback components, data components and data binding APIs, the Project Panel, and transition class libraries.
- **2005 - Flash 8**
  - Macromedia acquired by **Adobe** on April 18th, 2005
  - **New features:** filters, blend modes, animation easing, enhanced stroke properties (caps and joins), object-based drawing mode, run-time bitmap caching, FlashType advanced anti-aliasing for text, On2 VP6 advanced video codec, support for alpha transparency in video, a stand-alone encoder and advanced video importer, cue point support in FLV files, advanced video playback component, interactive mobile device emulator.
- **2007 - Flash CS3** – tighter integration with rest of Adobe line
- **2008 - Flash CS4, AS 3.0, Flash Player 10 -** inverse kinematics (bones), basic 3D object manipulation, object-based animation, an enhanced text engine, and further expansions to ActionScript 3.0. CS4 allows the developer to more efficiently and quickly create animations with many improved features that were not included in previous versions.
- **CS5 line due out early 2010**
- Current Flash Player penetration statistics
  - http://www.adobe.com/products/player_census/flashplayer/version_penetration.html

The Open Screen Project

- May 1, 2008 Adobe announced the **Open Screen Project** - provide a consistent application interface across devices such as personal computers, mobile devices and consumer electronics.
- **Goals:**
  - **abolition of licensing fees** for Adobe Flash Player and Adobe Integrated Runtime
  - **removal of restrictions** on the use of the ShockwaveFlash (SWF) and Flash Video (FLV) file format
  - **publishing of application programming interfaces** for porting Flash to new devices
  - **publishing of The Flash Cast protocol and Action Message Format (AMF),** which let Flash applications receive information from remote databases.
- The list of mobile device providers who have joined the project includes **Palm, Motorola and Nokia.**
- In short, Flash everywhere…..

What is ActionScript?

- Flash's native object-oriented scripting language based on ECMAScript.
- **ActionScript** is used primarily for the development of websites and software using the Adobe Flash Player platform (in the form of SWF files embedded into Web pages), but is also used in some database applications (such as Alpha Five), and in basic robotics, as with the Make Controller Kit.
- Originally developed by Macromedia, the language is now owned by Adobe (which acquired Macromedia in 2005).
- ActionScript was initially designed for controlling simple 2D vector animations made in Adobe Flash (formerly Macromedia Flash).
- Later versions added functionality allowing for the creation of Web-based games and rich Internet applications with streaming media (such as video and audio).

The Realities of Web Delivery

- Everyone expects instantaneous gratification, and the Web is no exception…
- The Web has several advantages over other forms of media, not the least of which is **#1**
  - **Advantage 1:** its dynamic nature…
  - **Advantage 2:** Can incorporate a wide range of media elements
  - **Advantage 3:** Is always accessible….
  - **Advantage 4:** Scripting allows developers to create applications that can achieve any number of functions….
- A word of caution:
  - Web content must be kept **fresh and stimulating…**
  - Content must be **useful…**
  - Delivery technology must be chosen based on the **target audience**…
  - Must utilize an **array of technologies…..**

Limitation of the Web/Internet

- Remember that for all the advances of the last 15 years, the biggest limitation of the Web is still **bandwidth.**
- Although, we also have to deal with:
  - Proprietary technologies
  - Plugins
  - Browser differences
  - Display differences
  - Other hardware differences (video card, etc)
  - Author and content validity

Limitation of the Web/Internet

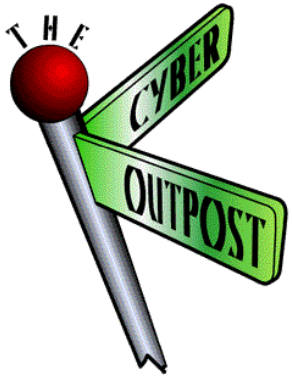
- The Flash Platform assists by offering users these features:
  - cross-platform, cross-browser
  - utilizes a small player
  - creates extremely small file sizes
  - high penetration rate

Designing for your Audience

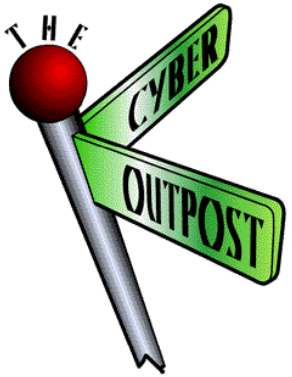
- For Whom Are You Developing?
  - Always develop for the lowest common denominator (within reason)
  - Good rule of thumb to design for the upper 84% of the population
  - 99% of worldwide web browsers have the Flash 9 plugin
  - 81.8% of worldwide web browsers have the Flash 10 plugin (86.7% of mature markets)

Vector Graphics

- Flash has Small files…vector graphics
  - People use Flash mainly because the files sizes are so small…
  - Heavily relies on vector graphics….



Flash Movie [2 KB]



JPEG Image [24 KB]

GIF Image [15 KB]

About Vector Graphics

- Were originally created for high resolution printing.
- Were not used for the web initially because of the typically poor quality of the aliased edges.
- Flash eliminates this problem by including an automatic anti-aliasing mechanism, thus providing a smoother appearance.
- Since it applies the anti-aliasing on the fly, the images look smooth and crisp no matter what size they are.
- This flexible nature of the dimensions of Flash graphics means that they are **scalable and resolution-independent.**

Benefits of Vector Graphics

- **resolution independence -** the state of a graphic in which the visual clarity is not dependant on any particular hardware or software.
- **scalable** - the ability to adjust the physical dimensions of a resolution independent graphic without any change in visual clarity

Flash Abilities

- The biggest improvements in the most recent version of Flash is its **developers interface, scripting language,** and the ability to do most things **dynamically.**

- **Basic Types of Flash Projects:**
  - **Linear Presentations** (ex. animations)
  - **Interactive Presentations** (ex. web sites, games, etc…)
  - **Data-Driven Presentations** (ex. dynamic web sites, games, etc…)
  - **Data-Driven Applications** (ex. software)

- Flash is one of the best tools for creating **Rich Internet Applications (RIA's),** which are next generation Web applications that combine the functionality of desktop software with the broad reach and low-cost deployment of the Web.

Example Flash Projects

- **Forms** for collecting and processing dynamic information
- **Video portfolios** using native import capabilities and dynamic loading
- Robust **chat rooms** and **message boards**
- Interactive conceptual **art experimentations and presentations**
- **E-commerce** and **e-business** solutions
- Self-container **projectors** or **executables** for CD or DVD distribution
- Broadcast quality **cartoons, advertising, or titling**
- Optimized animations for **Web**, **PDA**'s and **cell phones**
- **Digital video products** requiring special effects and compositing
- **Desktop applications**

Characteristics of Flash

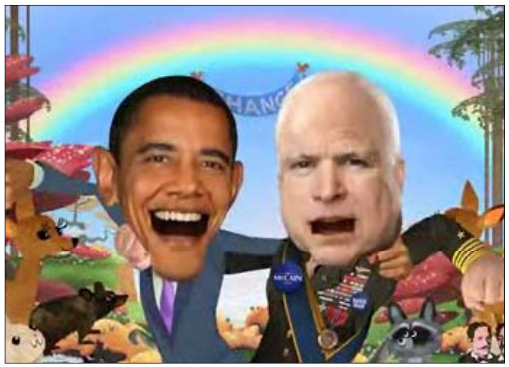
- Generate high quality animation with great sound in very small files
- Integrate nearly any multimedia format including vector and raster images, audio, and video
- Create precise layouts using embedded fonts
- Generate all content dynamically
- Create reusable template interfaces
- Create media for almost any platform, including Windows, Mac, Solaris, Linux, OS/2 SGI Irix, Pocket PC, and mobile telephones

- Create standalone media for output in almost any format including CD's, DVDs, and video

Flash Animations

- What Flash was originally known for…

- Permits **four types:**
  - frame-by-frame
  - motion tweening
  - shape tweening
  - actionscripted animation



- Animation is based on the fundamentals of **layers, frames, keyframes, tweens, symbols, and ActionScript**

Sound within Flash

- Integration of **sound** is another fundamental component of Flash.
- Due to the frame-based nature and ActionScripting of Flash, it's relatively easy to **sync sound** in Flash.
- However, you run into problems with sound sync because the performance of Flash is so **heavily reliant on the performance of the user's computer**.
- Can be stored in the .swf files or dynamically imported at runtime.
- Can import **WAV, AIFF, AU, and MP3 files** and can be compressed with both **ADPCM and MP3** compression, allowing for extremely small file sizes.

Video Integration with Flash

- Flash supports the integration and use of digital video in Flash movies, both during development and at run-time.
- The **.flv and f4v** formats are two of the most widely used on the Web today, and is used by well-known sites like YouTube, Facebook, etc…..
- This means that the Flash plugin is one of the **world's smallest video plugins,** excluding the need for other plugins like **Quicktime, RealOne, or Windows Media Player.**
- This dynamic capability of Flash makes your movies extremely flexible.
- Flash video can still be a pain however, due to certain Web limitations.

Interactivity and UI Components

- With Flash, you aren't limited to traditional HTML forms, buttons, and other components.
- This allows for dramatic flexibility with designing your interfaces.
- Flash components make this even easier, as well as integration with other applications such as Dreamweaver, Illustrator, and After Effects.

Issues / Problems with Flash

- Web browsers still require a plugin.
- More complex than previous versions.
- Browsers will not automatically redirect to alternative content if plugin not installed.
- Support for 3D is still limited.
- Search engines have a difficult time indexing Flash content.
- HTML or XML can be quicker, easier, and cheaper than developing with Flash.

Alternative Technologies

- **Microsoft Silverlight** - http://silverlight.net/

- **Adobe Director** - true 3D modeling support
  - http://www.adobe.com/products/director/

- **Dynamic HTML** - use <layer> or tags (can also combine with Flash)
- **XML and XSL**
- **Scalable Vector Graphics (SVG) -** graphics standard and XML-based **development language**
- **Microsoft PowerPoint**
- **SMIL - Synchronized Multimedia Integration Language**
- **Web 3D technologies**
- **Dozens of others – see one list here.**
  - http://www.allwebdesignresources.com/webdesignblogs/graphics/flash-alternatives-ultimate-list-of-flash-like-animation-software

- **Bottom line:** The technology you choose really depends on what you're doing and how quickly you need to do it…

Summary

- Rich Internet Applications (RIAs) are becoming more prevalent.
- RIA development is an essential skill for web programmers
- Flash offers us a tool to develop these applications
- Flash is the most widespread RIA tool on the web