

Flex and Air in the Trenches

6 Months in the Life of an Enterprise Project

Introduction

- Rich Client Solutions Inc.
 - President
- InfoQ.com
 - Chief RIA/Java Editor
- Conference Presenter
 - NFJS
 - JavaOne
 - OSCon
 - EclipseCon



Introduction

- Project Technologies
 - Swing
 - Ajax / JQuery / DWR
 - Eclipse RCP / SWT
 - Flex / AIR

Flex / AIR in a Nutshell

- Flex
 - Officially Introduced in 2004
 - Library built on top ActionScript 3
 - “Traditional application programmers found it challenging to adapt to the animation metaphor upon which the Flash Platform was originally designed. Flex seeks to minimize this problem by providing a workflow and programming model that is familiar to these developers. “
 - UI Components
 - Remoting Constructs
- AIR
 - Officially Introduced in 2008
 - Builds Upon Flex or JavaScript
 - Allows Online/Offline Access

Flex / Air in a Nutshell

- Key Successes
 - Thwirl
 - eBay Desktop
 - NFL SuperFan

Flex / Air in a Nutshell



Flex / Air in a Nutshell

The screenshot displays the eBay Desktop Beta 0.7.007 interface. At the top, there is a search bar and navigation links for Home, Find, My Items, BidBuy, and Feeds. The main content area is divided into several sections:

- My Favorite Searches:** A list of saved searches including 'digg', 'rtheater', 'Microsoft Bob', 'Ralph Vaughan Williams', and 'wacom tablet'.
- My Categories:** A numbered list of categories such as 'Bottles & Insulators', 'Historical Memorabilia', 'Casino', 'Collectibles', 'Recreational GPS Devices', 'Cell Phones', 'DVD, HD DVD & Blu-ray', 'Reproductions', 'Men's Shoes', and 'Women's Shoes'.
- Help:** A section with a 'HELP' button.
- Main Categories:** A central area with a list of categories including 'Cell Phones & PDAs', 'Clothing, Shoes & Accessories', 'Coins & Paper Money' (highlighted), 'Collectibles', 'Computers & Networking', 'Consumer Electronics', 'Crafts', 'Dolls & Bears', 'DVDs & Movies', 'Entertainment Memorabilia', 'Gift Certificates', 'Health & Beauty', 'Home & Garden', and 'Jewelry & Watches'.
- Coins & Paper Money:** A sub-section with a list of items including 'Coins: US', 'Coins: Canada', 'Bullion', 'Coins: Ancient', 'Coins: World', 'Exonomia', 'Paper Money: US', 'Paper Money: World', 'Publications & Supplies', and 'Scripophily'.
- Watching Items:** A section showing items being watched, including 'WACOM BAMBOO Pen Tablet MTE450 "NEW MODEL" Just Out' and 'NEW WACOM BAMBOO FUN MEDIUM GRAPHICS TABLET CTE650K1 I'.
- Bidding Items:** A section showing items being bid on, including 'PUMA RP 43 PETTY RACING 11 MENS SHOES CHECKERD FLAG' and 'Crank (2007, DVD) jason statham amy smart action'.
- Recently Viewed Items:** A section showing items recently viewed, including 'BUCK'S PLACE KANSAS CITY, MISSOURI ...', 'Line 6 Vetta Upgraded to v II Combo Amp Lt...', 'V For Vendetta (2006, DVD)', 'Microsoft Bob 1.0 - Vintage Historic Rare Sof...', 'MICROSOFT BOB - MICROSOFT'S WORST ...', 'WW11 Invasion Of Normandy-Steven Spielb...', and '*SET OF 4* Vintage Theatre Art Prints, Alad...'.

At the bottom of the page, there is a 'Submit a Bug Report or Feature Request' link and the text 'eBay Desktop Beta 0.7.007'.

Flex / Air in a Nutshell

Supercast 2008

  **DIRECTV SUPERCAST™**

GAMES

NOW PLAYING
RZC

FINAL
ARI 26 SEA 20

FINAL
BAL 10 NYG 30

FINAL
CHI 3 GB 37

FINAL
DEN 24 ATL 20

FINAL
DET 22 CAR 31

FINAL
HOU 27 IND 33

FINAL
MIN 13 TB 19

FINAL
NO 30 KC 20

FINAL OVERTIME
NYJ 34 NE 31

FINAL
OAK 15 MIA 17

RED ZONE CHANNEL



HIGHLIGHTS

MOST RECENT ▾

0 of 5 | [Play All](#)

- TEN: K. Collins-J. Gage for 38 yd TD pass
- TEN: D. Ball SACK
- ARI: D. Cromartie Pass INT for 6 yd
- STL: M. Bulger-D. Looker

STATS

TODAY'S BEST ▾

	RUSH	PASS	REC	
PLAYER NAME	TEAM	ATT	YDS	TD
S.Slaton	HOU	14	156	1
R.Grant	GB	25	145	1
J.Stewart	CAR	15	130	1
D.Williams	CAR	14	120	2
M.Lynch	BUF	23	119	0

FlexBuilder Demo

Looking at ActionScript and MXML

Differences Between Java and Flex

- No abstract classes
- No anonymous inner classes
- Anonymous functions
- No checked exceptions
- No function overloading
 - `public function setter(iValue:int, bForce:Boolean = false):void`
- No threading model (similar to writing AJAX)

Real World Impressions

Integrating AIR in an Enterprise Environment

League of Legends



League of Legends Game Lobby

- Providing architecture and development assistance for a high profile AIR application
 - Thousands of concurrent users
 - Ability to launch native application
 - Java based backend
 - Server to client messaging
 - Chat support between users



Flex Related Technologies

- Lifecycle Data Services
- AIR
- FlexBuilder
- FlexMojos
- Fluint

Tooling Impressions

- FlexBuilder
 - Solid but can improve
 - ADL Hangs
 - Slow Compilation
 - Hidden smoke and mirrors
 - Pros
 - Crash Free
 - WYSIWYG just works
 - Enough IDE for most Enterprise needs

Tooling Impressions

- Command Line Tools
 - ADL/ADT Work as Advertised
 - MXMLC
 - Accessible Via Ant
 - Slow

MXMLC Example

<mxmhc

```
file="${test.src.dir}/testModules/ClientTestSuite.mxml"  
output="${test.modules.deploy.dir}/ClientTestSuite.swf"  
actionscript-file-encoding="UTF-8"  
keep-generated-actionscript="true"  
incremental="true"  
fork="yes">  
  <compiler.keep-as3-metadata name="Autowire"/>  
  <load-config filename="${flex.src.dir}/frameworks/air-  
    config.xml" />  
  <source-path path-element="${flex.src.dir}/frameworks" />  
  <source-path path-element="${main.src.dir}" />  
  <source-path path-element="${test.src.dir}" />  
  
  <compiler.include-libraries dir="${swiz.swc.dir}" append="true">  
    <include name="swiz-o.2.m.swc" />  
  </compiler.include-libraries>
```

</mxmhc>

Tooling Impressions

- On the Horizon
 - FlexMojos Maven Plugin
 - Repository of SWCs
 - Unit Testing Support

Frameworks

- Do you need one?
 - Flex uses MVC at its core similar to other frameworks
 - Application MVC must be careful not to fight Widget MVC

Frameworks

- What is needed ... plumbing
 - Application Level Constructs
 - Login
 - Logout
 - Window Management
 - Modularity
 - Event Subsystem
 - Remoting Utilities

Frameworks Considered

- Cairngorm
- PureMVC
- Mate
- Prana
- Swiz

Results

- Cairngorm
 - Contains Singleton and Global Variables
- PureMVC
 - Doesn't Make Use of Binding or Flex Events
 - Requires Implementing Several
- Mate
 - Tag Based

Results

- Prana
 - XML Based
- Swiz
 - Dependency Injection Support
 - Command Chains
 - Gets out of the way

Diving Into Swiz

Using dependency injection in Flex

Basic MVC Structure

- Diagram
 - MXML
 - Controllers
 - Remoting Interfaces
 - Swiz
 - ViewMediator

Error Handling Support

- Actionscript Does Not Support Checked Exceptions
- Remoting Examples Frequently in MXML
- ActionScript can be used however...

Error Handling Support

```
<mx:RemoteObject id="RO"  
  destination="MyRemoteObjectDest"  
  fault="Alert.show(event.fault.faultstring),  
  'Error'">
```

```
  <mx:method name="GetQuote">  
    <mx:arguments>  
      <symbol>{stockSymbol.text}</symbol>  
    </mx:arguments>  
  </mx:method>  
</mx:RemoteObject>
```

Error Handling Support

```
// Create a remote object that represents our service
var remoteObject:RemoteObject = new RemoteObject();
remoteObject.makeObjectsBindable = true;
remoteObject.requestTimeout = 20;
remoteObject.destination = destination;

// Create a channel set that defines how we're talking to our service
if (channelSet == null)
{
channelSet = new ChannelSet();
var channel:RTMPChannel = new RTMPChannel("my-rtmp",
riotApplication.REMOTING_URL_PROP);
channelSet.addChannel(channel);

// Associate the channel set with the remoteObject
remoteObject.channelSet = channelSet;

// Associate the functions that will be called in the event of a result
// or a fault
remoteObject.addEventListener(ResultEvent.RESULT,
createOnSuccessHandlingProxy(onComplete, onSuccess));
remoteObject.addEventListener(FaultEvent.FAULT,
createOnErrorHandlingProxy(onComplete, errorMap));

return remoteObject;
```

Error Handling Support

- Using Building Blocks
 - Inject Arguments Easily
 - Add Lifecycle
 - Post Complete
 - On Success
 - On Error
 - Catching Unhandled Errors

Error Handling Support

```
public function createOnSuccessHandlingProxy(  
    onComplete:Function,  
    originalSuccessHandler:Function):Function {  
    return function (resultEvent:ResultEvent):void {  
        }  
        originalSuccessHandler.apply(null, [resultEvent]);  
    }  
}
```

Remoting/Messaging Requirements

- Support for Java Backend
- Easy Translation between Java and
ActionScript
- Fast
- Messaging Support for a large number of
concurrent users economically

Remoting Candidates

- BlazeDS
- WebORB
- LCDS
- Caucho Hessian
- XMPP
- GraniteDS
- Rest

Remoting Research

- WebORB
 - Messaging Issues
 - RTMP Java Product only recently released
- Hessian
 - Attractive Binary Protocol
 - Relatively New Comet Messaging Support
 - Relatively New XMPP Support

Remoting Research

- XMPP
 - Requires Custom Development for Marshalling and Invocation
 - Data Format is Larger (Text)
 - Limits Transmission of Binary Data
- GraniteDS
 - Technology was interesting
 - Messaging Based on Comet
 - Maturing and Commercial Examples Didn't Line Up
- Rest
 - Does not solve messaging requirements

Remoting Research

- BlazeDS
 - OpenSource
 - Numerous Examples
 - Included Transports Don't Scale
 - 100's of users per machine
 - Comet Support in Future Versions
 - Farata Systems NIO

Lifecycle Data Services

- Adds Transports to BlazeDS
 - NIO
 - RTMP
 - Thousands of Connections Per Machine
 - Commercially Supported

Lifecycle Data Services

- Remoting between Java and ActionScript
- Uses AMF Data Format (Speed)
- Pluggable Transports
 - HTTP
 - HTTP NIO
 - RTMP

Lifecycle Data Services

- Easy to Integrate
 - Few Jars
 - Web.xml Configuration
 - SpringFactory Works Out of Box
 - Pluggable Authentication
 - Spring Security

LCDS Issues

- Java to ActionScript
 - Null numbers converted to 0
 - Enumerations and Hashmaps
 - No Setters Cause Issues
- Messaging
 - MessageBroker Lacking Documentation
 - Needs to run in JVM of LCDS

Chat

- XMPP Based
- LCDS would have required additional development effort
- Utilizing XIFF Open Source Library

Native Integration

- Filesystem Access
 - Works as Advertised
 - Loading Local Properties
- Launching Native Applications
 - Not supported by the SDK
 - Socket communication is supported
 - Developed a custom process accessible via socket from AIR to provide functionality
 - Similar to Merapi
 - Similar to Switchboard

Unit Testing

- Considered a number of frameworks
 - ASUnit
 - FlexUnit
 - DpUnit/Fluint
- Decided on Fluint
 - Unit Testing of
 - Utilities
 - Controllers
 - Remoting Services with Mocks

Fluint Demo

Running a Unit Test

Functional Testing

- FlexMonkey
 - Team couldn't get it to work with AIR
 - Inserts delay between user actions
 - Can't start Java servers as part of setup
 - Conditional pauses
- Developed a Custom Runner Similar to Selenium
 - Java Process Connects via Socket to AIR Runners
 - Commands are sent driving
 - Mouse clicks
 - Text Input
 - Conditional waiting on buttons and dialogs
 - Fast

Tellurium Demo

Functional testing with AIR

Load Testing

- Existing Flex Load Harness
- No Java RTMP Library at this Time
- HTTP Based Library in Now Versions of Blaze
- Red5 RTMP Library Lacking
- No Support for Messaging in Commercial Tools
- Possible Future Avenues
 - Custom Load Tester Using Air
 - Threading Limitations

Final Thoughts

- Tooling
 - Serviceable
 - Feels like Java Circa 2000
 - Rate of Community Development is Accelerating
 - IntelliJ IDEA 8
 - FlexMonkey
 - Swiz, Prana

Final Thoughts

- Flex
 - MXML works as advertised
 - Easy to do complex things (table renderers)
 - Leverage language differences to your advantage

Resources

- Java to Flex Blog Series
 - <http://blog.sharendipity.com/moving-to-flash-part-5-network-communication>
- Swiz
 - <http://code.google.com/p/swizframework/>
- Fluint
 - <http://code.google.com/p/fluint/>