Developing rich Internet applications for SAP using Adobe Flex

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Introduction

Global enterprises rely on SAP products for robust and reliable management of complex business processes. As businesses leverage the Internet to enable employees, customers and partners, IT architects and developers are challenged to provide rich desktop-like experiences that overcome the limitations of traditional HTML-based interfaces. These applications must be presented to end users through rich and intuitive interfaces that increase user satisfaction, improve process utilization and completion rates.

SAP users benefit from solutions such as SAP Interactive Forms by Adobe, which allows users to integrate paper-like PDF forms into their electronic workflows, and Adobe Acrobat® Connect™ Professional for SAP Enterprise Learning, which extends training environments with web and video conferencing.

Best known for its animation capabilities, the Adobe Flash Player, which runs on 98% of PCs (Windows, Mac OS, Linux) worldwide, is in fact at the core of a vibrant ecosystem of technologies that allow developers to create rich internet applications. Leveraging the Adobe Virtual Machine (AVM) to run applications that blend Action Script 3.0, a powerful ECMAScript compliant object-oriented programming language and MXML tagging, developers benefit from just-in-time compilation and performance across platforms. The Flex Framework adds out-of-the-box support for persistence, messaging, stateful local manipulation of data models, binary sockets, security sand boxes and standard protocols that simplify integration with SAP and other back-end systems.

These capabilities are supported with industry-strength development tools including an IDE, debuggers, compilers and standard libraries. Both SAP and its customers have successfully developed applications utilizing the Flash ecosystem to dramatically improve their users’ experience. When enterprises need to move applications to the desktop, they can seamlessly migrate Intranet or Internet deployed applications using the Adobe AIR integrated runtime.
This paper will discuss the Adobe Flex features and architecture, providing an overview of how Flex employs service oriented principles that allow SAP users to assemble innovative and engaging solutions.

**Advantages of using FLEX for SAP environments**

While HTML-based user interfaces have helped organizations to extend the reach of SAP and legacy back-end systems to employees, customers and partners, the page-based model, lack of client-side intelligence, and limited selection of user interface elements can make even simple tasks frustrating and error prone. These shortcomings curtail users’ ability to visualize complex data, work offline, work efficiently with real-time data, or simply enjoy the responsiveness of a robust application. Adobe Flex combines the responsiveness and advanced interface capabilities of desktop applications with the power of the web to deploy broadly accessible solutions at low cost. The SAP Enterprise Service Oriented Architecture’s clean separation of presentation from business logic and objects eases the integration of Adobe Flex-based solutions.
Using Adobe Flex, organizations can better leverage their existing SAP installations with rich and engaging customer experiences that support tasks such as decision making with dynamic charts and visualizations, customer support and collaboration with animations and video, and a comprehensive palette of selectors, sliders, drag-and-drop functionality and other features expected from a desktop-like environment.

Adobe Flex also supports users with limited or occasional network access, such as field engineers or customers completing multi-stage transactions over discontinuous sessions. Through bindings to back-end SAP data sources, users benefit from real-time updates to the application user interface based on changes on the back-end. Further, multiple users can collaborate in real-time via robust messaging services.

Figure 2: Flex applications provide rich UIs such as audio/video, effects and transitions, data synchronization and conflict resolution, offline operation, white boarding, and real-time data push.
Flex Runtime Architecture

Adobe Flex employs a just-in-time deployment model. Developers use Flex Builder to generate a binary file of compiled bytecode for an RIA client. This file is simply deployed to a web server via FTP or any other traditional means. When an end user requests the application, it is downloaded and the bytecode is translated to machine code by the Flash Player’s just-in-time compiler. ActionScript application code executes within a virtual machine sandbox, providing safe, high performance support for business logic on the client. The Flash Player also renders rich text, supports graphics APIs, including vector graphics, executes animations and supports audio and video with an optimized codex.

Figure 3: The Flex Application framework includes MXML, ActionScript and the Flex Class Library.

SAP Integration

Enterprise IT Architects have several options for integrating their Flex applications with their SAP environments.

SAP Remote Function Calls (RFCs) and SAP Business Application Programming Interfaces (BAPIs) are standard SAP interfaces for communication between SAP systems as well as between SAP systems and non-SAP systems. RFCs and BAPIs can be exposed as Web Services or Java APIs using the SAP Java Connector.

Enterprises can integrate their SAP solutions with Adobe Flex by using Java or ABAP Web services. The SAP Web Application Server implements Web services standards including eXtensible Markup Language (XML); Simple Object Access Protocol (SOAP); Web Service Definition Language (WSDL); and Universal Description, Discovery, and Integration (UDDI).
Figure 4: Flex Builder is a robust and complete Eclipse-based IDE that can be run stand-alone or as a plug-in to SAP NetWeaver Developer Studio.

LiveCycle Data Services ES extends the capabilities of the Flex client framework by providing additional services for advanced integration with SAP applications. Managing services for tasks such as RPC, data management and messaging is simplified for developers. LiveCycle Data Services ES is implemented as a Java server application and can be deployed on the SAP Web Application Server or many other standard Java application servers.

LiveCycle Data Services ES leverage standard deployment tools provided with the server and can integrate with application server clustering features to enable highly available applications. LiveCycle Data Services integrate with the existing security profiles defined within the Java application server.
Using LiveCycle Data Services ES, developers can easily create and manage bindings between Flex applications and SAP. Using Flex Remoting developers can access BAPIs and RFCs exposed as Java APIs via the SAP Java Connector and benefit from superior client/server performance provided by LiveCycle Data Services ES.

Figure 5: Developers have multiple options for integrating Flex and SAP.

Whichever method of programmatic integration is selected, Flex applications can be embedded within SAP NetWeaver Portal iViews, providing a seamless user experience within the enterprise. Integration is often as simple as calling an HTML file that loads the Flex application in an iFrame.

Case Studies

T-Mobile

T-Mobile would like to have a benefits enrollment application for all New Hires and existing employees through MyWorkLife and external Web Portal. Every year around 40,000 users access this application to complete their benefits enrollment process.

The enrollment applications has four sections i.e. health insurance, flex spending, life insurance and confirmation sections. All the data shown on flex screens is retrieved from SAP and the data transfer between SAP and flex is purely through web services via XML and SOAP.