macromedia® white paper

Internet Applications: A New Frontier

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Update 2004

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Macromedia Central defines a new model for Internet applications, blending the best of a desktop environment with the best of the web. This new product from Macromedia builds on the strength of our Macromedia MX products, existing web standards, and the Macromedia Flash development community.

Experience Matters

One of the core values shared by Macromedia and its developer community is that the user experience matters and that great experiences are great business.

Great experiences improve customer interactions; they directly improve sales and productivity while delivering a compelling brand experience, leading to financial return through increased use, brand loyalty, and customer satisfaction. Forrester Research has quantified what we feel to be true: investments in the user experience can deliver as much as a 250% return on investment in commerce applications and significantly lower the cost of deploying and using enterprise applications.

Rich Internet Applications

Macromedia has been working to improve the experience of web applications via Rich Internet Applications, which combine the functionality of desktop software applications with the broad reach and low-cost deployment of web applications—resulting in significantly more intuitive, responsive, and effective user experiences.

Companies such as E*Trade, BMW Mini, Sony Classical, and Yankee Candle have embraced Rich Internet Applications due to their unique ability to offload application processing to the client, reduce the number of page refreshes to accomplish tasks, require less bandwidth, and deliver an experience that is more immersive, effective, and responsive.

This first stage has focused on the experience within the browser, using Macromedia Flash Player to deliver this better application experience, combining the best of the desktop with the best of the web, a blend of content, communications and applications.

Future of Applications

We are all so engaged in the way computers and applications work today that it can be difficult for us to see beyond the current framework. There continues to be little change in how applications work even though the Internet is sparking a fundamental shift in architecture to a networked, distributed, multidevice world. As the Internet evolves into a platform that provides worldwide distributed data storage, distributed computing, and real-time communication, we need an appropriate application metaphor for this new world of information in which we are becoming immersed - one that works across a multitude of devices, evolving from previous ages of the mainframe, the minicomputer, and the personal computer.

Instant Delivery

Applications are still sold primarily as a standalone item in a box. This is incredibly inefficient, particularly with the increasingly networked world in which we are living. Applications can be better delivered electronically, which would enable the distribution of a greater number of smaller applications that can be used in conjunction with each other, rather than buying them physically and installing them. Once this becomes incredibly simple and safe, we should see a similar revolution in applications across the Internet that we have seen with content enabled by simple delivery of the web.

Occasionally Connected Computing

Applications today are largely divided across a chasm of local desktop applications with little reliance on the network for data, and web applications that are totally dependent on a live network connection. In reality, people are not living in these connectivity extremes, and typically have occasional access to the network, particularly with mobile computers and handheld devices. The existing model for applications today doesn't represent this usage pattern well, where applications largely fall into "desktop" or "web" categories. Applications should be able to more easily live across both of these worlds, gaining the advantages of network connectivity when it's available and continuing to function on the local desktop when offline.

Cooperative Applications

Applications are very much silos today. There has been little advancement in integrating applications since the invention of cut/copy/paste in the 1970s at Xerox PARC. Applications should be able to work together cooperatively to accomplish tasks larger than their individual functionality. These integration issues become even more important as software is delivered as web services, and application functionality is distributed across the Internet. The current answer to this is massive combination of functionality, such as the combination of e-mail, contacts, to-do list, schedule, and newsgroups in one monolithic application. Instead, applications should be able to specialize in making particular activities great, and users should be able to mix and match these applications, creating combinations they find most effective, and be able to share these combinations with other people.

Open Data

Applications are too closely tied to the data they manipulate, even storing the user's data in black boxes, such as inside a spreadsheet or Microsoft Outlook contact lists. Applications should be cleanly separated from the data they display and manipulate, enabling the same data to be easily used by multiple applications and enabling users to choose which applications they would like to use to work with that data. XML forms the basis of application-independent data, along with the specific markup defined for common categories. This enables innovation in application design without the data being locked inside, and better enables the use of that same data across many devices.

Context

Applications lack context today, so they have little idea of whether the user is in a meeting, presenting material, traveling in Boston or San Francisco, or relaxing at home. This can result in undesirable events, such as personal instant messages appearing on the big screen when presenting in a formal meeting. Applications today also have little idea where the user is located geographically, who the user may be currently meeting with, or what activity is happening in other applications. Given more context, applications can become more useful to the user, and common context should be widely known and shared across a multitude of applications while preserving privacy through user control. This enables applications to use the right level of behavior when events occur, and also speeds interaction between applications through shared knowledge.

Collaboration

Applications are increasingly a multi-user experience. They are beginning to represent the presence of other people on the Internet, just starting to support collaborative work. Applications should have a common way of integrating communication with others in the context of the application, and be able to share application functionality to enable live collaboration in their use. The Internet is not only about connected web pages, it's about connected people.

Macromedia Central: An Internet Application Environment

Macromedia has been working on enabling this future of applications as we move to the next step of Rich Internet Applications — enabling them to run outside the browser, on your local desktop computer or handheld device. This will enable users to interact with Internet applications even when they're offline, combining the best of desktop interactivity and availability with the best of web deployment and up-to-date information. The new environment that hosts these occasionally connected applications is Macromedia Central.

Instant Delivery

With Macromedia Central, it's simple to enable users to install your application if you choose to do so. Macromedia Flash Player 7 enables installation of your application through a small bit of ActionScript that will also install the Central environment if the user doesn't already have it. This capability is already in the current version of the player, which has already been distributed to hundreds of millions of people—more than 70% of web users already have this functionality.

You can provide applications for download directly from your own website, and are able to list them on Macromedia Exchange to make it easier for users to find your applications. Central also provides automatic updating of applications, under your control. Most interestingly, Central provides an integrated Try/Buy capability that enables you to sell commercial applications to users and provide limited trial periods.

To enable sale of your application, you just need to sign up with an online merchant service, and specify the price and trial period in a simple XML file you place in the same directory as the Macromedia Flash application on your web server. As users download and purchase your application, Central will handle the transactions for you. This transaction framework is also available via an ActionScript API, so you can choose to charge users how you like, for example after a certain number of launches or when they get to a particular point in the application.

One of the core applications in Central itself is an Application Finder that enables users to see what other applications they might want to install. This provides great visibility for applications you develop.

All installed applications are contained within a secure environment, the same as in the web browser, where they are not allowed direct access to the user's hard disk or other applications running on the local computer. This enables users to try a wide number of applications easily without fear of viruses or other random mischief on their machines.

User Interface

The main elements of Central are the Console, the Application window, and applications themselves.

The Console shows the collection of Macromedia Flash applications installed locally and can be used to launch these applications. The Console can also display miniature application tiles that provide convenient displays of information or access to common utilities.

The Application window contains the current Macromedia Flash application being used. A user might have multiple application windows open, just as people sometimes have multiple browser windows open. The application window has some common elements at the top and bottom — a utility bar that shows the current application name with standard controls such as help and preferences, and a status bar that shows current progress information.

The applications run within the application window, and can take advantage of standard component libraries and patterns to provide a consistent user experience with other Central applications. Central will run not only on personal computers, but on handheld devices as well, so it's important to consider small form factors when designing applications.

This common user interface we are developing is code-named Halo, and its components are included with Central itself so your application can take advantage of them without requiring additional download time. Halo provides an elegant experience that works well in a variety of environments, and is tuned for the experience of occasionally connected applications on the Internet.

Occasionally Connected Computing

Sometimes users have a connection to the Internet and sometimes they don't. This model of mobile computing is fundamental to Central, where applications can continue to run offline and can take advantage of the network when online.

Central applications receive events when the user goes online and offline, so they can take appropriate action such as updating information. Data can be stored locally using the Shared Object capability of Macromedia Flash Player, and the end user can control the amount of storage allocated per application domain. Data from the same domain can be accessed by a Macromedia Flash application running either in Central or in a web browser. However, this information is stored according to the domain it originated from, so applications from different websites cannot read each other's data.

Content from any URL can also be stored locally for use when offline, which is a new feature of the Central environment. Using URLCache, any file type from the web can be cached, including XML, JPEG, SWF, etc, and your application can then access that file offline exactly as if the user were still online — no change is required to your application logic to read cached files.

These connectivity events and simple to use storage functionality make it incredibly easy to make your applications work well either online or offline.

Cooperative Applications

One of the exciting possibilities in Central is enabling your applications to cooperate with other applications, so people can use them together. This cooperation is accomplished by the "Send To" functionality, which can be used to send the current selection from one application to another.

For example, a user might want to select a restaurant in a restaurant review application and send that selection to a mapping application to show its location. This saves retyping the information into multiple fields across applications—a sort of super copy and paste, similar to UNIX pipes.

More advanced users may want to have applications automatically track selections. For example, whenever a selection is made in the restaurant application, it should be automatically sent to the map application. This enables the user to immediately see restaurant locations just by clicking around on the review list. This is accomplished by the "Send Automatically" command, whereby a user can choose which applications should automatically be notified of the current selection.

Data is exchanged between applications using XML to describe the information. Applications can use whatever format they like in XML, though to encourage interoperability across applications Macromedia will be recommending some common formats for typical data such as people, events, and locations.

This cooperation between applications is completely under user control, so no information is shared across applications without their permission. As users build trusted connections across applications, their environment will become more and more responsive.

Open Data

The primary ways for applications in Central to access information is by reading XML files and calling web services over the Internet.

XML files can be read directly from a Central application from any domain. Users will be notified if an application would like to read an XML file from a domain other than its own, and can choose whether they will allow this. This enables quick integration with existing systems by providing a simple XML version of information, which many systems already support.

Central also has native web services support, using standard SOAP and WSDL protocols. There has been so much focus on the infrastructure and plumbing of web services, but not enough attention on the end user's experience with these. Central provides the easiest user interface layer for web services, enabling very simple development of great user interfaces.

Applications in Central can call web services directly without requiring any additional server side functionality, regardless of what technology is used on the server to implement these.

Attaching a user interface to a web service can be done in just three steps in ActionScript:

```
// 1. Access the stock web service directly
stockService = new WebService(
    "http://www.flash-db.com/services/ws/companyInfo.wsdl");

// 2. Call web service to get company info
stockRequest = stockService.doCompanyInfo(
    "anyuser", "anypassword", "MACR");

// 3. Handle the result when it returns
stockRequest.onResult = function(result)
{
    stock.companyInfo = result;
}
```

You may want to transform data on the client after receiving it, and Central supports this with native regular expression support for matching patterns, and entity conversion support to quickly change HTML and XML entities like   and %20 into human-readable characters.

Sometimes you may not want data to be so open and readable by prying eyes, and Central supports secure transmission of data. Information can be transmitted in encrypted form using SSL with HTTPS, the same technology that browsers support. In the first release of Central, information is stored locally unencrypted, the same as documents and other information on a user's hard disk. In the future, Central will support encrypted local storage as well. Authentication to network services is enabled by HTTP challenges for name/password combinations, which is handled by Central itself so applications do not have direct access to a user's authentication information.

Web services can also be accessed securely, with encrypted communication over HTTPS and authentication provided by basic HTTP challenges. We also provide support for implementing more advanced authentication as standards solidify around web services security, such as WS-Security and SAML.

Context

Central enables the user to let all applications know specific information about themselves, and applications can also notify the user about current information.

Users can choose to specify information that can be known across applications, such as their name or their location. This enables people to just enter this information once and have it used many times. This information is stored on the user's local machine rather than on a central server, so it remains in their control, and they can specify which applications can see what information.

Providing a user's current location globally enables location-based applications to be developed, so for example a restaurant review application can show restaurants in the user's current area. At the moment, this information will need to be entered manually, but in the future devices will be able to provide this automatically using integrated Global Positioning System (GPS) support.

Central also supports running background tasks, known as Agents. These are pieces of logic written in ActionScript that can do things such as check content over the Internet for changes, like new items appearing on a weblog, or listen on XML sockets for information coming from a server, like an incoming message from a friend. Agents can choose to notify the user of this information by displaying a notice on the screen.

The user has control over whether notices appear on screen, and can also see that new notices are available through an indicator light on the Central console. From a notice, a user can launch a related Central application such as a stock notice linking to a portfolio application.

Collaboration

Central provides all the capabilities of Macromedia Flash Player 7, including support for Macromedia Flash Communication Server MX to build collaborative and communications applications.

Opportunity

There are tremendous opportunities to improve the effectiveness of applications across a spectrum of areas, including business applications as we've seen on the Internet, all the way to every day internal enterprise applications where the quality of user experience and the ability to work both online and offline can improve productivity and reduce costs.

Applications can be created using standard Macromedia Flash development tools, such as Macromedia Flash MX 2004 or Studio MX 2004, and distributed from any web site or through the Application Finder that runs both within Central and on the Macromedia web site.

You can even sell your applications through Macromedia Central, which will handle the full try and buy process for you and handle transactions with users buying your application. A percentage of revenue for these commercial applications is shared with Macromedia for providing this channel to users and handling the transaction processing.

Most importantly, we call all work to improve the overall experience of the Internet for users.