Speiros v1.0

White Paper

NOTE: THIS PAPER PROVIDES AN IN DEPTH LOOK AT THE SPEIROS PRODUCT FROM A TECHNICAL PERSPECTIVE. FOR AN OVERVIEW OF THE SPEIROS VISION AND CYRUS INTERSOFT, LOG ON TO THE WEB SITE AT WWW.CYRUSINTERSOFT.COM

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Introduction

The object of this technical paper is to give a detailed description of the different systems of the revolutionary Speiros technological infrastructure. It is divided into two parts with the first part covering the Speiros ESTATE. The last part is then devoted to the individual utilities provided by Cyrus Intersoft for Speiros.

Part 1. The Speiros ESTATE

The Speiros ESTATE is made up of the Speiros Run Time Environment and the Aspect. The Speiros Run Time Environment, or the client-side portion, provides an enhanced run time system within Sun Microsystem's Java Virtual Machine (JVM). It is transparent to the user and lives between the Aspect (user interface) and the JVM.

The user interface for Speiros has been abstracted from the Run Time Environment to allow Speiros to run on a wide range of hardware devices and for developers to use the power of Java to create their own interfaces and desktop environments. These interchangeable user interfaces are known as Aspects. The Speiros Bar is an Aspect that was created to help users and developers get started in Speiros until other Aspects are created.

I. The Speiros Run Time Environment

As the essence of Speiros, the Run Time Environment provides the means to launch Java applets and applications (collectively known as "apps") in a standard and customizable fashion.

Key features for the Speiros Run Time Environment include:

- δ Application launching across the network.
- δ Task management.
- δ A network-centric based virtual file system.

The Speiros Run Time Solution

Speiros came about in response to the industry's standard in working with modern operating systems and on-demand technology:

- δ **Industry problem-** the Java Virtual Machine has the capability to run multiple programs, but the Java core libraries were not designed to support multiple, independent programs running at the same time.
- δ **Industry solution-** other projects have tried to over come this limitation by modifying the virtual machine, but that presents portability problems in addition to the obvious licensing issues.
- δ **The Speiros solution-** surpass the limitation by safely running more than one program concurrently while still conforming to pure Java standards with no modifications to the Java Virtual Machine.

Components

The following components make up the Speiros Run Time Environment: the Virtual File System, Program Launching, Task Management, and the Status Subsystem.

1. Virtual File System

The Run Time Environment defines a Virtual File System that combines network servers and local file systems into a single file system. Each server is mounted to the single root of the File System which is similar to the Unix model. The architecture can abstract the actual data i/o so that any protocol can be implemented, providing the ability to mount various types of server files into the Virtual File System. It comes in two forms: the Primary Server and Local Mode.

1.1 Primary Server

This is what the user logs into for normal operation. The Primary Server's file system is mounted into the Virtual File System. There is also a specific subdirectory which holds configuration information so that the next time the user logs on Speiros, their Presence will come up the way it was when they last logged off.

1.2 Local Mode

Local Mode allows the user to run Speiros without logging on the server and still have the full Virtual File System functionality.

2. Program Launching

The Run Time Environment has a sophisticated launching system for invoking Java software. It consists of two systems, the Launcher and the MIME system, which, when combined, enables Speiros to effectively launch any file that can be specified by a URL. Speiros also utilizes the Alias File as part of the program launching.

2.1 Launcher

This is the launching system. It utilizes an advanced streaming method which allows the program to begin running before it is fully loaded from the network and increases the loading speed from traditional web browsers. A local caching technique lets a user run recently used programs more quickly, even if they are working offline.

2.2. MIME System

The MIME System is used to determine the MIME type of the file being launched because not every file is a program.

The reason for such a system is as follows:

- δ The Launcher can launch any arbitrary URL.
- δ A URL to any "app" can be associated with each MIME type.
- δ Icons are associated with MIME type.
- δ File extensions can be mapped to MIME types.

2.3 Alias File

In order to gain greater flexibility and control over the launching of apps, Speiros utilizes a file known as the Alias File. It acts as a symbolic link for the internet using XML grammar, while at the same time provides contextual information for the associated URL. It also incorporates mailcap style escapes to flexibly control launching by providing the necessary classpath and parameter information.

3. Task Management

Tasks in Speiros are very similar to Unix processes or Windows NT tasks. Whenever a new program is run within Speiros, a new task is created which encapsulates its run state utilizing Class Name Spaces. This creates a unique environment from both a system's and a program's point of view.

3.1 Class Name Spaces

This is defined as a collection of classes and classloaders which defines the environment a program runs in.

Here is the significance of Class Name Spaces in the industry:

- δ **Traditional Java environments**- there is one global system Class Name Space which is comprised of the Java Core Classes and prevents running more then one app concurrently in a single virtual machine securely.
- δ **The Speiros solution-** a separate Class Name Space is associated with each task, effectively separating the apps from each other as well as allowing them to operate as if each had its own virtual machine.

This system makes it possible to enhance the Run Time Environment functionality of Java and lends itself well to a capabilities style security architecture.

3.2 System's Point of View

From the system's point of view, the task subsystem enables the launching of new tasks as well as querying and ending the ones that are currently running.

3.3 Program's point of view

From the program's point of view, each task works in conjunction with its Name Space to completely emulate a separate virtual machine for each program.

4. Status Subsystem

The Run Time Environment provides a universal status subsystem which is used to provide feedback on the system activity. The dual functionality of this subsystem allows the Aspect to listen for any type of information it wants to display to the user in the form of plain text messages. It also utilizes Progress Indicators to show the status or speed of download operations.

II. The Speiros Bar Aspect

One of the primary goals for the Aspect Interface (AI) was to provide a uniform way for loading and saving configuration information as well as the means to interact with the Run Time Environment. This is important to curb any unnecessary incompatibilities that may arise between different aspects. As more aspects are developed and feedback is received, the AI will mature to the point where developers will not have to worry about configuration issues at all.

For now, the Speiros Bar is the primary aspect as the highest level user interface for the Speiros Run Time Environment and appears after the user has successfully logged into Speiros.

Key features for the Speiros Bar include:

- δ   Appearance settings can be changed which are saved and restored.
- δ   The Speiros Bar frame is a fixed size, which is also determined by user preferences.
- δ   Launching applications, the browsers, etc, from either the Speiros menu or their Favorites.
- δ   Mounting other Speiros Presences in the Speiros File System.
- δ   Keeping track of open windows in the Task Bar.
- δ   Exiting the Speiros environment in a clean manner.

<div align="center">

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The Speiros Bar

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Components

The Speiros Bar consists of the following components: the Toolbar, Mount Presence Dialog Box, and Appearance Settings Dialog Box.

1. Toolbar

This is the main component of the Bar as the primary user control console. The orientation can either be horizontal with the different elements added to it from left to right, or vertical with top to bottom elements. It consists of the following: the Speiros Button and the Favorites Dock Pane.

1.1 Speiros Button

This is the first component in the Toolbar. Clicking on it brings up the Start Menu which contains several commands.

Start Menu commands include:

- δ   **"About Speiros Bar"-** Displays a Splash page Property sheet containing version information.
- δ   **"Utilities"-** Opens a submenu for users to launch applications that are installed on the local computer as part of the Estate.
- δ   **"Updater Sites"-** Opens a submenu for users to launch the Updater Utility from any of the listed sites.
- δ   **"Mount Presence"-** Opens a Dialog Box for users to connect to another presence on a SpeirosCenter and, if successful, mount the presence into the Speiros File System.
- δ   **"Appearance Settings"-** Opens a Dialog Box for users to change the appearance of the Bar.
- δ   **"Exit Speiros"-** Exits the Speiros Run Time Environment and, unless this option is disabled by the user, it opens a Confirmation Box to confirm the exit. It will also notify the user of any active operations or windows and to close them before exiting.

1.2 Favorites Pane

As the second component in the Toolbar, this Pane shows any Favorites which have been docked by the user and stored in the desktop directory of the primary presence. Each one is represented by an appropriate icon superimposed on top of a tile image. A label is displayed in a text band across the top. If there are no Favorites, the pane will be invisible.

The Pane does not extend beyond the length specified by the user in the Appearance Settings Dialog Box and a Scroll Control appears as needed. They are located on either end of Pane as opposed to the traditional Scroll Bar.

2. Mount Presence Dialog Box

The Mount Presence Dialog Box is listed in the Start Menu and connects users to other SpeirosCenters. If successful, it mounts the presence into the Speiros File System, making files available to other programs. The Box also provides a Pick list of the recently-visited SpeirosCenters for the user, which only require a password; or users can type in a new SpeirosCenter and user name/password as well. Any errors that occur during the process are reported via error messages to the user.

3. Appearance Settings Dialog Box

The Appearance Settings Dialog Box is listed in the Start Menu and enables users to control the look and behavior of the Speiros Bar by modifying the appearance. Unless the user cancels out of the Dialog Box, any changes made are saved to a preferences file.

The Appearance Settings that can be controlled are:

- δ Toolbar orientation (horizontal or vertical)
- δ Favorites Dock Pane size
- δ Active Window Pane size
- δ Show File Names in Favorites Dock Pane
- δ Confirm on Exit

Part 2. The Applications

Cyrus Intersoft has a number of utilities that provide basic functionality to the Speiros ESTATE. They are distributed to the user via the Speiros Updater.

Currently, these applications are available for Speiros:

- δ **Speiros Updater**- for retrieving and installing the latest versions of support applications.
- δ **Alias Editor**- for altering, creating, and deleting Alias files
- δ **MIME Mechanic**- for adding, deleting, and modifying the MIME type configuration.
- δ **File Browser**- for managing the contents of their local drive as well as file systems on remote speirosCenters.
- δ **Catalog Browser**- for viewing and interacting with the contents of a Catalog which is a hierarchical collection of resources or applications.
- δ **Web Browser**- for browsing the Web.

III. The Speiros Updater

The Speiros Updater allows users to retrieve and install the latest versions of support applications. It is located under the "Updater Sites" menu of the Speiros Start Button.

Key features for the Speiros Updater include:

- δ Providing a mechanism for Cyrus to release the latest versions of support applications which are dowloaded from the site.
- δ Displaying application descriptions and general information.
- δ Multiple applications can be chosen for installation or updating.
- δ As each application is downloaded into the user's Speiros Presence (including jars, aliases and icons), Progress Indicators give the status of the operation.
- δ Installed applications appear under the "Utilites" Menu of the Speiros Start Button.

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The Speiros Updater

Parameters

The Updater requires the URL to the Properties file which contains a list of the items to install.

Components

The Updater consists of the following components: the Application Selector Check Box, Information Pane, and the Install Complete Dialog Box.

1. Application Selector Check Box

This component is located at the top of the Updater. It lists the applications the user can select by clicking on the box and was determined by the server from which it was retrieved.

2. Information Pane

The Information Pane displays descriptive information about the applications and corresponds to the one that was last checked in the Application Selector. If the user clears a check box, the text in the Pane is removed. Note: The text area supports the display of HTML.

3. Install Complete Dialog Box

This Dialog Box appears when all applications have been installed and the last Progress Indicator disappears to notify the user that the operation is complete. Clicking on the OK Button closes the Box as well as the Speiros Updater.

IV. The Alias Editor

The Speiros Alias Editor is used to alter, create and delete Alias files. It is located under the "Utilities" menu of the Speiros Start Button.

Key features for the Alias Editor include:

- δ Previously existing alias files can be viewed and edited.
- δ Users can access an online Help System.
- δ Users can change the alias icons.
- δ More advanced options of the alias file can be changed in the Advanced Pane.

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The Alias Editor

Components

The Alias Editor consists of the following components: the Menu Bar and the GUI Panes.

1. Menu Bar

This component is located at the top of the top of the Editor and consists of the following menus: "File", "Edit", and "View". Along with standard menu commands found in most apps, there are some specific to the Alias Editor.

Specific Alias Editor commands include:

- δ **"Open"-** Brings up a File Chooser Dialog Box for users to open a previously existing alias file for viewing and editing.
- δ **"Import from HTML"-** Gives users the ability to provide a URL to an HTML file containing an <APPLET> tag. The HTML file is parsed, and all <APPLET> tags are converted into aliases, which are then opened.
- δ **"Change Icon"-** Users can change the icon of the current alias.
- δ **"Alias Editor Help"-** Launches the Alias Editor Help System.

2. GUI Panes

The Alias and Advanced GUI panes make up the rest of the Editor.

2.1 Alias Pane

This pane contains the most basic options of an Alias File.

Alias Pane elements are:

- δ **Alias Name Text Field-** Users can change the name of the current alias.
- δ **Alias Type Drop-down Menu-** Allows users to set the type of their alias such as, "applet," "application" or "document."
- δ **Alias Target-** The target URL of the Alias file.
- δ **Change Icon Button-** Brings up the Change Icon Dialog Box for users to change the icon of their alias.
- δ **Content Text Field-** Users can alter the content (MIME) type of their alias so that Speiros to know how to open it.
- δ **Target Info Table-** Allows users to store basic information about the alias using a key-value hash table.

2.2 Advanced Pane

This pane gives users the ability to change some of the more advanced options of the alias file.

Advanced Pane elements are:

- δ **Invoke an Text Field-** Corresponds with the Alias Type Text Field of the Alias Pane and is updated at the same time.
- δ **With Class Text Field-** Where users define whether the target class of the alias is a type of applet or application. An example of a target class would be something like "net.cyrus.app.Alias Editor.Alias Editor."
- δ **Found in Table-** Allows users to set the classpath of the alias.
- δ **Program Supports Files of Type Drop-down Menu**- Contains the content (MIME) types that this alias is able to handle.
- δ **Arg Drop-down Menu**- Contains the command line arguments of the alias.
- δ **Parameters Table-** Allows users to set the applet parameters.

- δ **Properties Table**- Contains the application properties.
- δ **New Alias Button**- Opens a new window to create a new Alias.
- δ **Save Button-** Saves the alias to whatever filename is in Alias Name Text Field of the Alias pane.

V. The MIME Mechanic

The MIME Mechanic gives user the capability to add, delete, and modify the MIME type configurations. It is located under the "Utilities" menu of the Speiros Start Button.

Key features for the MIME Mechanic include:

- δ MIME types can be created or edited.
- δ An Icon Gallery is available for users to choose icons.
- δ Users can access an online Help System.

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The MIME Mechanic

Components

The MIME Mechanic consists of these components: the Title Bar, Menu Bar, and the Display Area.

1. Title Bar

This component is located at the top of the Browser and consists of a Program Button, Title Region, and an Exit Button. These elements adhere to what is delivered with Java frame.

2. Menu Bar

This component is located under the Title Bar and consists of the following menus: "File", "Edit", and "Help". Along with standard menu commands found in most apps, there are some specific to the MIME Mechanic.

Specific MIME Mechanic commands include:

- δ **"New MIME Type"**- Clears the display area so user is able to create a new MIME type.
- δ **"Save Changes"**- Saves the current changes made to the MIME type.
- δ **"Delete MIME Type"**- Deletes the selected MIME.
- δ **"MIME Mechanic Help"**- Launches the MIME Help System.

3. Display Area

This is the last component and is located under the Menu Bar. It consists of the following elements: the Selector Pane (left side) and the Editor Pane (right side),

3.1 Selector Pane

This Pane is located on the left side of the Display Area and shows the current MIME type configuration stored in the file, MIME.types.

3.2 Editor Pane

This Pane locate on the right side of the Display Area.

Editor Pane fields to edit are:

- δ **"MIME Type Text Field"**- Contains the MIME Type label for users to edit.
- δ **MIME Normal Icon Button-** Opens the Icon Gallery Dialog Box for choosing an icon image to represent the MIME type.
- δ **MIME Small Icon Button**- Opens the Icon Gallery Dialog Box for picking an icon image that will represent a smaller scaled image of the MIME type.
- δ **"Extension Field"**- Contains the file extension used to show this MIME type icon image.
- δ **"Program URL Field"-** Contains the URL which points to a program associated with the MIME Type.
- δ **"Description Field"**- Field which allow user to write a short description of the MIME type.
- δ **"New Button"-** Clears the editor pane for the user to create a new MIME type.
- δ **"Delete Button"**- Deletes the selected MIME type.
- δ **"Undo Button"**- Undoes the last action operation executed by the user.
- δ **"Save Changes Button"**- Saves the current setting to the file MIME.types.

VI. The File Browser

The File Browser gives users the capability to manage the contents of their local drive as well as the file systems on remote speirosCenters. When the Browser is installed, it is located under the "Utilities" menu of the Speiros Start Button on the Speiros Bar.

Key features for the File Browser include:

- δ Resource launching.
- δ Navigation through local and remote file systems.
- δ Files can be renamed, cut, copied, pasted, deleted, and drag-and-dropped.
- δ Multiple windows can be opened to drag-and-drop files between them.

(pic)
The File Browser

Components

The File Browser consists of the following components: the Title Bar, Menu Bar, Toolbar, and the Display Area.

1. Title Bar

This component is located at the top of the Browser and consists of a Program Button, Title Region, and an Exit Button. These elements adhere to what is delivered with Java frame.

2. Menu Bar

This component is located underneath the Title Bar and consists of the following elements: "File", "Edit", "View", "Search", and "Help". Along with standard menu commands found in most apps, there are some specific to the File Browser.

Specific File Browser commands include:

- δ   **"Home"**- Displays the contents of the user's home directory.
- δ   **"Tree View"**- Turns the display into a single pane, Mac style view. A check mark appears next to the active view.
- δ   **"Split View"**- Emulates a windows style display by showing both panes. A check mark appears next to the active view.
- δ   **"Content View"**- Turns the display into a single pane, basic style browser showing a collection icons. A check mark appears next to the active view.
- δ   **"Custom View"**- Opens up a Dialog Box for users to customize the Browser display in one of three ways shown.
- δ   **"Show Directory Tree Only"**- Emulates a Mac-style with single pane
- δ   **"Show Content Tray Only"**- Shows the basic view style with a single pane
- δ   **"Show Both Panes"**- Emulates a Windows style display by showing both panes.
- δ   **"Search"-** Opens a Search Box where users can enter any text string as the search parameters. A Results List then shows the matches found from the search operation.
- δ   **"Help"-** Launches a browser and displays the given help URL.

3. Toolbar

This component is located underneath the Menu Bar and consists of the following control icons which emulate these commands from the Menu Bar: "Home", "Open", "New Folder", "Rename", "Delete", "Copy", "Cut", "Details", "Icon", "Tree View", "Split View", and "Content View".

4. Display Area

This is the last component and is located under the Toolbar. It consists of the following elements: The Directory Tree (left pane), Contents Tray (right pane), Scrolling divider, and the Status Bar.

4.1 Directory Tree

This Pane is located under the Toolbar and to the left of the Scrolling Divider. It emulates the hierarchical listing of the Mac Finder by displaying the file data in columns to the right of the Folder. The columns can be resized with the Column arrows on the Pane Title bar.

4.2 Contents Tray

This Pane is located under the Toolbar and to the right of the Scrolling Divider. It emulates the basic style browser showing a collection of icons. The user can choose how they want the contents displayed. Because there is no hierarchical tree, the entire display changes to show the contents of the Folder when it is opened. The user moves back through the contents with the Back button on the Pane Title bar.

4.3 Scrolling Divider

This element is located between the Directory Tree and the Contents Tray. It can be dragged left to right to adjust the size of either pane without affecting the total size of the browser.

4.4 Status Bar

When launching the File Browser, a Status Bar shows the progress of the operation. It also appears during the copying and moving of resources.

VII. The Catalog

The Catalog is used to view and interact with the contents, which is a hierarchical collection of resources or applications. It is located under the "Utilities" menu of the Speiros Start Button.

Key features for the Catalog include:

- δ Opening and viewing multiple Catalogs.
- δ Navigating through different categories within a Catalog by using Pop-up Menus and Buttons.
- δ A Resource Information Pane for displaying information regarding a selected item or an overall category.
- δ A Personal Catalog for adding favorite items.
- δ A dynamic Advertisement Banner.
- δ The ability to specify a default Catalog.

(pic)
The Catalog

Parameters

The Catalog can use, but doesn't require, several different parameters from either a config file or the alias.

Key parameters include:

- δ **Default Catalog-** the location of the catalog to be opened when the Browser is started.
- δ **Name-** an identifier for the user to associate with the Catalog.
- δ **Type-** the type of catalog a given location will be such as a Personal Catalog, File Catalog, Database Catalog, etc.
- δ **Default Category-** the initial category a Catalog opens.

Components

The Catalog consists of the following components for each open Catalog window: the Menu Bar, Category Button, Category Navigator, Toolbar, Parent Category Navigator, Resource Information Pane, and the Advertisement Pane.

Note: When the Catalog is switched to a new category using the Category Button, the components may change as well.

1. Menu Bar

This component is located at the top of the Catalog and consists of the following menus: "File", "Catalog", and "Help". Along with standard menu commands found in most apps, there are some specific to the Catalog.

Specific Catalog commands include:

- δ **"Open Personal"-** Opens the users Personal Catalog.
- δ **"Open Recent"-** Contains a submenu that maintains up to ten of the last Catalogs the user connected to with the most recent one at the top of the list.
- δ **"Open Catalog"-** Brings up a Dialog Box for the location of a new Catalog to open. Clicking on the Open Button opens a new Browser window for the specified catalog.
- δ **"Launch"-** Launches the application shown in the Resource Information Pane. If the application can not be launched, nothing happens.
- δ **"Add/Delete"-** Adds or deletes items from the Personal Catalog. This element toggles in the menu depending on which command can be executed.
- δ **"Up 1 Level"-** Changes the Catalog back up level of the parent category.
- δ **"Go to Top"-** Changes the Catalog back to the root of the Catalog.
- δ **"Set as Default"-** Makes the current catalog and location the default to show the next time the program is opened.
- δ **"Show Information"-** Displays the information of the current category.

2. Category Button

The Button is located in the upper left-hand corner the Category Navigator and to the left of the Parent Category Navigator. The Button label displays the name of the last category opened. It is used for navigating up the category tree. Clicking on the Button opens a submenu of the parent category for the Catalog. Subsequent submenus show the child categories of the parent. Selecting a category from one of the submenus changes the Browser to that display as well as the Button label.

3. Category Navigator

The Navigator is located directly below the Category Button and to the left of the Resource Information and Advertisement Panes. It shows the items contained in the category displayed on the Category Button as an Icon Buttons with Arrows for submenus.

Note: If the selected item or child category is an alias, the Catalog changes to that alias's category and, at the same time, displays information regarding it in the Resource Information Pane.

3.1 Icon Buttons

The Buttons for each item include a distinctive icon for the given category. Clicking on it changes the Catalog to that display.
3.2 Submenus

Clicking on the Arrow opens a Submenu of the categories and aliases for the Button. Subsequent submenus are opened by moving the pointer over an item in the list. This allows the user to "tunnel down" through the subcategories until they find what they want. Releasing the mouse over a child category changes the Catalog to that display.

4. Toolbar

The toolbar is located to the right of the Category Button and above the Parent Category Navigator. It consists of the following control icons which emulates these commands from the Menu Bar: "Open", "Close", "Launch", "Add/Delete", "Up 1 Level", "Go to Top", "Set as Default", "Show Information", "Help" and "Exit".

5. Parent Category Navigator

The Parent Category Navigator is located to the right of the Category Button and above the Resource Information Pane. It provides an alternative method of navigating up the Parent Categories rather then using the Category Button. It remains empty until a user opens a child category using the Category Navigator and will list each subsequent child category opened. Clicking on any child category in the list will change the Catalog to that display and remove the categories that were listed below it.

6. Resource Information Pane

The Pane displays attributes and information regarding the selected category, such as a description, a logo or branding information, or the alias in the Category Navigator.

Alias information displayed include:

- δ   An icon
- δ   The name
- δ   The author
- δ   The version
- δ   The date it was created
- δ   The Alias's Home Page
- δ   Actions the alias can perform

Note: If a home page does exist for the alias, it is displayed in a scrollable text area below the other descriptive information.

7. Advertisement Pane

This is the last component and is located in the lower right corner of the Browser, directly below the Resource Information Pane and to the right of the Category Navigator. It displays advertisements specific to the Catalog and Category the user is navigating through. When the Browser is first loaded, it contains an advertisement associated with the Catalog itself.

VIII. The Web Browser

The Web Browser allows users to surf the Web and is located under the "Utilities" menu of the Speiros Start Button.

Key features for the Web Browser include:

- δ   Browsing the Web.
- δ   Searching for text on a HTML page.
- δ   Marking and editing bookmarks for their favorite web sites.
- δ   Changing fonts and screen colors in the Contents Pane.
- δ   Viewing the source code of the page.

(pic)
The Web Browser

Components

The Web Browser consists of the following components: the Menu Bar, Toolbar, Location Site Bar , and the Contents Pane.

1. Menu Bar

This component is located at the top of the Browser and consists of the following: "File", "Edit", "View", "Go", "Bookmarks", and "Help". Along with standard menu commands found in most apps, there are some specific to the Web Browser.

Specific Web Browser commands include:

- δ **"Open location"**- Displays the Open Location Dialog Box where users enter a URL to open.
- δ **"Save Applet"-** Opens the Save As Dialog Box which asks users the name of the directory as well alias to save it to. When the user clicks on the Save Button, the web page is parsed and an alias for each applet is written to the specified directory. A Confirmation Box shows the alias names and their paths. One alias is created for each applet on the web page and is named as inputname_appletclassname.alias
- δ **"Help"**- Launches a browser and displays the given Help URL.

2. Toolbar

This component is located underneath the Menu Bar and consists of the following control icons which emulates these commands from the Menu Bar: "Back", "Forward", "Reload", "Stop" and "Home".

3. Location Site Bar

This component is located underneath the Toolbar and consists of the Location Image and the Location Field.

3.1 Location Image

This is simply a gif file that has the word location on it. It acts as label to the location field.

3.2 Location Field

This Field displays URL of the current web page. Entering a new URL and clicking the Enter Button will load up a new one.

4. Contents Pane

This is the last component and is located under the Location Site Bar. Itdisplays the contents of the URL address listed in the Location Site Bar. It consists of the following elements: the HTML Pane and the Message Bar.

4.1 HTML Pane

The HTML pane constitutes the bulk of the Web Browser.

4.2 Message Bar

This element appears at the very bottom of the Browser. Messages regarding an item appear here as the cursor moves over it. It also acts as a Progress Indicator, showing the percentage of the completed operation.