July 15, 1996

SRC Research Report 139a

WebCard: Integrated and Uniform Access to Mail, News, and the Web

Marc H. Brown

digital

Systems Research Center
130 Lytton Avenue
Palo Alto, California 94301

Systems Research Center

The charter of SRC is to advance both the state of knowledge and the state of the art in computer systems. From our establishment in 1984, we have performed basic and applied research to support Digital's business objectives. Our current work includes exploring distributed personal computing on multiple platforms, networking, programming technology, system modelling and management techniques, and selected applications.

Our strategy is to test the technical and practical value of our ideas by building hardware and software prototypes and using them as daily tools. Interesting systems are too complex to be evaluated solely in the abstract; extended use allows us to investigate their properties in depth. This experience is useful in the short term in refining our designs, and invaluable in the long term in advancing our knowledge. Most of the major advances in information systems have come through this strategy, including personal computing, distributed systems, and the Internet.

We also perform complementary work of a more mathematical flavor. Some of it is in established fields of theoretical computer science, such as the analysis of algorithms, computational geometry, and logics of programming. Other work explores new ground motivated by problems that arise in our systems research.

We have a strong commitment to communicating our results; exposing and testing our ideas in the research and development communities leads to improved understanding. Our research report series supplements publication in professional journals and conferences. We seek users for our prototype systems among those with whom we have common interests, and we encourage collaboration with university researchers.

WebCard: Integrated and Uniform Access to Mail, News, and the Web

Marc H. Brown

July 15, 1996

Publication History

A preliminary version of this report appeared as "Browsing the Web with a Mail/News Reader" in the *Proceedings of the ACM Symposium on User Interface Software and Technology (UIST'95)* (November 1995), pages 197–198.

Abstract

This report describes WebCard, an integrated mail/news reader and Web browser. As a mail/news reader, WebCard is fairly conventional; the innovation is that Web pages are fully integrated into the mail/news reader. The user interface is based on folders, which can contain mail messages, news articles or Web pages. Folders can be used to organize material and to present the pages returned by commands such as “search” and “auto surf.”

Introduction

As people are spending increasing amounts of time processing e-mail, reading news, and surfing the Web, an integrated user interface to these three activities becomes increasingly appealing.

Leading-edge Web browsers are moving toward this goal by including features for handling e-mail and newsgroups. For instance, Netscape Navigator includes both a mail reader and a news reader. However, each reader appears in a separate top-level window, and the readers are only loosely integrated with the Web browser: the only connection to the Web browser is that when a mail message or news article contains a URL, the URL is "active." That is, the user can click on the URL, causing Navigator to fetch the page and display it in its Web browser window.

Leading-edge mail and news readers are also moving toward this goal by making URLs in messages active and by allowing mail messages and news articles to reference Web pages as MIME attachments. As a MIME attachment, the text part of the mail message or news article is shown in the standard fashion, and clicking on the "attachment" button invokes an external Web browser that displays the attached Web page. Once the Web browser is running, however, it is completely independent of the mail or news reader that invoked it.

This report describes WebCard, a mail/news reader (think of it as a combination of `xmh` and `xrn`) that has been enhanced to handle Web pages *using the same interface that is already used for handling mail messages and news articles*. The user interface is based on folders, which can contain mail messages, news articles, and also Web pages. The obvious use of folders is for organizing material, as is done in conventional e-mail and news readers using folders, and in Web browsers using bookmarks or hotlists. In WebCard, however, folders can contain an arbitrary mix of mail messages, news articles, and Web pages. WebCard also uses folders to present the mail messages, news articles, and Web pages returned by the "search" command, and to present the Web pages returned by the "auto surf" command.

WebCard was made available to the SRC community in the spring of 1995. At that time, no other system existed that provided integrated e-mail, news, and Web browsing. (In fact, at that time, Navigator could send, but not receive e-mail, and could read, but not post to newsgroups.) Two systems have recently been announced that appear to integrate e-mail and news with Web browsing much like WebCard: Cyberdog [2] from Apple and the Other Browser [7] from Pixelogic.

WebCard

At first blush, WebCard is a conventional folder-based e-mail reader. The user interface (see Figure 1) is divided into three regions: a *table of contents* at the top left, a *list of folders* at the top right, and a *display pane* at the bottom. The list of folders shows the folders belonging to the user. There are two distinguished folders: the *selected folder* and the *open folder*. Single-clicking a folder selects it, thereby making it the target of move and copy operations. Double-clicking both selects and opens a folder. Each message in the open folder is summarized by a line in the table of contents, containing a message number, the date the message was sent, the sender of the message, and the subject.

At any given time one message from the open folder, called the *selected message*, is shown in the display pane of the WebCard window. The corresponding line in the table of contents is highlighted. Clicking on a different line, or using the up and down arrow buttons, changes the selected message. The user can respond to the selected message, forward it, copy or move it to the selected folder, and so on. (Actually, more than one message can be selected, but some operations, like "Reply," are only valid when there is a single selected message.) Users can also perform standard folder operations, such as creating, renaming, and deleting folders.

WebCard handles newsgroups in the same way: a folder whose name refers to a newsgroup contains the articles in that group. Users can respond to a news article, copy articles to the selected folder, and so on. The primary difference between a newsgroup folder and any other folder is that newsgroup folders are read-only: users cannot delete messages from, or copy messages into, a newsgroup folder. WebCard uses the name of the folder to distinguish between newsgroup folders and ordinary folders; a period in the folder name indicates a newsgroup. The Andrew Messages System [1] is the only non-Web browser we know of that deals uniformly with e-mail and newsgroups.

WebCard is also a Web browser: Web pages are displayed in the display pane that normally shows the contents of a message. There are three ways to bring up a Web page: by clicking on a URL that appears in the currently selected mail message or news article (see Figure 2); by typing the URL into a dialog box that is opened by left-clicking the "WWW" button; and by selecting a URL in an arbitrary window (e.g., by highlighting it with the mouse) and then middle-clicking the "WWW" button. Once a Web page is displayed, clicking on a link fetches the associated page, which then replaces the existing page in WebCard's display pane.

Whenever WebCard displays a Web page, the menu bar displayed at the top of the display pane changes to contain "Back," "Forward," and "Stop" buttons, and a pull-down menu labeled "WWW." The "Back" and "Forward" buttons traverse the chain of Web pages that have been visited. For instance, when the screen dump was captured in Figure 3, a total of sixteen Web pages had been visited, and the user issued the "Back" command twice. The "Stop" button cancels any retrievals

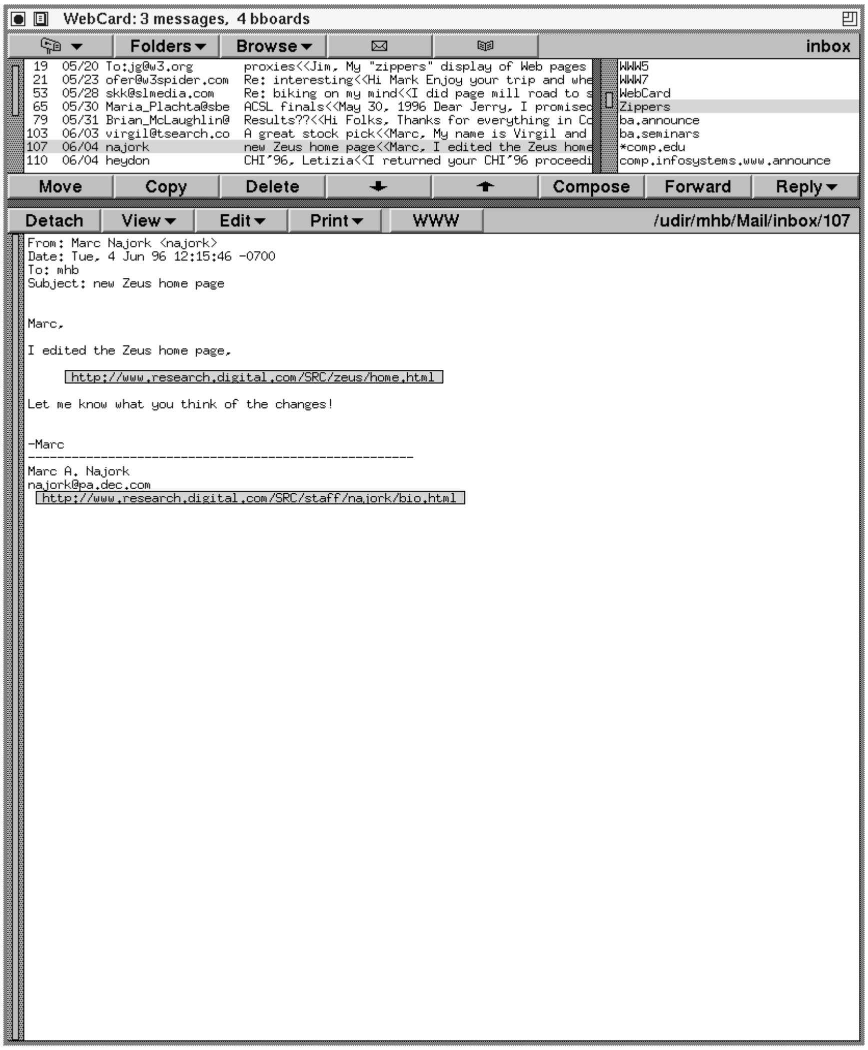

Figure 1. This screen dump shows WebCard displaying the author's inbox. The open folder is "inbox," and the selected folder is "Zippers." The selected message, seen in the display pane, contains two URLs: one refers to the Zeus home page and the other to the sender's home page.

in progress, and the "WWW" menu contains a variety of Web-oriented commands, such as "Auto Surf," described later.

The Web page currently displayed in the display pane can be added to the selected folder. When a page is added to a folder, the folder's table of contents shows an entry for the page. The date field is the date the page was added to the folder; the URL of the Web page is shown in place of the sender field of mail messages, and the Web page's title replaces the subject field.

Once in a folder, Web pages can be moved or copied to another folder just like any mail message or news article. The only mail/news operation that doesn't make sense for a Web page is "Reply."

Folders provide a convenient way for users to organize material. For example, a user can keep the home pages of all his or her colleagues together in a folder named "Colleagues," or keep all pages, news articles, and e-mail messages about the Boston Red Sox in a folder named "Bosox." The advantage of WebCard folders over bookmarks in conventional Web browsers is that WebCard folders can also contain mail messages and news articles. And the advantage of WebCard folders over folders in conventional email or news readers is that WebCard folders can also contain Web pages.

WebCard uses folders to return the results of certain operations. For example, the search command creates a new folder containing all items in the open folder that contain a specified string. A more innovative use of folders is for the "Auto Surf" command, which traverses every link on a particular Web page and returns all resulting pages in a new folder (see Figure 3). The retrieved pages can be traversed conveniently just by clicking on the up and down arrow buttons. The functionality of the "Auto Surf" command is now available in a variety of "offline Web browsers," such as Open Market's OM-Express [6].

WebCard allows users to detach the display pane, making it a separate pane (called a *detached pane*) in the WebCard window and causing a new display pane to appear. Detached panes can be deleted when no longer needed, and there can be an arbitrary number of them. This feature allows a page to remain visible for an extended period of time, even while following another chain of links in the display pane. This use of detached panes is similar to opening a new Web browser window in conventional browsers.

Another use of detached panes is to make it easier to explore lists of links, often found on home pages (see Figures 4 and 5). When clicking a link in the detached pane, the new Web page appears back on the display pane rather than obscuring the item in the detached pane. Without a detached pane, the user would need to issue the "Back" command after each link was visited. Netscape's frames are often used to achieve this same goal. The advantage of WebCard's approach is that the user, not the content provider, is in control. That is, the user can choose to detach *any* page and can decide when to remove it.

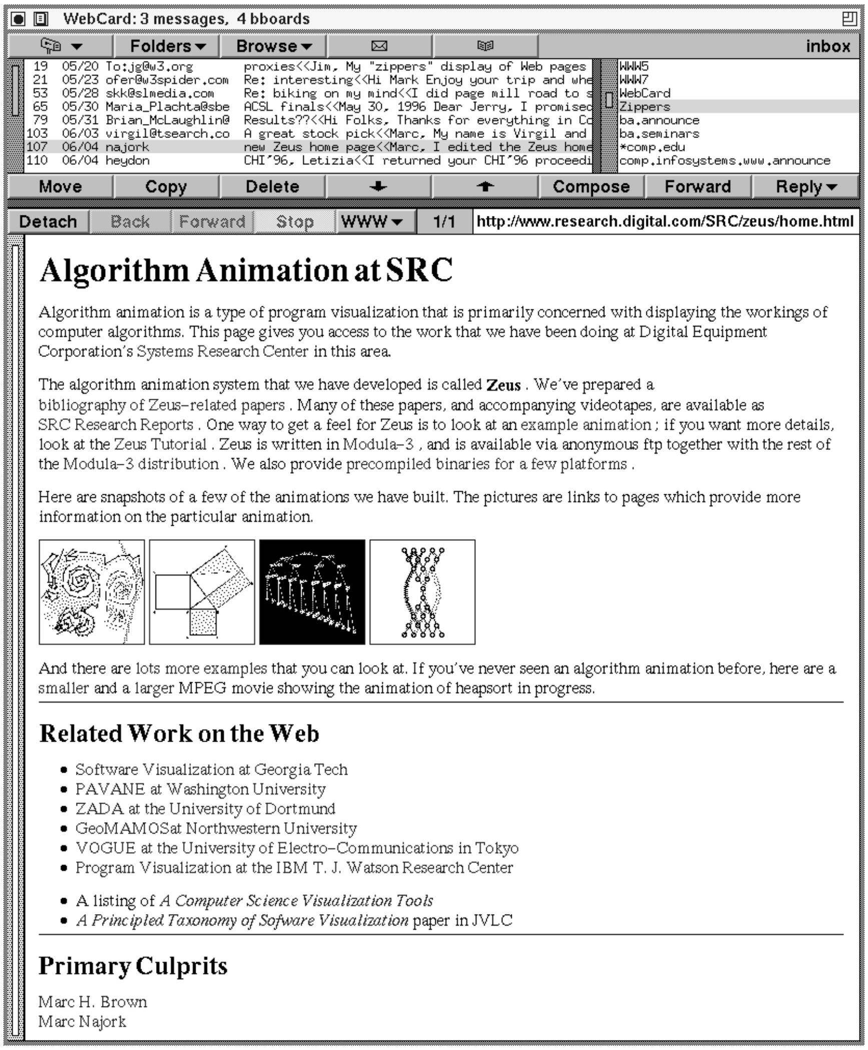

Figure 2. This screen dump is the result of clicking on the URL referring to the Zeus home page in the e-mail message shown in Figure 1.

Implementation

WebCard is implemented in Modula–3 [5], and makes use of two existing Modula–3 applications, Postcard and DeckScape. Postcard is a folder-based mail/news reader that has been in daily use at SRC since 1988. DeckScape[3] is an experimental Web browser based on the metaphor of a *deck*, a collection of Web pages, only one of which is visible at a time. The DeckScape display consists of multiple decks, all in a single top-level window. Users can move, resize or iconify decks, move or copy pages between decks, and so on. Decks in DeckScape serve the function of folders in WebCard. DeckScape pioneered detached pages and auto surfing in Web browsers.

Status

WebCard is a prototype and does not support many of the advanced HTML features that users expect of Web browsers, such as forms, tables, Java applets (however, WebCard does support *distributed applets* written in Obliq [4]), and so on. WebCard also does not support many of the features that advanced mail/news readers provide, such as MIME attachments and threaded discussions. The source code is part of the standard Modula–3 release.

Conclusion

WebCard integrates e-mail, news, and Web browsing into a single user interface, thereby avoiding the context-switching inherent to using independent applications. WebCard supports folders, a flexible way to organize, browse, and store large numbers of documents—e-mail messages, news articles, and Web pages.

We do not claim that WebCard is *the* correct way to browse the Web, to organize material on the Web, to integrate mail and news, or even to integrate mail/news with Web browsing. Discovering and quantifying the strengths and weaknesses of the approach introduced by WebCard are challenges for the future.

Acknowledgments

Andrew Birrell implemented Postcard; Rob Shillner implemented the initial version of DeckScape. Marc Najork convinced me to update this report from the UIST'95 TechNote version, and helped me prepare the revision.

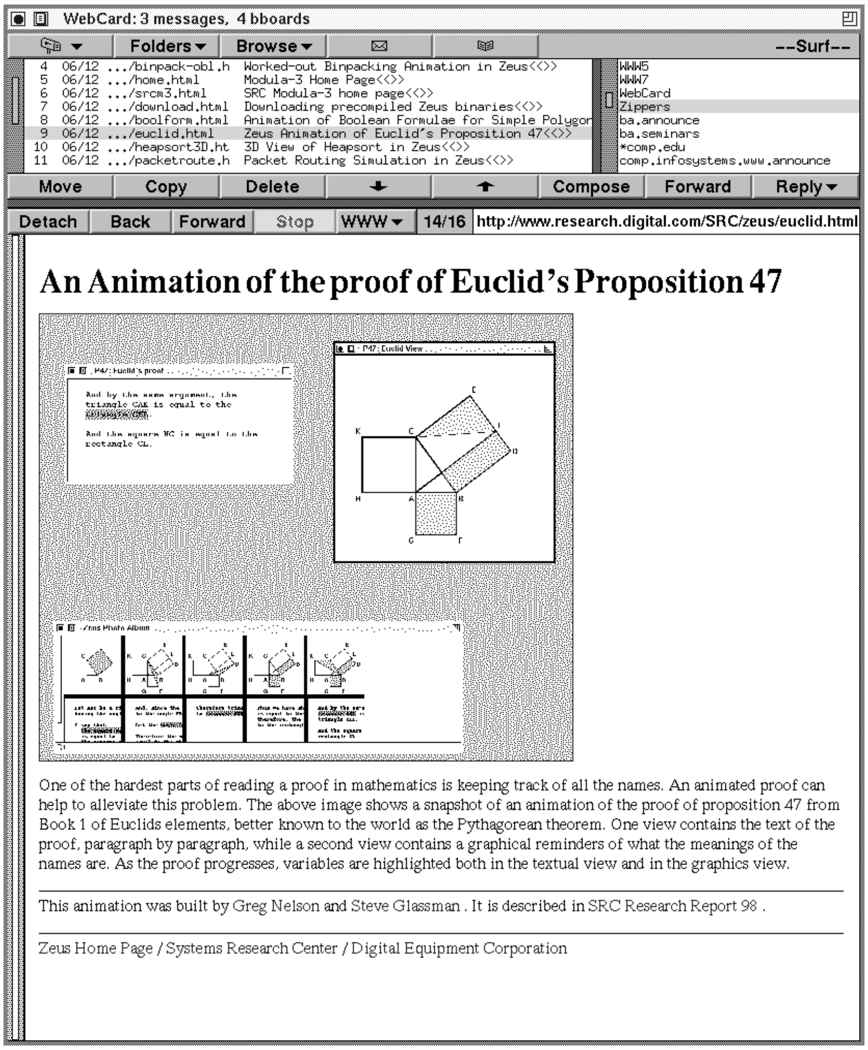

Figure 3. This screen dump is the result of issuing the “Auto Surf” command from the Zeus home page in Figure 2. The links are retrieved and stored in the folder named “–Surf–”, which is automatically opened after issuing the command. Thus, all links on the Zeus home page can be explored by simply using the up and down arrow keys to change the selected message.

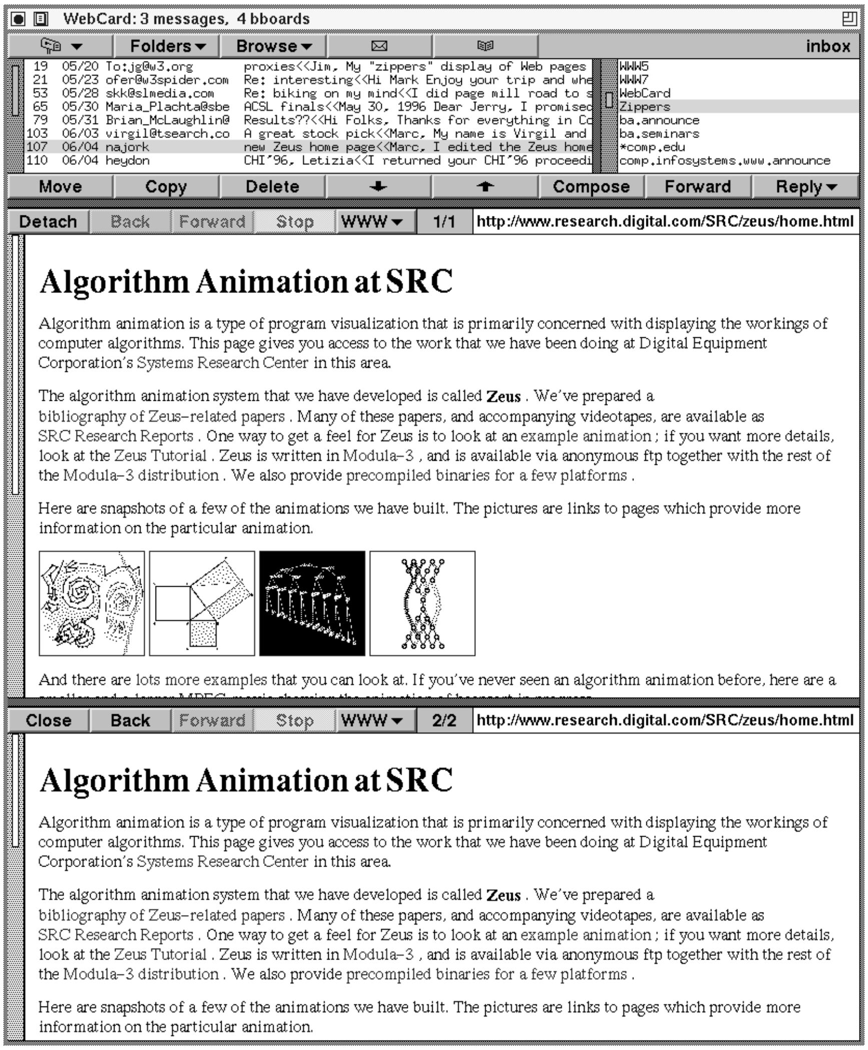

Figure 4. This screen dump is the result of clicking on the "Detach" button when viewing the Zeus home page in Figure 2. The WebCard window now has a display pane (middle) and a detached pane (bottom). Initially, the display pane and the detached pane both show the same page. Clicking on links in either pane will cause a new page to be displayed in the display pane. In particular, because clicking on links in the detached page does not obscure the page, a typical use of detached panes is for displaying an index page (e.g., a home page) with many links.

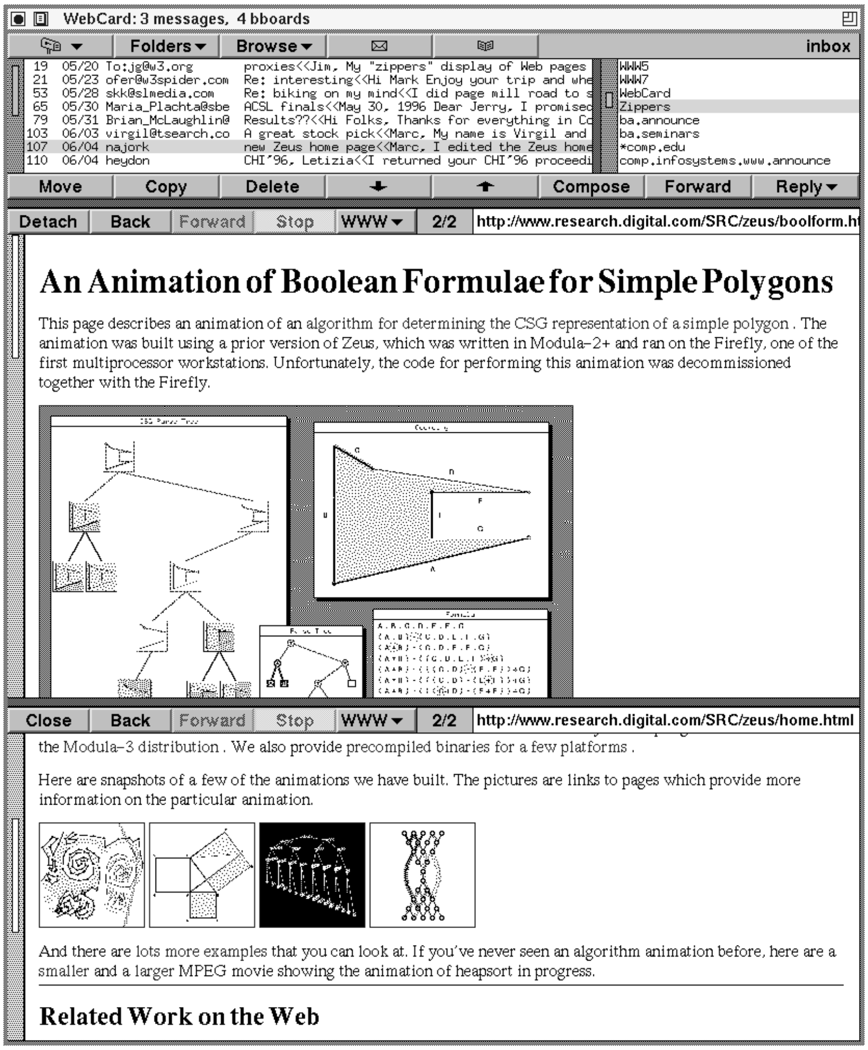

Figure 5. This screen dump is the result of scrolling the page in the detached pane (bottom) in Figure 4, and then clicking on the leftmost icon. The new page is retrieved and displayed in the display pane (middle).

References

[1] The Andrew Messages System
`http://www.cs.cmu.edu/afs/cs.cmu.edu/Web/People/AUIS/ams.html`

[2] Cyberdog
`http://cyberdog.apple.com/`

[3] DeckScape: An Experimental Web Browser
`http://gatekeeper.dec.com/pub/DEC/SRC/research-reports/SRC-135a.html`

Published as:
Marc H. Brown and Robert A. Shillner.
DeckScape: An Experimental Web Browser.
Computer Networks and ISDN Systems, **27** (1995) 1097–1104.

[4] Distributed Active Objects
`http://gatekeeper.dec.com/pub/DEC/SRC/research-reports/SRC-141a.html`

Published as:
Marc H. Brown and Marc A. Najork.
Distributed Active Objects.
Computer Networks and ISDN Systems, **28** (1996) 1037–1052.

[5] Modula-3 home page
`http://www.research.digital.com/SRC/modula-3/html/home.html`

[6] Open Market OM-Express Information Area
`http://www.openmarket.com/express/`

[7] The Other Internet Package
`http://www.theother.com/`