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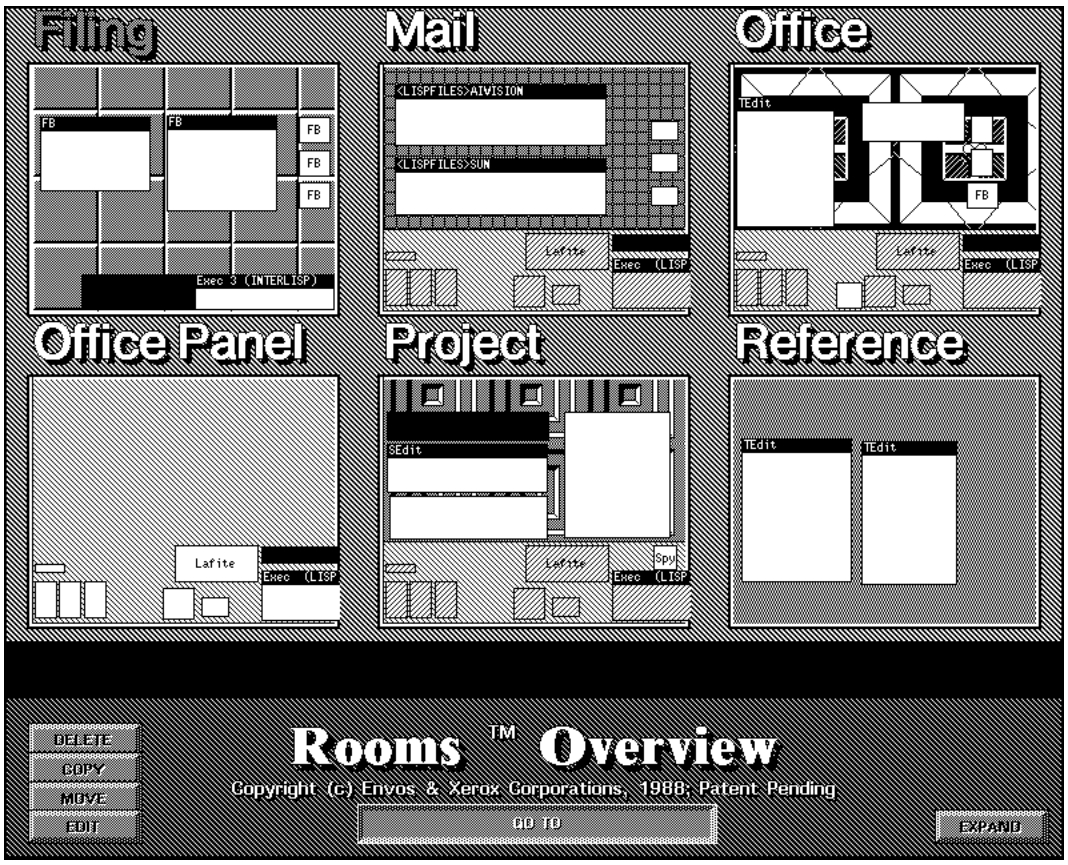
ROOMS™



Overview

ROOMS is a powerful interface to the Medley lisp environment window management system. ROOMS effectively increases the size of the screen and allows you to organize the work environment to facilitate management of complex parallel tasks.

For example a user may be developing and debugging a program, writing a paper, doing background research, reading mail, and filing all more or less at the same time. With limited screen space a user performing all these activities looses productivity shuffling through windows, icons, and other assorted screen clutter in order to reestablish the context of a task. ROOMS solves this problem of context switching by allowing users to create workspaces (called rooms), each one analagous to another screen, and containing only those tools needed for a specific task. Moreover, ROOMS provides methods for easily moving from one room to another and customizing the "look" of each room further aiding in efficient task-switching.

By providing dedicated workspaces, ease of navigation between workspaces, and a graphical link between each workspace and its related task, ROOMS helps users minimize context recovery time caused by task switching. In addition ROOMS provides an easy means to develop highly graphical custom interfaces for

end-user applications. The overall result of this seamless integration of form and functionality is increased productivity in performing tasks in the Envos Software Development Environment.

Research Background

The ROOMS system design resulted from the following observations by members of the Xerox Palo Alto Research Labs:

1) Most intellectual work requires coordinating many sources of information, e.g. notes, drafts, spreadsheets, program listings, etc.

2) Before the widespread dissemination of desktop workstations and personal computers, knowledge workers typically spread paper containing these items out on a desk (or dining room table). But the small screens of computer workstations do not allow such a lavish use of space when working on many concurrent tasks. For example, it takes 22 average PC screens or 10 19" workstation screens to equal the area of a typical desk.

3) The result for overlapped windows systems is a kind of electronic messy desk, where the user spends large amounts of time moving, shrinking, and resizing windows in order to switch tasks.

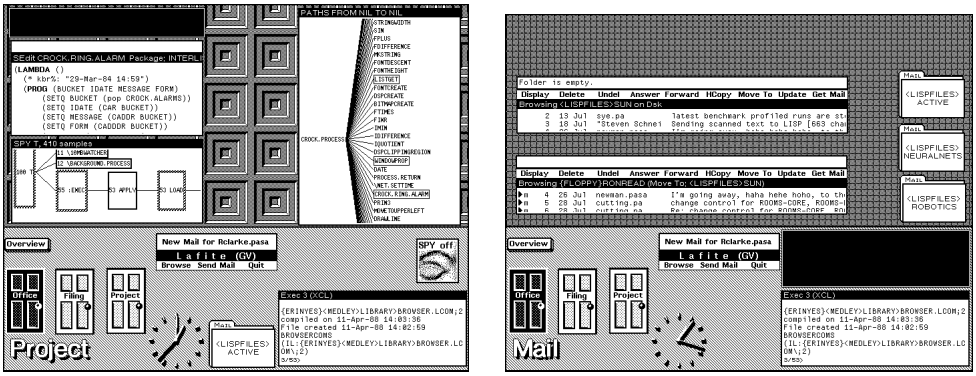
4) An interface designed to assist a user to work on concurrent tasks rather than assume linear work habits would have the following features:

   - Fast task switching and fast task resumption
   - Easy to re-acquire mental task context
   - Access to a large amount of information
   - Fast Access to information
   - Low user overhead
   - Engaged tools shareable among several tasks
   - Collections of engaged-tools shareable among tasks
   - Task-specific presentation of shared-engaged tools.

How Envos' implementation of ROOMS accomplishes these goals is described in the next section "The ROOMS Design".

The ROOMS Design

Rooms solves the problem of user task switching by allowing users to create a number of screen-sized workspaces called Rooms. The figure below shows two Rooms.



Two example Rooms (a) used for programming and (b) used for reading mail

In each room, there are a number of small icon-like objects called Doors. When a door is selected with the mouse, the user has the illusion of transiting to a new room containing windows. Each room is related to a different major task, such as working on a particular project, reading mail or file management. In the room are a number of engaged tools related to the task. When a user re-enters a room it appears exactly as when it was left.

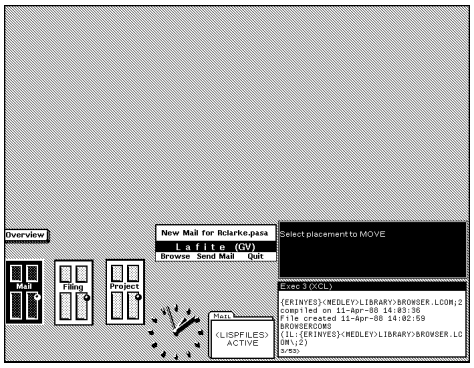
The basic notion of the Rooms scheme is simple. But in order for this basic notion to be successful the ROOMS system design has many features to help manage window interaction among rooms and to keep the user from getting lost.

Task Interaction

When working in ROOMS, there are usually a number of engaged tools that the user wants to share among different tasks. Examples of these might include a code editor, a text editor or a clock. The following ROOMS design features allow for the sharing of engaged tools:

Placements A window in a room has a specific location and shape. This is known as a Placement. The same window can exist in several rooms, with different locations, shapes, etc., in each room. Actions done on a shared window in one room are reflected in another room. Note that the black promptwindow in the Mail and Project rooms has a different location and shape in each room.

Inclusions Rooms can be included within other rooms. This allows collections of rooms to share a common set of windows, known as Inclusions. The band of windows and icons common in both parts of the Mail and Project rooms is a control panel, shown below, implemented as an included room.



Example of an included room called Office Panel

Baggage When moving between rooms you may carry windows with you. For example, you may wish to bring program code from one workspace to a workspace where you are doing documentation. This is accomplished by holding down the Move or Copy key when selecting a door. You will then be prompted to select the windows you wish to carry with you to the next room. The windows will have the same presentation in the new room.

Pockets You can also have a constant piece of baggage called a Pocket. A Pocket is a room dynamically included in all rooms. Whichever windows are placed in your Pocket (a clock say) will automatically occur (at the same location and presentation attributes) in all rooms.

Navigation

The organization of the user's workspace into a number of workspaces creates a potential navigational problem. ROOMS solves this problem with a number of navigational aids.

Doors Doors provide the basic link mechanism between rooms. Selecting a door with the mouse "moves" you to the new room containing windows associated with that room.

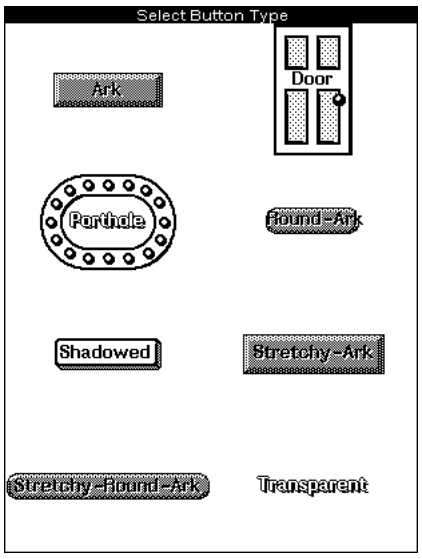
Back Doors Rooms allows you to create a Back Door in a room. If you have created a Back Door you can easily move back to the task you were previously working on before you entered the present room.

Rooms Menu Selecting the Go To Room sub-item from the ROOMS background menu presents you with a list of Room names. Selecting one will move you to that Room.

Overview The main feature of the Overview is a set of Room pictographs as shown in the openning diagram. From the Overview you can see the overall layout of a room and the tools it contains. The room pictographs can be instantly expanded one at a time, allowing you to browse through the windows in the entire set of rooms. In addition you can enter any room directly via the Overview.

Tailorability

Several mechanisms are provided to help users tailor rooms. First, simply creating, moving, deleting and shaping windows in the usual way causes things to exist in rooms. Thus ROOMS preserves the natural interaction with the user. Second, special background entries are provided to allow the user to create new doors and other conveniences of construction. Below is an example of the standard set of Doors available to users.



At the Overview level, it is possible to copy, move or delete window pictographs within a room and between rooms and have the changes reflected in the rooms themselves. And finally, Rooms has a simple layout language for creating unique backgrounds for Rooms. By using the structure editor, SEdit, on this layout language, users can run arbitrary procedures on the entrance and exit of a room and can compute

specialized backgrounds for rooms. Below is an example of a SEdit of a rooms layout expression for the Project room shown earlier.

```
SEdit Project Package: XCL-USER
(:INCLUSIONS ("Office Panel") :BACKGROUND
   ((:REGION (0 1/4 1.0 3/4) :SHADE
       (:EVAL ROOMS:RENAISSANCE-BITMAP)
       :BORDER 2)
    (:TEXT "Project" :FONT
           (IL:HELVETICA 36 IL:BOLD)
           :POSITION (10 . 10))))
```

Suites Having designed an environment to suit your needs, ROOMS allows you to restore that state if there is a need to reload your system. Subsets of rooms can be grouped together to form Suites. Suites can be saved to a file and later restored to a new enviroment or shared with other users. Most system windows have a ROOMS window-type specification which allows them to be saved and restored from a suite. Thus a Filebrowser window that you have open on a particular system can be saved and the window placement and contents will be restored when you reload the suite onto a new system.

Buttons Buttons are a unique user-interface device that provides for the execution of any lisp command at the click of the mouse. Buttons can be of any shape and size. Doors are examples of buttons that move you from one room to another. For example selecting the following button will perform a directory listing of the local disk.

The button definition is shown below:

```
SEdit Directory Package: XCL-USER
(:TEXT "Directory" :FONT
       (IL:HELVETICA 12
                     (IL:BOLD IL:REGULAR
                              IL:REGULAR))
       :SHADOWS :ARK :TYPE :STRETCHY-ROUND-ARK
       :HELP "Bring up local disk directory"
       :ACTION (DIR "{dsk}<lispfiles>")
       :INVERTED? NIL)
```

Customization of Rooms

When used as the interface to an application, ROOMS provides you with a complete programmatic interface to allow application specific customization. This includes the ability to have applications create and switch rooms under programmatic control as well as enable users to design custom buttons and window-types.

References

A Multiple, Virtual-Workspace Interface to Support User Task Switching, Austin Henderson/Stuart Card, 1987 ACM CHI + GI Conference Proceedings on Human Factors in Computing Systems and Graphic Interfaces

For further information about ROOMS contact your Envos Marketing Representative, or call toll-free in the Continental United States 1-800-228-5325, or in California 1-800-824-6449.

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