

# Peepholes: Low Cost Awareness of One's Community

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## ABSTRACT

In distributed communities, media spaces supply people with an awareness of who is around by displaying video or periodic snapshots of common areas and offices. This in turn facilitates casual interaction. Peepholes is a low cost alternative. Instead of video, iconic presence indicators show the availability of people in a virtual community. If people are absent, a user can 'ambush' them by asking the system to announce their return. When interaction is desired, people can easily contact one another because communication software is just a button-press away.

## Keywords

Groupware, contact facilitation, awareness, coordination.

## INTRODUCTION

*Informal awareness* of one's community is the general sense of who is around and what others are up to—the kinds of things that people track when they work together in the same physical environment. This awareness is the glue that facilitates casual interaction, the spontaneous and one-person initiated meetings that form the backbone of everyday coordination and work [1,3]. Yet casual interaction is problematic in distributed communities. While groupware is readily available, people have considerable trouble staying aware of opportunities for collaboration, and in establishing electronic meetings.

*Media spaces* are one way of providing distributed groups with informal awareness of each other. Users can select offices and common areas at remote sites, and view them through continuous video. Yet even compressed video demands too much bandwidth for everyday use. Portholes [2] partially solves this problem by periodically transmitting small video snapshots instead of a video stream. The community is presented on one's screen as an array of images. However, Portholes still requires people to have video cameras attached to their workstations and a willingness to leave them turned on.

An alternative to video is iconic *presence indicators* that

show who is around and the likelihood of their availability. This paper shows how presence indicators, as implemented in Peepholes, afford casual interaction, especially when they are integrated with common communication and groupware facilities.

## PEEPHOLES

### Creating a virtual work community.

Users can create their virtual community in Peepholes by choosing potential collaborators from an electronic address book. For example, Figure 1 shows a virtual community of five people selected from the book. Each person is represented by a labeled icon and optional address entry.

Peepholes automatically maintains the address book. It first scans incoming email for names and electronic addresses, and then adds new members to the book or updates old ones. This tracks people who have recently communicated with the user, and who are likely to be part of one's virtual community. In the book, a user can create sub-communities and assign people to them. Particular sub-communities can then be recalled quickly.

### Informal awareness through activity indicators.

Opportunities for casual interaction happen when people are aware that others are available for communication. On a network, similar opportunities could occur if we could see who is actively working at their computer. Because computers can easily capture and transmit how long it has been since their users were active, this information can be displayed as an estimate of a person's real availability. For example, the Peephole icons in Figure 1 continually display the activity status of each community member. Greenberg is now active (denoted by a bold character), O'Grady has been idle for a few minutes (the grayed out icon), Lowe is logged on but hasn't used the computer in a while, Schaffer is logged off, and Roseman is unreachable. A quick glance at these icons gives awareness of people's probable availability for real time communication.

### Ambushes for tracking availability.

It is not easy for one person to initiate a meeting over distance, as people are often absent or not immediately available. While activity indicators suggest when a call will work, they must be monitored regularly to see when an absent person to return. Indeed, users of the Cruiser media space would often open a full bandwidth video connection

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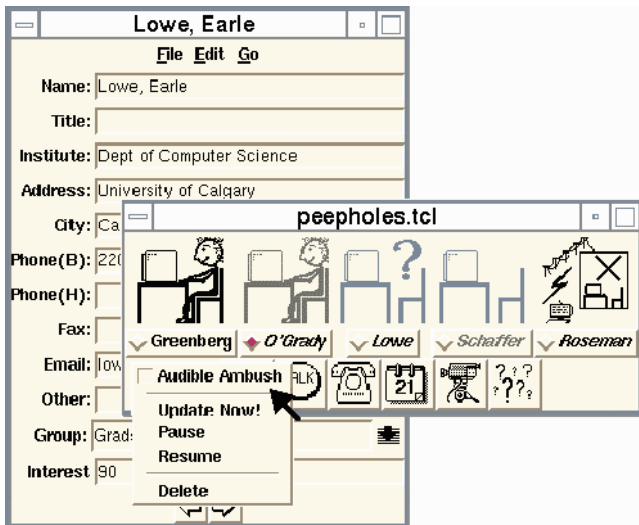


Figure 1. Peepholes activity icons and an address entry

to the empty office of a collaborator, solely to ‘ambush’ its occupant, i.e., to see when they returned [3]. In Peepholes, users can ambush others through a menu option (Figure 1). When the system notices that the person has become active, it announces their return by playing an audible sound of someone typing. This attracts the ambusher’s attention to the display, allowing them to initiate a call if desired.

#### From informal awareness to making contact.

Moving from awareness of another’s availability to an informal meeting is simple in physical environments but not on computers. Electronic addresses must be found, software connections established, system compatibility verified. Peepholes simplifies this by integrating communication and groupware tools via hooks. Electronic addresses are maintained in the address book, and connections established by simply selecting a person’s Peephole icon and an application icon (Figure 1, bottom). Connections are literally a button click away.

#### From asynchronous to casual interaction.

Email represents an opportunity for casual real-time interaction that should not be ignored. Peepholes is linked to a mail reader and, as people read their mail, a Peephole icon is automatically raised on the sender (Figure 2). The user can see if the sender is available for real time conversation, and contact them that way if desired. This is particularly useful for incoming mail, where it is more than likely that the sender is still active on their machine.

#### Information for free.

Peepholes only uses information freely available on the network [1]. No specialized software is installed at remote sites, allowing it to be used anywhere on the Internet. It works by continually querying the *ruser daemons* found on most Unix-based servers, and by massaging the results. In practice, this is a reasonable way to access many users.

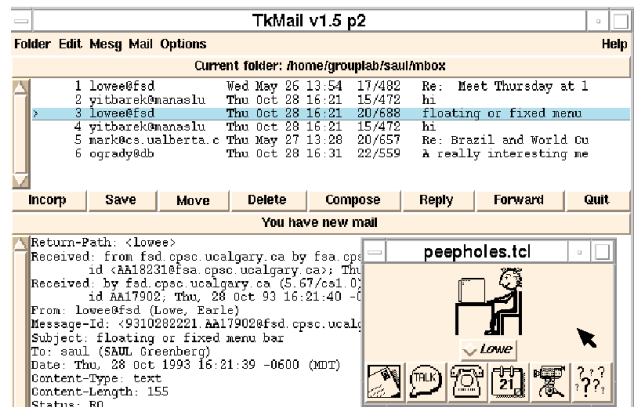


Figure 2. Integrating Peepholes and electronic mail

## DISCUSSION AND SUMMARY

In actual use, Peepholes does let a user maintain informal awareness and establish contact with others. As only a few bits of information are transmitted and no special equipment required (*cf. video*), it is very low cost. Although activity indicators cannot tell the difference between absent and inactive people, they are reasonable indicators of another’s availability. The ambush feature is a surprisingly effective way of getting hold of another person. Establishing connections is straight-forward, although software incompatibilities do occur. Information “for free” is useful but limited: some people are not observable because some sites do not install the ruser daemon, or use restricted versions of them, or insulate themselves from the outside world through firewalls.

We are now taking the ideas in Peepholes and installing them as components used by session managers in GroupKit, our groupware toolkit. Peephole awareness will be the lowest common denominator used to facilitate casual interaction. However, the system will also check for more sophisticated capabilities and substitute them when appropriate. For example, Peephole icons could be progressively replaced by participants’ images, by periodic snapshots, or even by full video. If custom daemons are used, they can better track awareness information, and can allow people to control the degree of privacy desired.

## REFERENCES

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