MESSAGE MANAGEMENT IN OFFICE INFORMATION SYSTEMS

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1. Introduction

An office information system is a distributed system consisting of workstations and functionally specialized stations such as file servers and printer stations, interconnected by a communication network. The workstations exchange messages. The contents of most messages can be interpreted as documents. A text document contains only character strings. A form document can be shown on an alphanumeric display device in a certain structured representation. A graphic document consists of graphic objects (points, lines, etc.), which can be shown on a vector display device. An image document consists of an array of picture elements, which can be shown on a raster display device. A voice document contains digitized sound patterns, which can be reproduced by a voice synthesizer.

Since there are many different types of documents, we can also distinguish many different types of messages. Messages containing graphic documents, image documents, and voice documents can be excessively lengthy. Messages containing text documents or form documents sometimes can also become lengthy. If such messages are sent without reasonable control, this could easily lead to congestion on the communication network, especially during peak office traffic hours.

On the other hand, not all messages are relevant to an office worker at a certain workstation. An office worker usually must dispose of a lot of "junk mail." Without reasonable control, the "electronic junk mail" in an
office information system can become even more wasteful than the traditional "paper junk mail," because it is so easy to send or broadcast an electronic message.

We therefore propose to augment the message management system at each station of an office information system by a message filter. The message filter, based upon current network traffic conditions and knowledge about the sender, the receiver, and message contents, determines whether the full message is to be sent, or a short alert message is to be sent instead.

Another problem of the office information system is that the communication network may not be highly reliable in the sense that messages may get lost. To increase reliability, the message management system is further augmented by an adaptive protocol handler. The adaptive protocol handler can transmit multiple short messages several times, and the desirable number of multiple transmissions is determined adaptively. For long messages, the receiving station's protocol handler sends back multiple requests for message retransmission, and the number of such requests is determined dynamically.

Therefore, the message management system is adaptive in two senses: (a) the message filter can adapt to traffic conditions to send more long messages and less short messages, and vice versa; (b) the protocol handler can adapt to noisy channel conditions to send multiple messages and several retransmitted messages.

The message management system is illustrated in Figure 1. It consists of the message manager, the message filter, and the adaptive protocol han-