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# The Open Office

*The trouble with documents in multiple formats can be managed through standards*

Much has been written about the paperless office, a place where communication is handled electronically by the ubiquitous computer-based office equipment and networks. Needless to say, we are now generating even more paper than before. One reason is that our electronic aids provide an easy way to generate wondrous looking documents. We naturally want to share these documents with coworkers, but they have different, incompatible systems. Therefore, we print and copy our electronic versions for distribution.

The problem is hardly limited to the business office. Universities are filled with paper. For example, a typical university professor writes a grant application using a word processor, prints the proposal, makes 10 copies, and sends them to a funding agency. The agency then sends the copies to reviewers, who write reviews on word processors (not necessarily the same word processor), make copies of the reviews, and send everything back to the agency. Although both scientific researchers and government program managers have near-universal access to computers and networks, paper remains the primary medium for communicating between them. There should be a better way.

One of the key technical requirements for encouraging electronic communication is interoperability; for example, the ability to move a piece of information (a document) from one system to a different system. One way to build interoperable systems is to publish a standard method for different systems to communicate. The adjective "open" is applied to systems obeying such a standard.

The requirement for open systems is not lost on large agencies. Several organizations are pursuing the use of open systems to foster electronic communication. For example, the Department of Defense sponsors the Computer-aided Acquisition and Logistic Support (CALs) Program. This program encourages contractors to provide electronic versions of project data, engineering drawings, technical manuals, and other deliverables that were once confined to paper. Contractors use open systems that conform to the CALs standards, which are based on various ISO, CCITT and ANSI standards.

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Another example is one that I have been involved with, called the EXperimental Research in Electronic Submission (EXPRES) Project. This project was sponsored by the National Science Foundation. The goal of the project was to encourage researchers (and reviewers) to submit electronically their research proposals (and reviews) to the NSF. Since researchers have purchased every conceivable kind of computer and word processing system, some way was needed to allow a proposal written on one system to be reviewed on another system.

The groups working on EXPRES decided to use the ODA standard as a mechanism to promote interoperability.

ODA is a joint ISO and CCITT standard, although one with two names. If you read ISO standards, you think of ODA as the Office Document Architecture, while if you read CCITT standards, you think of it as the Open Document Architecture. Beyond the title page, the two standards are the same ("aligned", in standards-speak). ODA defines a system independent way to represent a document containing multifont text, raster images, and geometric graphics. ODA can be used for other types of document content. For example, we included equations and tables in our documents, and one would expect to represent chemical structures, electrical circuits, and musical scores using ODA, as well. Therefore, ODA is one system-independent way for representing the information present in research proposals.

CALS, EXPRES and other projects are starting to bear fruit. However, the paperless office remains an elusive target. Many prerequisites must be provided before we substantially reduce the amount of paper we produce. Before an office becomes paperless it must first be an open office. An open office is something that we can strive for today.

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