

The Apple Open Collaboration Environment Technology

Working With Others Has Never Been Easier

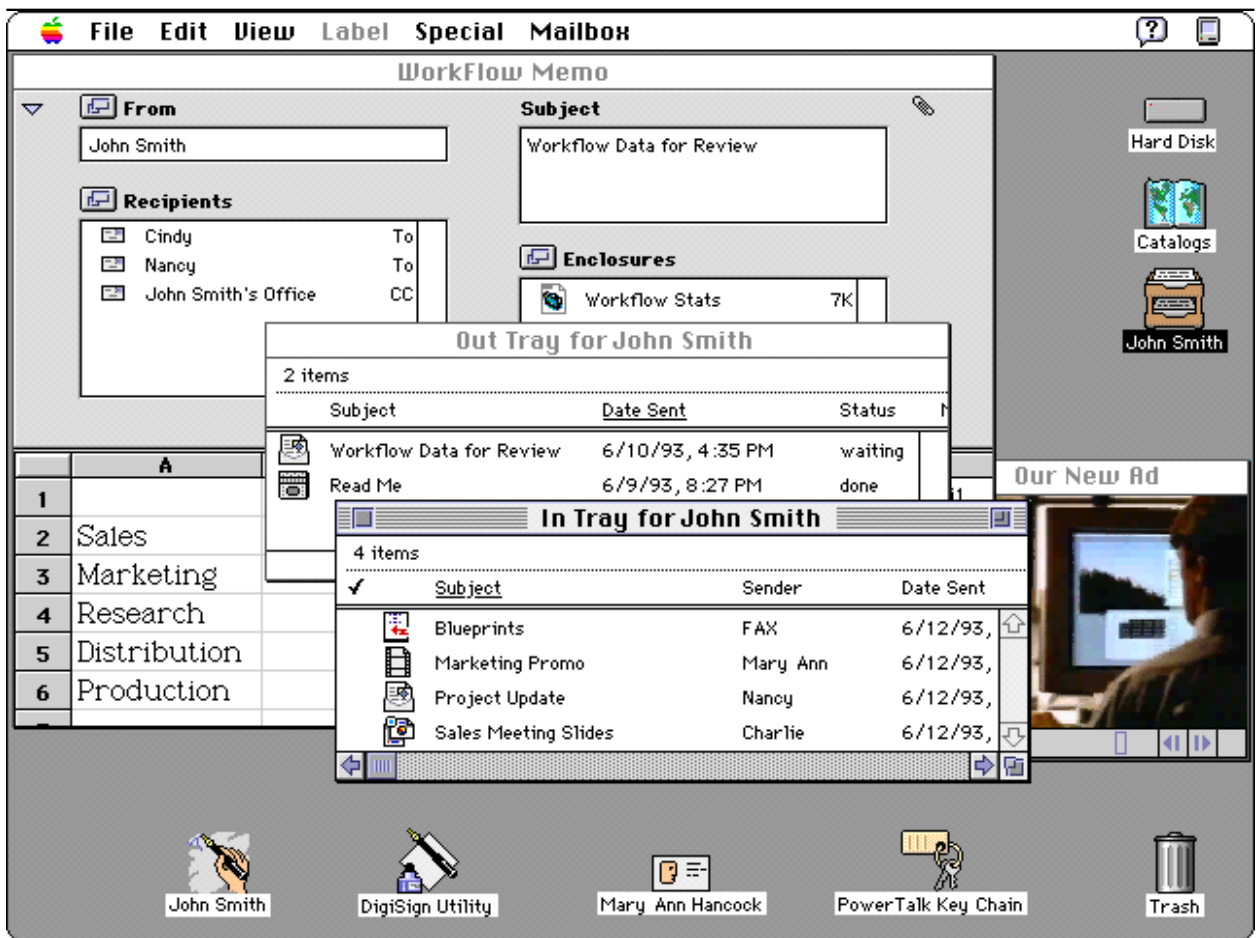


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Overview

Collaborate:

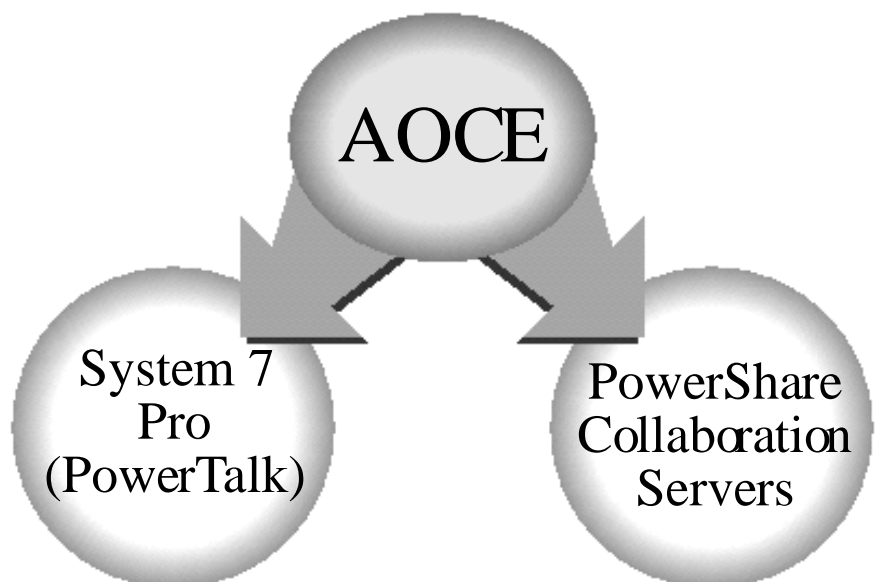
“To work jointly with others, especially in an intellectual endeavor.”

Today, personal and organizational communication is more important than ever:

- Organizational trends indicate that decision-making responsibilities are increasingly pushed downward and decentralized.
- Ad hoc teams form quickly to complete specific tasks, and then disband just as quickly.
- Whether at home, at school, in the office, or on the road, individuals must be able to exchange ideas and information with colleagues or clients—no matter where they are located.

Evolving personal communications needs, coupled with organizational trends, have fueled demand for a new class of applications: *collaborative applications*, which enable individuals to communicate and work together with others more effectively.

To establish a foundation for developing such applications, Apple Computer has developed a robust suite of integrated collaboration services: the Apple Open Collaboration Environment (AOCE™) technology. The first two products resulting from this technology are the PowerTalk™ System Software and PowerShare™ Collaboration Servers. PowerTalk System Software, delivered as a standard component of System 7 Pro, provides users and applications with integrated collaboration capabilities making working with others easier than ever before. PowerShare Collaboration Servers extend the PowerTalk environment by providing AppleTalk-based message, catalog and privacy services that enable a broad range of team productivity solutions.



The Current Situation

Today, people in all walks of life are working together more closely. They want their computers to facilitate their interpersonal communications, whether they involve coworkers down the hall or colleagues around the world. But most applications are still not designed to streamline the communications process.

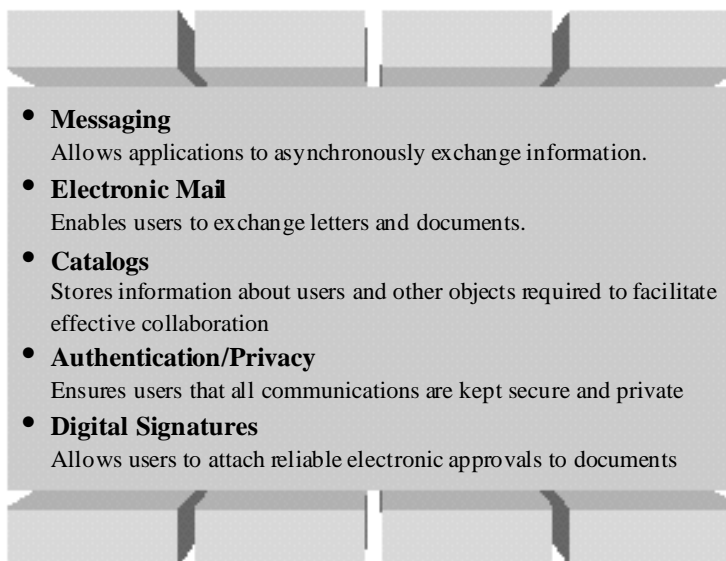
Consider, for example, a basic project management application designed for use by a single individual. Typically, a team leader working with such a program receives schedule and task information from each team member manually and publishes a time line at periodic intervals. This process is time consuming and team schedules become quickly out-of-date because the leader and members must proactively initiate each update effort. But a truly collaborative project management application would automatically remind team members of upcoming deadlines, regularly request status and dependency information, enable routing and approval of project change requests, and interact behind the scenes with their calendaring, authoring, document management, and other collaborative applications—thus facilitating efficient and effective interpersonal communications.

Although many current applications simply offer no collaborative capabilities whatsoever, others make the attempt. However, because these capabilities are implemented at the application level rather than at the system level, they utilize different conventions and require varying user input, and necessitate extensive and time-consuming developmental effort. To truly facilitate collaboration among computer users, an integrated, system-level communications infrastructure is required—which is exactly the driving force behind the AOCE technology.

AOCE Technology: A Framework for Collaboration

The Apple Open Collaboration Environment Technology at a Glance

AOCE software offers the following capabilities:



AOCE technology offers a flexible, scalable environment that addresses the communications needs of individuals, teams, and organizations—now, and as they change over time. AOCE software, in combination with collaborative applications that make use of it, is designed to benefit not only end users, but also systems managers and developers:

Users

Users can achieve substantial productivity gains from integrated electronic-mail capabilities within productivity tools such as word processing and spreadsheet programs, use digital-signature technology to vastly reduce the time they spend shuffling paper for approvals and other repetitive processes, and take advantage of advanced messaging capabilities to help them work effectively in teams—no matter what their location.

Systems managers

Systems managers benefit from the flexibility and scalability of the underlying AOCE architecture, which offers “plug-and-play” interoperability with existing and emerging messaging, catalog and authentication systems, as well as supporting a smooth migration from peer-to-peer to client/server systems. In addition, the catalog system vastly streamlines system administration, enabling a single catalog server for all collaboration applications.

Developers

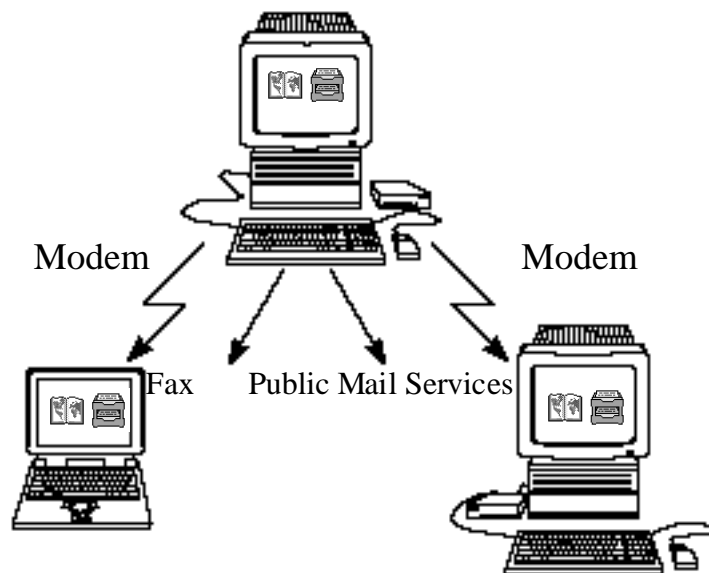
Both in-house and commercial developers benefit from the business and market opportunities afforded by creating new collaborative applications or enhancing existing ones. Because AOCE technology provides the foundation required to enable development of such applications, developers will have more time to focus on building user value.

Solutions for Individuals to Enterprises

The flexibility and scalability of the AOCE technology enables solutions for a wide variety of users, from individuals whose connection with their coworkers is via modem and phone line to organizations with vast and varied Enterprise-wide networks.

Individuals

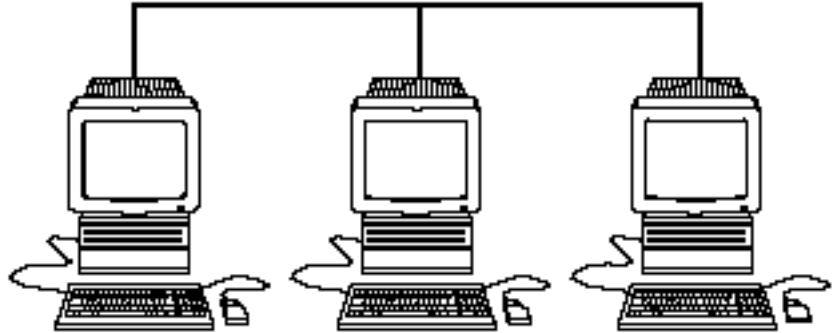
Dial-up user environment



Stand-alone users at home or on the road can collaborate with others using a data modem and a telephone line. PowerTalk enables users to communicate with one another in a peer-to-peer-fashion. Users in this environment have a desktop mailbox and personal catalog for receiving messages and storing information about other users locally on their hard disk. Equipped with the appropriate third party *access software* (plug-in software modules that integrate PowerTalk with other messaging systems), they can send and receive fax documents from their Macintosh desktop. Or those with subscriptions to public mail services such as MCI Mail, AppleLink, or CompuServe, and the appropriate access software, can use PowerTalk as a consistent environment to easily collaborate with others through these public services. In addition, stand-alone users can access their organization's networking system to retrieve and send messages using AppleTalk Remote Access software.

Teams

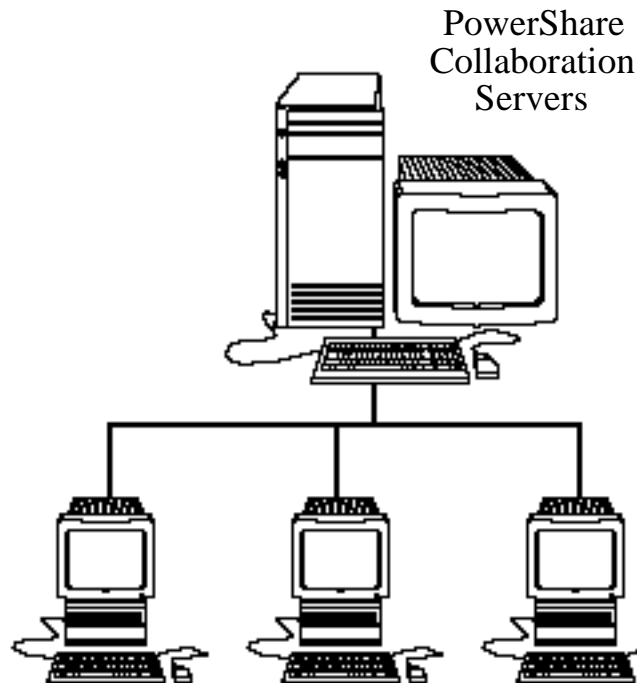
Peer-to-Peer environment



At the most basic level, a small team of users on a network without a server can collaborate in a peer-to-peer fashion: PowerTalk software includes built-in AppleTalk support, which allows users to communicate on a network without using a server. PowerTalk software makes it easy for users to send documents through its drop/send integration with the Finder and to receive documents via its universal mailbox.

Servers for Team Productivity

Server-based user environment

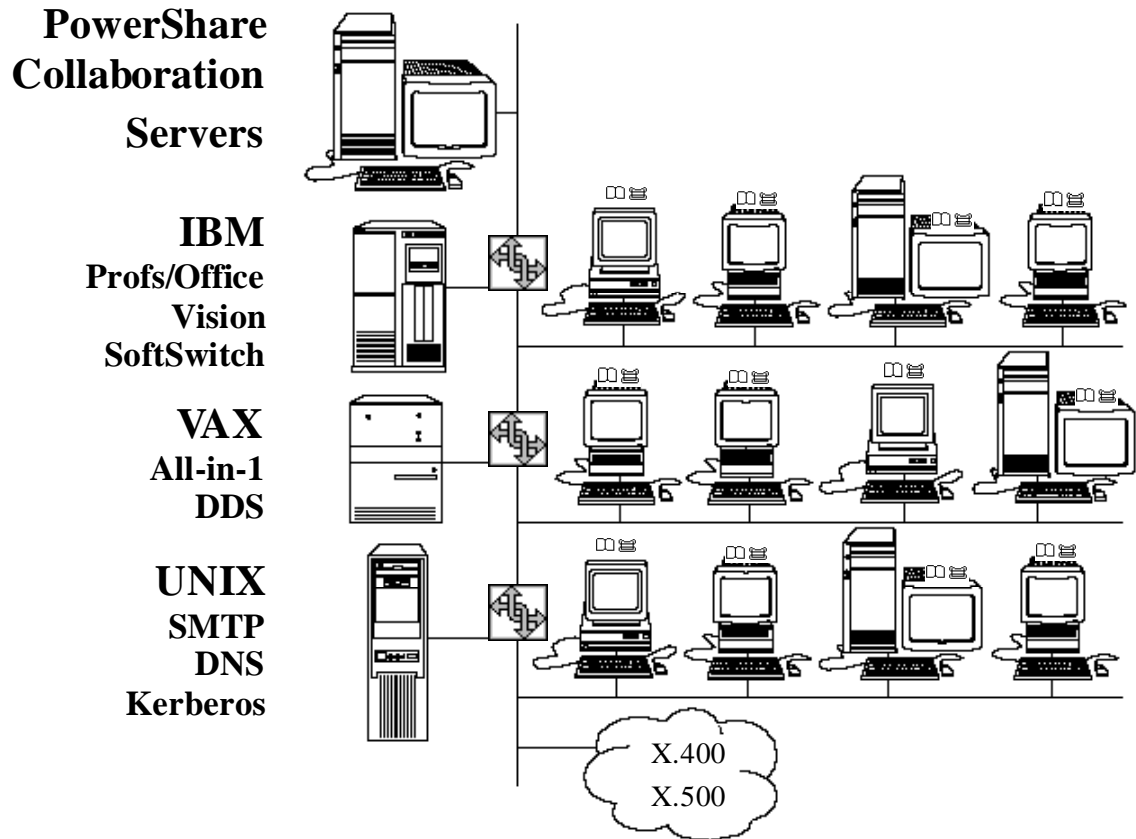


PowerShare Collaboration Servers allow people to communicate even if their computers are not simultaneously available, as well as allow network administrators to manage gateways to other messaging systems centrally. The flexible AOCE architecture enables a full range of server-based options. For example, if an organization wishes to phase in PowerShare server software gradually, server gateways allow AOCE and non-AOCE systems to coexist and interoperate.

PowerShare Collaboration Servers also provide centralized management of messaging, catalog, and authentication services—even to organizations consisting of thousands of users. PowerShare servers act as the common infrastructure for collaborative applications such as calendaring, project management, and business-forms-routing programs, vastly streamlining their administrative needs through the creation and use of common catalogs.

Enterprise-wide Networks

Multiple vendor user environment



Apple is committed to responding to the growing need to integrate desktop computers into enterprise system environments. AOCE technology is a key component of V.I.T.A.L., the Virtually Integrated Technical Architecture Lifecycle model that represents Apple's response to this need. The AOCE architecture provides the framework necessary for developers to create collaborative applications that will meet the needs of today's organizations and their increasingly complex computing systems.

In addition to supporting a variety of electronic-mail and messaging technologies, AOCE is also designed to extend across computing platforms to accommodate enterprises' heterogeneous computing environments.

Enterprise-wide information systems often include a variety of networking environments, as well as many different messaging and directory technologies. AOCE software protects organizations' existing investments—and facilitates client/server migration—by providing a practical way to integrate and interoperate with both current and future mail, messaging, and directory systems. An AOCE system can be easily integrated with X.400, SMTP, MHS, PROFS, ALL-IN-1, DCE, and other such technologies. Users with such systems can interoperate with AOCE systems by means of access software and/or server gateways.

Building on the Framework: A New Generation of Collaborative Applications

Previously, developers who wished to create collaborative applications found that it required two or more years just to build the underlying messaging, directory, and security infrastructures—all of this before the user-value components could start taking shape. By providing a collaborative computing foundation in its system software, Apple is enabling the rapid development of a whole new generation of innovative collaborative applications.

AOCE capabilities are accessible to developers via easy-to-use “packages” that provide standard user and programmatic interfaces for accessing mail, messaging, catalog, authentication, and digital signature systems. For example, the Standard Mail Package provides programmatic interfaces to a standard user-interface that enables any application to send messages, enclose documents, and sign letters—with minimal time investment on the part of the developer. In addition, these capabilities are accessible through low-level application interfaces. (For more details on this and other packages, see the Technology Behind AOCE Software section on page 15.)

Collaborative applications represent a significant new business opportunity. According to International Data Corporation (IDC), an independent market research organization, 64 percent of all Macintosh computers are networked (this number excludes networks that support only printer sharing). The time is right for developers to enhance and differentiate their applications with new messaging, catalog, and security capabilities. Again according to IDC, the market for collaborative applications, or *groupware*, is expected to grow at a 50 percent annual rate over the next five years. In particular, the workflow market is expected to exceed \$2 billion by 1996. Clearly, these emerging markets hold major promise for software developers.

The Impact of AOCE Technology: A Few Scenarios

Solutions created using AOCE capabilities can be divided into three main areas: integrated personal communications, team productivity, and workflow solutions.

Integrated Personal Communications

Many people feel that they spend too much of their day retrieving, managing, and replying to correspondence via electronic-mail, fax, and voice messages. These technologies require various actions, such as creating messages and addressing and sending them. Yet each requires users to follow different, and often repetitive, procedures.

PowerTalk software offers users a desktop mailbox that provides them with a completely integrated vehicle to receive any kind of interpersonal correspondence. Thus, they can receive electronic documents, faxes, or voice messages in a single location. This universal mailbox makes use of the specific third party access software installed to allow seamless information exchange among users.

In addition, every application can become “mail-capable”: a Send command in the Macintosh File menu will become as ubiquitous as the Print command is today. Currently, users who want to send a document to others must exit the creating application, launch a separate electronic-mail application, address a message, and then attach the document using complex, multistep actions. With PowerTalk applications, users can create documents with their favorite word processing or desktop publishing program, add attachments, and then simply sign them and send them to others as easily as they print documents today. This can be done regardless of the mode of transmission for each addressee—e-mail, fax, and so on.

Letter

From
John

Recipients

Jane	To
Dave	CC

Subject
Department Budget

Enclosures

Budget Summary	3K
----------------	----

	A	B	C	D	E
10	Date	Item	Amount	Vendor	Pa
11	1/2/91	Equipment	\$1,000	A.B. Properties	
12	1/6/91	Repairs	\$566	Ace Power & Light	
13	1/6/91	Gas	\$600	Wheelin's Gas Co.	
14	1/6/91	Delivery	\$200	Ralph J Cook Garbage	pend
15	1/6/91	Taxes	\$440	City of Franklin	
16	1/7/91	Inventory	\$16,000	SW Wholesale	pend
17	1/6/91	Salary	\$1,000	Mary Fuller	
18	1/6/91	Salary	\$1,270	Carol Stansen	

Example of a Mail-Capable Spreadsheet Application

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Scenario 1

A self-employed executive recruiter needs to communicate with many different clients using a wide variety of common communications technologies. Daily, she receives numerous faxed resumes, dozens of phone calls, and electronic mail via several commercial services (MCI Mail and AT&T) from potential clients, all of which require different—and sometimes relatively complex—procedures to forward on to the appropriate hiring managers.

Using third-party access software for fax, voice-mail, and commercial electronic mail services, that same recruiter receives and manages all of these communications from her Macintosh desktop in a single, standard way—no matter what the medium. And, for example, an electronically received fax document is easily forwarded to multiple locations.

PowerTalk applications called *software agents* also help users by automatically gathering relevant information and by handling the growing volume of interpersonal communication by diverting, forwarding, or otherwise acting automatically on users' correspondence. Mail-handling agents take actions based on the subject of a letter, the sender, or other criteria, applying rules established by the user. For example, a financial analyst can use a mail-handling agent to automatically check subject areas of incoming electronic mail for the word *budget* or *financials* and then automatically move them to his monthly budget preparation folder. A news software agent can automatically scan newswire services (such as AP or Reuters) for articles that match a user's criteria, and channel those articles into the user's desktop mailbox. Another agent might

automatically forward appropriate incoming items to a user's associates when that user is on vacation, or reply to clients, telling them when the user will return to the office.

Team Productivity

Individuals who work in teams want improved group communications for collaborating across time zones and geographies. But today's collaborative applications have several disadvantages, such as requiring users to maintain multiple directories and "in-baskets." For example, calendaring applications enable users to propose meetings with others and electronic-mail applications enable users to send letters to others. However, each application requires the user to follow different steps when selecting addresses from each different directory. Similarly, recipients of meeting proposals must access and open these items from the in-basket of their scheduling application, using different steps than are required by their electronic-mail system.

With AOCE technology, scheduling, calendaring, group authoring, and other collaborative applications can share the same catalog and message storage/routing facility. Users benefit from accessing catalog information in one easy-to-use, consistent way, as well as receiving all their correspondence in the same universal mailbox. And the use of the same catalog and messaging servers simplifies management for network administrators, who no longer need to support separate servers for each application.

Scenario 2 A small team of graphic designers working for an electronics company needs to get comments from a variety of groups quickly—yet these groups are located in various buildings around the world, and it's difficult to get in touch with all of the key players in the first place, let alone to find a mutually agreeable meeting place and time.

With AOCE technology, a team member uses a calendaring application to propose a meeting to a list of appropriate meeting participants, regardless of whether the individuals are available at that time to receive the message. While waiting for meeting confirmations, he forwards (directly from his PowerTalk capable desktop publishing application) the packaging copy and graphics to the meeting participants. At the agreed-upon meeting time, the team leader launches his PowerTalk based conferencing application, which automatically places a conference call to each participant, so the group can discuss the packaging proposal, without having to be in the same physical location. Each participant offers feedback, then passes the baton to the next speaker. The meeting concludes with the participants approving the document by signing it with their digital signatures.

Workflow Solutions

AOCE software will enable information systems managers to improve the efficiency and productivity of organizations, by providing organizations with extended authenticated connections and privacy capabilities that make AppleTalk networks appropriate for workflow solutions. And the AOCE digital signature technology provides approval capabilities that enable a completely paperless system.

Workflow solutions increase organizational productivity by streamlining processes and costs associated with routing and handling paper. For example, the routing and approval of purchase orders is done almost completely manually today, because they require manual, written signatures. With AOCE technology, purchase orders can be processed and approved completely electronically, using the integrated messaging, catalog, and verifiable digital signature capabilities. Bypassing in-house, paper mail distribution systems and approval methods saves users and organizations substantial costs as well as time.

Systems managers will be able to implement mission-critical workflow solutions using off-the-shelf hardware and software at a fraction of the cost involved today. And individuals can simply use off-the-shelf PowerTalk capable applications to implement their own ad hoc workflow solutions. In addition, with AppleScript, Apple's systemwide scripting system, customers can personally automate the sequence and process of their work. For example, an accounting program could be customized to generate a letter to a department head whenever that department is approaching budget overruns.

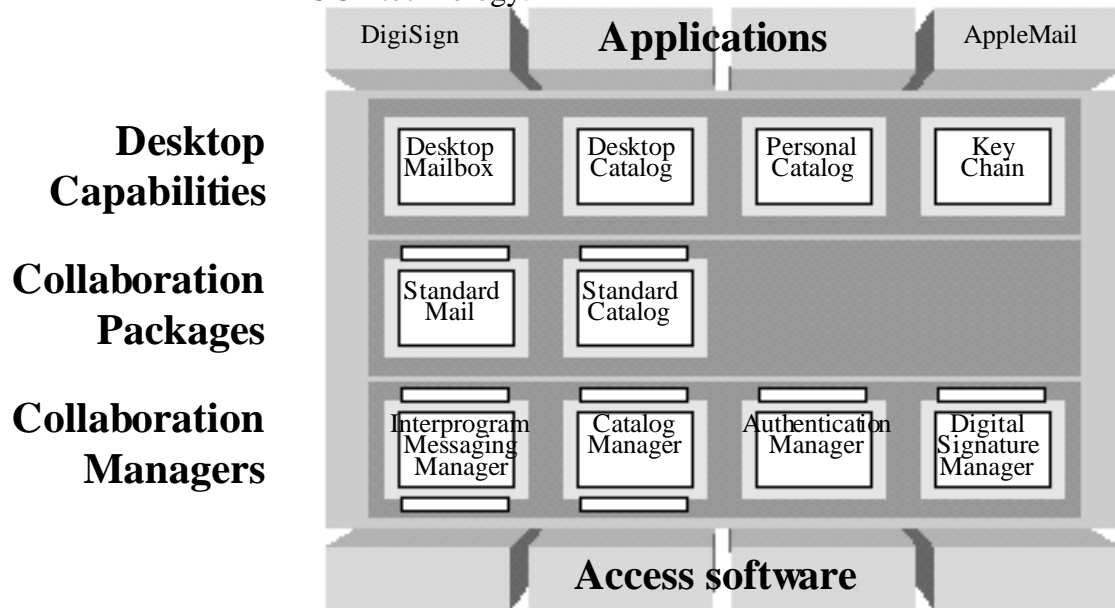
Scenario 3 A corporate salesperson for an office supply company needs to complete and process her sales orders rapidly to meet the needs of her clients, as well as her management. But it's difficult to make contact with the right people in a timely manner, let alone to track the progress of the requisite paperwork as it moves through the organization.

With a PowerTalk based electronic-forms application, a Macintosh PowerBook computer, a data modem, and AppleTalk Remote Access software, she completes her sales order at the client location, signs it with her digital signature, and forwards the order directly to the corporate office network for further approvals and routing. And the district sales manager can track incoming orders at any point, discovering whether the proper authorizations have come in from the ordering company, whether sufficient product stock is on hand or must be ordered, and other key process issues.

Through AOCE-based applications, customers will have more and lower-cost options for automating administrative tasks, for creating secure networks, and for implementing mission-critical workflow solutions using readily available hardware and software.

The Technology Behind AOCE Software

This section takes a detailed look at all of the components of AOCE technology.



The AOCE Technology Framework

PowerTalk is the AOCE client software integrated with System 7 Pro. The PowerTalk System Software consists of a number of components arranged in three architectural layers.

Collaboration Managers and Interfaces

These low-level system managers and APIs provide developers with a rich set of services for collaboration, which can be tightly integrated into their applications. They provide programmatic hooks that allow developers to pick and choose the specific capabilities that they wish to furnish to their users.

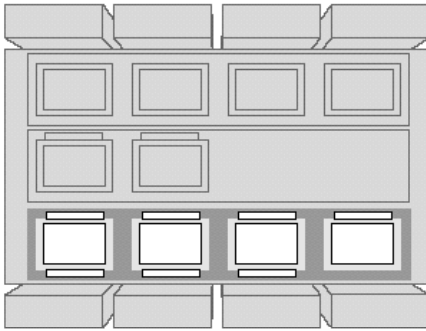
Collaboration Packages

These are predefined higher-level collaborative functions and user-interface capabilities that can be incorporated into existing applications with minimal development effort. For example, standard dialog boxes and other user-interface elements are provided to allow users to select addresses, add attachments, and approve documents in a consistent, intuitive way from within any application.

Desktop Capabilities

These provide users with simplified methods for browsing, sending, receiving, and managing information and communications conveniently from the Macintosh desktop.

In addition to the client services, Apple provides the PowerShare Collaboration Servers — two software servers incorporating AOCE technology for users of AppleTalk network systems.



Collaboration Managers and Interfaces

The AOCE core is its system software managers. Four main capabilities are provided: catalogs, messaging, network-based authentication and privacy, and digital signatures. Developers can add any of these capabilities directly to their applications through standard application programming interfaces (APIs). Any application can also access many different messaging and catalog environments. For example, a calendaring application today may include its own messaging and address list capabilities, but limits sharing of schedules to members of both the same server and computing platform. A calendaring application using the AOCE catalog and messaging capabilities would not only take much less time to produce, but with the appropriate third party access software it could also exchange information with a calendaring application on another computing platform.

Catalog Manager

This module offers application developers access to any kind of catalog system regardless of the storage format. For example, today's electronic mail applications use a directory to keep track of users' addresses. In this case, a directory serves a function similar to that of a telephone directory. However, in general, catalogs can contain other kinds of information needed to make collaborative systems work well, such as position titles and hierarchy information, spending authorization limits, or pictures. The Catalog Manager will make all of this information available to applications via standard programmatic interfaces.

InterProgram Messaging (IPM) Manager

On the Macintosh family of computers, this component complements the System 7 inter-application communications (IAC) architecture, which currently provides real-time program-to-program communications. IPM provides store-and-forward message delivery between applications, allowing messages to be stored for delivery whenever the recipient is ready to receive them. Messages can be exchanged between applications on one computer or across a network, regardless of whether the sender and receiver are available at the same time. In addition, one message can be sent to multiple destinations. With the addition of appropriate third party access software, messages can be sent over any type of message transport, such as SMTP, MHS, cc:Mail, or X.400.

Authentication and Privacy Manager

This component enables applications in a PowerShare Collaboration Servers environment to ensure that the people or programs at the ends of a network connection are who or what they claim to be. Developers can take advantage of the authentication capabilities to improve overall security for their users and to simplify security administration, so that users need only one password to authenticate themselves to the system and gain access to all of its services. The PowerShare catalog server grants authentication credentials by acting as the trusted third party. An application can use the authentication manager API to handle the entire authentication process to validate the identity of the collaborating entities (people, servers, or programs). The Authentication Manager also provides the tools for applications to establish encrypted AppleTalk data stream connections using a secure extension of the AppleTalk Data Stream Protocol. This privacy capability protects information that programs or users have sent against compromise through wire-tapping. The data are encrypted using the RC4 encryption algorithm licensed to Apple by RSA Data Security, Inc.

Digital Signature Manager

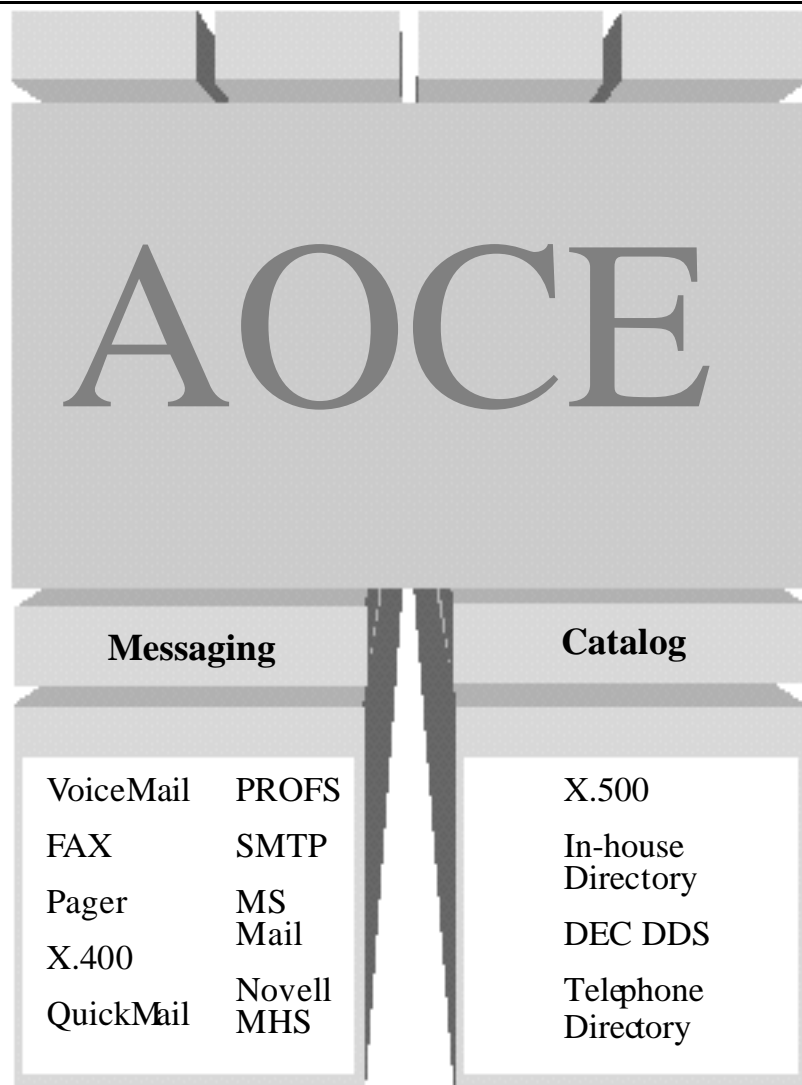
This component offers a means for attaching electronic approval signatures to computer documents, eliminating the need for time-consuming printing and circulation of paper for approvals. The digital signature capability can be used from within any application, not only to positively identify the approver, but also to detect whether a document has been altered since it was signed. This ability to attest to the unaltered state of the document makes digital signatures more secure than hand-signatures on paper. Apple's digital signature capability is based on public-key encryption technology, which is also licensed to Apple by RSA Data Security, Inc.

Access Software Interfaces

In addition to the system software managers providing applications programming interfaces (APIs) to developers, they also provide access software interfaces, which enable developers to build plug-in modules for connecting PowerTalk users and applications to any messaging, catalog, or authentication systems. Architecturally, these interfaces form back-end hooks into the interprogram messaging and catalog managers.

Access Software Interfaces

Third Party Access software



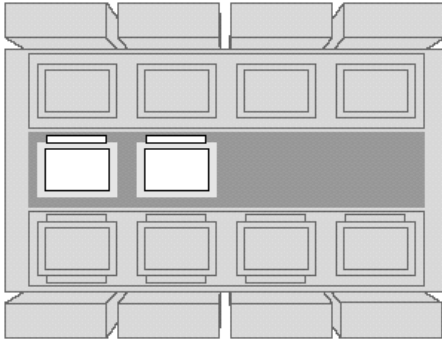
Access software allow individual users to consolidate the range of messaging and catalog services they use on their own computer. No server is required. So home and mobile users can access fax and any number of on-line services through a consistent interface on their Macintosh.

Messaging Access Software

These plug-in modules connect the AOCE InterProgram Messaging Manager to any messaging system, enabling users to consolidate and display messages from diverse messaging systems in a single, consistent manner. Third party vendors will provide messaging gateways for other popular messaging systems, such as MHS, X.400, and Office Vision, and for public messaging networks, such as CompuServe and MCI Mail.

Catalog Access Software

These plug-in modules permit users to access and browse through any catalog. Users benefit from a consistent user interface to these catalogs through the catalog browser. In-house and commercial developers can build catalog access software to provide access to other catalogs, such as X.500 directories or to private corporate directories residing on host-based systems. In addition, catalog access software can provide users with access to information databases such as a telephone directory on a CD-ROM or a host-based system.

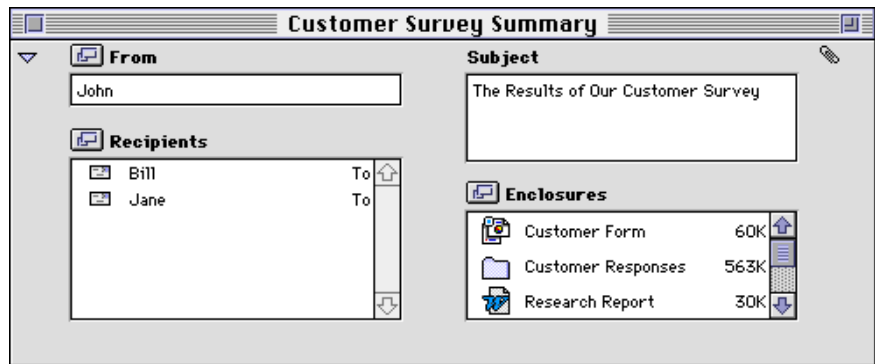


Collaboration Packages

AOCE collaboration packages provide application developers with a set of standard dialog boxes, and other user-interface elements, as well as the tools they need to provide user access to PowerTalk electronic-mail, digital signature, and catalog browsing capabilities from directly within their application. They are ideal for developers of personal productivity applications such as word processing or spreadsheet programs, because they enable them to rapidly offer collaborative functions to their users.

Standard Mail Package

This component allows *every* application to be an electronic-mail application. It provides a standard user-interface called the *mailer*, and other functions for making electronic-mail and digital signature capabilities available in any application. When users click on Recipients, a standard catalog panel is displayed, allowing them to browse among various personal and shared catalogs to locate address information. The Subject field allows users to annotate the information they are sending. Using the mailer's Enclosures field, users can enclose other documents and entire folders of items along with the letter. Double-clicking on any enclosed document will automatically launch the application that created it; double-clicking on an attached folder will open an appropriate Finder window. Users can also use the mailer to sign letters and verify digital signatures affixed to letters.



The PowerTalk Mailer

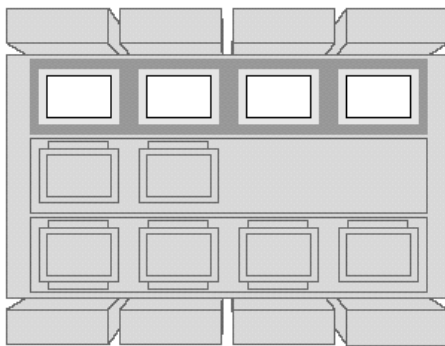
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Standard Catalog Package

This component provides application developers with standard user interface elements for browsing, finding, and selecting catalog records from within application programs. In the same way that users can browse their hard disk for files and folders, they will now be able to browse their catalogs to quickly access catalog information. The Standard Catalog Package also provides the user-interface elements for applications to prompt users to provide name and password authentication information. Developers can use the package in conjunction with the AOCE Catalog Manager to refer to a particular entity (for example, person, group, or server) in a catalog.

Desktop Capabilities

At the desktop level, AOCE software provides users with immediate benefits through a desktop mailbox, a desktop catalog, one or more personal catalogs, and the PowerTalk Key Chain. These desktop capabilities give users a consistent way to access any range of electronic mail and catalog services.



Desktop Mailbox

All of a user's incoming correspondence—messages and letters from multiple electronic-mail systems, voice messages, faxes, paging notifications, documents created in any application, and even QuickTime movies—arrives in a single universal desktop mailbox. Users can sort and view their correspondence, by sender, date, and name, for example, using new enhancements to the Macintosh Finder.

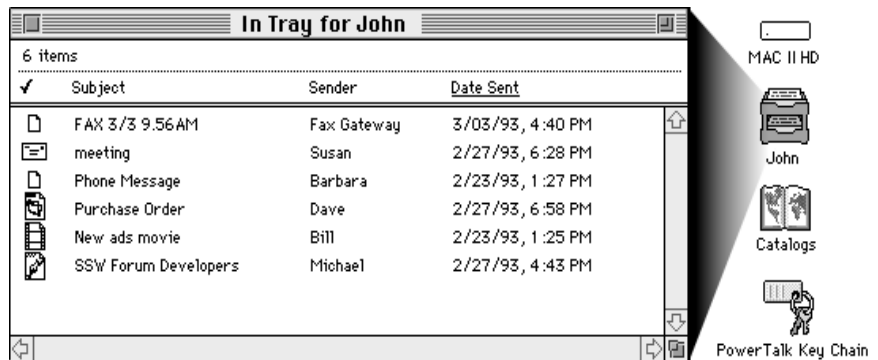


The PowerTalk user's desktop with mailbox, catalogs browser, and Key Chain icons.

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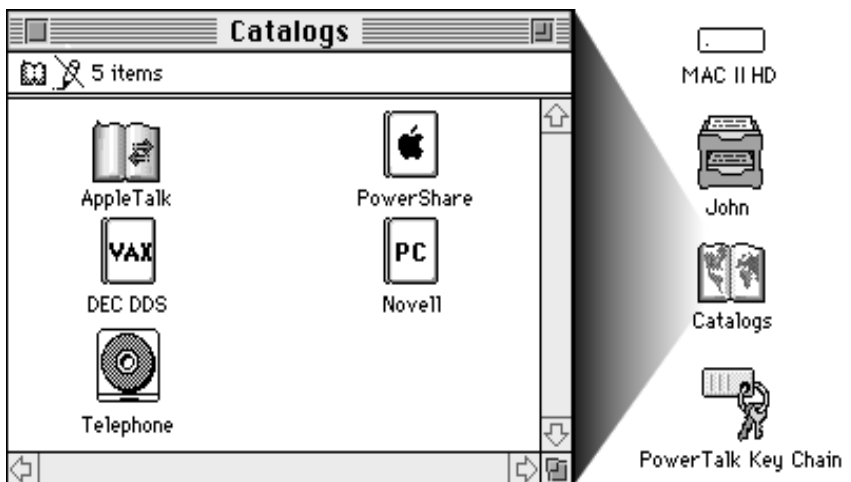
Desktop Catalog

This provides users with a consistent way to search for information required by collaborative systems, including identifying or descriptive information and network-based resources such as servers and commonly used electronic forms such as travel authorizations. Users browse shared catalog information residing on any system through this icon in a consistent, intuitive manner. In addition, the desktop capabilities of PowerTalk allow users to search the content of any available catalog in a consistent manner.



The PowerTalk in tray which can receive e-mail, voice messages, faxes, and other electronic correspondence.

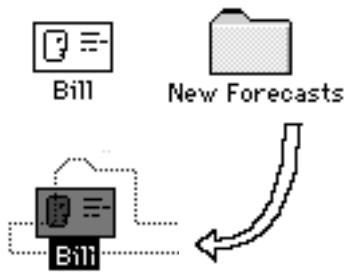
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PowerTalk catalogs browser window provides access to any catalog system with the appropriate third party access software.

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Users can copy records located in any catalog to their personal (local) catalog or to the desktop. When such records are dragged to the desktop, a copy of the catalog record, an *information card*, is made. Information cards can be sent to and shared with others in



Example of a folder of files that can be quickly sent to Bill by dragging it to his electronic information card

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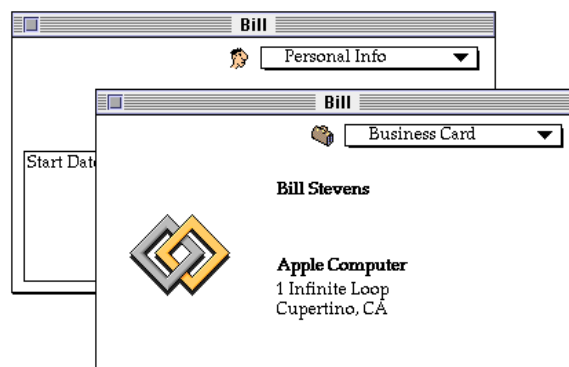
much the same way we use paper business cards today. Documents or folders of items can be dragged to information cards representing users, computers, or groups for automatic sending. This is one of several quick ways to address and deliver information with AOCE technology.

Personal catalogs

Personal catalogs are stored on the user's hard disk and are local repositories for catalog information, which can be added to and organized by the user. Personal catalogs go wherever the user goes. When users need key information, such as fax numbers, client information, postal addresses, or telephone numbers, while they're on the road or at home, they can take their personal catalogs along with them. This provides them with a copy of information that would normally be available only at the office.

PowerTalk Templates

These control the way catalog records and their contents are displayed on the Macintosh desktop. AOCE software comes with several built-in templates, and in-house or commercial developers can also create new templates to provide users with alternate ways of viewing catalog information. For example, salespeople may want to acquire a sales leads tracking template that allows them to fill in specific client information, such as action items, purchasing plans, and order fulfillment dates. Because templates are system software extensions, users can add new ones by simply dropping them into the System Folder.



Examples of catalog templates, which enable users to browse catalog information

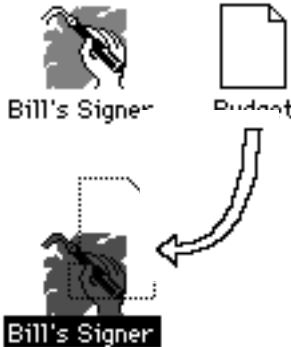
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This extensible user-interface allows commercial or in-house developers to provide access to additional pieces of catalog information. They determine which records are browsed, which information is visible, and how individual information items are displayed and edited. Organizations, for example, can build their own templates, providing users with access to specific information residing in various catalogs.



The PowerTalk Key Chain

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Example of approving a document by dragging to Bill's Signer

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PowerTalk Key Chain

The PowerTalk Key Chain allows users to authenticate themselves to multiple services using just one access code. With the PowerTalk Key Chain, a user only has to provide a single password to “unlock” services protected by the Key Chain. Locking and unlocking the Key Chain is under the control of the user. Keys for a user’s PowerShare and AppleShare accounts can be kept on the PowerTalk Key Chain. With the addition of third-party access software, the PowerTalk Key Chain can keep passwords for electronic mail, calendar and file server systems.

DigiSign

Users can electronically approve files with a special kind of Macintosh file called a Signer. The PowerTalk software includes a utility program allowing users to create a digital signature request form, which can then be given to an appropriate digital signature certificate issuing authority. Once the digital signature request has been approved, users can begin using their own unique signer to electronically approve documents.

AppleMail

PowerTalk includes a ready-to-go mail application that offers users a common method for creating and editing letters. This application uses the underlying AOCE collaboration packages: the standard mail package and the standard catalog package. AppleMail documents can be signed and sent to other PowerTalk users. AppleMail letter content can include styled text, sound annotations, QuickTime movies and pictures.

PowerTalk and the PowerBook

PowerTalk provides a set of features designed for mobile users: “I’m At,” Copy Local, and Deferred Sending. “I’m At” allows a user to specify a physical location - at work, at home, or on the road - to activate appropriate mail connections. While on the road, a PowerBook user gets mail via dialup but in the office mail access can switch to a server connection simply by changing the “I’m At” selection in from the Finder. The Copy Local feature lets a user copy mail from the server into the In Tray of the PowerBook so messages can be conveniently read and responded to while away. Deferred Sending lets a PowerBook user “send” mail without being connected to a network by putting mail into the Out Tray. The mail is held there until the network connection is reestablished, at which time the mail is automatically sent.

PowerShare Collaboration Servers

Two servers are provided with the PowerShare Collaboration Servers: The Catalog Server and the Mail and Messaging Server.

PowerShare Catalog and Authentication server

The PowerShare Catalog and Authentication server provides a full-function catalog of hierarchical containers that hold records associated with entities (users, groups, servers, and other resources). The catalog server can be used to store information needed to manage workflow processes and to communicate important information between applications. For example, applications might use the catalog server to store information on job functions and signature-authority hierarchies. When a user signs a form and sends it, the application can then determine the next approving party based on the information contained in the server; the user need never specify this information. Some developers plan to use the catalog to store common user profile information. For example, users who track the solar-power industry could be identified by their profile information, prompting collaborative applications to automatically send real-time news, articles, and other special-interest information concerning that topic to their mailboxes.

The PowerShare catalog server grants authentication credentials by acting as the trusted third-party, managing all network sessions. Catalog servers can be located anywhere on an AppleTalk internet, and the various catalog containers can be distributed among one or more servers. Copies of any container can be placed on multiple servers and kept automatically synchronized via a built-in replication and distribution mechanism.

Users view, browse, and select information from any catalog from within the catalogs browser icon on their desktop. Information contained within catalog records is visible and browsable by users through templates.

Catalog servers will play a major role in enabling workgroup applications, making it easier for administrators to manage those applications and build more convenient access control and automation mechanisms.

PowerShare Mail and Messaging server

The PowerShare Mail and Messaging server accepts correspondence and messages from users' computers, then delivers copies to appropriate destination servers and message queues, using a store-and-forward mechanism. The server forwards correspondence between PowerShare messaging servers and enables PowerTalk users to connect to any messaging system with the use of server-based messaging gateways. Users can have mailboxes on the mail and messaging server, allowing them to receive correspondence at all times, regardless of whether their Macintosh is switched on. The mail and messaging server also conserves users' local hard disk space by storing correspondence on the server's storage disk.

PowerShare servers come with an application for remote administration over a network. Both types of PowerShare servers can reside on the same Macintosh computer. Administrators also have the flexibility to install them on the same computers that contain their AppleShare or other servers, or on different computers.

The Promise of AOCE Technology

In designing its solutions, Apple has always focused first on individuals. With AOCE technology, the power and versatility of the individual's Macintosh-based solution is extended to empower groups of individuals and entire organizations.

Even as the architecture of the Macintosh computer has grown to encompass new capabilities, enhancements have always been elegant extensions of the already familiar—and AOCE technology is no exception. The same “plug-and-play” approach that characterized Apple's original collaborative tool—the AppleTalk network system—as well as later enhancements such as System 7 interapplication communications and file sharing, has been applied to AOCE technology.

AOCE technology is a dramatic expansion of the Apple computing environment. Yet users will not have to learn new ways of working. Systems managers will not have to replace hardware and software resources. And developers will find that their job is made not more complex, but rather simpler—and more exciting.

As an open environment, the AOCE framework supports interoperability with existing and emerging messaging, catalog, and authentication systems. With AOCE technology, the loose strands of voice-mail, fax, electronic mail, and remote paging will be woven into an integrated communications fabric, so that the sending and receiving of messages through diverse media will become as integral a part of applications as printing is today. In short, with AOCE technology, the Macintosh will become the most easily networked, and most collaboration-ready, personal computer in the industry today—and for years to come.

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