UNIX IN THE OFFICE

PRODUCTS • TRENDS • ISSUES • ANALYSIS

Targon Office

Nixdorf's Object-oriented Platform for Application Integration

By John R. Rymer

LIKE MANY OTHER vendors, Nixdorf Computer has seen its profitability suffer as users have shifted from proprietary systems to Unix and other standards. After two years of searching to profit in a standards-dominated market, Nixdorf thinks it has found a way. The company will acquire and/or build Unix products and technologies and integrate them into solutions, providing users with hand-holding and service. To support this strategy, Nixdorf is building an office applications platform that allows it to

• E D I T O R I A L •

A Modest Proposal

An Open Letter to David Tory and Peter Cunningham in Which We Challenge UI and OSF to Join Forces

By Judith S. Hurwitz

DEAR David and Peter,

You guys have been doing enough bickering about who has the best Unix for long enough. O.K., we get the point. Now, it's time to get down to the business of running commercial open systems. Stop arguing about whose operating system is (or is going to be) best. You both have worthy organizations that are providing a valuable service to the industry. Now that we have that out of the way, here is the proposal.

Since we are lucky enough to have two excellent organizations, why not let each do what it does best? We propose that Unix International's charter call for continuing work on the specifications for the current implementation of AT&T's System V operating system. (Nothing surprising here.) UI should begin to consider that OSF is not a competitor but an R&D organization that will provide new technologies and ideas that can be incorporated into future generations of the operating system. On the other hand, OSF should begin to consider UI as a strategic partner of keen importance to all of its member companies. (There isn't a single member of OSF today that does not use at least parts of System V as its technology base.)

We propose that UI and OSF remain separate organizations. They have fostered two different cultures with two different agendas. However, they need to align their agendas. We recommend that UI and OSF become their own consortium—a federation that has an overarching goal of bringing together the current generation of open systems technology with the future versions as they are being investigated and defined. UI would continue to specify details for the incremental improvements to System V. When a new piece of technology is developed by OSF, UI should be empowered to ask for its inclusion in a future release of System V. OSF should also continue—put out Requests For Technology (RFTs) and weaving responses into new, viable products.

What about OSF's plan to have its own separate operating system? We suggest that OSF not come out with a full operating system. Rather, it should develop modules that could either replace pieces of System V or could be added on top of an existing kernel. This way, users would get the best of both worlds—the security of knowing their investment is protected and the ability to integrate new technology as OSF developed it.

UI and OSF should jointly sponsor task forces on such issues as multiprocessing, database APIs, systems administration, security, and the like. Sure, UI invited OSF's participation in its multiprocessing task force, but participating in someone else's project is different from making it a joint effort. A joint effort means joint responsibility. By the same token, we would like to see UI have input into the structure and wording of RFTs. This would ensure that the requirements of users of current technology are taken into account.

We suspect that the way UI and OSF are currently structured causes potential commercial users to shy away from Unix. We think that the current structure takes time, energy, and talent away from the productive work of moving to the next generation of Unix. Users need Unix to have many more commercial features than it now has: good administration, ways to interface LANs into Unix systems—the list goes on and on.

Therefore, Peter and David, it's time to stop playing politics with Unix. There are too many important tasks to be done. It's time to remember just who the audience for all this stuff is anyway—the user. ☯

•NIXDORF•

(continued from page 1) integrate a variety of tools and applications in a distributed environment: the Nixdorf Computer Office Architecture (NCOA).

In one sense, Nixdorf's platform strategy is not unique. Digital Equipment, Hewlett-Packard, Unisys, IBM, Data General, and virtually every major Unix platform vendor is building modular, distributed software services—mail, calendar, file, print, communications, workstation integration—to support complex application environments. But Nixdorf doesn't intend to compete strictly as a platform vendor. The company seeks a return to its golden days as a single source of solutions and service. Nixdorf will license the products it develops to OEMs, but primarily as a way to get its software ported to a variety of platforms. In North America, Nixdorf expects the lion's share of its earnings to come not from hardware and software sales, but from the design, consulting, and support services it provides along with the boxes and wares. NCOA will succeed if it helps Nixdorf pull together solutions for customers. Nixdorf is ambitious, but seems to understand what's needed to reach its goal.

New Design for a New Era

The Nixdorf Computer Office Architecture is to Nixdorf what Applications Integration Architecture (AIA) is to Digital Equipment Corporation and Systems Application Architecture (SAA) is to IBM. NCOA defines a platform of modular services that can be distributed across a network of heterogeneous devices. NCOA is based on standards wherever they exist, both de jure and de facto. NCOA employs the client-server design for distributed computing. That is, applications code runs on client worksta-

tions, and taps servers to gain access to mail, printing, communications, filing, and other services common to all applications.

NCOA accomplishes this design using an object-oriented approach. It structures applications, services, and physical resources as objects, each of which knows what functions it can perform when asked by another object to do so. Objects in NCOA interact by sending one another messages, requests, commands, and data. The result is an inherently flexible system. New users, applications, services, and resources can be added without complex reconfiguring of the network. The new elements are simply registered, and the other resources are notified of their existence.

Flexibility is the first advantage of the object-oriented approach to distributed environments. The second is task and
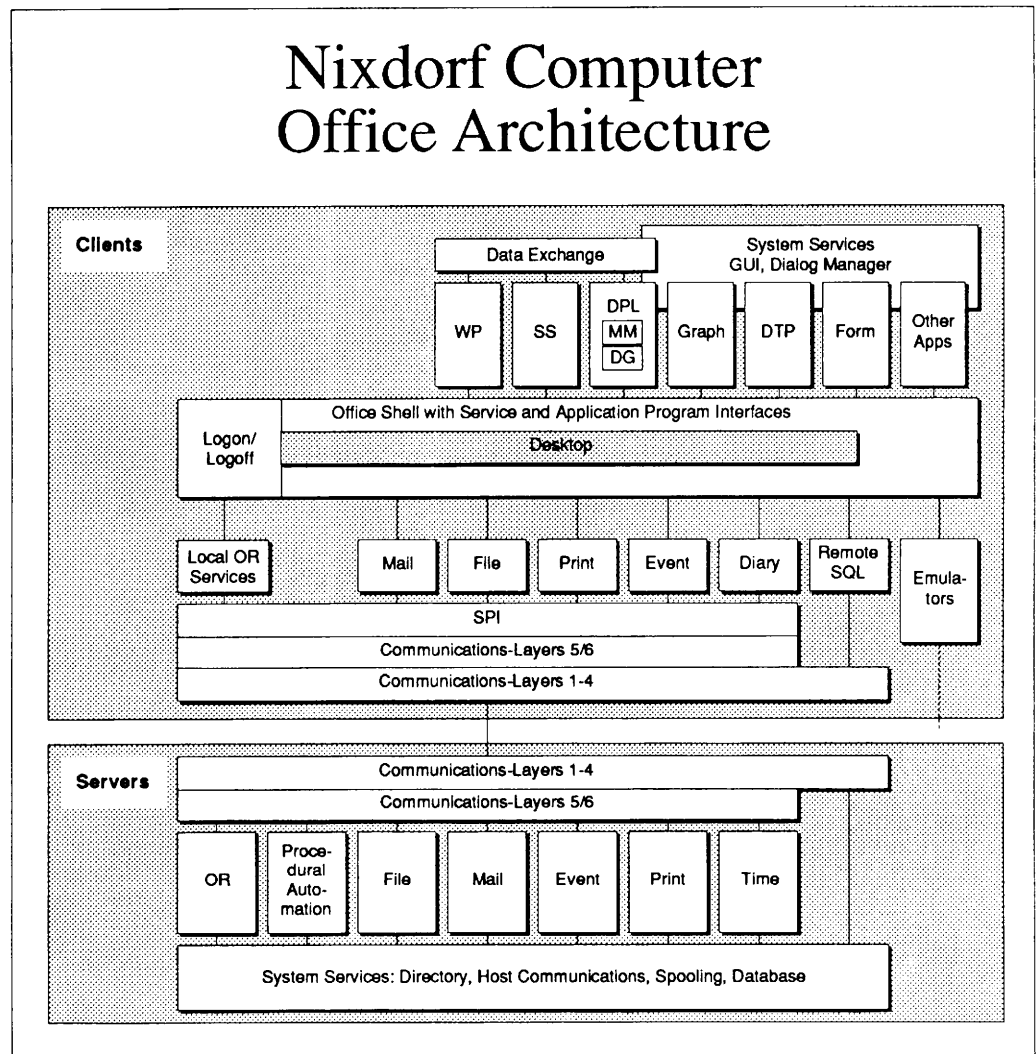
Illustration 1. The Nixdorf Computer Office Architecture defines a standards-based platform of modular services that can be distributed across a network of heterogeneous devices. Applications run on client workstations, tapping servers to gain access to mail, printing, communications, filing, and other services. NCOA structures applications, services, and physical resources as objects, each of which knows what functions it can perform when asked by another object to do so. The result is an inherently flexible system.

Nixdorf's ODA Editor Design

Nixdorf Editor Solution

User Interface-Specific Functionality

ODA Engine API

ODA Engine

Industry-Standard Shared Implementation

Illustration 2. Targon Office won't have a compound document editor until Nixdorf completes its editor based on the international Office Document Architecture standard. It's likely that Targon Office 3.0 will be introduced without this editor, although Nixdorf has an early prototype of the pr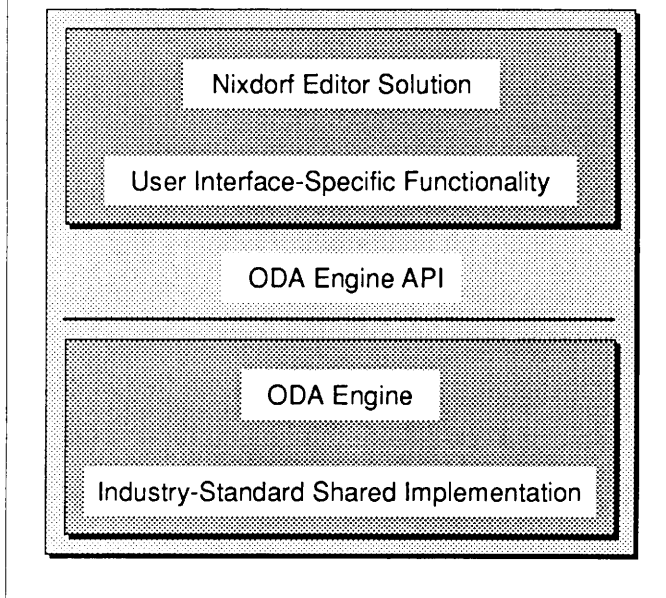oduct today. The biggest challenge for Nixdorf at this point is finding a partner(s) to support the architecture outlined above. There is no general agreement that implementing editing capabilities on top of a generalized ODA engine is the best way to go. Nixdorf is pushing to resolve this matter this year.

procedural automation. Because the integration of complex resources is accomplished by allowing two objects to pass messages, interactions between objects can be encoded in automated procedures. NCOA provides a language to do this.

Does all of this sound familiar? It should. Object orientation is everyone's model for a distributed applications environment. Nixdorf's NCOA shares a common heritage and common features with environments from Hewlett-Packard, Digital, Unisys, and others. The difference is in Nixdorf's procedural automation language and corporate strategy. Again, Nixdorf's purpose in designing this environment is to help it win as an integrator.

A Turnkey Heritage

Nixdorf grew to become a $3 billion company primarily by selling turnkey banking, telecommunications, and retail proprietary systems, mostly for the European market. Nixdorf recognized that it had to shift to a standards base years ago; the

Unix-based Targon product line was launched in 1986. But the transition has been rough. Until recently, software for the line was adequate but not particularly innovative. Nixdorf's office automation marketing has also been unfocused. The Nixdorf U.S. and U.K. subsidiaries sell Uniplex II Plus. In Europe, Nixdorf is focusing its sales efforts on Targon Office 2.0, which is based in part on a subset of Quadratron's Qliq office software suite. Before Targon Office 2.0, Nixdorf resold Quadratron's Q-Office in Europe. The result: a slow transition from its proprietary base to a new standards base. Nixdorf's profits nose- dived by 140 percent between 1987 and 1988. The results from the first nine months of this year: revenue growth of 5 percent and a loss of 168 million marks. Consequently, Nixdorf Chairman Klaus Luft resigned last November.

Nixdorf clearly had to do more to differentiate its Unix products in order to profit from them. Its strategy is to substitute Unix for its proprietary base in building turnkey solutions and to integrate its own products as well as those of other vendors. Nixdorf prefers handling every aspect of a system sale, from hardware to networks to applications packages. Unix is attractive as an integration platform because it offers good raw performance for the money, and because lots of products run on and with it. Yet, until recently, Nixdorf's Unix office platforms didn't lend themselves to easy customization and integration with a variety of applications packages. Also, as an OEM of Unix office software, Nixdorf didn't control the development of its office platform. With Targon Office 2.0, Nixdorf struck out on its own as a provider of Unix office software that would fit its integration strategy.

Enter NCOA. The Nixdorf Computer Office Architecture defines a modular set of distributed software services—mail, print, file, calendar, database, etc.—that can accommodate third-party applications while supporting workgroup computing and task automation. Services common to word processing, spreadsheets, graphics, and other applications are structured as a horizontal layer of software supporting these applications. Through OCS (Office Communication Software) NCOA will accommodate a mix of DOS, OS/2, and Unix systems on TCP/IP and OS/2 LAN Manager for Unix (LM/X) networks. OCS also supports OSI protocols and, in the future, will support SNA as a transport system

Central to NCOA and Nixdorf's office strategy is the recognition that PCs and existing PC applications are an integral part of a viable overall solution. This directly implies an architecture open to PC integration. Nixdorf is committed to the Unix PC as a strategic workstation, as well.

As an engine of applications integration, NCOA is supported by two other Nixdorf Unix platforms: DCPA and the Entry Management System (EMS). DCPA is Nixdorf's data-entry system. It has been moved to Unix and extended to support new data-capture methods. Fax is being added first; others will follow. EMS is a toolkit for building image storage and retrieval systems independent of applications and hardware architectures.

NCOA Defined

NCOA is an architecture, not a product. It will guide the development of Targon Office. Some of the components of Targon Office 2.0, which was just announced as Nixdorf's first worldwide office software platform, conform to NCOA, even though the product runs on a host processor accessed by terminals. These components include three modular services based on client/server architecture—Targon Admin, Targon Mail, and Targon File—and three applications—such as Targon Word, Targon Calc, and the Desktop user-interface front end. These will be carried forward into a distributed version of Targon Office (Release 3.0), based on a client-server architecture. The three services will become true services running on servers; the applications will become client applications. Targon Office 3.0 is scheduled for worldwide release early in 1991. As NCOA evolves as an architecture during the next three-to-five years, Nixdorf products will fully realize its advantage. In early-1990, Nixdorf will offer customers PC integration with Targon Office 2.0 as an interim step in the migration to Targon Office 3.0.

NCOA CLIENTS. The clients supported in NCOA are: MS-DOS with MS Windows, OS/2 with Presentation Manager, and Unix with OSF Motif. The servers supported are Unix and OS/2. Each of these clients will feature a uniform object model of the applications environment called the Desktop. This interface will use icons to represent printers, the file system, and other shared tools, as well as personal resources. Nixdorf will build this object model on top of the user-interface intrinsics of the separate environment. The analogy is to Hewlett-Packard's NewWave environment. In the same way that HP built New-Wave atop MS Windows, Nixdorf will build the Desktop on top of MS Windows, OS/2 Presentation Manager, and Motif.

Nixdorf plans to implement its DOS/MS Windows client first, then Unix/Motif, and, finally, OS/2 Presentation Manager.

Where's the Macintosh? Currently, it's not on the agenda. Nixdorf's development plans are a reflection of European users's priorities—and the Mac isn't one of them. This may be the case today, but it is not likely to remain so. Indeed, Nixdorf could differentiate its office product by providing support for the Macintosh. Support for Macintosh clients is on the back burners of many development shops. The vendor who moves it forward stands a good chance of standing out in the crowd.

NCOA SERVERS. NCOA anticipates mail, file, print, time/date, event, office procedure, and organizational resource services initially, with others to follow. Mail, file, print, and time/

Targon Office Rollout Strategy

Targon /31 /35

8818/Ethernet NBN

V.24/IHSS

PWS M40 MS-DOS, OS/2, UNIX

Targon Office 3.0
– Distributed system
– Shared resources
– Multitasking
– Graphics Interface

VT220

BA80

PWS PC MS-DOS

PWS PC MS-DOS

– Integration of PCs and Office workstations
– Decentralization of components

Targon Office 2.0
– Functions
– Integration (Desktop)
– PC functions
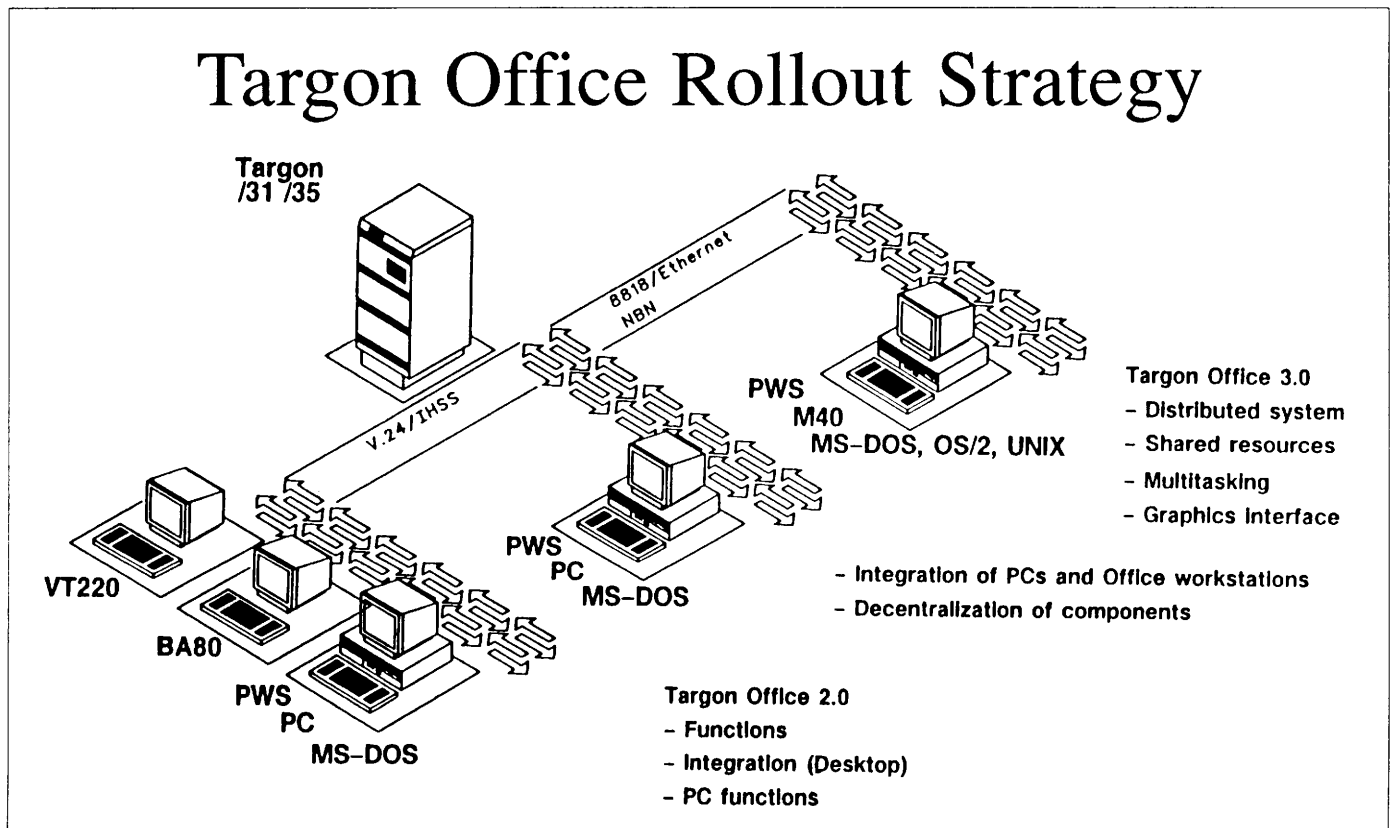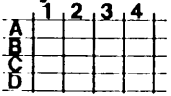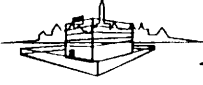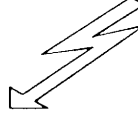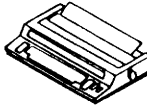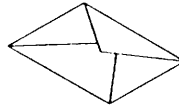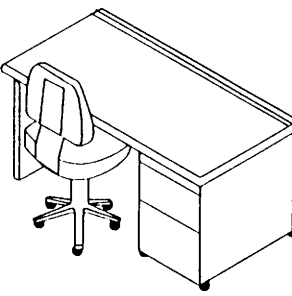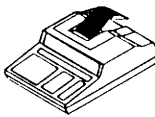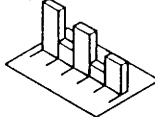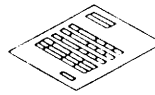
Illustration 3. Nixdorf just introduced NCOA by announcing worldwide availability of Targon Office 2.0, a multiuser system that constitutes the first step on a migration path toward a distributed environment. By the middle of 1990, Nixdorf will offer a DOS integration option to Targon Office users. And in early 1991, Nixdorf will roll out a client-server architecture.

Profile of Targon Office 2.0

Spreadsheet analysis	Image integration	Phonebook/ notepad	3270 integration	Text editing
3	1	2	1	4

Electr. mail	Desktop			Programmable word processing
4				1

Calculator				Graphics
2			1	1

Forms processing	User management	Appointment calendar	DDB /4 Integration	Filing/archive system
2	1	2	1	1

1 = Written by Nixdorf

2 = Licensed by Quadratron

3 = Nixdorf's own version of Q-Calc from Quality Software

4 = Nixdorf's own version of Quadratron Qlic Word

Illustration 4.

date are fairly conmon services. Nixdorf's value-added is in the event, office procedure, and organizational resource areas.

The Event Service registers all elements on an NCOA network. It then coordinates both the interaction between services and between client applications and services. Event Service is the manager of events (messages, requests, responses, notifications) on the system. Client applications request services or respond to requests from servers through the Event Service, which ensures that the right "events" get to the right servers in the right order. Also, the different services can communicate with one another via the Event Service.

The Event service registers objects on the network and coordinates their conversations across the network. Thus, the Mail Service can receive messages from a project management application without knowing anything about that application.

The Office Procedure Service encompasses Nixdorf's Office Procedure Language (OPL). OPL is a language to automate tasks and encode procedures into and across applications. For example, a hospital could use OPL to ensure that admissions personnel follow the proper procedures when admitting patients. OPL anticipates that different applications will be

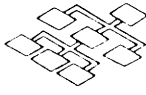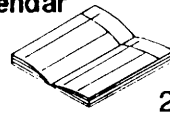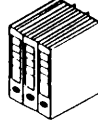used in automating tasks. In this, it in part provides the same macro-like function as HP NewWave's Agent facility and the Builder component of Digital's DECdecision. Nixdorf plans to implement OPL to be independent of individual interprocess communications facilities, for example, on top of OS/2's Dynamic Data Exchange API.

The Organizational Resource Service performs several functions. It is the locus of security and authentication services, and it also functions as a message router. It will conform to the X.500 directory standard.

NETWORK INFRASTRUCTURE. NCOA defines servers as being based on either Unix or OS/2 and using either TCP/IP or LM/X networking software. Support for Unix servers will be implemented first, with OS/2 to follow. The glue between clients and servers is found in NCOA's application and service programming interfaces. These interfaces give independent developers the means to add new applications and services to the NCOA framework. Applications written to the API of NCOA will be able to participate in the environment with other applications and services.

Nixdorf plans to write its own API, but the company is committed to migrating to standards when they become available. This is more than an idle promise. Nixdorf recently joined the Object Management Group (OMG), an international consortium of vendors and users seeking to define a technology base for a multivendor, distributed object environment. One of the top priorities of the OMG is defining standard APIs. By joining OMG, Nixdorf will participate in this work, and will have early access to whatever standards emerge.

Notably absent from Nixdorf's server line-up is Novell's NetWare. Nixdorf developers say LAN Manager made it into their plans as an extension of their work with OS/2. They're looking hard at NetWare, they add. That's good, given the number of NetWare networks installed.

Applications Focus: ODA Editor

Nixdorf anticipates hosting a variety of document editors within NCOA, but it is also building a new compound document editor based on the Office Document Architecture (ODA), with its Office Document Interchange Format (ODIF). The ODA Editor is an architected compound document editor that uses ODA as an integrating mechanism.

Nixdorf chose to focus on building a new editor because the editing function lies at the heart of NCOA. Nixdorf sees its ODA Editor as a special service as opposed to a vertical slice of applications code. The Editor itself is implemented atop an ODA engine. (See Illustration 2.) The engine is an NCOA service, although it typically runs on clients as opposed to servers. Nixdorf will provide an API to its engine, giving third parties an entree into using it as a base for applications that use ODA to exchange processable documents with other applications. Nixdorf is initially focusing on a compound document editor built atop the engine; it may leave development of other, specialized applications to third parties—at least for the near term.

The company chose ODA because it is the de jure standard in compound document interchange. Nixdorf's strategy demanded a compound document editor built on available standards. Nixdorf is leveraging its Piloting of ODA (PODA) work in building the ODA Editor. It is also actively seeking partners. Nixdorf is building the engine and compound document editor. Its goal is to find other vendors to collaborate on the engine and, especially, applications that use the engine.

A PEEK AT AN ODA EDITOR. The object-oriented approach Nixdorf has adopted in NCOA is well-matched to ODA. ODA thinks of documents as collections of elements, known as objects. Each object is defined by properties, which describe its type and structure. Through its properties, each object is self-defined and independent of other objects. Users themselves set and modify the properties of objects. For example, a paragraph is the type described as text, and has properties like line length, word spacing, type font, and size that define its appearance. Similar kinds of definitions apply to graphics and images.

What's important about this underlying structure is its flexibility. Elements "know" about their content and structure,

and this knowledge is retained when the element is incorporated with other elements into a document. Thus, a graphic can be edited in its place within a sales report. In the early prototype of ODA Editor we saw, this capability allowed multilingual editing: We edited a document comprising parallel columns of English, German, and Japanese text with a single text editor.

ODA also allows users to view documents from different contexts. A full view yields a WYSIWYG display of the document, page by page. A table of contents view is a list of the logical objects in the document, in order.

BETTER LATE? The biggest risk in Nixdorf's ODA Editor project is the unsettled state of ODA implementations. There's a high risk that different vendors will implement ODA-based products that don't work well together or don't work together at all. ODA itself is incomplete as a specification for high-end (i.e., multimedia) applications. Vendors must add proprietary extensions to the basic standard to build such products. Nixdorf concedes that there is no general industry agreement yet on its model of ODA applications driven by an ODA engine. The PODA group may accept the model. But Philips (which just announced its Papyrus editor based on an ODA subset), Apple, Digital, and Xerox aren't members of PODA.
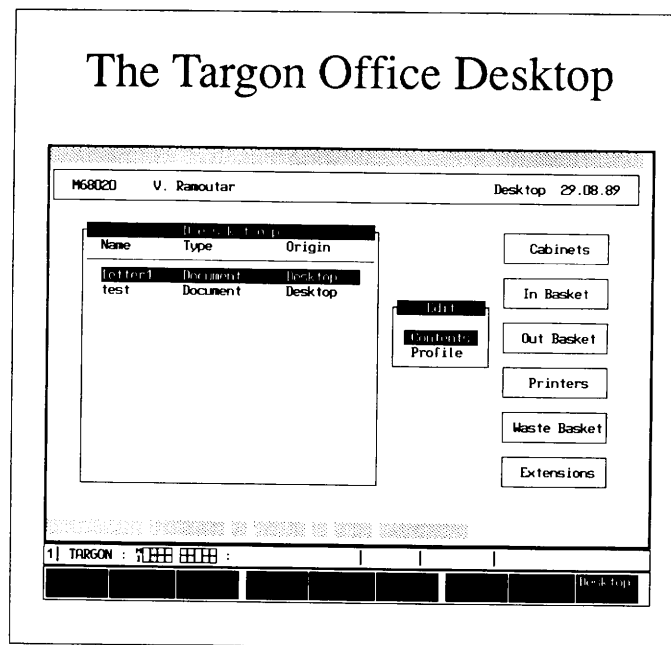
Illustration 5. This is the main screen of Targon Office 2.0, a look that will be carried forward in subsequent releases of the product. The Desktop window at left lists the contents of the user's files. The labeled rectangles at the right give the user access to the filing system (Cabinets), the mail system (In and Out Baskets), Printers, and a Delete file. "Extensions" is a portal to other functions, like 3270 emulation. The small "Edit" menu in the middle displays the choices in altering an object in Targon Office. Editing the Profile changes the information about the document; editing the contents changes the information in the document.

Object Profiles

```
M68020    V. Ramoutar                        Profile Form  29.08.89

  Profile for Id                          Type: Document

  Name......: letter1                     Title: csd letter form

  Cabinet...: _____                    Delete on: _____

  Container Level:
                   _____
                   _____

  Modified by _____
  Author(s).: V. Ramoutar
  Notes.....: Letter to Joan, Yvonne, Lynn

1| TARGON : ▓▦ ▦▦ :      |       |      |              Desktop
 ▐▐▐▐▐▐▐▐▐▐▐▐▐▐ History Options ▐▐▐▐▐▐▐▐▐▐▐ Desktop
```

Illustration 6. Targon Office prompts users to complete Profiles for each object created within the environment, usually when storing the object for the first time. The display above shows the Profile form. This information is stored separately from the content of the objects, and can be used in searches and document management chores.

Types of Objects

```
M68020    V. Ramoutar                        Desktop  29.08.89

        ╔════ Desktop ════╗            ╔═══ Types ═══╗
        ║ Name   Type   Origin ║       ║ Document    ║
        ║                      ║       ║ Text        ║
        ║ Nothing Found!       ║       ║ Dictionary  ║
        ║                      ║       ║ Glossary    ║
        ║                      ║       ║ Folder      ║
        ║                      ║       ║ Dist'n List ║
        ║                      ║       ║ Spreadsheet ║
        ║                      ║       ╚═════════════╝
        ║                      ║
        ╚══════════════════════╝

1| TARGON : ▓▦ ▦▦ :      |       |      |              Desktop
 ▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐▐ Desktop
```

Illustration 7. Separating the content of an object from its Profile is an important utilization of the object-orientation's concepts. Targon Office also recognizes certain types of objects; the above displays some but not all of the possibilities. Each type of object is associated with a particular application. The result is an easy invocation of tasks: By selecting an object from a list, the user invokes the proper application on it.

Nixdorf is monitoring developments like Philips's announcement, and is seeking through PODA and the International Standards Organization to influence ODA's evolution to encompass new extensions. For example, ODA today defines content types for text, geometric graphics, and raster images. Support for color is a draft international standard. Audio and video are next on the list, but a vendor that wants to implement support for these today goes it alone.

This is one case where a delay in coming to market may benefit a vendor. Nixdorf plans to roll out its ODA Editor in about two years. In the meantime, Nixdorf's developers will have the benefit of monitoring subsequent developments in ODA.

Nixdorf's Involvement in Standards

Nixdorf has committed NCOA to conformance with international standards, de jure and otherwise. In doing so, the company has set itself up for yet another cultural change. Nixdorf's product line today features many proprietary products and protocols. DPTG, its terminal and file-transfer protocol, is an example. To implement its vision, Nixdorf needs to move beyond its heritage of proprietary plumbing—and quickly.

Nixdorf appears to be serious about its commitment to standards. It was a founding member of the Open Software Foundation and it has joined the Object Management Group (OMG), which has begun examining standards in this area, to ensure that NCOA is aligned with developing standards. It is also an active participant in the European Economic Community's (EEC's) Esprit technology projects. Esprit projects are funded by the EEC to promote a robust European technology base.

Nixdorf is active in two Esprit projects. The first is the PODA project which grew out of the work by the European Computer Manufacturers Association (ECMA) on generating the ODA standard. PODA I has defined an architecture for ODA-based document editing. PODA II is examining application integration within the ODA framework. PODA's leaders are Nixdorf, ICL, Bull, Siemens, Oce (Netherlands), Olivetti, British Telecom, TITN (France), University College London, and IBM. The second big Esprit project for Nixdorf is Ithaca (Integrated Toolkit for Highly Advanced Computer Applications). Ithaca is an object-oriented development environment featuring a language, tools, and an integrated objectbase (an object-oriented database). Ithaca's leaders are Nixdorf, Bull, Datamont SpA (Italy), the University of Geneva, TAO (Spain), Cap Sesa Innovation (France), and the Foundation of Research and Technology (Greece).

Targon Office 2.0

As noted earlier, Nixdorf has begun planting the seeds of a distributed office environment with Targon Office 2.0, a suite of office software. Its basic components include a word processor (Targon Word), a filing system (Targon File), system ad-

ministration (Targon Admin), and a Desktop tying the system together. This includes Prototype and standard paragraph management, along with the Document Procedure Language. DPL (Document Procedure Language) manages text manipulation between objects. Optionally, it includes a spreadsheet (Targon Calc), native X.400 mail (Targon Mail), Teletex, forms, notepad, calendar, and phonebook. DDB/4 and 3270 integration can be added.

Targon Word is Nixdorf's enhanced version of the text editor in Quadratron's Qliq. The forms, notepad, phonebook, and calendar portions are licensed from Quadratron. Targon Calc is Nixdorf's enhanced version of Q-Calc from Quality Software.

Nixdorf has been marketing Targon Office 2.0 in Europe for more than a year. Last month, the company announced an English version of Targon Office 2.0, and said it intends to provide Portuguese, Dutch, and Finnish translations during the first quarter of 1990, and French and Swedish translations during the second quarter. In the United States, this means Nixdorf can focus its marketing on Targon Office, and start to eliminate the diffusion that resulted from Nixdorf Computer Corporation, its U.S. subsidiary, selling Uniplex while the European operation sold a different platform. The first order of business for Nixdorf is to convince Nixdorf Computer Corporation, to adopt and market Targon Office 2.0. At press time, the discussions between parent and subsidiary had just begun.

Targon Office 2.0 is based on a shared-logic architecture accessed by character-based terminals. Nixdorf offers it only as a package on Targon hardware. Targon Office 2.0 is offered in two packages and a set of options. The Text Management package includes the Desktop, Targon Word, Targon File, and Targon Admin. The Office Management package adds to these forms, calendar, notepad, and phonebook. The options are Targon Calc, a module that gives users access to Nixdorf's DDB/4 relational DBMS, 3270 emulation and file transfer, Targon Mail, and Teletex.

Targon Office 2.0 is comparable in its range of functions to Qliq and Uniplex II Plus. Its system administration module and task automation facilities are better; its integration of PCs and workstations is less elegant, and it doesn't include compound document editing. Here's a rundown of Targon Office 2.0's distinguishing features.

THE DESKTOP. Targon Office 2.0 introduces NCOA's concept of objects via the Desktop, a character-based windowing interface and a Dialog Manager user-interface component that runs across Targon Office applications. The system associates documents and files with the applications that created them, simplifying their invocation and manipulation. Objects can be filed and mailed. Working with physical resources on the system is also simplified: Printing takes one keystroke, and Targon Admin reduces configuration changes to the manipulation of objects representing devices, applications, and users.

The Desktop uses icons and dynamic soft keys to structure user access to system resources and applications. Targon Office 2.0 doesn't support graphical displays, so the icons are

DPL in Action
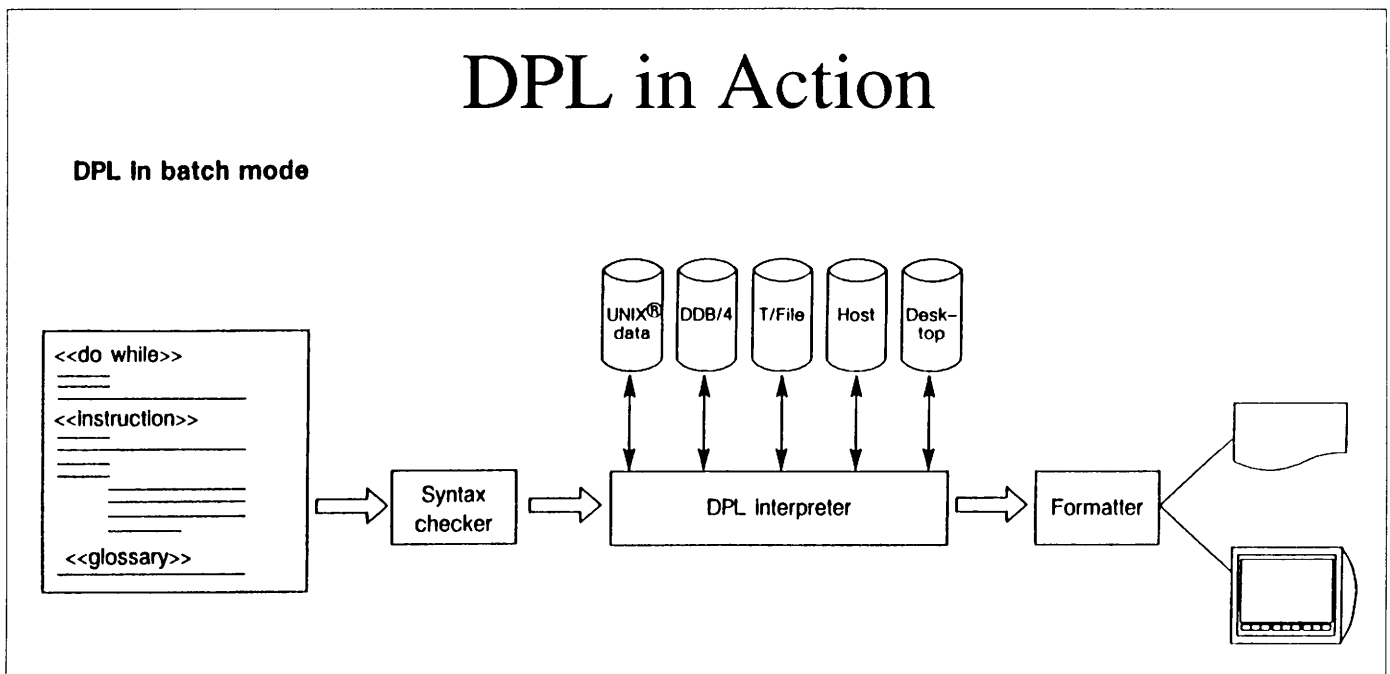
Illustration 8. The Document Processing Language launches a comprehensive procedural automation facility called the Office Procedure Language. DPL is available in Targon Office 2.0; it allows developers to embed Basic-like commands and procedures within documents. A batch mode operation is shown above. OPL will introduce similar language capabilities that allow procedures to be encoded across applications in a single environment and across discreet user environments.

A Sample DPL Routine

```
DEF &statis STRING
DEF &file FILE
DEF &fname STRING
DEF &lname STRING
DEF &title STRING
DEF &office STRING
DEF &company STRING
DEF &floor STRING
DEF &street STRING
DEF &city STRING
DEF &postalcode STRING

OPEN FN "/desktops/nixcan/[user name]/mail-db1.dat"
IN FILE &file
READ FILE &file LEN 341

LOOP UNTIL EOF(&file)

    LET &status = trunc(&file(1,4))
    LET &fname = trunc(&file(5,20))
    LET &lname = trunc(&file(25,30))
    LET &title = trunc(&file(55,50))
    LET &office = trunc(&file(105,50))
    LET &company = trunc(&file(155,60))
    LET &floor = trunc(&file(215,30))
    LET &street = trunc(&file(245,40))
    LET &city = trunc(&file(285,50))
    LET &postal code = trunc(&file(355,7))

    CALL doc "form-dbase genletter" at "DESK"

    READ FILE &file LEN 341

LOOP END
CLOSE FILE &file
```

Illustration 9. This is the DPL routine Nixdorf used to code the Mail Merge feature of Targon Office 2.0. We present it here to show its simplicity and Basic-like syntax.

boxes, not pretty pictures that can be dragged across the screen. Users perform functions on objects using soft keys. To send a document via mail, for example, a user positions the cursor over the object and presses the Send soft key.

The Desktop gives the user personal space on a time-shared system. The main screen is the user's primary working environment. The work area on the left is the place to create new objects and edit existing ones. Targon Office 2.0 supports seven types of objects, including documents and spreadsheets (see "Objects" below). Users create new objects by selecting the "create" option from a menu and then selecting a type of object. The system invokes the proper application needed to create the object. For example, creating a spreadsheet object invokes Targon Calc, the package's spreadsheet.

On the right of the main screen are the user's principal resources. Cabinets give the user access to Targon File,

Nixdorf's own distributed ISAM-based filing system, and to both their own and shared objects/files contained in a hierarchical structure up to 10 levels deep. The Inbox and Outbox icons are the user's access to Targon Mail. The Waste Basket is a temporary repository for up to 30 deleted objects. Printers give users access to print queues and other management functions. Users don't print from here; printing is accomplished using a soft key. Users running PCs in terminal emulation mode with Targon Office 2.0 can have a sixth icon on their Desktop that exits them to DOS.

An Extensions icon is the user's doorway into other parts of the system that aren't represented on the desktop. These include the forms application, the system's calendar, notepad, phonebook, access to DDB/4, access to 3270 emulation and file transfer, and system administration services.

The Dialog Manager is the key to achieving the PC-like feel of Targon Office 2.0. The Dialog Manager is slipped between the Desktop front end and system resources and services. It is a layer of software that presents files, applications, and other resources, and mail, print, and other services as a series of personal and shared objects. The Dialog Manager simulates a client-server architecture within a shared-logic system.

OBJECTS. Targon Office 2.0 classifies its objects into three categories: resource objects, containers, and application objects. Resource objects include the filing system, mail, 3270 emulation, DDB/4 integration, calendar, and task-automation routines. Folders are containers that hold multiple objects. Application objects are documents, spreadsheets, and files created with specific applications. The user's file is associated with the application that created it. For example, in selecting a document from a listing on the Desktop, the user invokes Targon Word on the appropriate file.

Targon Office 2.0 allows users to work with 10 types of objects.

• Document. A document is formatted text created using Targon Word. (Users of Quadratron's Qliq Editor can edit these documents and vice versa.)

• Text. A text object is an unformatted document created using Targon Word. One purpose of text objects is to export text to other text-processing formats.

• Dictionary. Dictionaries are custom spell-checking files that are created using Targon Word.

• Glossary. A Glossary contains keystroke-saving macros. The macros are created using a keystroke recorder and Targon Word.

• Folder. Folders are created using Targon File.

• Distribution List. A Distribution List is created using Targon Mail.

- Spreadsheet. A spreadsheet is created using Targon Calc.

- Mail Journal. A Mail Journal is a monthly, weekly, or daily summary of E-mail messages; it is created by Targon Mail.

- Program. Program objects are scripts or programs that can be executed from the Unix shell.

- External. External Objects allow users to file or mail programs or files that have not been formally integrated into Targon Office 2.0. For example, Lotus 1-2-3 hasn't been added to Targon Office 2.0, but a user can encapsulate a Lotus 1-2-3 file as an External Object and mail it to a user across the country. The user on the other end can then manipulate the file with Lotus 1-2-3 or import the file into Targon Calc, and file it in Targon File. External Objects can also encompass executable programs. Lotus 1-2-3, then, could itself become an External Object.

Upon creation, each object is registered with a reference to the application that created it in two Unix files, one for content and one for a Profile of the object. Separating content from Profile information helps users locate individual objects and objects that are similar. Profiles can be indexed using keywords. An object's profile can contain a number of things—the name of the object's creator, the name of the file cabinet the object is stored in, the access permissions, the delete date, the name of subsequent users who modify the object, distribution list information, the name of the object, and its type. Users can search the cabinets in Targon File for objects by type and creator name, for example.

Profiles are automatically updated to reflect the object's current status. When a user mails an object, for example, the object's Profile is updated to reflect who mailed what to whom. Thus, an object's profile becomes its chronicle.

Readers familiar with object environments like Hewlett-Packard's NewWave and NeXT's NextStep will recognize

Nixdorf's Targon Hardware

Name	Processor Type	Operating System	Partner
Targon/386	Intel 80386 (16 MHz)	Xenix	Not applicable
Targon 31 (uni-, dual-, and triple-processor versions)	Motorola 68030 (33 MHz)	TOS (System V.3 with symmetric multiprocessing extensions)	Not applicable
Targon 35	Pyramid RISC	TOS (Pyramid System V.3/BSD Unix with symmetric multiprocessing extensions)	Pyramid
Future	MIPS R-series RISC	TOS	MIPS Computer Systems
Future	MIPS R-series RISC	TOS	Tandem Computers

Illustration 10.

these concepts. One note of caution: Targon Office 2.0's objects are not objects as defined by object-oriented programming. Targon Office 2.0 does not place objects into class structures that define how functions and features can be inherited by one object from another. The only use of inheritance is in Targon File. A keyword defined at a high level of the file hierarchy will operate at lower levels proceeding from it.

INTEGRATION FROM WITHIN TARGON WORD. Targon Word can be used to integrate data from a variety of sources into a single document—but without a WYSIWYG display for graphics and images. By selecting parameters off a menu, users can create "graphics space reservations" for images and graphics, and reference the file they want included in the space at print time. The proper file is bound into the document when it is printed. The result is primitive compound documents. There are no live links in this scheme.

Having organized Targon Office 2.0 into a series of objects, Document Procedure Language (DPL) allows organizations to automate interactions and exchanges between them.

Data stored in DDB/4, Nixdorf's SQL relational DBMS, can also be pulled into documents. From within a document, a user selects an "Access to DDB/4" option from a menu, which switches the user to a query interface called XEasy. From XEasy, users can formulate queries and select up to 64 records. Exiting from XEasy, the user is returned to the document, and can then mark locations for deposit of DDB/4 data and key in the individual entries one by one with a single keystroke.

Nixdorf provides the DDB/4 access facility mainly for ad hoc queries. The company anticipates that most DDB/4 search procedures will be encoded in DPL routines. Nixdorf does not provide connections to other SQL databases in the first release of Targon Office 2.0. Support for Oracle and Ingres are planned for early 1990, with other databases to follow in subsequent releases of the product.

Users can also use the 3279 Data Integration application within Targon Office to integrate data from an IBM host into a document. By extricating data from a 3270 data stream, this application makes the host available within a Targon Word edit session. The entire process can be automated using a built-in macro facility. Background or batch processing can also be achieved by including the macro in a DPL routine.

In addition, Nixdorf announced DISOSS integration within Targon Office 2.0 (for release early 1990), where Targon Mail and Targon File interact via DDS and DLS of DISOSS.

Generally, document conversion is provided between Targon Word and many industry-standard formats using the Key-

pak conversion package from Keyword Office Technology. This facilitates document exchange between as many as 40 word processing packages, including WordPerfect, Microsoft Word, and DCA.

EXTENSIONS. The Extensions option on the main Desktop screen is the user's portal into the system beyond his or her personal desktop. Users of the Targon Office Text Management package are presented with menu options including systems administration, and access to a filing index facility. Users of the Office Management package add to these facilities the forms application, calendar, phonebook, and notepad. In addition, DDB/4 access and 3270 emulation are separate features.

Targon Admin shields users from the underlying Unix system. Through menus and soft keys, Targon Admin allows an administrator to maintain user permissions, add new users, and add and delete applications. The interface is consistent with the rest of the system. Individual users work with a subset of Targon Admin to customize their environments.

Extensions' DDB/4 option gives the user direct access to DDB/4. When this icon is chosen, the user is placed into a DDB/4 session.

DOCUMENT PROCEDURE LANGUAGE. Having organized Targon Office 2.0 into a series of objects, Document Procedure Language (DPL) allows organizations to automate interactions and exchanges between them. DPL is a Basic-like language with embedded SQL used to customize document-oriented applications. It lays the groundwork for OPL.

DPL is designed to aid Nixdorf's integration effort, and to help customers MIS departments further customize Targon Office 2.0 environments. Nixdorf's approach to the problem of task automation is different from the approach taken by Hewlett-Packard with its NewWave product. NewWave uses keystroke recording to automate routine tasks. Nixdorf views keystroke recording as a useful way to improve personal productivity, and provides this facility with Targon Word glossaries. However, Nixdorf believes the NewWave approach is a weak base for automating tasks and procedures. DPL forces organizations to design, program, verify, and debug the tasks they automate.

Nixdorf used DPL to write the Mail Merge function in Targon Office 2.0. Mail Merge is one of several DPL routines delivered with Targon Office 2.0.

MIGRATION VEHICLE. As a transition environment, Targon Office 2.0 is effective. It introduces the concepts guiding development of Nixdorf's future environment without requiring wholesale replacement of terminals with workstations. And investments in Targon Office 2.0 won't be blown away as Nixdorf implements office software based on a distributed architecture. As noted, key components of Targon Office 2.0 will be migrated to Nixdorf's distributed version of the environment. Even Targon Word will have a long future, Nixdorf believes. ODA Editors won't totally displace it for years to come.

A key step in the migration process is the introduction of PCs to the environment before early 1990. Targon Office 2.0 PC Integration will fill the most glaring deficiency of Targon Office 2.0. The PC integration enhancement will allow PCs to be configured as Targon Office terminals under the Desktop interface. Also, Nixdorf will provide a DOS version of Targon Word for these PCs.

It works like this: When users boot their PCs, a terminal emulation session is launched and the Desktop interface comes up on the PC display. At this point, the PC user has all of the capabilities available to terminal users. When the user selects a document for editing or creates a document, the host system suspends the terminal emulation session, transfers the file from its file system to the PC, and invokes Targon Word under DOS on that file. The file transfer is accomplished using Nixdorf's DPTG protocol. Targon Office 2.0 manages the transition from terminal emulation to Targon Word for DOS. Manual file transfer is also possible between the server and the PCs.

The DOS integration package is helpful to Nixdorf customers who want to use their PCs intelligently within the Targon Office 2.0 environment to offload the main processor in a shared-logic environment. In addition, an identical user interface is presented to the PC and dumb terminal user. But the real benefits come with Targon Office 3.0's distributed function and accommodation of a variety of desktops.

Conclusion

It's easy to pick on Targon Office 2.0's list of features by calling them inadequate or even boring, given the movement today toward graphical user interfaces, compound document editing, and distributed network computing. But to do so misses the product's significance. Nixdorf may not compete directly with Unix office software vendors like Applix, Uniplex, or Quadratron in selling Targon Office 2.0 today, but future plans include making Targon Office 2.0 available on other hardware platforms. The product initially will only be sold on Nixdorf's Targon hardware, and then primarily as part of a total solution sale. Nixdorf's added value is in integrating all of the pieces of whole solutions, as well as providing a facility for the generation of specific customer-oriented applications (e.g., using OPL to automate office procedures).

Targon Office 2.0 is important for the change it represents in Nixdorf. And Nixdorf is important for the potential it brings to the Unix market.

First, consider Nixdorf. The company is finally in a position to execute a strategy it understands within the context of Unix and standards-based computing. And NCOA gives it a plan to introduce advanced technologies within a comprehensive framework. These are both firsts for the company.

Second, consider the Unix market. Is Nixdorf's strategy useful to any customers? We believe it is. Given the hyperdiversity of the Unix market, we believe a fair amount of customers will gladly pay Nixdorf to solve their information management problems and build their solutions. ☾

NEWS

PRODUCTS • TRENDS • ISSUES • ANALYSIS

ANALYSIS

• G U I •

Battle of the Unix Shells

As the quest for the definitive graphical user interface (GUI) continues, developers have another related choice: the graphical shell (a.k.a. graphical desktop manager). The two main Unix GUI contenders, Motif and Open Look, have relegated the user interface shell component to individual implementers, leaving room for vendor differentiation. However, many have turned to third parties for shell components, and activity in the shell arena hovers around two vendors: IXI Limited (Cambridge, England) and Visix Software (Arlington, Virginia).

IXI'S X.DESKTOP. Many third-party GUI shells we've come across are the work of IXI. To wit: SCO's Open Desktop, Uniplex, Locus, Motorola, Olivetti, Unicad, and NCR have licensed X.desktop. Up to this point, X.desktop has only been available as a bundled application, but retail versions of Release 2.0 are available this month for the Sun3 and 4, Apollo Domain systems, HP9000 series, Sony NEWS workstations, Mac II, DECstation, and 803860-based PCs (for $495).

IXI announced the second release of X.desktop at Unix Expo in November. Whereas the original product had a Mac-like interface, the latest version is based on Motif, so it sports configurable PM-ish icons. Essentially, the program spares you Unix commands by providing a graphical representation of files and programs. From within X.desktop, you can run programs and carry out file management tasks such as copying, deleting, creating new files and directories, printing, and archiving. Administrators can configure menus and rules from within X.desktop. To simplify things, it has its own rule language with full-length words instead of abbreviated codes. (The Unix shell command language, incidentally, is available from within the rule language, so you can execute Unix shell scripts without exiting X.desktop.) But it actually could be simpler—maybe even simple enough for users? (Let's face it, most administrators don't have much of a problem with abbreviated codes; users do.)

IXI VERSUS LOOKING GLASS. When we asked IXI what the difference was between X.desktop and Looking Glass from Visix, we were told that X.desktop is user oriented, while Looking Glass was more of a "systems professional" type of tool.

Well, sort of. Frankly, X.desktop

seemed somewhat more superficial than Looking Glass, and the depth of Looking Glass doesn't at all detract from its end-user suitability. Like X.desktop, Looking Glass hides Unix behind a graphical desktop manager (in addition, Visix offers Directory Shell, a GUI for character-based terminals). It lets you navigate the Unix file system, manage files and directories, launch and manage applications, and perform system and network administration iconically.

The strength of Looking Glass lies in its depth. Visix put over 300,000 lines of code into the product. When you make a mistake, you don't get a cryptic error message; you get help messages. Furthermore, Visix has developed a powerful proprietary toolkit (along the lines of NextStep) that enables Looking Glass to run on a broad range of computer systems and window environments (i.e., not just X). The toolkit sounded pretty interesting, and we wondered if Visix planned to commercialize it as well. But no. Visix reasons that putting the toolkit into the public domain would merely let the competition do what it's doing. Makes sense. However, the company may consider making the toolkit available to its large, end-user customers.

Marketing. Visix appears to be in the midst of a marketing blitz for Looking

Glass, and it should be. IXI has already gotten an edge in the market; it's even lured IBM. The current customers of Visix are mostly OEMs, but the product is also available retail (price ranges from $595 to $795).

Next Steps. Visix didn't balk when we mentioned the possibility of pumping more productivity into its products—something more along the lines of NewWave, where you can program agents to take care of procedures and tasks behind the scenes. The potential is there. (Actually, when—if?—it does take on such capabilities, the desktop manager may have an advantage over NewWave in that you needn't identify new applications to the environment the way you must in the NewWave environment.) Graphical desktop managers make dealing with Unix easier, and that in itself is worthwhile. We're all for a less intimidating Unix. But all the recent talk about ease of use and graphical user interface squabbles is getting monotonous. What users really need are powerful, productive, and, yes, easy to use applications.   —*L. Brown*

•X/OPEN•

X/Open Flexes Its Muscle

X/Open isn't letting any grass grow under its feet. It is aggressively moving forward to make sure it is able to understand and thereby help shape the open systems requirements for the coming decade. In the past, X/Open, along with other open systems-oriented organizations, has been criticized for not listening to the needs of commercial users. That's changed.

LISTENING TO USERS. The first step in X/Open's new direction was a user requirements conference it sponsored last June in Montreal. At that event, 104 representatives of user organizations as well as independent software

vendors, systems integrators, hardware vendors, government agencies, and industry associations from all over the world met to tell X/Open's management what their concerns and needs were for the future. These representatives broke into a series of workgroups in categories such as user interface, interoperability, database, and security, to name a few. The result of the workgroups was a set of 117 detailed requirements. To X/Open's credit, it has augmented this information with extensive interviewing and research so that the data will be reflected in X/Open's future.

Data Interchange. As a result of the conference and X/Open's research, a few user demands have surfaced. For example, users require a data interchange standard, which has been incorporated into X/Open's technical program. Another user concern is how to migrate from the second to the third volume of the X/Open Portability Guide. X/Open will include a migration strategy in the upcoming fourth edition of the Portability Guide.

Getting There from Here: Migration. Some of the other user requirements will take much more work. For example, users are asking for guidelines (i.e., a business model) to help them migrate to open systems. X/Open promises a model in 1990. Another major demand is to have interoperability with major entrenched proprietary systems. This is a more complex but equally important issue for users. Clearly, no user can simply throw away decades of installed systems and technology. To this end, X/Open has licensed IBM's CPI-C (Common Programming Interface-Communications).

LICENSING CPI-C: A COUP FOR IBM. CPI-C is a key component in IBM's Systems Application Architecture (SAA). CPI-C is perhaps the most important of IBM's protocols from the perspective of the scalable software model and cooperative processing. CPI-C allows for true cooperative proc-

essing between disparate environments without resorting to different protocols in different environments or terminal emulation. In essence, CPI-C is a general implementation of a consistent application-to-application communication protocol. (For more information on OfficeVision, IBM's first software under SAA, see *The Office Computing Report*, Vol. 12, No. 10) However, one of the major problems is that CPI-C is a complex, low-level protocol, which programmers will find very difficult to work with. Therefore, there may be opportunities for third-party developers to develop higher-level interfaces.

The fact that IBM turned CPI-C over to X/Open is significant. First, IBM desperately needs CPI-C to be a generalized application-to-application protocol for both SAA and AIX. In the public domain, through X/Open, it has the potential to become a generalized interface that will significantly help IBM create an important synergy between SAA and AIX.

This should not, however, diminish its importance for users. Many commercial users require interoperability between open systems and IBM mainframes, and CPI-C is a key to making this happen.

A UNIFYING FORCE. In addition to getting in touch with the user, X/Open is surfacing as the neutral force between the warring factions Open Software Foundation (OSF) and Unix International (UI). At the recent Unix Expo conference, OSF and UI joined with X/Open in agreeing to work towards developing a comprehensive set of conformance test suites for open systems.

WHAT NEXT? These are heady times for X/Open. It has succeeded in changing its image from that of a musty specification-writer to a leader in open systems. In doing so, it has set an ambitious agenda. Therefore, X/Open must continue to keep in touch with all components of this volatile marketplace. That will be expensive, in terms of both time and money. It will have to hold more conferences where users can give

input on a regular basis. It will have to devise a mechanism to make sure that it is in touch with current reality. Over time, we suspect that X/Open will have to become a user-run organization rather than one that, from time to time, simply asks users what they want. X/Open is off and running on the right track, but the stakes are growing ever higher.   — *J. Hurwitz*

•INGRES•

No More Mr. Nice Guy

It was a matter of time. Relational Technology Incorporated finally succumbed to the trend and changed its name to Ingres Corporation. This not only trades on the success of its Ingres relational database management system (RDBMS), but also makes life easier for those who write about the company.

Ingres also made a major product announcement that moves it out in front of its competitors in several areas, and got started on a new program of Oracle-bashing. No more Mr. Nice Guy for Ingres. This is one company that's had enough. Long viewed as a company with good technology and engineering and lousy marketing (Ingres likens itself to Hewlett-Packard in the well-known story about HP's honest marketing techniques: if HP marketed sushi, it would call the product "cold dead fish"), Ingres has taken repeated blows from Oracle's impressive marketing program. Ingres is now out to differentiate itself, and to make its strategy and products crystal-clear in comparison to those of the competition.

The new features of Version 6.3, called the Ingres Intelligent Database, focus on the database server rather than front-end tools. Version 6.3 introduces data management enhancements as well as two optional new products: the Ingres Object Management and Knowledge Management extensions.

The new version of Ingres takes the product significantly beyond what Oracle can offer today; it also implements a number of the features that have impressed us about Sybase, and more. It's another salvo in the database war that continues to keep all combatants working to improve the functionality of their products and clarify their strategies and advantages.

DATA MANAGEMENT ENHANCEMENTS. In late 1988, a rearchitected, multiserver version of Ingres (Version 6) was introduced. The objective was to enhance both performance and functionality in order to better meet the requirements of online transaction processing (OLTP) applications. In addition to the ability to take advantage of multiprocessing, other major improvements were database procedures and reductions in I/O overhead.

Compiled database procedures are functions written in the Ingres 4GL which are compiled, stored, and managed by the database server. Typically, these are used for predefined transactions. The benefit is the ability to write a procedure once that can be accessed by multiple applications, reducing the need for logic in the application itself. Other benefits include reduced network traffic and easier maintenance, since the procedure only has to be changed in one place. Compiled database procedures are comparable to Sybase's stored procedures.

I/O reduction techniques include fast commit (deferred writes), group commit (piggybacked commit), multiblock reads, and multiblock writes.

Building on this base, Version 6.3 adds several significant features to the database server:

- Two-phase commit protocol, which is a critical component for supporting distributed database processing across multiple sites in a single logical transaction. A two-phase commit protocol decomposes the commit operation into two phases (prepare-to-commit and commit) so that a

multisite update is either committed or rolled back by all participating sites. This is necessary to maintain data integrity.

- Online backup for high availability, which is an important consideration in online transaction processing (OLTP) systems.

- Improved optimization of subqueries.

- International language support for sorting sequences, error messages, and 2-byte character set.

- An increase in the maximum columns per table to 300 from 127.

- The ability to activate the fast-commit feature in a multiserver environment.

KNOWLEDGE MANAGEMENT. The Knowledge Management extension to the Ingres server introduces a rules system that can be used to capture both referential integrity constraints and business policies in the database server itself. It allows for the definition of an unlimited number of independent rules per table; rules can be nested (to unlimited levels) and recursive. This goes beyond what Sybase, for example, has implemented in its triggers. Sybase triggers are limited to one per table for each of the data manipulation operations (insert, delete, and update), can only be nested 16 deep, and cannot be recursive.

Knowledge Management also contains a resource control system and an access control system. The resource control system allows the administrator to tell the server how much in the way of resources each user can consume. Limits are associated with the user authorization profile. If the user tries to execute a query that will exceed this limit (as evaluated by the query optimizer), the server rejects the query. The important point here is that the query is rejected before it is executed, not after the limit has been reached

(e.g., after the 1,000th row has been retrieved, if that is the defined limit). This reduces the potential conflict between ad hoc and production users of a database, and eliminates unpredictable performance.

The access control system adds group and application permissions to the standard individual user permissions for access to data in a database. Thus, the administrator can define a group called "marketing" and grant the entire group specific levels of access to data. Applications can also be given permission to access data.

OBJECT MANAGEMENT. The Object Management extension allows the creation of user-defined data types, such as geographic coordinates (longitude and latitude), temperatures, weights, and time-series data. The user can also define operators and functions to be used with these data types—the ability to calculate the distance between two locations, convert pounds to ounces, and calculate the volume. For example, the user could teach Ingres about inches, feet, yards, etc. and how to add and multiply these user-defined values. The data types can be manipulated using standard SQL.

According to Ingres, this is "phase 1" of its implementation of object management in the database. There is no inheritance, compound objects, or subclasses yet, but the company is in the process of evaluating these capabilities. The primary goal is to make Ingres SQL-based and fast first, and then to enhance it with additional functionality as required.

AVAILABILITY. The Ingres Intelligent Database product suite was available in November for Digital's VAX/VMS, and will be ported to a variety of Unix platforms in the first half of 1990. The data management extensions are a free upgrade for current Ingres installations on a maintenance contract. The Knowledge Management extension costs 30 percent of the base license fee for the

Ingres DBMS. The Object Management extension costs 50 percent. Together, they can be acquired for a total fee of 60 percent of the base license cost.   *—J. Davis*

• U I •

Grabbing the Spotlight

Unix International (UI) is using the occasion of the release of System V.4 to embellish its image within the Unix community. When Unix International was founded, it appeared (and was, in fact, targeted) as a direct answer to the vendors who organized the Open Software Foundation (OSF). But as UI matures, its charter and purpose are becoming better defined. Unix International, first and foremost, is the cheering section for AT&T's implementation of Unix. It is there to promote V.4's use. But probably the most important role of UI is as the voice of companies that use the operating system. Ironically, had UI been formed (with AT&T's blessing), OSF would never have gotten off the ground.

COMMERCIAL APPLICATIONS? In its Unix public relations role, UI has been compiling statistics about just how important and pervasive System V and Unix have become. For example, it has discovered that there are 15,000 applications written for Unix (this compares to 2,000 Digital VMS applications). Of these, 1,700 are accounting applications. From UI's perspective, this number should end the debates about the commercial viability of Unix once and for all. However, it is unclear exactly what type of applications these are. We suspect many are geared to noncommercial applications. End users are still clamoring for more and better Unix applications. Even so, 15,000 applications form an impressive group.

PREDICTING HUGE GROWTH. At the same time, UI is touting some new Unix market share numbers from both IDC and the Gartner Group. Gartner, for example, is projecting that, by 1993, 33 percent of multiuser operating systems will be Unix. Compare this to 1987, when only 18 percent of multiuser operating systems were Unix. IDC estimates that Unix will capture 21 percent by 1993. This would equate to $13.5 billion, given Gartner Group's projection of a total computer market of $62 billion.

OS/2 AS ENEMY. UI also appears to be still poised for battle. For example, it is going to great lengths to compare System V to OS/2. Ironically, it is trying to prove that System V is more viable by remarking that OS/2 is a "closed system" owned by Microsoft. In addition, UI is beginning to take potshots at the yet-unreleased OSF/1. As an argument, it notes that many OSF companies will use System V and not OSF/1. While this may be true, it is a moot point. OSF does not yet have an operating system to sell. And, until it does and until the system is proven in the commercial marketplace, no vendor worth its salt would denounce System V in favor of an unknown commodity.

COMING TOGETHER? The next few months should be interesting for both Unix International and its rival OSF. OSF has succeeded in making AT&T look at the possibility of decoupling the operating system operation. On the other hand, AT&T is the first on the block with its operating system that incorporates some of the features that users have been asking for. At this juncture, the two Unix power-seekers are holding talks. While we have no information about the status of their discussions, we expect that there is too much intense pressure for these talks to fizzle. Therefore, we suspect that, within the next six months, both UI and OSF will find common ground for cooperation. The sooner that happens, the

better off the user community will be. Ironically, the sooner this happens the better off UI will be as well. When UI can find a way to change its charter from simply a supporter of one version of Unix into a more generalized role, it will improve its image. When OSF becomes not a rebel but a leading research and development organization, it, too, will change its image. There is a lot to be gained in compromise.

— *J. Hurwitz*

• L A N   S E R V E R S •

SCO-Compaq: MPX Server Powerbrokers

There's a new triad in the PC LAN server world: SCO, Compaq, and Corollary. Together, these three vendors have locked in a strong role for Unix in the future of LANs based on Intel-architecture PCs. The three vendors last month announced SCO MPX, a multiprocessing version of SCO's popular Unix V/386 that will be very attractive to LAN users. The new server platform clears away the uncertainty among software developers about how multiprocessing would be implemented in PC LAN servers, and should spur a new wave of distributed applications for PC LANs based on Unix.

The SCO-Compaq-Corollary platform isn't the first multiprocessing option available to PC LAN users. Data General, NeXT, and others have had multiprocessing operating system extensions for some time now. What's interesting about SCO MPX is that it isn't tied to any one machine. Users who don't like the idea of buying their Unix servers from one of the big mini-makers now have an alternative they will like.

MULTIPROCESSING PLATFORMS. With Compaq leading the way, the PC industry has embraced multiprocessing as the future of PC LAN servers. Two designs for multiprocessing have emerged: the shared-memory architecture championed by Compaq and others, and the distributed design being pursued by Acer and IBM.

In a shared-memory design, two or more processors read and write to the same system memory pool, coordinated by a special memory manager. Coordination of the processors is straightforward because both are working from the same memory. Shared-memory designs require an internal processor/memory bus because neither EISA (Extended Industry Standard Architecture) nor MicroChannel supports the throughput needed to do shared-memory multiprocessing. The price exacted by this design is in introducing a proprietary internal memory bus to an otherwise standard system.

In addition to Compaq, which has written multiprocessor extensions to OS/2 LAN Manager, SCO and Corollary Incorporated are also championing the shared-memory design with a new version of SCO's Unix System V/386. SCO last month announced SCO MPX, an extension of Unix System V/386 codeveloped with Corollary. The first platform for which SCO MPX will be available is Compaq's SystemPro. The extension is Corollary's 386/smp and 486/smp symmetrical multiprocessing Unix kernel extensions ported to SCO System V/386. The two kernels— SCO's and Corollary's—are binary compatible, allowing applications portability across them.

Corollary's multiprocessor architecture maps nicely to the architecture of Compaq's new SystemPro server platform and to similar designs from other 486 vendors, among them AST. The architecture incorporates a processor/memory bus with slots for up to 10 processor boards and a Symmetrical

Multiprocessor Extended Kernel. The kernel extension is packaged as an add-on to make it easily portable to other Unix versions and other shared-memory hardware architectures.

Until Corollary began working with SCO, its claim to fame was as the operating system behind Zenith's Z-1000 multiprocessor box. Now, Corollary is in the forefront of multiprocessor Unix for Intel-based PC LAN servers. Along with the Compaq SystemPro and Zenith implementations, Corollary's architecture is also available on the new Series 500 from American Mitac Corporation. American Mitac is using both Corollary's extended Unix and its hardware implementations.

Acer and IBM are championing the other multiprocessing architecture: distributed memory processors (see illustration). At Comdex, Acer announced the Acer Application Processor (AAP), a 25 MHz 386 board with a multiprocessor Unix kernel written by Acer for MicroChannel machines. Up to two AAPs can be added to each system. Future releases will support SCO MPX and other Corollary-based software.

AAP is based on a "distributed dual-port architecture" that uses the system I/O bus to coordinate memory references between multiple processors. Each AAP has its own processor-memory complex supported by its own local memory bus. An AAP accesses the MicroChannel bus only when it needs to share memory references with another AAP. This characteristic makes an AAP a MicroChannel bus master card. It doesn't need the intervention of the main processor to get its work done.

The operating system does load-balancing for applications, and thus, existing applications won't have to be modified to take advantage of AAPs.

The mechanism to coordinate memory references between AAPs is a Cross-Processor Call. Whenever a new process is created, the operating system

assigns it to a processor and installs the process in that processor's memory. When an application calls for a process to be transferred from its home site to another CPU—typically, to perform a task that can't be performed at the home site—the system executes a cross-processor call. It works like this:

* The process is put on the run queue of the other processor.

* The system executes the specified process on the other CPU, using memory for that process's home site as resident memory. The system uses the MicroChannel bus to couple the other CPU to the home site memory, until a predefined set of tasks has been completed.

* The system then places the specified process back on the run queue of its home site, so that execution of the process will resume there.

Acer plans to move its AAP technology to EISA machines at some future date. It is currently seeking distributors of the technology among OEMs—Novell perhaps—and value-added resellers.
    A good candidate for deployment on an AAP is Intel's i860 RISC chip. IBM and Intel are promoting the i860 as a coprocessor for computational-intensive tasks, like graphics and design work. Intel has begun sampling a family of bus master and slave devices for MicroChannel adapter cards called the 82325 MC bus master chip set and 16 bit 82326 slave-interface device. The chip set provides interface functions for I/O, memory, and DMA (Direct Memory Access) transfers, and bus-control logic for 8-, 16-, and 32-bit MC adapter

Multiprocessing Approaches
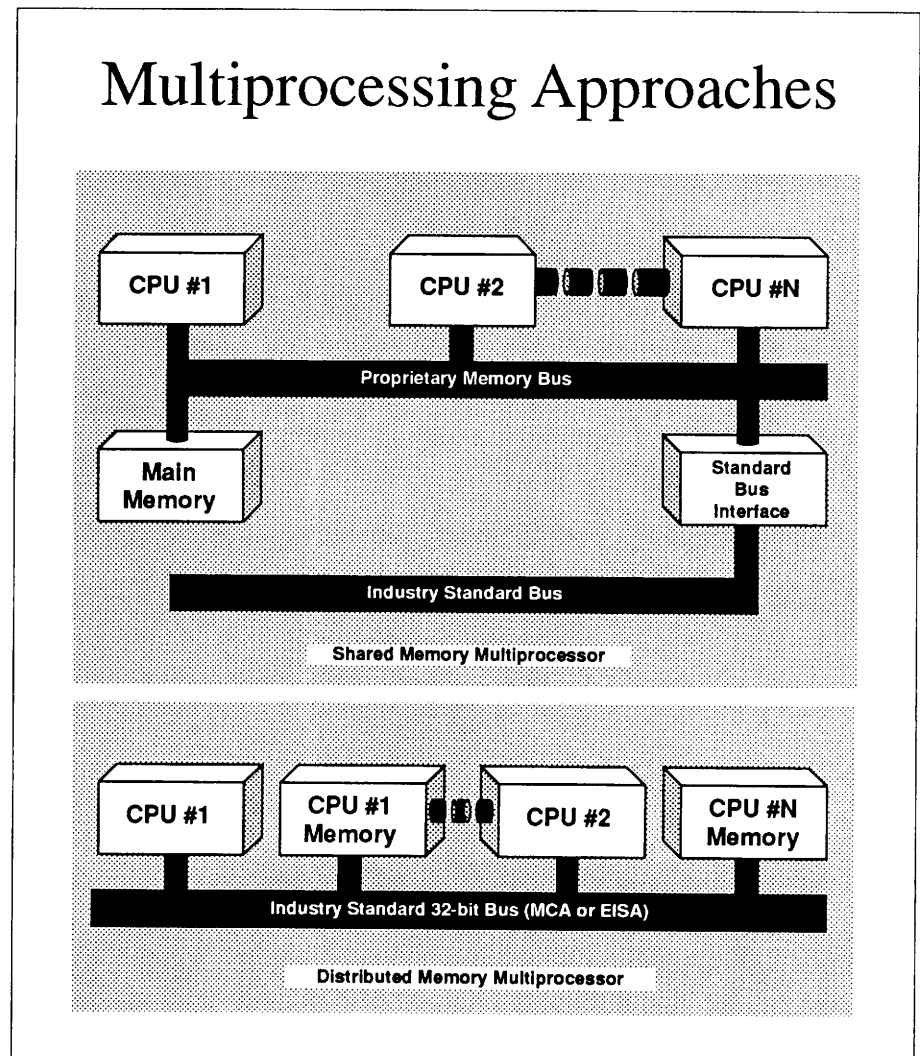
There are two major approaches to supporting multiprocessor hardware in PC servers. The top approach uses a shared memory and a proprietary memory bus. Compaq's SystemPro uses this design. The bottom design distributes memory across processors. It is being used by Acer.

cards. Full production is expected in the second quarter of next year.
    Intel is supporting utilization of the i860 in applications with a new C development and porting toolkit. The kit helps developers build applications us-

ing Intel's Application Processor Executive (APX), which supports the distribution of tasks in OS/2 applications between either a 386 or 486 main processor and an i860 coprocessor.

—J. Rymer

The Second Annual
Executive UniForum Symposium

The Applications Development Environment of the 1990s:
Can Unix Set the Innovation Agenda?

May 22, 23 & 24, 1990, Four Seasons Biltmore Resort Hotel, Santa Barbara, California

Sponsored by Patricia Seybold's Office Computing Group, UniForum, and X/Open

"It synthesized the relationships between all the major players in the Unix industry."

—1989 Executive UniForum Symposium Attendee

The theme of this year's Executive UniForum Symposium is the Unix software and applications development environment. If Unix is to become a commercially viable operating system, it must be able to support, attract, and nurture the next generation of applications and development tools. Is Unix up to the task?

This conference will present the views of industry leaders, including hardware, software, and networking vendors, as well as the views of commercial users. It will also provide a forum to spotlight the next generation of Unix applications.

Registration Fee:

- $895 for all registrations *paid by* February 12, 1990.
- $1095 for all registrations *paid after* February 12, 1990.

For more information about this conference, call Deborah Hay at 1-800-826-2424 (in Massachusetts, call 617-742-5200).

Patricia Seybold's Computer Industry Reports

ORDER FORM

Please start my subscription to:

		U.S.A.	Canada	Foreign
☐ *Patricia Seybold's Office Computing Report*	12 issues per year	$385	$397	$409
☐ *Patricia Seybold's UNIX in the Office*	12 issues per year	$495	$507	$519
☐ *Patricia Seybold's Network Monitor*	12 issues per year	$495	$507	$519
☐ *P.S. postscript on information technology*	12 issues & tapes per year	$295	$307	$319
☐ *P.S. postscript on information technology*	12 issues per year	$ 95	$107	$119

Please send me a sample of: ☐ *Office Computing Report*   ☐ *Network Monitor*
☐ *UNIX in the Office*   ☐ *P.S. postscript on information technology*

Please send me information on: ☐ Consulting   ☐ Special Reports   ☐ Conferences

☐ **My check for $_____ is enclosed.**   ☐ **Please bill me.**   ☐ **Please charge my subscription to: Mastercard/Visa/American Express (circle one)**

Name: _____ Title: _____

Company Name: _____ Dept.: _____

Card #: _____

Address: _____

Exp. Date: _____

City, State, Zip code: _____

Signature: _____

Country: _____ Bus. Tel. No.: _____

Checks from Canada and elsewhere outside the United States should be made payable in U.S. dollars. You may transfer funds directly to our bank: Shawmut Bank of Boston, State Street Branch, Boston, MA 02109, into the account of Patricia Seybold's Office Computing Group, account number 20-093-118-6. Please be sure to identify the name of the subscriber and nature of the order if funds are transferred bank-to-bank.

IU-1289

Send to: Patricia Seybold's Office Computing Group: 148 State Street, Boston MA 02109; FAX: 1-617-742-1028; MCI Mail: PSOCG
To order by phone: call (617) 742-5200