GO CORPORATION: OUR FRIEND THE PEN

Today GO Corporation is holding a developers' conference to introduce PenPoint, the new operating system for hardware platforms that will be manufactured by IBM, NCR, Grid Systems...and anyone else who cares to apply for a license. Next month, on the 21st, Microsoft will hold a similar conference to unveil Pen Windows, with two of the three hardware vendors (plus others) and a slightly more establishment cast of ISVs. The competition is fierce, but the actual arguments sail past each other: Just as Oracle was proud to be a marketing company and Ingres was proud not to be one, so is Microsoft proud to offer a sensible business strategy to users and developers, while GO is attempting to establish a new market that many people don't believe exists -- with coach Bill Campbell leading the way.

What's the big deal?

What is the meaning of these PenWares? To call them pen-based computing would be like calling the Macintosh mouse-based computing. It's broader than the pen, and broader than a single vendor (as Apple is belatedly discovering in another context vis a vis the Mac). Just as "Mac-like" was a word that assumed its meaning only as people used and explored the system and discovered a gestalt for it, so will "PenPoint-like" (or penware) find its meaning only over time. The word is here, but the meaning isn't ready: There is no widely shared understanding yet of what penware represents.

GO's challenge over the next few years is to get the world to understand that concept and to get vendors to sign up and support it before Microsoft can move the status quo forward incrementally. Microsoft offers a less disruptive alternative with Pen Windows -- much as it promised an alternative to the Mac (and VisiOn) seven years ago with Windows. In fairness, we believe Microsoft caught on to the promise of the Mac quickly; it doesn't seem to have done so here. (Of course, Microsoft's NIH syndrome works to GO's benefit, since once Microsoft does understand it will be an even more formidable competitor.) Overall, PenPoint will hit the market first, but Pen Windows will immediately support a broader base of applications because of its compatibility with Windows.

We've seen a wave of pretenders to next-wave status -- including NeXT itself; "open systems" (which concerns how computers relate to each other, not how they interact with humans), and of course each all-singing, all-dancing environment of the month (OfficeVision, HyperCard, NewWave, ToolBook and Rooms). Likewise, new platforms abound, ranging from superservers to the Poqet.

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pc. You can get voice input, pen input, color output, and so on. But none of these by itself will impress anyone outside a small circle of friends.

GO promises to broaden the market for personal computers at a time when desktop computers are increasingly just client-side displays or components of a "corporate computing infrastructure." Says industry veteran Vern Raburn, CEO of Slate, "It's a return to the one-to-one relationship between a person and his computer that we had in the old days." From its form factor -- small and unobtrusive enough to bring into a meeting or use during a conversation -- to its software, the PenPoint machine leaves the traditional model behind. It's an interface, but not just a visual interface. (For a full description of penware and GO and some other companies involved, see Release 1.0, 90-6.)

Computers should be used but not noticed

In this age of fascination with client-servers and GUIs, we have come to a misunderstanding of the user interface. It's not just the visual layer that the user sees; it's the whole application suite that he interacts with directly. At its best, the interface is an intelligent subsystem that interprets the user's commands for other applications, and interprets the applications' knowledge and capabilities for the user. PenPoint provides a way to implement such an interface, with connectivity to and enhancements of existing applications. The second thing PenPoint (and its applications) will allow is for the user to operate close to his work or other people and remote from other computers, both in time and space. When he reestablishes connections, it will provide intelligent updating and reconciliation of inconsistencies. At least at the start PenPoint will sit on a notepad machine, so it won't displace existing desktop systems and can complement them instead. But in the long run penware will surely show up on desktop machines.

Smartening up the interface

That is, the PenPoint machine is an interface between the user and a broader world of shared databases and corporate computers. Rather than being ideal for standalone, disconnected applications -- as Microsoft VP Jeff Raikes suggests in arguing for the compatibility of Pen Windows -- PenPoint is ideal for enhancing access to existing applications and data, not by replicating them on a notepad but by interpreting them intelligently.1

Of course, this requires thinking of the interface in a different way. It's not a semi-transparent layer that lets the application shine through; indeed, there are applications on the PenPoint system, not just interfaces to existing ones. (Perhaps it's more of a front-end than an interface.) But you have to think differently about how applications can cooperate. Any user task is generally executed through a combination of functions, some on the PenPoint machine, some remote, some immediate, some deferred.

1 In fact, we'd argue that there's no such thing as a "standalone" application. Where does the data for the application come from? (God forbid that one should have to write it all in.) Who needs the results? If the work you do with the application isn't worth saving, reusing or transferring to someone else, is it worth doing at all? Most "standalone" applications appear that way only because it's so difficult to link them to anything else, not because you wouldn't want to.
Cooperating applications, shared contexts

The system is designed to be smart so that the user needn't be. A single gesture of the pen means a lot, because the user and the system share a context -- an application, a set of data objects, an expectation of what should happen next within applications or between them: After you enter the order, you generally want to write a thank-you letter, call the next client, or whatever. All this places great demands on the operating system that underlies it. Its intelligence can't be abstract or general; it has to be specific and have specific understanding not just of the application but even of the user's specific data.

Yes, a lot of this is user-, application-, or company-policy-dependent, but that's the point: By its very newness, PenPoint will foster the development of a new style of applications that require and benefit from easy customization by developers and personalization by users. Easy-to-adopt systems that let you reuse Windows applications (for example) discourage the sort of innovations that PenPoint will encourage. Again, it's not a single feature such as pen input that constitutes penware; it's the whole mindset.

Compatibility

In short, you don't want your user interface to be compatible with your applications; you want it to mediate between you and them. Specifically, it should interactively take your input your way, at your convenience, and deliver it to a stationary system -- a network database, a public e-mail service, a desktop PC -- later on when a connection can be established. Certainly you want it to be able to understand desktop data formats, and command sequences shouldn't be confusingly different. But as Microsoft clearly understands with its new version of Excel (page 8), a "click-click" or pen gesture in the right place at the right time that produces the right result is generally superior to a sequence of keystrokes, however well-learned.

To the developer, of course, platform compatibility is a huge advantage -- in cost, time to market, and potential market size. Any Windows application can run under Pen Windows; the Pen Windows layer will translate pen events into the appropriate key strokes, commands or mouse events, and the application won't be any the wiser. (For example, the delete-word gesture would be translated into select-and-delete.) With a little more effort, a Windows application can become pen-aware, with the ability to support application-specific capabilities such as pen annotations.

Inside PenPoint

But compatible platforms means compatible applications; the new penware applications need an operating system that makes it easier to implement application-specific intelligence such as Slate's SmartFields and targeting techniques (page 11). PenPoint achieves this with capabilities such as blackboarding, a kind of AI multiple-hypothesis technique, to enhance not just character but word-, gesture- and object-recognition accuracy with dictionaries and contextual information supplied by the applications.

PenPoint's Embedded Document Architecture is a sensible, low-glitz implementation of hypertext which allows documents and other largish data objects of all kinds to be linked to or embedded within each other. You can find most
of them through the table of contents, or by navigating through buttons and other means from one to another. For example, an appointment could have an annotated map attached; a letter could include a spreadsheet or a form to fill out, itself linked to a remote database; entries in a table could link to explanatory notes or images of the original data. (PenSoft, page 12, uses the hyperlinks to let users build complex data structures.)

Since the PenPoint operating system is object-oriented, with functions organized hierarchically, it's easy to add new capabilities incrementally without losing existing functionality. For example, you can add a forms or communication capability using standard languages such as C or Pascal and still (let your users) work with PenPoint's or other ISVs' text-editing capabilities, communications systems or other functions. Your application can have classes that are specializations of the PenPoint classes, with PenPoint capabilities for text recognition, text-editing, object creation and drawing, gesture recognition and so forth, or you can add callable modules to a dynamic link library. This maximizes interoperability and consistency among applications.

This [penware market] is on a par with what's going on in the Persian Gulf -- although to be a little serious, we aren't losing any lives. If someone announced voice support or some kind of toe-based computing where you wiggle your toes, Microsoft would announce Voice Windows or Toe Windows the next day.

-- Pete Peterson, WordPerfect

These system capabilities are equivalent to modes, but they come with the application objects rather than being a state of the whole system; in other words, the mode you're in depends on where your pen happens to touch down -- or, in the long run, what your voice says. There is not cursor to constrain you. This is not no-modes, but invisible-modes; in the same way, automatic transmission doesn't mean you're not changing gears, but rather that the system does it for you unobtrusively at the right time.

The commercial PenPoint system will be 32-bit, based on a 386, although current pilot models are 286-based. You can do development on a pc and cross-compile to a PenPoint machine using the PenPoint SDK. But it's best to check out the visual aspects on an actual PenPoint machine at some point during development, even though PenPoint includes a constraint-based automatic layout system that generally makes things look right without much developer effort, handling different screen sizes, resolutions and aspects. Softview will offer further size/design-to-fit capabilities, operating across PenPoint and other non-pen platforms.

PenPoint also includes a variety of service managers (and virtual slots for more of them) to handle database access, file transfer and reformatting, remote communications via fax, voice, e-mail, or even pager via a variety of media potentially including local-area networks, modems or radio, depending on attachments. (The initial protocol stack for LANS is TOPS over AppleTalk from Sitka, which gives access to pcs, Suns and Macs. Communications can be immediate or deferred, with inboxes and outboxes.)
OUR FRIENDS THE OEMS

GO started life as a 286-based hardware company, but gradually, correctly changed its mind to be software-only and 386-based. If you're going to license your operating system, and you want to license it widely, why compete with your customers? It will only annoy them and divert your own attention. GO announced this decision last summer, in a somewhat awkward fashion: "We're no longer doing what we never announced we were doing." At that press conference it also announced support from IBM.

While IBM will probably offer Pen Windows (which requires much less of a commitment), or Microsoft will do it for them, we believe IBM's commitment to PenPoint is more sincere, and will be better fulfilled, than it was with the obvious parallel, NeXT. Why? Primarily because this is not a platform competing with IBM's own platforms, but a software system for which IBM can sell the hardware. It opens up a new market, rather than addressing an existing one of workstations (whatever NeXT thought about the fourth wave). GO addresses a rising wave of interest in pen-based notepads, as opposed to shrunken pcs. "NextStep was an alternative; this is incremental," says IBM's Kathy Vieth, newly elevated to vp of portable systems.

Moreover, the world has changed politically since the NeXT announcement: IBM is a little humbler, Microsoft is a little more dominant; maybe there's a way to redress the balance. Finally, we think IBM recognized good technology when it saw it (as indeed it did with NeXT and with whatever Dave Liddle is promising at Patriot Partners). The challenge is shifting the inertia of the IBM Corporation to momentum behind this new platform. So far, the signs are good. IBM has put a dedicated team in place under vp Kathy Vieth, with 50 people working in Boca Raton but also comprising technical, production and industry marketing facilities throughout the country. "We're trying to restore some of [Boca's] verve, flair and go-for-it attitude," says Paul Mugge, vp systems of IBM's Entry Systems Division.

Other hardware vendors include NCR and GRiD, both of which will support Pen Windows as well as PenPoint, and each with a single machine to support either penware. "We'll leave it up to the customers," says GRiD president Alan Lefkof, maintaining a careful neutrality. GRiD, which is already shipping its own pen-based GRiDPAD, is exploring how to link its own handwriting recognition algorithms and its GRiDPAD software development tools and GRiD-Pen user interface to both penwares. (Because of the common MS-DOS base, that task will be easier with Pen Windows.) The GRiD software is available on MS-DOS-based laptops costing under $2000 in volume, he notes, while GRiD's Pen Windows/PenPoint/386 machine will likely cost twice as much.

NCR promises to deliver a 386SX penware machine for $4995 by this summer. Right now the prototype is under four pounds; the company hopes to shrink it to under three before production. In line with its corporate policy of supporting standards, the machine will work with PenPoint, Pen Windows and even DOS, using direct pen-to-DOS keystroke and mouse emulation (based on some algorithms from Communication Intelligence and some work of its own).

Apple is also working on its own hardware-software penware, but word has it that such a system is far from ready. At this point, when Sculley has said he's ready to do anything, even license the Mac ROM to others, he may also be willing to bend the other way, and license technology from others, such...
as GO. The division of labor between General Magic’s personal communication tool and Apple’s internal penware project is unclear, and it’s also unclear how PenPoint technology would fit in. Meanwhile, Bill Campbell’s arrival at GO is likely to foster closer ties regardless of formal arrangements.

The specs

PenPoint can support a variety of hardware implementations, because it is divided into Generic PenPoint and the PenPoint Machine Interface Layer (just like most portable OSes). As long as you write for Generic PenPoint, your application can run on any PenPoint system. For example, Generic PenPoint handles pen events as delivered to it by a specific version of MIL for a specific kind of pen. Likewise, there are MIL modules for various kinds of physical communication devices, screen technologies -- and potentially for RISC chips as well as Intel x86es (which would require recompilation of applications). To be sure, there will likely be hardware-specific PenPoint applications optimized to run on only one system; correspondingly, systems designed to run both PenPoint and Pen Windows may suffer from some compromises, such as Pen Windows’ "preference" for a hard disk.)

### ROUNding up support: PenPoint ISVs and OEMs

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<td>Claris</td>
<td>??</td>
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<tr>
<td>GRiD</td>
<td>hardware, GRiDPAD development tool (also for Pen Windows)</td>
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<td>IBM</td>
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<tr>
<td>Lotus</td>
<td>spreadsheet?? connectivity to Notes/Agenda??</td>
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<td>Marathon</td>
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<td>Nantucket</td>
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<td>PenSoft</td>
<td>tool for PIMS, rich data, scheduling, etc.</td>
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<td>??? from Symmetry Software, Scottsdale, AZ</td>
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<tr>
<td>Softview</td>
<td>intelligent form tool (if:x)</td>
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<tr>
<td>WordPerfect</td>
<td>PenPerfect (WordPerfect code with PenPoint interface)</td>
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**missing OEMs:** Japanese or European hardware vendors, Apple, Microsoft

**missing apps:**
(Mix & match: Some of these are promised by GO but vendors are not specified.)

- spreadsheet
- utilities
- drawing/presentation tool
- inbox management (mail filtering, auto-response, fax & e-mail, etc.; see Release 1.0, 90-6)

(7 means it's our guess; other data comes from the firms themselves.)
OUR FRIENDS THE ISVS

GO's list of ISVs isn't very impressive at first glance, especially with all the question marks. But don't be misled. When Apple announced the Mac, it featured three powerhouses that would supposedly push the machine to stardom (remember the Hawaii tapes?): Microsoft, Lotus and Software Publishing. One out of three isn't a great call, especially when you consider that line-up totally missed the real killer app -- PageMaker from Aldus Corporation.

With the hindsight of history, GO is more cleverly featuring a couple of start-ups: Slate Corporation and PenSoft, along with several dozen more. But people will no doubt waste more time speculating about the precise plans of Lotus, WordPerfect, Claris and Borland than they will in exploring the potential of the newcomers.

Not all of these people are fully enthusiastic. WordPerfect's Pete Peterson, for example, likes the machine, and is willing to support "anybody who will give Microsoft a bit of trouble." However, he's not going to finish development (which started some time ago but stopped when GO deferred delivery of the machine in conjunction with a switch to software-only policy) until the platform shows signs of hitting the market. When that happens, WordPerfect will be there with an elegant port, using its current fairly portable Release 5.0 built with Objective C and Display PostScript.

So yes, there will be versions or close analogues of WordPerfect, 1-2-3 and numerous presentation programs for PenPoint -- but the issue is applications that shouldn't or just wouldn't be built for traditional platforms. The most interesting established-vendor product is likely to be a version of Borland's Sidekick 2.0, which was developed especially for mobile asynchronously, intermittently attached pcs (see Release 1.0, 90-11). With Sidekick 2.0, Borland illustrated a key underpinning of penware cosmology: Data integrity may not be perfect if you are disconnected from your data; the trick then is to figure out an easy way to reconcile conflicts, rather than vainly try to avoid them in the first place.

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We gotta go somewhere, and the GO platform seemed like the one. We saw it; we liked it. We've been working with the GO people since before they were a company, and obviously we have a lot of common interests in object-oriented thinking.

-- Spencer Leyton, Borland

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Sitka on-site

There's a broad range of connectivity options, but one of the more important -- straightforward, general access to a variety of desktop machines and networks -- will be implemented through TOPS from Sitka Corp. (The Sun subsidiary, formerly called TOPS and formerly formerly Centram Research). GO will offer AppleTalk and TOPS support as an option to OEMs. (A company such as NCR, for example, may prefer to support only its own range of networks.) This allows the GO machine to be a peer on any TOPS network, publishing data volumes of files or reading volumes published by other network clients. To connect to a non-TOPS network, the user can turn a single pc or Sun or Mac into a TOPS server, which has access to any files that machine can read as a
A SEEMING DIGRESSION: EXCEL 3.0

Remember "softer software"? It was about two paradigms before "information at your fingertips" in the Microsoft litany. Well, Microsoft has now delivered a sterling example. (It forces us to recant on our premise that "spreadsheets are boring, subsequent releases of anything are boring, and a combination thereof is deadly.") Excel 3.0 is what softer software is all about: It understands the user, and does as much of the work as possible. This isn’t magic; you can find out what to do by watching real users -- for example, a Rice University study showing that 5 percent of commands get 85 percent of the use. Microsoft made those functions extra-accessible through the Toolbar feature of Excel.

Click-click: Do the right thing

Such close understanding of the user must be application-specific: You can’t guess what a person is going to do if you have no idea even of what he’s trying to do -- write a letter, calculate on a spreadsheet, manage a calculator, balance the books. And so Microsoft has done a stunning job of creating a context-sensitive application reminiscent in its approach of Ashlar's Vellum (see Release 1.0, 89-12). The system knows the underlying grammar -- what the user could possibly do at each point -- and presents him with defaults. If he double-clicks on the right edge of a column that’s too thin to fit all the data, the column resizes itself appropriately. Elsewhere, a double-click summons the appropriate dialogue box for the context. Or he can highlight a single cell and click the Autosum button on the Toolbar; the system makes a guess as to the range to sum (avoiding double-counting of subtotals, of course) and does so when the user confirms (or after he modifies the range). If he trusts the system and double-clicks, the system goes ahead without confirmation.

Similarly, outlining uses knowledge about the application and data to perform routine tasks automatically. It’s pretty easy to figure out different levels of detail in a spreadsheet, from details to subtotals to totals, from months to quarters to years, and "outline" a spreadsheet. (Of course there are cases where this doesn’t work, but that just means the user is no worse off than without outlining.) Outlining works together with the styles capability, so the fonts and other text attributes match at each level of the hierarchy. The same sort of intelligence is applied to consolidations; data from matching columns and rows is merged, and unmatched ones retained as distinct items in the consolidation. Finally, in one more use of application-specific knowledge, the system offers help for common 1-2-3 commands (in a way approved by Microsoft's lawyers), either showing how Excel would do it or showing the user how to state the commands for Excel.

With Excel, Microsoft proves there's more to an interface than just visual display; it also includes the intelligence to understand and anticipate the user's actions. The user interface is not a separate layer located on the screen; it's the expression of the underlying intelligence to the user through the behavior on the screen. You have to have more smarts at the user end. You can't be smart in principle; you have to be smart in context...
client of its own network. Then the PenPoint machine, as a peer of the TOPS network server/client machine, can share files with that machine -- and through it with the entire network. This arrangement may be a little cumbersome if a particular GO machine user wants to connect to, say, a NetWare network and nothing else -- but it allows for general connectivity and also solves GO's need to support a variety of networks until individual network vendors or other third parties provide specific solutions.

The point, says Sitka's Rich Shapero, is that "the GO machine is a full peer. It can share files like any other network client." File conversion, of course, is the responsibility of individual applications -- most of which can read the appropriate formats such as 1-2-3's wks or dbf or various text formats. Some such conversion routines are also available as managed services, independent of a particular application and available through the PenPoint operating system.

FEATURED PLAYERS

GO is highlighting two ISVs who are pledging fealty and announcing products or strategies at the developers' conference. They are Slate Corporation, a brand-name start-up, and PenSoft, the archetypal out-of-nowhere start-up.

Slate's mission is to be the "leading supplier of pen-based applications." Although its first suite of tools and applications is for PenPoint and the company has an office a floor below GO's in a Foster City office building, the company is religious about the pen, not about a particular pen-based church. Ceo and founder Vern Raburn also happens to be a close friend of both Bill Gates and Jeff Raikes, the vp in charge of Pen Windows. Slate's first products will work on PenPoint.

Aside from Raburn, who has worked at Byte Shops, Microsoft, Lotus and Symantec (where he was chairman), Slate comprises a stellar collection of old industry hands. They include president Tom Byers (Digital Research, Symantec), vp Boston development Dan Bricklin (Software Arts/VisiCalc, Software Garden), vp marketing Dottie Hall (Microsoft, Symantec), vp Bay Area development Debby Meredith (Metaphor), and developers Bob Frankston (Software Arts/VisiCalc, Lotus), John Friend (GrandView), Matt Kursh and Matt Brown (both Clearview/SmartForm), Bill Lynch (Funk Software), Tony Robinson (Deneba/Canvas), Mike Freedman (Sun and GO). The big challenge will be keeping these people marching in the same direction, let alone in step. (The company also plans to publish products from Simple and Symmetry.)
Slate's funding sources are equally illustrious: It has $6 million from Kleiner Perkins, Hummer Winblad and others, as well as smaller amounts from Charlie Jackson (Silicon Beach Software), Bill Joy and Mitch Kapor (who worked with GO chairman Jerry Kaplan on what became Lotus Agenda). Its tony California office costs more per month than its Phoenix headquarters.

Slate isn't saying much about the full range of products it expects to offer, but it's hard not to expect a spreadsheet given the presence of Dan Bricklin and Bob Frankston -- to say nothing of Vern Raburn, who has always considered spreadsheets both the measure and the finest fulfillment of a pc platform (like a restaurant critic who orders veal marsala wherever he goes to compare restaurants on a standard dish). Other likely products would be a form tool and presumably some kind of PenWrite (a la MacWrite).

Juan & Alice on ISVs and IVs

Juan: What happens to companies like GO or NeXT if they don't attract enough ISVs?

Alice: Then they have to start looking for IVs from big companies who want to invest in innovation.

The product the company is announcing is PenApps, a powerful tool for building data-intensive applications that should help GO/PenPoint address the vertical/functional application market first staked out by GRID Systems. PenApps is not just a forms tool, but more a data-entry/data-access/data-manipulation tool. The issue isn't data storage, which we assume happens on the home base, but access to the data and the ability to manipulate it enough to appear smart. PenApps enables corporate developers or VARs to build data-intensive applications and provides for interaction with remote data sources -- such as dBASE, any SQL database and other standard formats -- through Slate's Data Access Architecture. (Note here the focus on connectivity, not compatibility.) The assumption is that many users (a "fleet") need to do roughly the same tasks, each with his own subset of the data.

PenApps offers instant prototyping, with WYSIWYBSF, or what you see is what you've built so far; it also provides easy modification. While software vendors offer new releases from time to time, corporate developers keep changing their systems constantly -- or would if they could; PenApps should make it easier. Thus when the company adds a new product line, or a new step in some procedure or a new required data item, it's easy to add with PenApps -- and to download the next time each user logs into the central system with which he shares his data.

Slate is currently offering a pilot release of PenApps that works with the pilot release of PenPoint and 286 hardware. The company promises a migration path without any spurious claims about the precise work involved in converting. Since most of the tool-user's work concerns the content of the application and the user interface, we suspect PenApps users shouldn't have too much trouble. Slate, however, faces a somewhat tougher job, dependent on what further improvements GO makes in PenPoint beyond simple changes due to a simpler, larger memory structure and the 32-bit instruction set.

Release 1.0 22 January 1991
PenApps offers a substantial development time reduction over direct use of PenPoint. In addition to simple forms-painting (no code) and data access, it makes the developer's task easier by the same sort of guess-ahead approach PenPoint takes -- and also makes it easier to build application-specific intuition into the application being developed. For example, you might want to make the entry in the "ship-to" fields default to those in the "bill-to" fields.

Do you rent or own?

With branching and skipping, individual selections on a form can be linked to other forms: A yes answer to a question may lead to further questions; particular answers lead to different lines of questioning.

With "SmartFields," PenApps can build look-up tables automatically based on a user's entries (so that each individual's PenApps application is customized). Juan, a Silicon Valley sales rep, for example, needs to write in Sausalito or Portola Valley recognizably only once, and will then be able to find it in a pop-up list of cities thereafter; in Hungary, Alice will find Esztergom, Szekesfehervar and even Kiskunfelegyhaza waiting for her the sec-

At left, you can see branching, "targeting." At right is the full form, partially completed, with the ship-to entry defaulting to the sold-to entry. With a gesture, you can fill in the second address as well.

Release 1.0

22 January 1991
ond time she encounters a prospect in any of those cities. Written text can be translated when it is entered or later. (If the user is likely to be filling in a form in conversation with a customer, he probably wants to defer translation, which is still a little slow, especially if he writes sloppily. Later on he can go through the translation process at leisure and compare his original written entries with the system's guesses.)

With "targeting," another PenApps trick, PenApps applications will automatically be able to interpret entries even if they don't quite fit in the box allocated, and will use the look-up lists to improve word recognition. (Ultimately, PenPoint should be able to look at the content of an entry to figure out where an entry should go: numbers into the Zip code field and two-letter combinations into the state field. Obviously, recognition and placement of entries are interdependent. That's where techniques like blackboarding come into play.) Text and graphical objects and images can be intermingled; users can fill in a form and then scrawl a comment across an order that might be increased if a different color were available.

PenApps comprises four modules: Designer, a form generator; DAA, for data access, using canned routines for standard data formats and allowing the developer to create new ones for proprietary databases or nonstandard formats; Filler, basically the runtime system that allows end-users to create and fill in empty forms and handle their disposition (send, store, export and so on); and the Engine, a dynamic link library of functions and objects which manages the data while the application is running. The last two combined are basically a runtime system.

PenApps costs $2500 for a single copy, with a free upgrade to the Commercial Release from the Pilot Release. The PenApps "engine" (runtime) fee of $200 is waived for use on pilot machines. Finally, GO will include PenApps in its $7000 corporate developer's package, which also includes pilot hardware (and a free upgrade from Slate, which obviously wants to keep in touch with potential customers).

PenSoft -- Making the possible natural

While PenApps provides for connectivity to remote databases through DAA, PenSoft's focus is more on local data, the kind a user keeps for himself.

PenSoft is announcing that it has a tool/application for such local-data-intensive applications, but it has no formal name as yet. Like, say dBASE, you can simply use the tool as is, or you can use the builder's facilities to customize the interface, create new data structures and automated routines such as calling up a form letter when a certain type of appointment is checked off as completed. The company is showing a prototype of its technology in the form of a schedule manager and an organizer, which allow you to create tables and forms for your data and to build schedules in a variety of formats.

PenSoft's tool strikes us as an object-oriented information manager in the spirit of Lotus Agenda, with some data types (classes) already implemented, such as time and date, contact (with data fields for name, address, phone, follow-up date, etc.). However, PenSoft's tool has a number of significant advantages. The first is that it's part of a broader PenPoint environment that thinks more or less the way it does (with PenPoint objects), whereas
Agenda was sealed off from the rest of the world (of 1-2-3, DOS files, and so forth). PenPoint provides a nice medium for its applications to share data and interact, and PenSoft's tool in particular can operate as a sort of coordination and control center. You can not only communicate with other applications; you can also use them at the same time and link to and from their data using PenPoint's hyperlink buttons (which PenSoft lets you query and manipulate by name).

Links are data too

Moreover, PenSoft offers the ability to build real class and component hierarchies, whereas Agenda's categories and views are somewhat more awkward database entities. PenSoft groups individual data elements into "items" such as contacts or appointments (an initial level of association) and can also create links between items (a second level). Agenda does only the first level, assigning items to categories (potentially to several categories), but items or groups of items in Agenda cannot be assigned to each other without going through some extra steps such as creating "virtual" categories to force such links. "The point," says PenSoft founder Michael Baum, "is that links must be made at the right level. Otherwise there are too many and they become unmanageable and undistinguishable. You can't remember why you did things." In other words, PenSoft helps you make explicit the sorts of understanding that are still only implicit in most PIMs.

The builder-user can take PenSoft's classes and specialize them or add his own. He can also combine individual data elements to create items -- sort of an is-a-part-of object network. The contact is one example of an item, which PenSoft has built already; another example might be a set of contacts for a particular article a reporter is writing, linked to related documents, memos and appointments, and of course the article itself. These items can be created generically, but an end-user can also add elements on the fly (on the go?) as he uses the system.

The builder-user can perform tasks such as "Find all the contacts in Aspen linked to the to-do list," or "Print out all the map links in the schedule for today and tomorrow" so you can give them to the driver. (Even a PenPoint machine may not be the ideal thing to look at while you're driving.) Or you might want all the letters you had written to a certain person.

Automate the routine

Certainly you could accomplish all this in more traditional ways -- each letter could be stored by the addressee -- but maybe you're in Alice's file and looking for the letter about her that you wrote to Juan. Of course, you did have to create the link from Alice to the letter at some point; in this case, you were probably looking at her entry in the contact file at the time you were writing the letter to Juan. Also, with named links, you could designate which sets of annotations should be sent to each of several recipients of the same document. (But be careful you don't inadvertently annoy the boss or break an NDA this way!)

The point is that the PenSoft tools will make it easy to associate data in such ways. How many times have you ever paused to create or modify a database record while you were writing a letter? With PenSoft, you just make a little link.

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PenSoft's funding comes from Mohr Davidow Ventures; the amount is undisclosed. President and ceo is Michael Baum, who spent a year at H&Q Technology Partners after leaving Reality Technologies, the business-simulation company he co-founded in 1984. For much of his time at H&Q he was studying the market and potential applications for pen-based computers until he could resist the lure no longer and founded PenSoft with his brother David, a software engineer at PenSoft. Other members of the team include evangelist Tom Buttermore, responsible for PenSoft's semistructured information model; software architect Michael Schaffer, with whom Michael Baum co-founded Reality Technologies; user interface architect Robert Ulrich, who worked on MORE at Symantec; manager of engineering Jim Allison, formerly with Odesta and a consultant on object-oriented projects to American Airlines and Teradata, among others; software engineer Andrew Levin, co-designer of Time-Slips; and product manager Diana Bury, formerly with Symantec and GO (people move fast in this business; ask Bill Campbell!)

New kids, new block

Mitch Forcier of Walnut Creek, a well-rounded independent developer of software, printer and other products, is developing a new PenPoint product through his company Marathon Development. He's close-mouthed about what it will be, but he believes GO is the computer for the common person, not just the mobile executive, and his product will be some kind of note-taker/outliner for that marketplace. If we were building such a product, we'd make sure that it had glossaries and some enhanced word-recognition features like the automatic look-up lists in PenApps. As for the actual product, it may have that, and it will surely have other features we can't imagine that will help to differentiate it from the product promised by WordPerfect, the big kid on the old block.

Meanwhile, Pixus, a start-up formed by former Mac system developers Joe Buczek and Neil Cormia (who also wrote Studio Session and Jam Session), is working on some kind of connectivity tool to link Macs and PenPoint systems tightly. "It makes sense to do a product in a marketplace that isn't flooded yet," says Buczek. "We have to find people willing to speculate."

Finally, there's Scott Warren of Rosetta in Houston. He has lived through enough fast-out- and fast-down-the-chute introductions that he resolutely refuses to say what he's working on, but he's enthusiastic about PenPoint, and likes PenPoint's "object-oriented from the ground up approach." His previous work includes VisiOn (which played the PenPoint role opposite Microsoft's first release of Windows), and a variety of other products for other companies he doesn't even want to name.

Even if [Microsoft] is only blowing smoke which some people take as fire, it adds credibility to the whole area.

-- Joe Buczek, Pixus

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Microsoft: The Comfort of Compatibility

Microsoft will have an equally impressive line-up at its developers' conference on February 21. In fact, we expect it will have more of the big industry players, but fewer of the small start-ups. Its OEMs include NCR, GRiD, Kyocera and Wang. Most of Microsoft's roster of ISVs -- except for Slate, which plans to do ports from PenPoint -- are basically doing ports of existing (or soon-to-exist) Windows products. Besides Slate, they include Delrina (forms); DaVinci (e-mail); Polaris (a Pen Windows version of its PIM PackRat); LeTECH, affiliated with Franklin International Institute, a well-known time-management consulting firm (a Pen Windows version of Ascend, a Windows-based PIM introduced last October that incorporates Franklin techniques and concepts); Future Soft (terminal emulation with gestures instead of function keys, including modules for CompuServe and MCI Mail, and also Dynacomm, a remote communications front-end with scripting capabilities); and Contact Software (a Pen Windows version of the forthcoming Windows version of ACT!, "which itself was designed with the nontypist in mind," says ceo Pat Sullivan).

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I think PenPoint is really sexy, but we could only do one. I could fund a Windows project and end up with basically two products -- one for Windows and one for Pen Windows. It was easier to go from where I'm at and place a bet on the pen without a placing a bet on GO.

-- Pat Sullivan, Contact Software

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The final line-up will include virtually every Windows developer, since, as Delrina's Mark Skapinker says, "we can purely worry about the pen issues, not the overall development." His company will port PerFORM, a form-building tool that will allow users to build forms and move them across platforms easily.

Pen Windows' biggest appeal, compatibility, is a real one. It means quicker development times, the ability to spread development costs over a broader and larger installed base, and the benefit of hundreds of existing applications and tools. There's more existing infrastructure. Says Pradeep Singh, group product manager for Pen Windows, who is well aware of the appeal of PenPoint's objects-all-the-way environment: "The pen/gesture layer is distinct from the rest of the OS. Our job is to take advantage of the pen interface, and I'm convinced that we can do that as well as anyone; we're all starting fresh. [As for an object-oriented operating system,] Microsoft as a whole will take care of that over time, with a product that's in the mainstream. By the time there's a critical mass of applications for PenPoint, the same capabilities will be available on our platform [through a DOS successor] as well."

That's true, but it strikes us as still missing the point. It's precisely the disruption and rethinking caused by a totally new operating system that will foster the creation of the next generation of killer libraries. (As we explored in Release 1.0, 90-9, the killer app is dead; long live the killer lib! As exemplified by the modular structure of PenPoint, applications of the future will consist of interoperable modules and tools -- class libraries under the covers.) Applications aren't just based on technology; they

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reflect a mindset (a mindset visible, incidentally, in the newest release of Excel; see page 8). As we talked to prospective ISVs for both companies, we got the feeling that the starry-eyed people were heading for PenPoint, while the sober-sided business types will use Pen Windows.

That makes sense, of course. Probably only a few of the PenPoint ISVs will even survive two years, much less achieve greatness, while the Pen Windows people, many of them already in business, will still be around. But the new applications, or re-creations of old genres, will be on PenPoint. By analogy, the Pen Windows people are doing the equivalent of word-processors, while the PenPoint folks are dreaming of desktop publishing.

DYNAMICS OF SUPPORT

For all GO’s impressive round-up of support, its success is hardly guaranteed. Certainly it has helped enormously that GO made the right decision to forgo manufacturing itself: it was able to round up far more enthusiastic support from a number of key players (notably IBM), and avoids what will ultimately be a commodity business while manufacturers vie to make the whole value-added package cheaper. Unlike Apple with the Mac, it lacks the cash flow from an existing product to fund the establishment of a proprietary standard. Unlike NeXT, it is freely licensing its operating system, counting on a large market and knowledge that its own contribution is key.

But GO is an upstart in a world controlled by Microsoft. If Microsoft achieves its sensible goal of providing a smooth transition to an object-oriented operating system (with or without a pen interface), Pen Windows developers will be able to avoid the chasm of from-scratch development that forces a new way of thinking. By contrast, the PenPoint developers have embraced a new way of thinking, and they are willing to leap over that chasm...or into it.
RESOURCES & PHONE NUMBERS

Spencer Leyton, Borland, (408) 439-1869
Jim Dao, Communication Intelligence Corp., (415) 328-1311
Pat Sullivan, Contact Software, (713) 496-9400
Chris Evans, Da Vinci, (919) 881-4320
Mark Skapinker, Delrina, (416) 441-3676
Tim Farrell, Future Soft, (713) 496-9400
Jim Cannavino, Kathy Vieth, IBM, (914) 766-3220
Kevin Carmony, LeTECH, (801) 975-1776
Tom Mays, Alok Mohan, Bruce Langos, Kim Warnock, NCR, (513) 445-2357
Alan Lefkof, GRID Systems, (415) 656-4700
Jerry Kaplan, Robert Carr, Dan'l Lewin, GO Corporation, (415) 345-7400
David Reed, Lotus Development, (617) 693-5001
Mitch Forcier, Marathon, (415) 943-1232
Chris Graham, Microsoft (Excel), (206) 882-8080
Jeef Raikes, Pradeep Singh, Microsoft (Pen Windows), (206) 936-8069
John Rizzo, Momenta, (415) 969-3876
Larry Heimendinger, Nantucket, (213) 390-7923
Jack Leach, Polaria, (619) 743-7800
Scott Warren, Rosetta, (713) 528-8350
Michael Baum, PenSoft, (415) 358-1575
Joe Buczak, Pixus, (408) 267-6627
John Page, Quill Software, (408) 741-3480
Rich Shapero, Sitka, (415) 769-2614
Vern Raburn, Dan Bricklin, Dottie Hall, Slate Corporation, (602) 443-7322
Ron Frankel, Softview, (805) 385-4920

COMING SOON

Forum documentation: Now you know about GO, Slate and PenSoft, but who are all those other companies listed in the Forum agenda, and what do they do?

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Release 1.0 is published 12 times a year by EDventure Holdings, 375 Park Ave., New York, NY 10152; (212) 758-3434. It covers pcs, software, CASE, groupware, text management, connectivity, artificial intelligence, intellectual property law. A companion publication, Rel-EAST, covers emerging technology markets in Central Europe and the USSR. Editor & publisher: Esther Dyson; associate publisher: Daphne Kis; circulation & fulfillment manager: Lori Mariani; executive secretary: Denise DuBois; editorial consultant and copy chief: William M. Kutik. Copyright 1991, EDventure Holdings Inc. All rights reserved. No material in this publication may be reproduced without written permission; however, we gladly arrange for reprints or bulk purchases. Subscriptions cost $495 per year, $575 overseas.
Release 1.0 Calendar

January 23  GO and friends at the Boston Computer Society - Boston. A second chance to see the GO announcement, with a little more levity than at the first, formal event in San Francisco. Call Carol Broadbent, (415) 345-7400 or Alisha Farris, (415) 592-7600.


February 5-7  The fifth annual technology investment symposium - New York City. For investors (if there are any left). Sponsored by Goldman, Sachs & Co. Call Joan Pereira, (212) 902-6829.

February 12-14  NetWorld '91 - Boston. Sponsored by Bruno Blenheim. Call Annie Scully, (201) 569-8542 or (800) 444-3976.


February 21-22  Industry symposium on virtual worlds technology - Seattle. Sponsored by Human Interface Technology Laboratory. With HITL sponsors such as DEC, Sun, US West, VPL Research. Call Bob Jacobson, (206) 543-5075.

February 24-26  Second conference on organizational computing, coordination and collaboration - Austin, TX. Theories and technologies for computer-supported work. Sponsored by EDS, MCC, RGK Foundation, University of Texas at Austin's IC2 Institute. Call Andrew Whinston, (512) 478-4081.

February 24-27  Communication Connections 91 - San Diego. Public-access telecommunications: BBSes, e-mail, groupware, etc. Sponsored by Dimensions. Call Laura Fletcher, (415) 637-2300.


February 25-27  Sun Open Systems Expo - Boston. Sponsored by PCI. Call Brona Stockton, (512) 331-7761 or (800) 727-EXPO.

February 26-28  *Graphicon '91 - Moscow, USSR. Sponsor: USSR Academy of Sciences, with SIGGRAPH. Call Cindy Stark, (312) 644-6610.


March 5-7  Windows & OS/2 conference - San Jose. Sponsored by CM Ventures and PC Week. Call John Bourgein, (415) 601-5000.

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<tr>
<th>Date</th>
<th>Event</th>
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<tr>
<td>March 10-12</td>
<td>European cyberspace congress - Amsterdam, Netherlands. &quot;Art and cyberspace; terrestrial cyberspace applications; fantasy cyberspace; technology forum.&quot; Sponsored by Sala Communications. Call 31 (20) 273198, or fax, 31 (20) 253280.</td>
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<tr>
<td>March 10-12</td>
<td>The fifth computer game developers' conference - San Jose. Sponsored by CGDC. For gamesters who take games -- but not themselves -- seriously. Wish we could go... Call Brenda Laurel, (408) 741-5865.</td>
</tr>
<tr>
<td>March 10-13</td>
<td>**EDventure Holdings PC (Platforms for Computing) Forum - Tucson, AZ. &quot;Beyond the desktop: Networks, notepads and legacies&quot;...and the people who will make them happen. Featuring Bill Gates, Jerry Kaplan and Vern Raburn (see this issue). Also Jim Manzi of Lotus, Bob Epstein of Sybase, Philippe Kahn of Borland, Jeff Raikes of Microsoft, John Landry of wherever, IBM, PenSoft, Apple and many others. Call Daphne Kis, (212) 758-3434.</td>
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<tr>
<td>March 15-17</td>
<td>Networks for the 90's - Tyngsboro, MA. Sponsored by Wang Institute, Boston U. Call Andree Fontaine, (508) 649-9731.</td>
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<tr>
<td>March 17-20</td>
<td>*Software Publishers Association spring symposium - San Francisco. With John Sculley and Andy Grove, and much of the pc software industry. Call Ken Wasch, SPA, (202) 452-1600.</td>
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<tr>
<td>March 19-21</td>
<td>AIS 91 - London. &quot;New technologies in today's business environment,&quot; including hypertext, object-oriented programming, expert systems, etc. Sponsored by Learned Information. Call Jean Mulligan, 44 (865) 730275, or fax, 44 (865) 736354.</td>
</tr>
<tr>
<td>March 25-28</td>
<td>*First conference on computers, freedom and privacy - San Francisco Peninsula. Sponsored by Computer Professionals for Social Responsibility, organized by Jim Warren. Intended &quot;to build bridges between the villages on the electronic frontier,&quot; this is a multi-ethnic event, with people from the FBI and government agencies as well as public and private lawyers, hackers, free spirits, and intellectual property rightists and leftists (whichever is which). Keynote address by Professor Laurence Tribe of Harvard Law School. Call Jim Warren, (415) 851-7075, or fax (415) 851-2814.</td>
</tr>
<tr>
<td>March 25-28</td>
<td>DB/EXPO 91: The national database exposition and conference - San Francisco. &quot;Emerging technologies for the '90's,&quot; with</td>
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Adam Green, E.F. Codd, Chris Date, Vaughan Merlyn, others. 
Sponsored by Norm De Nardi Enterprises. Call Dana De Nardi, 
(415) 941-8440 or (800) 2DB-EXPO.

**March 26-28**

**Spring symposium series - Stanford University.** Sponsored by 
The American Association for Artificial Intelligence. Ad- 
dressing such topics as argumentation and belief, constraint- 
based reasoning, machine learning of natural language and 
ontology, logical formalizations of commonsense reasoning. 
Call Carol Hamilton, (415) 328-3123.

**April 8-12**

**COMTEK '91 - Moscow.** Sponsored by ComputerLand/Moscow. 
With speeches by Peter Norton and Esther Dyson. Call Steve 
Woods, (203) 834-1122.

**April 9-11**

**1991 Technology Forum - Cambridge, MA.** "Objects and net- 
works: Creating object-oriented applications in the distrib- 
uted environment." Sponsor: Patty Seybold’s Office Computing 
Group. Call Deborah Hay, (800) 826-2424 or (617) 742-5200.

**April 9-12**

**People & systems: The software development management con- 
fERENCE - San Francisco.** Chaired by Larry Constantine; 
sponsored by Miller Freeman. Call KoAnn Tingley, (415) 995- 
2472.

**April 9-12**

**UNIX Challenge - Boston.** Sponsored by The Wang Institute of 
Boston University. Call Andree Fontaine, (508) 649-9731.

**April 10-12**

**Summit '91 - Newport Beach, CA.** "Where distribution leaders 
get results." Participants include Ed Anderson, Computer-
Land; Alain Schwartzmann, Metrologie International; Luther 
Nussbaum, Ethernet Systems; Rick Inatome, Inacomp. Sponsored 
by MicroVision. Call Mickey Dude, (603) 888-5626.

**April 10-12**

**UNIX Challenge 1991 - Tyngsboro, MA.** Sponsored by Wang In-
stitute, BU. With rms of the Free Software Foundation, Rob 
Pike of AT&T, David Korn of the Shell and Andy van Dam of 

**April 10-12**

**Million-Dollar Awards Classic - Tarpon Springs, FL.** Spon-
sored by International Computer Programs. Call Angela Win-
ship, (800) 428-6179 or (317) 844-7461.

**April 14-17**

**International technical communication conference - New York 
City.** Sponsored by the Society for Technical Communication. 
Opening speaker will be author Douglas Adams. Call Jeffrey 
Hibbard, (914) 742-5923.

**April 16-17**

**LAP & PALMTOP '91 - New York City.** Sponsored by Laptop Ex-
positions. Call Peter O'Connor, (212) 682-7968.

**April 18-21**

**World computer law conference - Los Angeles.** Co-sponsored 
by Center for Computer Law and Center for Informatics Law. 
Call Michael Scott, (213) 689-5186.

**April 21-24**

**ADAPSO spring management conference - Miami.** Sponsored by 
ADAPSO. Call Ellen Kokolakis, (703) 522-5055.

**April 21-24**

**Software Maintenance Association meeting - Philadelphia. 
"Aware of today -- ready for tomorrow."** Sponsored by Soft-
ware Maintenance Ass’n. Call Robin Gross, (707) 643-4423.

**April 22-25**

**NGCA '91 - Chicago.** Sponsored by the Computer Graphics Asso-
ciation. Call Irene Cahill, (703) 698-9600.

**April 26**

**Third Computer Bowl - San Jose.** With Bill Gates, Heidi 
Roizen, Philippe Kahn, Dave Liddle, David House and Ed Juge 
from the West (including Fort Worth!); Pamela McCorduck, John 
Armstrong, James E. Clark (AT&T, not Silicon Graphics), Sam 
Fuller and John Markoff from the East. Sponsored by the Bos-

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<tr>
<td>April 28-May 1</td>
<td>*Borland languages conference - San Francisco. Come C what's so exciting about languages! Call Kathy Bentley, (408) 438-8400 or (800) 946-TURBO.</td>
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<td>May 7-9</td>
<td>National Online meeting - New York City. Sponsored by Learned Information. Call John Yersak, (609) 654-6266.</td>
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<tr>
<td>May 15-20</td>
<td>Computerworld/Forum Prague ‘91 - Prague, Czechoslovakia. Sponsored by the Czechoslovak state committee of science and technology and the Society of the Czechoslovak Universal Exposition in conjunction with IDG World Expo. Call Dorothy Ferriter, (508) 879-6700.</td>
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<tr>
<td>May 19-23</td>
<td>International DB2 users group: Distributing the experience - San Francisco. Sponsored by IDUG. Speakers include Chris Date, Codd &amp; Date; Michael Stonebraker, UC Berkeley. Call Larry Fleischman, (312) 644-6610.</td>
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<td>May 20-23</td>
<td>Spring Comdex - Atlanta, GA. Sponsored by the Interface Group. Call Elizabeth Moody, (617) 449-6600. Includes Windows World; coincides with...</td>
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<td>May 20-23</td>
<td>Interface/91 - Atlanta. Sponsored by the Interface Group. Call David Kaminer or Victor Cruz, (617) 449-6600.</td>
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<tr>
<td>May 27-31</td>
<td>Avignon ’91: Expert systems &amp; their applications - Avignon, France. Sponsored by AFIA, ARC, ECCAI &amp; JSAI. Call Jean-Claude Rault, 33 (1) 4780-7000, or fax, 33 (1) 4780-6629.</td>
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<tr>
<td>June 3-7</td>
<td>*Object World - San Francisco. Co-sponsored by The Object Management Group and World Expo Corp. Businesspeople’s answer to OOPSLA. Call Dave Bradway, (508) 820-8123.</td>
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<tr>
<td>June 9-12</td>
<td>*2nd annual SPA European conference - Cannes, France. Sponsored by SPA. Call Ken Wasch, (202) 452-1600.</td>
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<td>June 12-14</td>
<td>First international Windows 3.0 developers conference - Tyngsboro, MA. Sponsored by the Wang Institute of Boston University. Call Andree Fontaine, (508) 649-9731.</td>
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<tr>
<td>June 25-27</td>
<td>PC Expo - New York City. Sponsored by Bruno Blenheim. Call Annie Scully, (201) 569-8542 or (800) 444-EXPO.</td>
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<tr>
<td>July 2-4</td>
<td>Machine Translation Summit III - Washington, DC. Sponsored by the Center for Machine Translation, Carnegie Mellon University. Call Jaime Carbonell, (412) 268-6591, e-mail <a href="mailto:mtsummit@cs.cmu.edu">mtsummit@cs.cmu.edu</a>.</td>
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<tr>
<td>July 9-12</td>
<td>*PC Forum - Moscow. Organized by IDG World Expo and Information Computer Enterprise, USSR; co-sponsored by several USSR state committees. Call Dorothy Ferriter, (508) 879-6700.</td>
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<tr>
<td>July 14-19</td>
<td>*AAAI conference - Anaheim. Sponsored by American Association for Artificial Intelligence. Also includes Innovative Applications of AI. Call Carol Hamilton, (415) 328-3123.</td>
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<tr>
<td>July 28-Aug 2</td>
<td>SIGGRAPH '91 - Las Vegas. Sponsored by ACM. Art meets computers: The place to see and be seen. Call Jackie Groszek, (312) 644-6610.</td>
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<tr>
<td>August 5-8</td>
<td>International workshop on human-computer interaction - Moscow. Sponsored by ACM/SIGCHI and the International Centre for Scientific and Technical Information, Moscow. Contacts: Larry Press, (213) 475-6515, fax (213) 516-3579, e-mail <a href="mailto:lpress@venera.isi.edu">lpress@venera.isi.edu</a>; or Yuri Cornoostaev, 7 (095) 198-72-41 or <a href="mailto:enir@iaeal.bitnet">enir@iaeal.bitnet</a>.</td>
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<tr>
<td>September 11-14</td>
<td>*Software Publishers Association annual conference - Orlando. Sponsored by SPA. Call Ken Wasch, (202) 452-1600.</td>
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<tr>
<td>September 25-27</td>
<td>*Second European conference on computer-supported cooperative work - Amsterdam. Knowledge workers and academics, unite! Organized by the Center for Innovation and Cooperative Technology of the University of Amsterdam. (The language of cooperation is English.) Call Mike Robinson or Liam Bannon, 31 (20) 525 1250/1225; fax, 31 (20) 5251211; e-mail, Ban- <a href="mailto:non@learn.ucd.ie">non@learn.ucd.ie</a>; or Charlie Grantham, 1 (415) 370-174; <a href="mailto:cegrant@well.sf.ca.us">cegrant@well.sf.ca.us</a>.</td>
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<tr>
<td>Sept 30-Oct 1</td>
<td>Virtual Reality conference - San Francisco. Sponsored by the Meckler Corporation. Call Marilyn Reed, (203) 226-6967 or (800) 635-5537.</td>
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<tr>
<td>Sept 30-Oct 4</td>
<td>*Seybold Conference - San Jose. The leading event in the computer publishing community. Sponsored by Seybold Seminars/Ziff. Call Kevin Howard or Beth Sadler, (213) 457-5850.</td>
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October 15-17  NetWorld '91 - Dallas. Sponsored by Bruno Blenheim. Call Annie Scully, (201) 569-8542 or (800) 444-EXPO.

October 17-21  USA Showcase '91 - Budapest. Co-sponsored by the Hungarian Ministry of Trade, the Hungarian Chamber of Commerce and the American Chamber of Commerce in Budapest. Call Jay Bowman at (713) 266-0610.

October 21-25  *Comdex - Las Vegas. So wonderful they couldn't wait until November? Whatever the reason.... Sponsored by the Interface Group. Call Elizabeth Moody, (617) 449-6600.

October 27-29  The Classic - Monterey, CA. Sponsored by the American Electronics Association, for cute companies and eager investors. Call Flo Lewis, (408) 987-4200.

November 4-7  ADAPSO fall management conference - San Francisco. Sponsored by ADAPSO. Call Ellen Kokolakis, (703) 522-5055.

November 10-13  **Second East-West High-Tech Forum - Warsaw (Prague in 1992). Sponsored by EDventure Holdings. With a roster of serious-minded entrepreneurs and vendors from East and West. Don't just come to listen to advice; come to mingle with the people making it happen. Call Daphne Kis, 1 (212) 758-3434 or fax (212) 832-1720; MCI Mail: EDventure, 443-1400.


November 19-21  PC Expo - Chicago. Sponsored by Bruno Blenheim. Call Steve Feher, (201) 569-8542 or (800) 444-EXPO.

December 3-5  European Publishing conference - The Hague, Holland. Sponsored by Seybold Seminars. Contact: Laurel Brunner, 44 (323) 410561 or fax, 44 (323) 410279.

December 15-18  *Hypertext '91 - San Antonio, TX. Third International conference on hypertext. Sponsored by ACM. Call Janet Walker, (409) 845-0298, e-mail leggett@bush.tamu.edu.

Please let us know about any other events we should include. -- Denise DuBois

*The asterisks indicate events we plan to attend. Lack of an asterisk is no indication of lack of merit.
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