RELEASE 0.5: CONTENT IS KEY

This issue is the documentation for the PC (Platforms for Computing) Forum. The theme, "Content is Key," reflects the primacy of information over tools. As will be further explored throughout, this newsletter is just a pale paper view of the collective knowledge base of this industry, distributed among the heads of its members in both explicit and inexplicit form. This knowledge base is far from a tidy, consistent relational database; it is full of ambiguity, missing or obsolete data, inconsistencies and even inaccuracies. The Forum is a multi-dimension, multi-medium instantiation of this knowledge base in realtime, through speeches, demos and interactive discussions. The people milling around (yourself included) are "agents" attempting to discern and display the underlying knowledge in explicit form. We hope this documentation will help you to pick out a few patterns amidst the information. For example...

Tools are important shapers of information, and communications tools are important media for information, but in the end they're useless without information as raw material.

Just as pcs brought tools to the common person, so does the embodiment in software of content (knowledge and procedures) bring a sort of wisdom or at least procedural expertise within the reach of smaller firms and individuals who couldn't develop it themselves.

With the prevalence of communications tools, we are moving from desktop publishing, which lets people generate good-looking information at their desktops, to a broader notion, where people can distribute information from their desktops (or portable devices) to anywhere in the world.

In a world of commodity software tools and platforms, content soft-

WELCOME TO PHOENIX!
ware is the next frontier of unique value and usefulness -- and the foundation of the next generation of promising start-ups. Taligent, for example, is a "content-oriented" platform in that its focus is as much on incremental development around application frameworks as on the underlying OS.

This Forum doesn't investigate the prospects of the PC establishment; instead, it points out where it should be looking to improve its prospects. Instead of the usual roster of celebrity speakers, we have some of the industry's more foresighted leaders, along with a host of newcomers with wild ideas, promising start-ups and nifty vaporware. Little will qualify as hard news -- except perhaps some remarks by Jim Cannavino -- but we hope you come away not just with memories of neat new products but with a sense of the potential of content-based technology -- both for users and vendors.

The Forum takes place over three days. Each day has a focus: content, content-based services, and communications/content platforms -- and occasional digressions. This newsletter more or less follows that sequence, including Monday's noon/evening political/infrastructure discussion, and descriptions of the afternoon company presentations, which "illustrate" the morning sessions, listed after Tuesday.

An advertisement for itself

As we have done for several years, we are using the Forum as a realtime demo of many of these technologies. However, the technology has also improved to the point where we consider it a service as well as a demo. Thus, although the software and hardware are loaners (thank you, Lotus, Microsoft and Compaq), we have paid Lante to set up the system that will help you get full value from the Forum by communicating with others, both about its public content and with your own private messages to other attendees. One backbone of the system is Lotus Notes; the other is Windows for Workgroups, which includes Microsoft Mail and Schedule+ for making (requests for) appointments.

Will all these tools work seamlessly together? In principle, yes, but not here, not this year. You were asked to choose between cc:Mail (on the Notes server) and the mail within WFW; the system you picked will be your default. The biggest challenge is not to get the systems to send mail to each other, but to get them to use a common directory. That is the challenge we hope Lante will find easier to overcome next year; listen to Mike Zisman's talk on Tuesday to find out why it's so difficult.

Separately, each user who's willing to take the responsibility (by signing a credit card slip) will receive a GRiD Convertible -- the pen/keyboard machine recently introduced by GRiD/Tandy Electronics. It will be outfitted with Windows, several Windows apps and GRiD Pen Essentials from Slate.

Other information facilities include two kiosks -- from Strategic Mapping and Axxis/Helix -- with local maps and listings, to help you find and select local restaurants and other amenities. Two other kiosks contain content from Dow Jones (the Journal) and Newsweek/Washington Post.

This paper issue of the newsletter describes the speakers and company demos and provides some context; the version on the Forum network is richer, because it links in relevant pieces of previous issues.

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Although content is not only electronic, we focus here on electronic content for obvious reasons. Moreover, we focus on how electronic content can be made alive. Dead texts, unparsable images, monolithic stretches of video can easily be delivered electronically, but they might as well be delivered on paper, records (remember those?) or film or tape. The challenge -- or opportunity -- is to transform them into live information that can be manipulated and enhanced electronically. In fact, we suspect most electronic content will be fresh, created for its electronic form, just as most movies are no longer filmed plays or books. Perhaps a better example is music videos, which have no non-electronic analogue. Likewise, although much online help text derives from printed documentation, we don't think that's optimal -- although both online help and printed documentation could come from a common source.

How is content made alive?

The value of electronic content lies in its manipulability -- either to make it more intelligible or accessible to humans, or to make it interact with other applications and tools. Ideally, humans can query content by keywords or values in fields such as date, topic, author, skills in a resume or the name of an applicant. They can also browse through some automatically arranged schema, and specify criteria for display and highlighting of information of particular interest.

But the information can also be reused and recombined as well as transmitted, searched and displayed. It can be defined and manipulated before being fed into an application such as a letter-generator or selective publishing tool, or it can generate parameters that control execution of an application.

Thus the most interesting content is executable and active -- information to drive tools, or information to be refined or manipulated by tools.

- Pattern/object recognition -- getting live information out of dead information, or at least raising the level of abstraction from "This is a sequence of words" to "This is a paragraph" to "This is the third paragraph in the second section of the fourth chapter, and it covers the topic of widget maintenance." You can perform low-level actions on low-level objects, and high-level actions on high-level objects. For example, you can send someone a text string, or you can send him a query about a meeting next Tuesday at 4. To do the latter, you need either to define or to recognize explicit objects with explicit features. A text tool needs to know the precise content of a paragraph before deciding what to do with it. ("Precise" is a relative term: "about IBM" might be sufficient, or you might need something like "about IBM, John Akers, negative tone, author: liberal press.")

- Information-driven execution -- information controlling execution and design... With these parameters, you can draw a deck, design a schedule that fits both Juan's and Alice's constraints, or send the right letters to the right people. The combination of some user input with generic rules or formulas and suggested values for, say, building a deck or calculating a year-end bonus can be a productive combination.
EPSTEIN -- APPLICATIONS OF THE FUTURE

Bob Epstein is best known as the developer of Sybase's elegant database. But he's also a practical guy: The latest Sybase innovation is replication, a realistic answer to the problem of data integrity in an imperfect world where realtime global consistency through two-phase commit and universal, instantaneous updating is impossible.

Epstein has spoken at PC Forum many times and always has something new to say. This year, he comes to the notion of content by his own route: What do applications of the future need? he asks. "The key business policies [content] have to be visible and accountable. In finance, you have rules for accounting for cash and an overall budget; the way you manage the cash follows those rules." That is, applications' content should be visible and inspectable, rather than hidden in the mind of the developer.

The issue is how you get from content or abstraction to application -- and back. Although there are a variety of tools that can help you derive rules from details, they rarely rise to the level of intent, or real business policies -- such as "we always respond to inquiries within 24 hours" or "we set our fares to maximize revenues, based on the following assumptions: business travelers don't like to stay over Saturday nights; business travelers don't travel with companions; Thursdays are light travel days, except before three-day weekends; ..." (More often, the original content has been changed through incremental engineering; and since the original was never clear, the new meaning is undiscoverable and possibly contrary to what anyone wanted. This is the "Why? Because it's always..." syndrome.)

While it's extremely difficult to move from the details to the rules, tools are now available to help or even automate the process of moving from the rules to the code. The advantage is that such rules and assumptions can easily be interpreted, analyzed, and modified -- unlike the code that implements them. This issue of transformability of content pervades the world of software and business procedures.

The goal, says Epstein, is not that managers should be able to create such models/rules (let alone the code) without regard to low-level plumbing issues or even higher-level interface design, but that they should be able to understand them and direct programmers, who can change their content into computer programs. Ideally, this would happen automatically, but the purpose isn't to save time. The purpose is to improve the clarity and quality of the content. (With the proper specs, or rules, anyone can program quickly; it's the ambiguity and changes in most specs that take the time.)

BOB STEIN, VOYAGER -- BUT LET'S NOT FORGET THE ART...

Bob Stein is a co-founder of the Voyager Company, first known for putting films on laserdisc along with comments by their directors, and now for its Expanded Books (such as Jurassic Park and The Annotated Alice). We asked him to the Forum to remind us of the need for art as well as technology. "The Industry has spent ten to fifteen years building tools; now they're in the hands of artists and poets," he says, with exciting results.

Voyager is known for quality and respect for content rather than for its technological wizardry, although it happens to be one of the leaders in
using technology to enhance and extend content. While good books frequently make poor movies and vice versa, the Expanded Books still retain their identity as books. And good books make good reading, on disk or elsewhere.

In the end, each medium will require and acquire its own metaphors and its own artistic approaches -- possibly after some wild forays into excess. For example, many people are bedazzled by the freedom of hypertext, which allows a user to move around a text (or set of objects) at will. But there's a counterview that defining a path through the information is not always a constraint; sometimes it's a worthwhile piece of intellectual effort that can help make the experience more meaningful or enjoyable. Consider for example a mystery or a tough piece of analysis that requires lucid, well-laid-out exposition. Hypertext links may enrich the experience, but an appropriate underlying structure is vital.

WILL WRIGHT -- SIMULATION MAN

Complexity is not just a new science (pace Tom Ray); it's also the basis of many of today's problems. People don't understand how the economy works, either in the large or in their own companies. People don't make the connection between taxes and government services -- and between those and the size of their paychecks. Our favorite example of such thinking was a poll that found that 89 percent of people feel that good drivers should get a discount on their auto insurance. On the other hand, later in the same survey, 79 percent felt that people with poor driving records should not be penalized; it might not have been their fault.

All this leads people to vote for the wrong programs in the large, and to work less effectively than they might on the job. What's the solution? One possibility might be a game called SimFate, which shows how things really work -- and why you can't always get what you want.

In the meantime, there are some credible other efforts by SimCity creator Will Wright and his company Maxis. Maxis recently received $10 million from Warburg, Pincus to fund its move into the serious educational market. That doesn't mean just schools. It means on-the-job training, such as a project Maxis worked on with Chevron to build SimRefinery, a model of Chevron's Richmond refinery near San Francisco (and Maxis' Orinda offices). Simulation can give people "experience," a far more intense medium for learning than reading or hearing.

Maxis is also talking with a wide range of companies, including several fast-food chains (SimChow?), who could model how to manage the split-second timing that keeps customers from lining up, how to control inventories, how to plan for peak and slow periods. PG&E has hired it to build a simulation to explain the dynamics of the power business to its regulatory overseers. Just as Maxis created a generic city for SimCity that could be customized to match the reality of a particular city -- or someone's dreams -- so can it build generic companies in particular industries that can be customized for an individual company's data.

With its new SimCity 2000 (to be demoed at the Forum), the company is encouraging third parties to build modules to interoperate. You can add data or events to SimCity, or alternatively you could add a SimCity data file to Microsoft Flight Simulator and fly over (or into) your city.

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Childhood's end: Stand by your assumptions

The point of simulation, properly used, is elucidation more than prediction. The simulations don't have the answers, but they can illustrate the dynamics if you supply the assumptions. Aside from explicit rules in your assumptions, you also make implicit assumptions by what you filter out, since you consider only a subset of the data; a simulation is never as rich as the real thing. Thus you get the anti-butterfly effect; the lack of those tiny disturbances and anomalies that make reality so unpredictable.

But you can't make a model without assumptions. What will happen to sales if you raise prices? What will happen to productivity and ultimately profits if you invest in new equipment? What will happen to the quality and loyalty of employees if you raise salaries? (What will happen to morale if you raise the chairman's salary?) On the political level, how much impact does "mood" have? Can a strong leader change people’s behavior?

The assumptions are the big issue; they are the content that controls the activity and behavior of the simulations. Right now we have lots of arguments over tax policies or the funding of the global network, all based on assumptions about human behavior, competitive strategies, investment criteria and the like.

Like any powerful tool, simulation can be dangerous if misused. Used well, however, it can expose assumptions and clarify thinking. It could help produce a more educated workforce and ultimately a better-informed citizenry. At least people would argue about clearly stated assumptions rather than strongly held convictions with no analytical underpinnings. Consider the possibility to show former East Bloc citizens -- and our own -- how markets really work...

LIDDLE -- THE END OF COMPUTING

David Liddle will talk about the end of computing, in the same sense that Francis Fukuyama talks about the end of history. It's not that history ends, but that there are fundamentally no new ideas. In the computer business, progress will continue, but the computer will no longer be as much a topic of discussion as a given. When everyone uses computers, we will focus more on what they do with their computers. Just as the profession called "scrivening" disappeared when most people became literate, so will the profession of programmer (as opposed to designer) become obsolete when programming becomes an automatic transformation of spec into code, and when everyone uses computers not as a job in itself, but to do his regular job.

Once computing is no longer a separate task (and no one talks about our industry, but rather about the various content-oriented segments it will devolve into), what happens to computing? "The notion of computing as a distinct, content-independent pursuit seems doomed to the fate suffered by scrivening -- namely to be overwhelmed and absorbed by the various realms of content to which it's applied, and to be vulgarized and made useful by the hearty, backslapping hand of commerce," quoth Liddle.
MONDAY PANEL

Today's panel is about content; tomorrow's about content services....

DICK HORN, COMWARE -- PERFORMANCE SUPPORT, OR JUST-IN-TIME TRAINING

Our prediction for the most popular buzzword of 1993 is performance support. This is the simple notion of on-line software support carried one step further -- to support of the content. (Of course, the performance support itself is content, too.) That is, software help might tell you how to use an application to change margins. Performance support will guide you in assessing how wide the margins should be. In a form-based application, performance support might guide an interviewer in asking questions to elicit a truthful answer; in an inventory application, it might say, "Make sure to check all the barrels, and then count the contents of every tenth one carefully." And so forth.

The basic value in performance support is almost all content, but implementation in software can augment it considerably, turning it from boring, hard-to-remember and -apply classroom training or reference materials, into self-service just-in-time training.

To the extent that work is accomplished electronically (the forms application above), you can link the appropriate performance support modules to each electronic task. (This integrates well with workflow.) Appropriate instructions or multimedia demos appear at the right time, linked to the steps in the actual task the user is performing. The links can be hard-wired, or instantiated through techniques such as hierarchical searches, case-based reasoning or simple keyword searches; it's sort of a help-desk for internal procedures rather than for customers.

But this approach simply organizes information that someone has generated, attaching it appropriately to an application system. More interesting is the issue of how the performance support is generated: From the business rules Epstein describes above, can you generate the appropriate performance support content as well as the software to execute the automated portions of each business process? Ideally, changing an item in the spec changes the software and also changes the instructions and the related simulation. Change the dimensions of the screw or the number of knobs, and the diagram in the on-line instructions will change appropriately, and step 5 -- "Close all three valves" will turn into "Close all four valves."

How close are we to reaching this point? The answer depends very much on the type of task. Physical, explicit tasks are easier to specify -- and the specs are easier to modify. However, we are making progress with higher-level tasks, as Dick Horn will outline. His company, Comware, is devoted to the creation of performance support systems. Users include Martin Marietta's operations at the Oak Ridge nuclear facility, mostly concerned with safety; Promus Companies (Embassy Suites, Harrah's Casinos, Hampton Inns) for reservations and customer service; and US West, for guidance to people in the field who have to design and run courses even though they aren't trained as trainers. (Something recursive there...)
TSI International exemplifies the notion of business-content software. Its basic product, Trading Partner, is a generic EDI tool, but you can enrich it with a range of content packages that generate purchase orders, bills, invoices and order forms for trading with specific buyers such as Wal-Mart or Ford. (See Release 1.0, 11-92.)

TSI's content tools even the balance for the little guy. By embodying certain specialized business practices in software, they make it possible for even small firms to follow the procedures of large firms without spending a lot for training or development. The cost of these specific tools can be spread across a user base, even if it's only a few hundred users.

The economics and marketing channel for this business are different from traditional PC software (even though the products are technically normal Windows applications). TSI generally sells direct, with the marketing help of the EDI-using buyers who want their suppliers to follow their rules.

Although this isn't yet the case with TSI, we believe that in the long run, much content-based software will be distributed or at least marketed by third parties to their business partners -- bankers who supply financial information to customers (as brokers now provide stock-pricing services or Bridge machines with special analytical tools to favored traders), pharmaceuticals manufacturers who supply medical information to doctors, computer resellers who supply product information to customers (cf. Trilogy, page 18). It's just like the newspaper or other advertising business, except that the content isn't generic news or features but rather specific information or even executable content software.

KEN KOPPEL, CONTENTWARE -- HOME SHOPPING OFF-LINE

"The tv shows selling fake diamond rings to a legion of couch potatoes are certain to splinter into a series of boutiques as channel capacity expands geometrically," says Ken Koppel of Contentware. "The possibility of [tv's] Barry Diller launching a Madonna-inspired electronic lingerie boutique might well give pause to Victoria's Secret. The only defense long-term for cataloguers is an interactive marketplace of their own." He wants to be their mercenary/ally in dealing with this threat.

However, he doesn't think the best answer is necessarily a new "Home Shopping Boutique." Home Shopping Network and other tv buying shows are effective in selling, but they're not interactive -- only the buying is interactive: you call an 800 number, and make your purchase. In fact, tv shopping is plain old one-way television entertainment, with some transactions attached. Koppel offers a different vision: Enrich and make interactive the selection process, not the purchase transaction. (Indeed, phone-and-credit card is an effective mechanism that doesn't need to change for now.)

Koppel spent 20 years at Ziff Communications, ending up as president. He oversaw its new ventures into on-line marketing and buying services such as Computer Select, Information Access and other databases, all targeted at computer users. (We worked for him at Ziff when we ran the late lamented Computer Industry Daily, and we still like him, which says something!) He left a year ago to start Contentware.

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The first product, Interactive Catalogues, addresses a market Koppel isn’t yet ready to disclose, but rest assured that it’s broader than pc enthusiasts (although of course customers will need to have pcs to use the product). The idea is to offer electronic classifieds/catalogues on CD-ROMs or floppy disks along with “performance support” for buying -- what to look for in certain kinds of products, how to go through the entire process of buying a house from looking for an agent to checking titles, arranging for escrow, etc. Ultimately the product might be put online, so your transactions could be implemented through software, but that’s a minor issue, says Koppel. The important point is that the search and selection be interactive. For now, the market can only be reached through traditional sales channels, along with bundling deals with some hardware manufacturers.

The appeal to consumers is to allow them access to a broader range of catalogues than they would otherwise receive, with the opportunity to do easy (through software) comparison shopping (similar to what Computer Select did for computer buyers). Compression technology and attractive displays (by Harney Morris at Animatrix) should make the product more appealing than some earlier attempts. For cataloguers, Interactive Catalogues offers a low-cost way to reach an audience.

The challenge for Koppel is to make it happen: to sign up enough suppliers to make compelling catalogues, and to generate enough transactions to keep the suppliers happy. It’s easy enough to sign up vendors if you charge them per-transaction; just make the cost per transaction lower than what they normally spend. Of course, that means that Contentware is taking the risk that the customers will buy. (So far, it has a number of catalogue vendors Koppel won’t name; consumer response won’t be clear until the product ships next winter -- in time for Christmas and Hanukkah?)

For the moment, Interactive Catalogue’s contents are the products you can buy through it, but Koppel also has the notion of providing some “editorial” content -- both buying advice and perhaps spreadsheets for comparing products, games or other active content. Currently, customers who pay for a catalogue (on disk or not) generally expect some “editorial” material, not just ads (or product information), although that attitude will change.

National or local?

Koppel’s (and other people’s) catalogues will be a combination of local and national content -- just as TV Guide has local listings and features combined with national editorial, or tv stations combine national shows with syndicated shows selected locally and news generated locally. For example, real estate listings and price advice would be local, but some general advice would be nationwide; a catalogue-oriented service is countrywide, but perhaps with pointers to local merchants or repair/support services.

Right now, the print catalogue business is either highly targeted or the province of rich companies. Contentware and its ilk should open up the market to a number of smaller vendors. "The advertising infrastructure would resemble directories more than network or even cable tv," says Koppel. "Big advertisers could still blanket the market, but smaller advertisers wouldn’t be locked out and could be found by those seeking them." And compared to his old business, this is more like pcs than mainframes -- lots of purchases, each one small, could amount to a big business.
LUNCH: JEFF HAWKINS ON THE BRAIN -- REAL INTELLIGENCE

Now for something completely different! How do we -- people -- process content? Jeff Hawkins, known to most of us as the founder of Palm Computing -- and before that the developer of the GRiD Convertible -- is also a long-time student of neuroscience and theories of intelligence. Most of his talk will come from research he conducted at Berkeley in 1986 while he was working towards a PhD in biophysics. He will propound a new theory of intelligence, with an eye towards building intelligent machines.

His theory is that the real evolutionary significance of intelligence is prediction. That is, evolution doesn't select for capabilities, such as intelligence, but rather for results, such as prediction. In the old days (and still!), you had to predict where to find food, whether a particular person would make a good mate or an honest hunting partner. You had to predict what kind of behavior would get you into trouble if you were a slave, or get you power, if you were lucky enough to be well-born. Intelligence is not simply reasoning capability, but the ability to decide how to solve a problem for the best results -- reasoning, pattern-recognition, emotion, etc. Indeed, intelligence is the highest order of information-processing -- the ability to assess a situation and to predict the future. Test-taking does measure one kind of intelligence -- the ability to predict answers that test-givers will consider right. Ultimately, says Hawkins, the same prediction ability underlies our abilities to see, hear and feel.

This is an interesting issue in its own right. The implications for how we design "intelligent" machines, or personal agents for that matter, are also intriguing.

PLATFORMS FOR COMMUNICATION: DESIGNING THE ELECTRONIC FRONTIER

In this year of political change, the computer industry (broadly defined) has a unique opportunity to influence the development of the nation's communications infrastructure. What technologies and standards make sense? Who should provide them, and under what regulatory constraints (if any)? What role should the government play? How can fruitful competition be fostered? Who should define and manage the stop signs and tollbooths of the electronic frontier? As both provider and user, the computer community has a vital interest in these questions.

The Electronic Frontier Foundation (we sit on the board) has been addressing these issues since it was founded two years ago by Mitch Kapor and John Perry Barlow. In addition to providing legal and educational services for the "net community" and others, EFF lobbies for its vision of the future in Washington. Even if you disagree with the EFF's positions, it wants you to think about the issues.

Fundamentally, the EFF's position is that this country needs a broadly accessible and open communications infrastructure, much as it has a broadly accessible and open highway system. However, EFF doesn't necessarily want the government to fund this development; rather, government should foster it through a regulated transition to a mostly free market, with subsidies to appropriate user groups (schools and universities and the poor, for example) as it thinks appropriate. (Regulation should focus on safety and

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honesty of practices, not on technology or terms and conditions of offerings.) Although EFF would like to see standards emerge, the best place to develop and refine them is through competitive interaction, much as we have developed the current and future standards in the pc market. (There are certainly problems with this process, but the government's abilities to understand technology are not strong enough that we'd like to adopt any of its recommendations as a legislated standard.)

Rather than wait for the coming of broadband everywhere, EFF sees ISDN as a reasonable step forward, one that would not impede progress to better things beyond. The government could encourage its adoption easily enough by requiring the RBOCs, still regulated, to offer ISDN as a standard offering. This alone should flush out enough demand -- given the current booming markets -- to make it a profitable product for them to offer within a couple of years. But who uses it and how much is charged should generally be left to the market.

Congressman Ed Markey, chairman of the subcommittee on Telecommunications and Finance, propounds essentially this approach. Markey will be leading -- and guiding -- the new government's policies in this area. His speech, however, will focus more on the computer community's absence in Washington -- and the danger of having laws made without your input. Traditionally, the pc community has been too busy making neat things and earning money to pay much attention to government (let alone charity or other good works). Yet the development of the communications infrastructure is now of vital interest to you. It will affect how you can offer your services, and what products and services you can offer. It is both an infrastructure and an important market.

For logistical reasons, three industry leaders will discuss their views of Markey's talk and the issues raised on Monday evening. Mitch Kapor will lead the panel and moderate questions afterwards. The panelists are:

JOHN WARNOCK -- ACROBAT OF PRINT

John Warnock of Adobe will lead off. Typical of his industry, he'd prefer to see the government leave things alone and let everyone fight it out: "It's very important that we as a society realize eventually we'll go to electronic highways for information transfer," he says. "To the extent that government regulation makes sense in making it affordable and broadly available, there may be a role for government. The government can mediate between the various warring factions!"

But of course, he adds, "You have to remember that markets develop standards, not committees." This comes from a man with experience: He developed PostScript -- a de facto market standard although you couldn't accuse it of monopoly. Adobe is now preparing to launch Acrobat, which could make it much easier to distribute rich information over a broad network, even with low bandwidth (page 30). And for what it's worth, Warnock sits on the advisory board of General Magic, which hopes to make Telescript a standard. These are not the things government dreams are made of, but rather elegant instruments that will be honed by competition.
CRAIG McCaw -- VOICE OF EXPERIENCE

Craig McCaw, chairman of McCaw Cellular Communications, applauds the idea of government-business partnerships in principle, but he gets wary when he starts to think about it. "If government and business don't work together, this nation will become a second-rate player. But the reality is that there is already fiber all over this country; the question is only how to distribute it locally. The government needs to realize that the fiber is already there; it's duplicated three times over. It doesn't require all this subsidy to build it. The government's role should be to figure out how to foster the building of local loops."

Furthermore, he adds, technology moves far faster than the government can; "It's almost a given they'll be out of date on any specific technology."

His special concern vis a vis the pc industry, which hasn't spent as much time in Washington as the communications folks, is that they may be lured into government "partnerships" without understanding the downside. "The computer industry sees now that there's an opportunity to get the government to give it something. 'Why not get the government to put together an OS to take us through 2020?' They forget that anytime you bring the government in -- once they get in, they never get out. How do you draw the line as to where the government oozes in?" A good question.

DAVID NAGEL -- WORTHY OF MENTION!

David Nagel spent 17 years at NASA in human factors research before joining Apple in 1988. He rapidly became head of Apple's Advanced Technology Group, succeeding Larry Tesler when Tesler moved on to manage the Newton project (page 44). Now Nagel has a second hat, replacing Roger Heinen as head of the Macintosh Software Architecture (operating system development and marketing). Meanwhile, each time Sculley is "mentioned" as a potential government figure or head of some ailing corporate giant, Nagel is mentioned as Sculley's replacement.

As a longtime government employee at NASA, Nagel has a somewhat more optimistic view of the potential role of government than most of us, but he's also well aware of its failings. He'd like the government to get involved in research on how to implement the network, and set standards for it, without actually getting involved in its implementation or operation. "The government has been successful in basic science, but terrible at operating things," he says. "At NASA, for example, it was incompetent operating a space program although the underlying science was excellent."

The big issue left is intellectual property, he adds: "Privacy, security, encryption -- the rules of the road, and the technical means to enforce them. These issues must be pushed at and poked." Nagel is now active in several government groups, including the Computer Science and Telecommunications Board of the National Academy of Sciences and Engineering. He also represents Apple in the Computer Systems Policy Project.
TUESDAY: CONTENT SERVICES AND TOOLS

Today we consider content tools and information services...

ZIPSMAN -- THE PLATFORM OF THE FUTURE IS IN-BETWEEN

Mike Zisman wrote his PhD thesis on groupware ("Representation, specification and automation of office procedures," 1977), and he's been working to build an infrastructure that could support it ever since. His company, Soft•Switch, sells e-mail switches to connect disparate e-mail systems. However, as the fact that you had to select either Windows for Workgroups or Notes/cc:Mail as your e-mail "home" before coming to the Forum indicates, it's still a challenge to integrate e-mail systems completely. The snag in this case is the difficulty of integrating the directories; you have to be registered in a particular e-mail system directory; you can't just be registered in general. That is one of the challenges Soft•Switch has been addressing since its founding in 1979.

Why is X.400 worse than anything except any reasonable alternative? At the Forum, Zisman will explain what X.400 is and what it can and cannot do. X.500, the proposed directory standard, may actually be more successful than X.400, because people want to share a directory even though they don't want to use X.400 directly. "We need an infrastructure to build enterprise and inter-enterprise mail networks that don't drive people crazy," he says.

Our friends sometimes kid us about our e-mail return address, which looks like this (courtesy of a combination of MCI Mail, an interface to the Internet, our MHS hub, and BeyondMail):

"ESTHER+1p_bmail+a_EDV+1tESTHER+r%MHS+d_B1D65A2B015387D1-+<CD465B2B015181C 2+50930118204105/0003765414NA1EM%Edventure_Holdings"@mcimail.com

But you can reach us directly at 511-3763 on MCI Mail, or at 0005113763@mcimail.com or edyson@eff.org on the Internet.

DEMO AND DISCUSSION: TEXT TOOLS

In order to handle content automatically and intelligently, you need to be able to define it precisely enough so that software can manipulate it based on the individual features of each item. For example, you can paginate a document easily enough, but only by identifying the sections properly can you specify when to start a new page before the previous one is full. You can build a table of contents easily if you have tagged the headlines of each section. And so on.

There are two basic approaches to identifying text elements. The easy one is the equivalent of an old UPS ad: "You want it there tomorrow? Send it yesterday!" Much cheaper! That approach is to identify the objects as they are created: This phrase is a headline; this item should be identified with the keywords Juan and Alice; this word is the name of one of our company's products (so it can later be bold-faced and indexed, and used to generate a
Deriving content

The second approach is to use clever tools to figure out what the items are or mean after the fact. Since most people aren't careful enough when they create information, and since the ways of representing such meta-information aren't yet standard, this after-the-fact approach is the more usual one -- which is why we have so much data and so little meaningful information.

The all-singing, all-dancing, bottomless knowledge base

As noted earlier, the ultimate goal is to have an object-oriented database that could store all kinds of information, and make it more worthwhile for people to define their information upfront. This knowledge base could support all kinds of applications and information media, transforming the information into content -- for example, the same basic information sits in design documents, manufacturing instructions and bills-of-materials that talk to inventory and ordering systems, assembly or repair instructions, help systems, performance support (which might take its information in part from the commentary surrounding design), documentation, marketing materials, and so forth. These contain information at different levels, with all kinds of formal and less explicit relationships among them.

Just as a spreadsheet can be complete by itself but has more and more come to be viewed as a view or report from a database, so is a document a view on a knowledge base floating around in the background.

NEWBOLD, WICAL -- JUST THE MAJOR FACTS, PLEASE!

Although Oracle is best-known as the leading SQL database vendor, it also has a more interesting side, just as Lotus has Notes as well as 1-2-3. Oracle Data Freight is described on page 19; here we consider Oracle's office automation group and more specifically the tools it has built on the basis of Artificial Linguistics Inc. (PC Forum 1991) and its text engine, developed over 18 years by Kelly Wical. (Oracle acquired ALI last summer.)

The Text Engine is a monster 40-megabyte content-and-tool system that can parse English sentences and also knows a huge amount of specific information about words; what kinds of words they are (inanimate noun, transitive verb,
comparative adjective); and to some extent what they mean, in terms of synonyms, appropriate uses with certain prepositions or phrases, and so forth. It also understands grammatical constructs, such as appositive clauses -- such as "such as appositive clauses" in this sentence. (An appositive clause is a clause that further describes an object, usually set off by commas or by "which" or "that.") It can also discriminate between active and passive verbs, recognize synonyms or categories, and detect main and subordinate clauses of a sentence.

The text engine generally parses a selection of text at the rate of 400 to 800 words per minute (on a 486), and creates a metafile that describes the words and concepts in the document and their relationships. It also recognizes various kinds of content, such as themes of a sentence or paragraph, and the relationships of clauses within a sentence.

Given a text file and its metafile, a variety of applications can go to work. One simple one, for example, is PowerEdit, which is now available under Windows for both Word for Windows and WordPerfect 5.0. The pc version uses only part of the text engine, without its 40-megabyte textbase of word meanings and complex grammatical and usage rules. However, it provides rigorous grammar-checking more powerful than most of the standard grammar-checkers. Other applications could do SGML markup, topic classification, or message filtering.

More interestingly, one could do granular message filtering, where you filter the words and ideas within a message rather than messages as a whole. At PC Forum, Oracle's Brett Newbold and developer Kelly Wical will show such an application. It's not a product but a software tool/component that works with the output of the text engine -- a sort of intelligent reader. It could enhance a variety of other applications or services, such as a mail tool or a text-based information service. Given the cost of the text engine in terms of resources, it's more likely to be used on a server than at each user's workstation. The results could then be used by individual readers or other recipients.

Just tell us the good parts

Basically, the "reading tool," familiarly known as Griff, generates multiple versions of each sentence in a text, each one terser than the last.

The system uses its knowledge of the text. (Originally, we had written: "In essence, the system works by making use of its knowledge of the text.") At the first pass, articles, meaningless phrases such as "of course" and "in fact" and "interestingly" are removed. So are appositive clauses and other filler matter. You can judge the quality of your writing by how much gets removed; if the content-to-waste ratio is high...draw your own conclusions. We'd love to try it on some press releases! In fact, we think that this idea -- this notion, so to speak -- is really quite a provocative one that could certainly use some thinking about if you happened to be so inclined.

As the system goes through the text, it also uses short-term memory. The first time a certain phrase shows up as the topic of a sentence, it rates attention. But as the term is used again and again in the same section of text, it loses importance. For example, at this point the word "text" doesn't add much.

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In the second and third levels of reduction, certain types of subsidiary clauses and other secondary items go. (In the preceding sentence, you'd lose everything up to the comma; in this sentence, you'd lose everything up to "you'd lose....") Nouns tend to last longer than adjectives; action verbs last longer than phrases such as "tend to," which the system recognizes as fundamentally meaningless.

The final iteration is simply a single word or phrase that represents (in principle) the basic topic of the sentence. In the fourth reduction, only a word or phrase remains per sentence; sometimes the sentence is deleted entirely (as this restatement of the preceding sentence might be).

This section is an example of the third level, with the most important themes highlighted in italics.

You can use the output in a number of ways. You could simply list the topics of each sentence and delete the leftover text, you could print the summaries, or you could view the entire text with important information highlighted or in red ("John Dvorak mode," you might call it). That mode is likely to be the most commonly used for some time; it provides comfort to dubious readers that they aren't missing anything.

The potential of such a tool is obvious. Think how much more readable it would make one's e-mail, Chuck Digate. Or how it could improve the legibility of online services, Steve Case or Ray Ozzie. Or resumes, Bill Clinton and Steve Leung of Resumix. Even the CIA could use it, [deleted]. Since this is a malleable tool, not a shrinkwrapped product, a developer could customize the server to reflect a particular user's or company's notion of what's interesting, using corporate buzzwords or a particular person's worldview.

As a writer, we can also see it as a tool to improve writing (like Hypersoft's Inteltext, page 36). Too much compression, and you know your original was too wordy. If it highlights the wrong ideas, maybe you weren't clear in the first place. Got it?

REID, VERITY/FRAME -- TOPIC IDENTIFICATION AND MORE

As we mentioned, there are direct manipulation tools that allow you to use and manipulate content, there is content-based software that lets you manipulate generic content in conjunction with your own information, and there are tools to refine content -- to take existing inexplicit content and derive information that wasn't explicitly put in by man or machine.

Verity's Topic, co-designed by Cliff Reid, is a tool of the third kind. But it does not use the typical word-matching, statistical approach of most text-classification systems, which allows you to measure the closeness of any two items and rank any number of items by their closeness to a target query or text sample; instead, Topic allows you to build a concept hierarchy of meanings. For example, "software" includes Microsoft; "Microsoft" includes Windows, Excel, Access and much of the rest of the industry; "Arizona" includes Phoenix and Tucson. Topic works primarily on the basis of words and of synonyms defined by the builder-user, but it can also use other "tokens," such as SGML tags or the symbols financial publishers use to
uniquely identify public companies, which make topic assignments quicker and more accurate.

Most other systems rely on the end-user for a model of how topics might relate; Verity's Topic requires a builder/user to construct such a model as part of the development process, which provides a useful, sharable framework for assigning texts to any part of a concept space. It works on UNIX, OS/2 and VMS servers; a variety of clients or applications can manipulate the text items as appropriate based on the attributes Topic supplies for them. For example, users could read items selected by topic; appropriate items could be forwarded automatically to various departments; a publishing application could assemble items on certain topics in a specified order or layout for distribution to key customers.

DIGATE, BEYOND -- SCRIPTING UNDER THE COVERS

While Verity helps classify plain text, Beyond's BeyondMail lets people create and work with more structured messages, or forms. The forms guide users in creating structured messages such as meeting announcements, bug reports, sales reports or other repetitive documents. At the other end, Beyond's BeyondMail offers a form interpreter, and a tool that allows users to create rules for how to handle the filled-in forms. For example, a rule set could look for certain values in certain forms in the field, and then take actions such as forwarding the form to a certain individual or group, or taking particular values and (using DDE) plugging them into canned replies or sales reports.

That's the BeyondMail application, with its own set of objects (forms) to interpret. Its underlying scripting language, BeyondRules, could easily be extended to handle a broader range of objects, such as database records, text items classified by topic (currently it can search for text strings in any field) or SGML tags. BeyondRules, now available in an API toolkit, accomplishes many of the functions of Telescript -- filtering and forwarding messages and generating automatic responses or actions (but it lacks the in-the-network support Telescript will get from AT&T -- unless it somehow adopts the Telescript syntax). In Windows, BeyondMail can also call any OLE application.

We have watched Beyond Inc. closely since before its founding in 1988. The company based its business on the work of Tom Malone at MIT (who spoke at PC Forum 1992). But Digate pragmatically took only part of those ideas, and built a commercial product that now has more than 50,000 users.

The original version worked with any MHS-based mail system (notably Da Vinci's e-Mail, cc:Mail) or any other system that could be reached via MHS; now it also works native on Banyan and interfaces to Notes (via BeyondNotes). Beyond has now expanded from its base by providing a module for Windows mail (WinRules) and a front-end to Notes. It is subtly encouraging the use of BeyondMail on servers, where it can act as a group agent or intelligent mail server instead of just as a single user agent. We would love to see it with its APIs exposed and integrated with powerful filtering tools such as Verity's Topic or the Oracle technology.

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PANEL: CONTENT SERVICES

Yesterday we talked about content. Today, we discuss content-based services. Like TSI International, which allows smaller firms to operate on equal terms with big ones as far as technical interfaces go, the middlemen we describe here will also help to make the marketplace more democratic. To the extent that trading becomes more an automated function accomplished by computer, it will tend to lower the costs to small firms of competing with large ones (since their costs will be per-transaction, and the broad systems investment will be made by the middleman). Equally, it will lower the per-unit cost to large firms of dealing with smaller suppliers, and will make the smaller firms easier to find and do business with. The losers will be vendors with high-priced commodities, who will no longer be able to rely on "special relationships" with their customers. They will be forced to provide genuine value-added instead -- perhaps in the form of some exclusive ancillary information/content service, such as performance support.

AMOCHAEV, QRS -- I'VE GOT YOUR NUMBER!

Tania Amochaev is president of Quick Response Services, the doing-business name of FRJ&. QRS runs a traditional buyer-vendor EDI service for the retail industry, where it is a reseller for IBM’s Information Network services and a leading supplier in the field (neck and neck with General Electric Information Services). To that service it adds content -- a database of 18 million Universal Product Codes. Although strictly speaking the information isn’t proprietary, QRS makes a good return for the task of collecting it from the vendors and making it available to just the right retail customers: Companies on both sides of the deal pay QRS $135 per month per trading partner, up to a cap of $2700 per month. That is, for Macy’s to get UPCs for Bali’s bras for one month (an unlimited number of queries, or conversions of a list of product descriptions to UPC numbers) costs Macy’s and Bali’s each $135. (See Release 1.0, 11-92.)

QRS has placed itself squarely in the middle between vendor and buyer, and also benefits with a small fee from each transaction between them. It’s in the enviable position of a wholesaler, but without the logistical problem of actually handling any goods. This kind of information-middleman role will be a significant one in the future, we believe.

Aside from their profitability to QRS, these services also benefit the small firms who can afford to trade through such middlemen, but who would be crowded out in a world of direct transactions between giant firms.

LIEMANDT, TRILOGY -- SABRE FOR COMPUTERS: (FOR STARTERS)

Trilogy began its life as a software product company, selling a high-end tool, SalesBUILDER, designed to help a vendor configure complex products (see Release 1.0, 10-91). Used by salespeople, SalesBUILDER enables them to fill a customer’s needs correctly, suggest appropriate add-ons and accessories, and minimize misorders, either combinations that won’t work or combinations missing items that then need to be supplied for free (because it wasn’t the customer’s fault). Satisfied customers include HP, LSI Logic, Silicon Graphics, Octel, Pyramid and Data General; AT&T (for PBXes), Rolm and Compaq have just signed up.

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The company initially focused on its Silicon Valley neighbors when it started in 1991, but it has since broadened to serve other vendors of complex products such as Navistar (trucks). Fundamentally, SalesBUILDER is a rich object-oriented system that allows a builder-user to represent components and their complex interactions; although its initial use is for configuration and sales, it could also be used as a guide to assembly, manufacturing or even the interaction of software modules. (Of course, the data need to be correct.)

So far, Trilogy has sold its tool directly to product vendors, and reached sales of over $10 million in 1992, its first year of shipments. An obvious extension suggests itself: What about configuring products with components from different vendors? The beauty part of this idea, a project code-named Conquer, is that Trilogy could act as an intermediary and collect transaction fees, since few vendors would like to put their information in a competitors' hands, but they might trust Trilogy.

The idea is something like the sharing of help-desk information that Compaq is encouraging with a variety of third parties, but for a different point in the sales cycle, and for a different purpose. The company hopes to be in operation by year-end. Long run, we expect that most vendors will beg to be included. To the extent that Trilogy can't deal directly with vendors, it will work with retailers and other third parties who want such a service.

The business model is intriguing: Trilogy should be able to charge both the users and the vendors whose products are presented (wait till the FTC gets hold of that five years from now). Will there be charges of favoring certain vendors and unfairness? Trilogy should be so lucky. Unlike American Airlines' Sabre, however, it is in a stronger legal and ethical position, since it sells none of the configured products itself. Thus it is on an arm's length basis with the suppliers of the products it lists and will highlight any of them for a nondiscriminating fee. And of course, if it gives bad advice, it will lose its market. If it gives good advice, it should have a long and happy life.

Indeed, in its underlying engine Trilogy may just have the software for a knowledge base from which an application could transform product designs to manufacturing instructions to assembly instructions, configuration aids and support information. Change the Trilogy model, and you get a whole new set of all the relevant documents and content-filled software.

Trilogy was founded by Joe Liemandt, straight out of Stanford. He now has assembled a team that includes former senior executives from ComputerLand and Syntelligence, among other places. However, the company still hasn't found the perfect visionary manager for Conquer. (Yes, a free ad!)

DICK BRASS, ORACLE -- KNOCK, KNOCK, DATA FREIGHT!

Long ago, Dick Brass worked at the New York Daily News, where he was features editor. Since then he has founded Dictronics Publishing where he acquired exclusive electronic rights to many notable reference works, sold Dictronics to Wang and worked at Wang for three years, worked for Ken Koppel at Ziff (two weeks), and founded General Information, which sold the first electronic phone directories on disk.

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In 1989, he joined Oracle to start Oracle Data Publishing. Its Data Freight service, he says, will ship information over the air at speeds 100 times higher than existing data services, in a technology he hopes will win an experimental FCC license later this year. The goal is to operate nationwide by the end of 1994. (See Release 1.0, 10-92.)

Whose information? is the obvious question. The plan is to be simply a re-distributor, not an original publisher (to avoid competing with customers). The idea is to go mainly after print or at least non-electronic publishers, since that market is hundreds of billions a year, versus only $10 billion or so in electronic publishing. Data Freight will provide the publishers with mostly incremental revenues from electronic publishing rather than cannibalizing print revenues, the theory goes. Of course, the medium could also be used for delivery of software or of data. Eventually, Oracle hopes to sell databases to customers who collect a lot of data.

In the end, the role of a middleman service such as Data Freight will probably be to add some value-added that no single publisher could do on its own, combining the content from various sources in a uniquely interesting (useful) way -- much as Trilogy will.

ATCHESON, MUSICNET -- I KNOW WHAT YOU LIKE!

John Atcheson of MusicNet has a different vision of a buying service -- and of what content is. Yes, MusicNet sells records, disks and tapes, or content, but its value lies not in the goods it's selling, but in content about the goods and their buyers. (See Release 1.0, 6-91.) The system will watch buyers' preferences and behavior (as connected with purchases and queries only) and use it to predict what other customers might like. (It will start its database with customers' lists of their ten favorite artists.)

In simple terms, the service works on the basis of, "You like Linda Ronstadt? Most people who like Linda Ronstadt also like Bonnie Raitt. How about...?" From the vendor's point of view, MusicNet will offer the ability to try out a new artist on a specially selected focus group, and then figure out which subsets of customers to promote it to. (Or it may allow the vendor to avoid a disaster before it costs too much!)

The algorithms, of course, are slightly more complicated, but they're akin to those used in text classification and case-based reasoning. In effect, they're an attempt to electronically emulate word-of-mouth.

As with other commercial media, MusicNet's market is both people who buy the music and those who sell it -- to whom it is delivering customers just as television or newspapers deliver an audience or market. "We've got the six major labels to pledge their support -- Warner, Capitol/EMI, MCA, Polygram, BMG, and Sony," Atcheson says by phone from a hotel in Beverly Hills.

As investors, MusicNet has signed up Apple (with two "strategic loans") and Tandem as a supplier of the data- and algorithm-crunching server with generous credit and support terms. Equity funding of $275,000 is from Mayfield Software Partners, along with additional money from individuals. (Esther Dyson is a limited partner of Mayfield Software Partners.) Founder Atcheson has a background as a singer, songwriter and producer, and since 1986 has

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worked for Digidesign and as a consultant to Apple and MacroMind. Tim Mott is on the board, and the company has just hired QuickTime project manager John Worthington as director of engineering.

MusicNet is scheduled to test a pc version of its service this fall, but for now it works fine over a telephone. Ultimately, MusicNet plans to operate over interactive broadband networks, with CD-quality audio and full-motion video (yes, we’re all waiting for it!). For now, phone-quality music just makes you want to buy your own to play locally.

PORAT, GENERAL MAGIC -- MAGIC FOR PEOPLE WITH MOTHERS

The finest moment of the General Magic press conference: AT&T’s Bob Kavner explains how he could send a message to his mother during a boring meeting.

General Magic illustrates many of the themes of this conference: the melding of content and communications into delivered information services; the empowerment of almost anybody to become a content provider (although that begs the question of their ability to persuade the market to buy); and the notion of making communicated content more alive (you can send people things to execute on their machines, with appropriate security constraints). This last is not a new idea, but the notion of making it into a broad, useful standard is. (In extremis, viruses are one example.)

Further, as described by Jerry Michalski in our January issue, General Magic joins the intelligent user device with complementary services in the cloud. Each side does its allocated part best: The device holds local information about and for the user (both sender and recipient), and talks to him with a friendly, intelligible and intelligent interface. The cloud holds (access to) directories for the whole world, coordinates delivery of messages, and provides -- from other devices or servers -- a variety of outside information. (Sometimes it consolidates and processes information from a variety of sources, a la Trilogy or most of the text consolidators/distributors.)

The architecture

We haven’t yet seen General Magic’s code, but its architectural thinking is elegant. Take the tidy separation of user environment and interface (Magic Cap) from scripting tool (Telescript). Each platform vendor can supply its own environment (or license Magic Cap), but service providers and users can communicate easily across platforms using Telescript APIs and verbs. Magic Cap is simply a user interface to the Telescript communication functions and to information and other services that will accept Telescript commands.

General Magic apparently supports our contention that operating systems are less interesting commercially than cross-platform, content-rich tools such as Telescript. Each device vendor will offer an OS/environment for Telescript and compete in a brutal platform market; we believe the more differentiable businesses will be those of the service providers who use Telescript as a standard tool/language to deliver and enhance their services. Overall, General Magic should have a relatively easy time convincing developers to use Telescript, but many platform suppliers will compete vigorously with Magic Cap. Apple/Newton and EO/PenPoint (EO is an AT&T partner, remember) have already made noises of support for Telescript, but not for Magic Cap.

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A second architectural construct is the client-server distinction. Magic Cap, EO/PenPoint, Newton and other user environments will run clients to Telescript public messaging servers, provided mostly by AT&T EasyLink. Telescript-enhanced content servers from vendors such as News Corporation, Intuit and Mead Data will also use the communications services as clients.

General Magic seems happy to let others compete with Magic Cap to provide a user interface to Telescript; that's the price of getting Telescript accepted. However, AT&T, the main provider of Telescript backbone communications services (aside from Motorola's cellular services), is less open-minded, and has won a 30-month de facto exclusive on Telescript public messaging services in the US. However, providers of information services are very welcome. (Perhaps that's just an indication of how much harder communications services are to differentiate.)

Tell about Telescript

The Telescript language, which GM founder Marc Porat envisions as a sort of PostScript for communications, can operate within any number of OSes and communications environments. It handles the nitty-gritty of communications and messaging -- forwarding, manipulating directory information and access to it. It can deliver queries or commands to whatever content services Telescript-using information providers care to make available, ranging from calendar entries (individuals) to public databases or text files (commercial information services). It will easily support applications or extensions that deal with such functions and concepts as agreeing to appointments or counteroffering (same place, different time; or with Juan but without Alice; yes, but only for half an hour). But it is not as rich as, say, Action Technologies' conversation manager, which handles offers and counteroffers, replies and confirmations -- although it could easily be extended to do so.

Many PDAs offer such functions as interactive applications, but it's difficult to send the in-case statements for remote execution along with the message: "If he's not there, then send it to his boss." Telescript makes such actions scriptable (usually through a friendly front-end) by the sender as well as the receiver, and thus automatable. However, environments at either end have to understand the detailed semantics for any real negotiation to take place; Telescript simply manages what happens to the envelope, not the message inside (the message inside could be a Telescript reply script.)

Telescript does not provide a standard user interface; that's up to the developers of the apps and various platforms. One example, of course, will be General Magic's own Magic Cap, running on various hardware vendor's platforms (and GM's own not-for-retail-sale reference device). However, GM is likely to make a lot more from its Telescript licensing fees than it could have made from selling its own devices into what promises to be the world's next great overcrowded hardware market.

The scenario

Our message-sending test is the following. Juan wants to have lunch with Alice next Thursday. If she can't make Thursday, he could do it Friday, but he'd really prefer Thursday, so he doesn't want to even mention Friday unless she refuses his first offer. In a normal e-mail system, she gets his message, and eventually sends one back that says, "Sorry, busy Thursday."
By the time he gets her response and sends her a message about Friday, she has booked Friday as well.

With Telescript, the system has a verb for refusal, so that Juan can program his message to try again immediately with a second message: "How about Friday?" When his agent receives Alice's refusal, on her machine, it tries again with the second message, and returns triumphantly with her second reply: "Friday would be great!"

This sounds wonderful, and so it is. But there's a third variant, which points out the flaw: Telescript understands yes and no, but it can't go inside the envelope to understand the reason for Alice's refusal. If she replies, "Sorry, busy for lunch, but how about a quiet dinner that evening?" she'll still get the same second try: "How about Friday?" Worse yet, does he mean Friday lunch -- or a quiet dinner on Friday evening?

The solution to all this, of course, is a richer form of Telescript that would understand the semantics of calendar management. Someone will surely develop it. In fact, so many people will offer one that it will be hard to settle on a standard. Perhaps General Magic should be arrogant enough to impose a general standard; it would surely help all our social lives!

The partners

GM so far has done a good job of lining up significant alliances, notably three leading consumer electronics vendors (Philips, Matsushita and Sony) who together control a majority of the consumer electronics market, along with communications and device suppliers AT&T/EasyLink and Motorola. AT&T partner EO will be one of the first users of Telescript.

Porat originally got into this business at Apple, where he was brought in in 1988 by Larry Tesler to design new businesses based on advanced technologies within Apple. And so he did... But basically, says Tesler, "He designed an industry, and we decided it would be easier to get third-party support if it were partially independent of Apple." In 1983, Porat had founded Private Satellite Networks, which builds and operates satellite networks.

ROSENTHAL -- SOFTWARE AS PRODUCT: HOW TO DEFINE, MEASURE AND SELL ITS USE

What we saw last year in hardware, we will see this year in software. At the software end, most pc software products are becoming little more than commodities -- and at last their prices are beginning to reflect it. As they become commodities, one way to differentiate them is through packaging -- not the boxes, but the terms and conditions and support options. One close watcher and even fomenter of new ways of defining and delivering software is Forum speaker Mort Rosenthal, founder of Corporate Software.

Under Rosenthal, Corporate Software has been one of the leaders in anticipating and benefiting from such changes. Founded in 1983, it resells pc software directly to large accounts -- sort of one-stop shopping and support for companies too big to go to retail stores and dealers, and accustomed to providing their own hardware support. Like the middlemen mentioned above, it benefits from its extensive knowledge not just of a variety of vendors' products, but of their interactions, both productive or disastrous.
In many ways Corporate Software behaves like a mainframe software vendor, working directly with its customers, providing full-scale support and services. It has been an innovator in licensing practices, and works closely with vendors in shaping terms and conditions of product licensing -- the definition of intellectual property, in a word. In conjunction with the vendors, Corporate Software can reduce the costs to users by assisting with upgrades, licensing arrangements, electronic delivery, etc. (In the same way Dell is becoming more and more of a product designer by means of its catalogues, pre-loading of software and other activities in the area of delivery and support of commodity products.)

Corporate Software also works more directly with vendors. It was a beta user of Notes for two years before the product was announced (and is now a major Notes reseller). It also provides support on behalf of several vendors who don't want their names used; customers who call think they are getting the vendor itself. And it is managing a large number of Windows NT betas for Microsoft.

LUNCH: TOM RAY ON ARTIFICIAL LIFE -- IT'S A JUNGLE IN THERE!

Artificial intelligence, broadly speaking, attempts to simulate human reasoning by automating various intellectual processes such as rule-based reasoning, pattern recognition, grammatical parsing and the like. Artificial life, by contrast, works from the bottom up, simulating the most important features of life -- reproduction and evolution as succeeding generations of individuals are selected according to some criteria (natural or otherwise) and become better at meeting those criteria. So-called genetic algorithms are algorithms that are evolved to become better and better at solving particular problems such as scheduling, design and constraint resolution.

Tom Ray's critters, basically small programs that start out doing little beyond reproducing, are less sophisticated in most ways -- but closer to life. In essence, they start out as creatures that grab memory (in order to have space into which to reproduce) and copy themselves into the memory. Generation by generation, little errors accumulate that allow some individuals to become more efficient at reproduction and grabbing cycle time. They crowd out the less efficient ones with stunning speed. The tricks they evolve look suspiciously unnatural -- but that's only because in the space of a few hours the program has selected them from thousands of generations of millions of individuals.

Ray himself is a biologist, not a computer scientist, who learned his craft in the jungles of Costa Rica watching plants, beetles, butterflies and ants. Now he's found a more congenial physical environment as a fellow at the Santa Fe Institute, the major institution devoted to the sciences of complexity. In the remotest reaches of computer memory, he studies creatures who evolve at such speeds that he can watch the process -- instead of merely the results -- of evolution. We like Ray's work because it's so untheoretical: He experiments rather than programs.

For further reading, we are handing out copies of Steven Levy's Artificial Life to Forum attendees. (See also Release 1.0, 4-92 and 5-92.)

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AFTERNOONS: COMPANY PRESENTATIONS

These sessions illustrate some of the themes outlined in the mornings.

BOOKS THAT WORK

Books That Work was founded last summer by president Dan Levin and CEO Stuart Gannes. Levin was a MIPS software engineer-turned-marketer who managed the Digital and Wang relationships. Gannes is best known to this industry as a reporter for Fortune (1985 to 1990) and then as the Jerry Michalski of Stewart Alsop’s P.C. Letter from 1991 to 1992 (after a stint at MIPS). However, he has a more relevant background too: eight years at Time-Life Books as a writer and editor of several how-to series, plus two years at Time’s ill-fated electronic publishing venture, Time-Teletext (1981 to 1983).

Based on that experience, he has dreamed for years of publishing books as software. These are not mere texts rendered more interesting with animated illustrations, hypertext links and additional annotations, but CAD tools content-enriched with specific formulas, diagrams, instructions and possibly even advertisements. Hardly generic, they focus on specific tasks. Thus the first in the premiering backyard builder series is the hardly universal "Designing and building your deck."

"Designing and building your deck" may not make the best-seller list, but it’s likely to find a solid niche market. What makes a good content market is not necessarily size but reachability, and this market is reachable and actually quite large. Sunset’s best-selling home improvement book is "The Sunset Deck Book" (125,000 copies a year and 50 percent market share). BTW should be able to sell through a number of homebuilder and home-improvement magazines such as Sunset and Better Homes & Gardens, as well as hardware stores and lumber dealers, home maintenance catalogues and the like. It could also provide a medium for advertisers who use such media. Who’s a better market for a cordless drill than a homebuilder whose software has just told him he needs one? (And how about a Telescript link direct to a merchant of same?)

Gannes, of course, hopes that though "Designing and building your deck" is specific, the concept and some of the underlying software is generic. The underlying tool is a CAD program with a few constrained models already loaded. There are some basic components to a deck -- a flat surface, an underlying support structure, attached to a wall, with or without stairs and railings. The kind of brace underneath may vary, as well as height above ground and the size and shape. And of course there are different layouts, species of wood and dimensions of boards, and so forth. Software guides the user through the process, as he answers questions, makes choices and follows instructions. As he goes, he can display the deck from a variety of perspectives, or see the bracing underneath. The software calculates the resources needed -- both boards and nails, for example, and appropriate tools. It can also calculate costs, based on the user’s locale (roughly) or prices he enters (as charged by local merchants). For certain tasks, it can provide handy tips, animations, estimated times and other useful information.

Of course, the tool is helpful to someone actually building a deck, says Gannes. But it will probably also be as appealing as a fantasy game to many a homebuilder -- imagine if I built a four-foot deck with three-foot railings, and put up a wall.... Call it computer-assisted doodling. It could
also allow a non-handyman to show a contractor precisely what he wants (and perhaps to judge the progress of the work), or a contractor to entice a customer.

The business model is appealing: The underlying design engine can probably be reused for, say, build your own fences or build your own toolshed, play structures, planters or benches. On the other hand, build your own bathroom would require a lot of specific knowledge about pipes and plumbing that build your own deck lacks (even under the covers). But build your own bathroom could benefit from the distribution channel BTW will build up.

So far, BTW has six-and-a-half employees: Gannes; Levin; Kelly Rodrigues, from Ogilvy & Mather; a half-time office manager; two programmers; and Jim Rosenau, a well-known (in his field) Berkeley contractor specializing in decks and patios, who resisted Gannes's entreaties five months before joining the company. Funding comes from Hummer Winblad.

PENMAGIC -- PERSONAL CONTENT

The personal device is the last bastion of personal computing at a time when most pcs are cogs -- pardon us, clients -- in extended interconnected corporate networks. If you want to send letters about a special offer or a sales seminar to the 100 clients with a promising buying pattern ("4qrev > $20,000 and location = PSP or SAN"), the department server can do it. No sweat.

But what about the kind of letters your mother wanted you to write, but they were always too much trouble? How many times have you written almost the same letter: "Thank you so much for... It was a pleasure working with you on... I really enjoyed our meeting, and your insightful comments on... I look forward to working with you again soon/in the future/whenever you need our ...." These letters don’t need the heavy-duty industrial strength of a desktop word-processor with a mail-merge program, the kind of thing that lets you send out hundreds of almost identical letters to hundreds of prospects you’ve never met.

It’s half boiler-plate, half personal. You send it out after a pleasant meeting, sales call, when someone does you a favor. (You do, don’t you? Or if you meet someone on a plane and send them something, do you just scratch a note on your business card?)

What you want is a flexible way to intersperse the boiler-plate with the particular. That’s what PenMagic’s LetterExpress provides. It’s kind of a letter construction kit that runs on the PenPoint operating system on several brands of pen computers. You start out with the basic format, and then you select things from an intelligent menu. To the system’s internal content, you provide about as much information as you might give a secretary: "Send Fred a letter thanking him for our meeting last week -- and add thanks for being so flexible about rescheduling it at the last moment. Then tell him I’ll call him back as soon as we get an answer from the suppliers about the pricing. And then add best wishes to his wife -- what was her name? -- and hope that she gets over her broken leg soon." Now that’s certainly within the capabilities of any normal secretary (as long as you’ve got a spell-checker), but it’s just too complex, with too many nonstandard extra clauses, for your typical mail-merge program.
With LetterExpress, you can start the letter by selecting "Thank you for ..." -- one of the smart templates that come with the program or perhaps one custom-created by you or your department. You pop up access to your personal address book; there's one in LetterExpress but you can also use one from another vendor. Then you tap on other menu choices to continue with the letter. You can get a second list of things you usually thank people for. You might carefully write in a phrase about Fred's flexibility -- which probably won't be on the menu unless you have really bad habits and load it into the customizable pick list of phrases because you use it so often. Now back to the "next actions" menu for the next section, and the "closings" menu. For Fred's wife's name, you can pop up access to your personal database, select Fred's record, and there's his wife Cindy. You tap on the word Cindy with your pen, and paste it into your letter.

You've spent just a minute or two, you've carefully printed in a couple of words for the text recognizer, and your letter is ready. You can also add a personal touch by writing a message off to the side that will remain in "ink" rather than be converted into text. Now, you can send it over e-mail (sans ink, for now), fax it, or connect up to your pc later on and print it out for mailing. (Your personal device also includes default information on how to reach your correspondents.)

PenMagic's LetterExpress, of course, is only one example of nifty combination of content and processing power put to the service of individuals. (There's no reason to limit it to mobile or pen machines; please put it on our desk, too!) The tool itself may well be part of the operating system someday -- a text-assembly service -- but the content is unique and customizable, and provides an opportunity for vendors to create a huge variety of boiler-plate for specific markets. Companies may also have their own preferred expressions. Another option would be to hook the underlying engine up to, say, BeyondMail or Telescript and some sort of recognition engine; then you could generate automatic responses to incoming mail. Best to have a person look at them though, until the technology is foolproof...

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Coming soon -- possible add-ons for LetterExpress:

- Burke's apologies (1,001 excuses for all occasions)
- 101 reasons for a down quarter
- Alsop's greatest open letters (a collection of insults and suggestions suitable for most companies)
- "The dog ate it" and other teen-age favorites
- Bug bites: 100 calming responses to angry users
  (guaranteed not to admit liability)
- 50 ways to leave your lover

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MATHSOFT -- CONTENT IS RAZOR BLADES

MathSoft just went public a couple of weeks ago at $13 rising to $22, with a multiple of more than 100 times trailing earnings. That was probably more due to its stellar financial performance than to its identity as a vendor of content software. It makes extremely good money by marketing intensively to
its installed base of Mathcad tool users, and providing them with content-enriched templates, formulas and equations that can be executed by Mathcad.

MathSoft’s information is unlike most content we discuss here: It doesn’t change much. "After all, Planck’s constant is Planck’s constant,” founder David Blohm once said. That means its titles have a long shelf life -- but a low replacement market. For now, MathSoft has a way to go to "electronify" the $2-billion-a-year technical and reference market; by the time it has saturated that market, engineers will have dreamed up new disciplines. There’s always the opportunity to update things, provide new versions for new machines, and add better simulation and multi-media capabilities.

The basic tool is a neat combination of an abstract mathematical tool with extensive information about specific objects in physics and engineering (depending on which handbook you buy). To extend it, MathSoft publishes content -- applications packs and electronic handbooks, with scientific technical formulas, techniques and rules of thumb in "living documents" that let users apply them directly to their data. They include search tools, hypertext links, and other useful functions. This allows the company to leverage its installed base of tools with a broadening set of industry- and function-specific Electronic Handbooks for engineers, chemists, designers and other technical people.

MathSoft provides a model for how to publish information that’s alive instead of dead until a user does something with it. With OLE, it can also plug results into or take values from other applications.

KNOWLEDGE ADVENTURE -- HOW MANY ADVENTURES ON THE HEAD OF A PIN?

Knowledge Adventure is Bill Gross’s second company. He sold the first one, GNP Development, to Lotus in 1985 and stayed there for six years to manage the HAL (a natural-language interface to 1-2-3) and Magellan businesses. Technically astute, he also happens to be one of the more imaginative people in his use of content-oriented software technology. HAL was basically an extremely clever parser combined with a grammar for 1-2-3, and a patternmatcher that could generally figure out what a user was trying to do. (However, most serious users of the product ended up preferring commands.) Magellan uses clever indexing and compression techniques to give users quick access to files -- a capability now widely available.

At Knowledge Adventure, married and with a son who is now six years old, Gross started out with the idea of publishing content for kids. But of course, he started to tinker again, and rapidly came up with some technology under the covers that makes a difference to users.

His experiences illustrates the point that the low-end (or at least mass-market) may be an appropriate place for high-tech that enables you to make the formerly impossible not only possible but cheap. Knowledge Adventure has graphics and visual display to rival those on many workstations. In fact, much of the content is created on a workstation, and then compressed for interactive replay on a Knowledge Adventure platform -- a 286-and-up pc.

Knowledge Adventure’s products use a variety of compression and real-time playback techniques which the firm is licensing to other content providers.
Specifically, KA does pattern recognition for texture, stores differences for displaying sequences of frames, as in movies or panning shots around a 3D scene: take the starting scene and add the appropriate differences in any direction. The differences are stored not on a pixel-by-pixel basis, which is expensive especially when things move across the screen, but with an object-position language that describes how things move as a whole. Overall, it has the efficiency advantages of vector over raster.

In general, Knowledge Adventure uses a more clever, content-sensitive approach to compression than most other compression tools, which focus on patterns of bits and look for redundancy or statistical repetition. KA's technology takes into account the kind of information it is compressing -- video with movement, voice or instruments -- and then models the higher-level objects. In a sense, it's a sort of content derivation, turning the data into objects and models; then the decompression is a simulation of the actions of those higher-level objects.

For compression of movies and other moving images, KA uses a form of object recognition: A very slow (even Gross says so!) pattern-matching algorithm patiently searches all the frames in a sequence to identify objects and record their movements from frame to frame. This is extremely "asymmetric" compression: slow to compress but fast to decompress. For example, the process takes about four hours on a 486 for a typical 15-second sequence that takes up 50 megabytes of pixels (that amounts to two months for a 90-minute movie; good news for Intel and its Pentium!). But it yields a tiny description file of only 100K that can be played back in real time from a floppy disk on a 16-MHz 386SX by reconstructing the frames on the fly. Quite a feat!

Knowledge Adventure takes a similar approach to sound and voice compression. The voice compression, for example, "recognizes" the fundamental resonances and harmonics of a speaker's vocal cords, so that it can produce the original waveform (or something very close to it) from an extremely compressed file of time and frequency information. In this case, the recognized pattern is the decompression of abstract speech into the timbre and harmonics of a particular person's voice; this technique could also be used, interestingly, to generate realistic sounding "recordings" of someone saying words he in fact never uttered. The implications are intriguing....

KA itself is using these technologies to make interactive educational software, but it's also applicable to many other content vendors, including most of those at PC Forum. You can deliver straight movies this way, or you can use random access to look as if you're moving around in space or changing the flow of a story, simply selecting the appropriate frames depending on the direction the user indicates with a joystick or mouse. Obviously, these approaches save on data but require extremely clever algorithms to accomplish effectively on a pc -- the algorithms KA is licensing. We couldn't hope to explain it more fully (nor does KA want to give away all its secrets), but you could always read Bill Gross's patents once they're awarded.

Aside from all the technical stuff, Bill Gross will demo some of his educational Adventures, and give away copies of the new Peter Rabbit adventure (to show off the fine technical points to your two-year-old, of course).
ADOBE AND NO HANDS -- HAVE ELECTRONIC PAPER, WILL TRAVEL

Two companies, Adobe and No Hands, are demonstrating superficially similar approaches to "electronic paper" -- how to distribute pages to a broad variety of computer systems without losing their look. The idea is to be independent of operating system and output device. The purpose of these systems is to allow any page to be printed or displayed anywhere, by any machine or on screen. It is not a document interchange standard; what it produces is not editable or otherwise modifiable (except as a display object), although it is searchable and annotatable. Yet you don't want a fax system, since you want color, you want the addressability and searchability of text, and you want better compression than you get with straight images. In other words, the ASCII is still there, so anyone can create a shadow file that contains an index, markups or other items referring to the original. (And you could of course pull off an ASCII representation that would then be editable, but without any of the formatting.)

Both systems work with the notion of tool that produces a file for distribution, and viewers at the other end that allow a user/reader in (almost) any environment to receive and view the file, page by page. Both create files with a tool that looks like a local printer driver to the local application; Adobe's Acrobat also converts PostScript files directly.

Both companies will sell through normal channels, but both will probably also try to get publishers to redistribute viewers to their readers with a small fee to Adobe or No Hands for each copy.

But there are also differences. Adobe is trying to set a broad standard, based on PostScript and its SuperATM multiple-master fonts, while the smaller No Hands is trying to navigate among standards, producing files and specific viewer tools for a variety of environments. Thus Adobe has to do the work only once and can then rely on PostScript (assuming the broad existence of PostScript), while No Hands must keep up with changing display systems and graphics drivers as they evolve. Adobe's big challenge will be to gain broad market acceptance; No Hands' will be to follow its Macintosh implementation of CommonGround with a Windows version this summer (or its whole premise falls through).

Broadly speaking, in the majority of cases CommonGround and Acrobat will display normal business documents nearly identically. In some cases of fancy typefaces, at fixed resolutions, CommonGround will have an edge. But for viewing at non-standard resolutions, or for many printing tasks, Acrobat will do better. Thus CommonGround may make most sense for electronic publishing on-screen, since it is resolution-dependent and oriented to Mac's QuickDraw and Windows' GDI, while Acrobat addresses the crowd who want high-resolution printing and the kind of graphics manipulation (Bezier curves) PostScript can provide, but without complete fidelity for nonstandard fonts.

Thus CommonGround is suitable for distribution of pages to a known range of environments, especially Mac and Windows displays, whereas Acrobat is more appropriate for high-end, unpredictable information transfer to a broader range of environments and printers, including machines not yet developed.

Both should be priced a little under $200 per user, with volume discounts for the readers.

Release 1.0 21 February 1993
Adobe -- Papering the world with PostScript

Adobe has been announcing Acrobat (nee Carousel) for the past year, and should finish the job -- with prices and other terms and conditions -- later this spring, probably at the Seybold conference.

How does it work? (If anyone doesn’t know yet.) It takes the original PostScript output and turns it into a .pdf (portable document format) file, which assesses the characteristics of each font (width of each character, boldness, italic or Roman, etc.), so that a corresponding font can be created on the output device if it doesn’t have the original font. The file is resolution-independent, and can be displayed or printed at the best resolution of the target system. This works reasonably well with a normal range of fonts, but it works poorly if you’re using Olde English or something similarly exotic. (Then you need to buy an extra copy of the font set for the recipient, a practice which Adobe, a large-scale vendor of fonts, is happy to encourage. For symbolic fonts, it automatically sends along a restricted-use outline of the fonts, just as No Hands’ CommonGround does.)

Although you need a local interpreter (viewer) which includes the multiple-master font technology on each platform, the .pdf file itself is completely operating-system independent, and is in 7-bit ASCII for easy transmission. Acrobat also includes a text-search engine, facilities for hypertext links and annotations, and automatically creates thumb-nail views of each page for easy searching and viewing.

Acrobat sends a few parameters for each font, amounting to about 2K. Overall the system is efficient and elegant in memory and data transmission (except the need for a local viewer), but it requires more processing. Ultimately, the Acrobat approach could be extended to include multimedia and realtime font transformations, something that CommonGround would find hard to handle.

No Hands -- More self-reliant, less global

By contrast, No Hands’ CommonGround is a simpler approach. CommonGround is the long-awaited commercial realization of Farallon’s DiskPaper; creator Nick Gault, who had an informal agreement with Farallon, moved over to start No Hands and joined the company fulltime (with Farallon’s legal consent). CommonGround will probably be cheaper than Acrobat (although both companies will probably make deals with publishers to get their products out into the market).

CommonGround is perhaps more practical for now but less extensible in the long run. While Acrobat generates generic fonts on the fly using the parameters of the original, CommonGround sends bitmap font outlines along in the file. That’s efficient when the ratio of content to font varieties is high, but it breaks down when you have a variety of type styles on a single page; each font set for each size of the font, for a fixed range of resolutions (72, 100, 200 and 300 dpi), costs about 7 to 10K. However, CommonGround has an advantage when you use distinctive fonts (as No Hands will demonstrate), since it sends along the font images with each file.

CommonGround initially will have a smaller range of platforms. CommonGround currently runs Mac-only, but No Hands promises a Windows version for this summer, and a toolkit for UNIX environments (which have no common imaging...)

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model). You can easily copy or paste from CommonGround into local applications, whereas Acrobat lets you copy only text easily for now.

**The implications**

The good news about this is that you get a guaranteed original; no one can alter the payment amount on the third line, or change the ranking from poor to good (although of course you can copy the whole thing as an image to some local application and alter it at will). It is a way of capturing and distributing output, not of transforming input.

All this raises the interesting question of copyright and look and feel -- not of the fonts, but of the content overall. For example, people who receive Wall Street Journal material online generally get it as plain text; it looks just like the stuff from the St. Petersburg Times, Reuters or PC Week. Similarly, all the articles in our First! fax service (also available as e-mail) look alike. No one is happy with the situation as is. The stuff looks terrible; it's hard to read and has no identity. Ideally, Dow Jones, Dialog and First and other resellers would like the stuff to look good. They would also like to have a "look" that is identifiably theirs -- a certain typeface and style of layout (see Pages, page 35).

However, the content provider has different motivations. He'd like the content to look like his original publication -- an article from the Wall Street Journal in the Journal's font; a pretty page from Time Magazine; an excerpt from any of the magazines now so carefully produced by designers and style specialists -- no matter what service it comes through. It's no accident that most magazines prefer to do reprints themselves; they don't allow photocopies not just for copyright reasons but in order to control their image -- no messy photocopies; no retyped, possibly edited republications. The original look protects the integrity of the original and maintains its identity. (How you lay out all these items if they retain not just their type style but their shape and layout is another issue.) But to the owner of the information, the ability to retain its original look is an alluring one. Aside from ownership, rich layout and fonts also provide clues to the meaning and importance of the content.

Eventually, with viewers from Adobe and No Hands (and also Interleaf and Frame), electronic text will have more identity. As you search through an information service, the source will be identified in a listing as it is now, but the visual cues will be far more powerful. Lawyers, get ready!

**FOLIO -- PERSONAL ELECTRONIC PUBLISHING**

Like Acrobat and CommonGround, Folio is a tool for publishers with a one-way reader version, but it focuses on selection and organization of content rather than distribution of pages. The firm is a longtime alumnus of PC Forum, but it keeps coming up with impressive new developments on its basic product, Folio Views. A hypertext tool with text search, a marvelously intelligible interface and clever compression, Views is now in its third version, written in C++ for DOS, Windows and Mac. Once a standalone system for compressing and managing "infobases," or collections of text chunks that could be organized hierarchically, searched by keywords and synonyms and otherwise managed, it is now better integrated into the Windows environment.
(via OLE) and comes with proper tools for multi-user access and security, as well as WYSIWIG display with WP-level formatting capabilities.

The company has done an excellent job with the publisher's-friend approach, and is now the leading medium in the software-help, legal and accounting markets, with some 20 million viewers in users' hands. Aside from Novell, which was key to the product's success, it provides the underlying tool for the software-help systems of 3Com, Artisoft and WordPerfect (which is about to release a private-label version of Views). Views is also the medium for the disk the Interface Group hands out at Comdex each year. In the legal market, its customer/publishers include the Bureau of National Affairs, Barclays, Prentice-Hall and Computer Language Research; in accounting, the American Institute of CPAs, the Financial Accounting Standards Board, Prentice-Hall. All this was recognized by Mead Data Central, among others, which recently bought the company for an undisclosed amount. (See Release 1.0, 2-91, 7-91, others.)

INTERLEAF AND FRAME -- CIRCLING THE KNOWLEDGE BASE

While the world's systems integrators focus on client-server and multimedia, many of their customers are facing huge problems managing important corporate information that MIS never sees. The customers, in documentation and publishing departments, instead work with vendors such as Interleaf, with a staff of 250 consultants worldwide, and Frame, which recently acquired Datalogics, a consulting-oriented publishing system vendor. These two veterans of the publishing business are both moving towards the knowledge base model, Interleaf and Frame.

Although most of the customers aren't quite ready for the all-singing, all-dancing knowledge base as a back end for documents that we discuss on Tuesday, the concept of "database publishing" is catching on rapidly. That's everything from producing catalogues or phone listings to publication of on-demand documents: certain portions and variants of the text according to a variety of parameters -- data in the text, the identity of the reader, etc. This can be useful in producing targeted documentation for various models and configurations of products, on-demand repair instructions, customized reports for everything from insurance policies to form letters, targeted catalogues, and personalized newsletters.

Interleaf was founded in 1981 by David Boucher, now a partner at the firm that gave him venture capital, Applied Technology Ventures. Interleaf's initial product was a turnkey system; it included a Sun workstation and an electronic publishing system for 10 times the price of PageMaker. Times have changed, of course, and Interleaf made the painful transition to software-only in the late 80s. (Maybe Steve Jobs should talk to David Boucher.) The firm could legitimately claim to do more than PageMaker; it handled long documents, and it managed multi-user document processing and assembly. But it also had to compete with upstart Frame Technology, co-founded in 1986 by Charles Corfield and Mouse Systems co-founder Steve Kirsch. Thus Interleaf is now more a full-fledged text-, image- and content-oriented development system than a layout tool -- at a time when such systems are coming into their own. And Frame is acquiring companies that should offer similar functionality if they can all be integrated.

Release 1.0 21 February 1993
Interleaf -- Active documents

As competition heated up in the 80s, Interleaf moved in the direction of programmability for complex document-oriented tasks. It was one of the first publishing-system vendors to notice that you could do things on the basis of a document's content. Currently, it supports SGML, text-search, selective publishing with SQL interfaces, and the like. Its Active Documents environment is basically a LISP-based development system for building text-based applications that allow an application to treat text as objects, identified uniquely or classified by SGML tags or content classifications.

It can download data or text from a standard relational database; more recently, Interleaf has been exploring the use of an object-oriented database to manage rich, structured metadocuments more effectively. The company works closely with many of its customers, including Saab, Allen-Bradley, Amoco and Canadair. These are companies for whom information management, not just publishing or data manipulation, is a mission-critical task.

Interleaf is exploring the use of object-oriented databases as a repository. Currently, it offers RDM (Relational Data Manager), which includes an object-oriented layer on top of Oracle, used by Canadair and Boeing, among others. Revenues in 1992 were about $100 million, including $20 million of consulting services.

Frame -- Active acquisitions

While Interleaf has developed most of its expertise in-house, Frame is acquiring companies ranging from Datalogics, a high-end systems house that is the country's major supplier of SGML tools and systems, to Verity, the dean of content analysis. With the acquisition of Verity, Frame hopes to offer a soup-to-nuts product range with end-user tools, data access tools, content analysis and the like. Perhaps the biggest gap in its line-up is support for SGML: Although both Interleaf and Frame now "support" SGML, Frame's support is more recent and consists of add-on modules for its FrameBuilder that can parse SGML and DTDs (document type definitions, or SGML schemas).

Among other things, Frame hopes that Verity will give it the ability to classify incoming or stored texts automatically. Once they are classified, they can be assigned to the proper location or part of a document, formatted automatically, or quality-controlled to a human inspector. In a complementary way, you could build a structured document that described not just the object types, such as heading or caption, but also the content, such as "items about nonlocal companies, ordered by distance from Silicon Valley." (Seattle, Austin and Portland arbitrarily rank higher than actual distance would indicate; among countries, England, Germany and Japan rank highest.)

Obviously, this would be a handy technology in automatically constructing a tailored, personalized newspaper; it could also be applied to, say, collating a set of case study medical reports in a submission to the FDA, organizing an alumni newsletter into sections on various activities, and so forth.

However, the biggest part of Frame's business is still document layout and publishing, rather than online information management. The firm generated revenues of over $75 million in 1992, with about $4 million from consulting.

Release 1.0 21 February 1993
BOSS LOGIC -- BOSS LOGISTICS

If we don't watch out, Frame may well acquire all the companies doing company presentations here. It has just acquired Verity, above, and also owns 20 percent of Boss Logic, for which it paid $1.5 million. Folio, however, is off-limits; it was just acquired by Mead Data Central.

Boss Logic to some extent follows the model of a document as a view on a database, but the product itself is focused more on the management of a production cycle than on rich document assembly. That is, it knows more about files and components of documents than about the intricacies of textual analysis or the niceties of layout. It offers a combination of low-end workflow and high-end information structuring, currently all based on Sybase's SQL Server and in the NeXT environment (with Windows next quarter). Where Boss Logic differs from other more-or-less traditional document-management and image-flow systems is its support for compound documents. It is built in a clean, clear client-server architecture that makes it easy to understand, modify and extend (and will make it easy to move off its current NeXT platform).

A SQL Server application manages content and workflow for document/image-intensive tasks. They include compound document management, including version control, revision control (who may make changes), document structuring and assembly, and management of auxiliary information, such as links to clients, projects, etc.

Each document is represented as a (usually) hierarchical set of components -- chapters and diagrams, sections, captions and pictures within chapters, say, or sections of documentation relating to the different components of a product. They could also be the parts of an annual report, including formatted spreadsheets, artfully presented sales charts and flattering photos of the chairman surrounded by adoring employees. Need to revise the sales figures? No problem. Boss Logic reminds you that they're linked to the sales charts, so you'd better use the revised version of those too. Fire a board member? Get rid of his picture, quick!

The second part of Boss Logic manages workflow. Users can use forms to design workflows with routes, due dates, and different views for different users. You can query Boss Logic about the status of a job, all the projects related to a certain client, etc. You can define an approval cycle, say, or a trip to the art department for creation of appropriate decorations, etc.

Currently, Boss Logic is focusing on environments with structure-intensive compound documents, such as advertising agencies, technical and reference publishers, and customers such as investment banks who produce long, defined-format documents.

PAGES -- WHAT YOU SEE IS WHAT YOU REALLY WANTED...

As far as we're concerned, Pages is one of the best arguments for NeXT -- hardware or just software. Now it will soon be available on 486 machines with the NeXT OS. Pages solves the direct-manipulation problem of typical page-layout programs: After about the third page, you don't want to move things around the screen/page; you want them to move themselves. Pages al-
allows the user to select from a number of templates for layout, alter it to suit, and then let the system take over and resolve most of the conflicts and trade-offs. Rather than fixed layouts, it arranges and formats the objects to meet a set of rules that generally lead to a pleasing consistent layout not just for a single page, but for long documents as well (limited only by memory and disk). If you move the picture, then you have to move the caption, but now the third column is too long and the diagram on the fourth page no longer adjoins the text it refers to...and so forth.

The system is a clever combination of content -- user-specified parameters, design rules and constraints, text and graphics objects -- and executable code that places text elements so as to meet the constraints. It's exciting to watch it move things around a set of pages until it finally gets everything to fit -- unless you just spent half a day doing the same task!

grapeVINE -- LIVING NEWS

We wrote about grapeVINE at length in our August issue. grapeVINE is a database-based tool for managing and selectively disseminating content -- text information and any other objects that can be pointed to by a SQL database and delivered over a UNIX or OS/2 (and soon NT) server. The underlying database is usually Informix but could be any SQL server.

Basically, the system selects items and directs them to a set of initial readers, who can annotate them or raise their rated importance. Depending on the readers' annotations, the items may be delivered to other readers with different interests or with a higher threshold of interest. Thus the system combines its own fairly simple word-based analysis with feedback from human readers to flag items of interest and deliver them to the appropriate readers. That is, it augments its own automated selection capabilities with intellectual content supplied by human readers.

The system is easily extensible; people can change their profiles; user-builders can change the thesaurus within each server; and servers can send items to each other, so that a geographically dispersed can keep in touch without sending everything all over the world. A server is treated like a person: It has an interest profile that determines what information other servers send to it. (This solves in a transaction-oriented way the selective replication problem Notes addresses by having a developer decide which databases or sections of databases should be replicated to which nodes.) Indeed, grapeVINE would be an ideal match for Acrobat or Oracle's technology, among others. A distiller at the server could create .pdf files for delivery to any user on any user node. The database would point to the .pdf files, while grapeVINE would work off the associated full-text index files.

HYPERSOFT -- ACTIVE HYPERTEXT

Inteltext is a tool that can help organize text independently of the grand unified knowledge base. It's a single-user pc product developed by Dmitry Subbotin at Hypersoft, a start-up in Moscow. (Subbotin is the author of "The C programming language for the personal computer," which sold 100,000 copies in Russia.) Inteltext can find the inherent semi-linear structure...
for a set of text chunks and links without explicit topics and without (to start) an explicit structure. In essence, the tool derives the most appropriate structure according to the multi-dimensional web of hypertext links that already exist among the items. This presupposes an existing set of links which could have been created by hand, or could have been generated by an automatic process that connected keywords, or statistically linked items according to their degree of similarity.

Now in its second or third iteration (depending where you start counting), Inteltext automatically constructs coherent, linear texts from a set of text fragments. At the Forum, Subbotin will demonstrate how Inteltext can make coherent articles out of the scattered thoughts of "63 of the World's Most Influential People in Personal Computing," taken from the 15th-anniversary issue of Byte magazine.

Basically, it works with a fairly simple algorithms that examine the number of links between each pair of items. The resulting structure will generally reflect both the importance of each item, and its closeness to a sequence of designated primary items or topics.

Making sense from nonsense?

To use it, a person assembles a sequence of topics and subtopics or themes (hypertext nodes), and then lets the system assemble the rest of the items according to that order. (The topics could come from the items, or could be a set of folders to which mail should be assigned, for example. But it provides enough ordering that to use it simply for assigning text to buckets would be a waste.) An item with many links to the main topic and weaker links to the other topics would come first; then come the items with medium links to the first topic but even weaker links to other topics. Next a second topic and its items, and so forth. The tool can be used interactively: Try out one topic sentence, then another. Ask the system to focus on strong relationships, or to include a broader range of related items, and so forth.

Thus, it can take a hypertext web that can only be viewed on a computer, and produces a linear text output organized according to some principle determined by the user. The organizing principle could be relevance to a series of topics or clusters of ideas, for example. For example, it could be used to organize a document, with a series of main topics, and all the subsidiary items attached to them in proper order. In the large, it could be used to organize a textbook and ensure that the items within it all followed a certain pattern; in the small, to construct an article written by a number of collaborators (assuming a final edit at the end).

We see Inteltext both as an author's tool, for someone to organize his own notes, and as a tool for organizing mail, excerpts and other collections of material. The system is intriguing, but it probably does not yet qualify as a commercially viable product for the West; however, the technology could enrich any hypertext system, or work well as a complement to an information-sharing tool such as Lotus Notes. (The predecessor product, Sempro, already has an impressive roster of users in Russia, including one commodities exchange, Alisa, and a variety of government organizations including criminal investigators as well as academic outfits.)
Forte -- Location, Location, Location

Forte was founded two years ago by Marty Sprinzen, who spent five years at Candle Corp. and five years at Ingres, along with a brief stint at Nastec, a CASE company. Forte looks like most of the current crop of database-oriented development tools, with stored procedures, reliable transactions and the like, but it has a difference. Most vendors talk about object-oriented front-ends and interfaces, but Forte provides an object-oriented approach to execution without making much of the term. In essence, the software decides at installation time where each component of a program should run. (It generates a default configuration, which an administrator can change.) You don't just put the user interface on the pc and everything else on a server, as most systems do. You could do some local processing, do the database queries on the database server, and perhaps offload some heavy-duty analysis onto a number-crunching VAX nearby. Or you could do analysis locally, using a variety of different data sources. And so forth.

All this is invisible to the programmer as he builds the system, which can be repartitioned as the hardware environment changes, or run in different configurations at different locations. To accomplish this, Forte builds its code in nice modules, and supplies its own distributed object manager to manage interactions among the modules. When there's a standard ORB, or one provided by a system vendor, Forte applications will be able to use it. But in the meantime, you get the benefits without the buzzwords.

Photonics -- Beam Me Across!

With most of the information industry's attention focused on wireless radio communications, Photonics has been laboring quietly to build a strong niche for infrared, which has no licensing or health issues to speak of -- worldwide. To help grow the market, ceo Gary Hughes has focused Photonics' engineers on making cheaper, smaller, and less power-consumptive components (as opposed to seeking faster transfer rates or covering longer distances).

More importantly, though, he is selling the concept of the Personal Area Network: An ad-hoc, self-configuring link that is set up as needed by applications. For example, six developers meet in a room and start using brainstorming software on their PDAs and notebook pcs (potentially running different operating systems); the software brings up a wireless link between the machines as needed, allowing everyone to post ideas and leave the meeting with a full copy of the work-in-process. After the meeting, one of the developers returns to her desktop pc, which has an infrared port. An application automatically synchronizes the files in both machines, copying modified files to her desktop machine and picking up any new messages. Some of those messages can be scheduling events from Windows for Workgroups' Schedule+, others might be messages created in Lotus Notes.

The concept of PANs must be sold to network administrators, too. With PANs in their enterprises, they will have a "phantom limb" feeling: PAN-linked devices seem to be attached, but are really only occasionally there. A placeholder such as Novell's forthcoming virtual connection capability keeps the LAN connection alive. (See Release 1.0, 10-92.)

-- Jerry Michalski

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ASSOCIATION FOR SOFTWARE DESIGN -- 12 STEPS TO ELEGANT SOFTWARE

Three years ago at PC Forum, Mitch Kapor gave a talk about the importance of good software design. That led to the creation of the Association for Software Design, with Kapor as advisory chairman and Andrew Singer, now at Interval Research, as volunteer operating chairman. The Association's goals include "recognizing and encouraging excellence in design and spreading the knowledge and methods that lead to it," with meetings, workshops, and publications. Andrew Singer will discuss the work of the Association and invite like-minded individuals to join.

ORBACH -- RESSELLER ROUNDTABLE

It takes one to know one. Bobby Orbach, who spent nine years as chief luminary at 47th Street Photo, is now a consultant advising deserving young pc companies on how to sell their products to places such as 47th Street Photo. At the Forum he will run a roundtable to discuss retail and distribution strategies with both vendors and resellers.
WEDNESDAY -- COMMUNICATION AND PLATFORMS

It's a truism that new operating systems don't succeed directly on their own merits, but on their ability to attract vendors who will build compelling applications. Of course, the quality of the OS plays a part in attracting the developers, but so do other factors such as promised compatibility to an installed base and the OS vendor's perceived ability to generate a new installed base, whether through fear, uncertainty and doubt, effective marketing, or the ability to gather a broad coalition of vendors.

That's true on the desktop, but it will not be true on the personal device; the game there will be different, with different elements, although the same laws of physics will apply. In the new world of personal devices and communications, the driving factors will be content and communications services. Take Newton, whose fundamental premise is, "The operating system is dead! Long live the content platform!" The goal of Newton is to hide the operating system and provide a suite of good-enough applications and tools. This is a platform for content, not for tools.

KAVNER, AT&T -- HIS MOTHER SHOULD BE PROUD!

AT&T shows the beneficial effects of Justice Department attention: a little adversity and a division of labor can revitalize a company. Moreover, MCI continues to keep AT&T hopping. Thus it's ironic that AT&T is about to become a bigger giant all over again, properly figuring that it needs a countrywide presence and a way to horn in on the local loops of its former subsidiaries in order to succeed on tomorrow's electronic frontier. Its acquisition of McCaw gives it the local presence and direct customer contact it lost when the Justice Department split it up. (See Release 1.0, 11-92.)

And this time around, AT&T won't have the chance to get sluggish, as there should be plenty of competition from everyone from coalitions of RBOCs and cable tv companies to Motorola with its Iridium project, MCI, Sprint, British Telecom and possibly even IBM. (Like AT&T, IBM probably belongs in this kind of business more than in the pc or software business, where nimbleness rather than size counts.)

It will also have Bob Kavner, a dark horse who began as the company's chief auditor at Coopers & Lybrand and oversaw the NCR acquisition. Under Kavner, AT&T has shown nimbleness in exploiting its size. While most innovation is the province of small companies such as EO and General Magic, it's up to large companies to provide infrastructure and support. Fortunately, AT&T is now rising to the challenge. In this case, the support is part blessing from a household name, part financing, and part the actual communications infrastructure of AT&T's EasyLink Services.

GROWNEY -- GLASNOST AT MOTOROLA

Once noted as one of the most zealously secretive organizations in the technology business, Motorola has undergone a radical transformation in the past 18 months. Senior executives are on the road explaining their charters and giving glimpses of the company's product and service strategies. Motorola figures prominently in the most far-reaching alliances -- Newton, General Magic and Iridium, to name a few. The big realization for Motorola's man-
agement was that the company can't fulfill its ambitious visions of a future filled with wireless services alone.

On the wireless data side, the person in charge is Bob Growney. It is his job to make Motorola's wireless equipment and services the preferred transport for the portable devices it is launching or helping to launch. Ubiquitous wireless communications has enough facets (indoor vs. outdoor, short vs. long messages, one way vs. two, nationwide or worldwide coverage) to be daunting to all but a few companies. Wireless LAN vendors and special-purpose or regional radio-data carriers can't compete across the board. Visible competitors are either already large (e.g., MTel, owner of SkyTel); alliances themselves (e.g., Cellular Digital Packet Data); or are backed by companies with credible resources (RAM Mobile and BellSouth). In fact, each of these players is also a potential customer or collaborator for Motorola. So far, Motorola's offerings aren't integrated; over time, we can expect Motorola to present a more coherent face to the market.

The marketing challenge is to make Motorola, a well-known name in vertical industries ranging from police and rescue to field repair technicians, into an office/consumer name as well. Today, Motorola's wireless data offerings sell primarily to niche markets. Embarc, its wireless message-broadcast system, probably has the broadest potential customer base. Finally, with wireless voice and data operations reporting separately within Motorola, the firm must take extra measures to evolve a wireless voice and data platform.

-- Jerry Michalski

CANNAVINO, IBM PERSONAL SYSTEMS -- PICKING ON SOMEONE ITS OWN SIZE

We originally thought Jim Cannavino belonged with the platform people in the second half of Wednesday's session, talking about OS/2 and IBM's increased aggressiveness in the pc business. However, it turns out he has something to say about communications...

If you listen carefully, you'll hear that almost everyone this morning has some sort of tie-up with AT&T. (Wasn't that the company they broke up a few years ago?) Although we generally look for innovation from small firms, only a large firm with huge resources has the possibility of making a significant difference to the overall infrastructure in any short time -- as outlined Monday by Ed Markey and the Electronic Frontier panel. Thus, we're intrigued by IBM's hints that it plans something in the communications infrastructure business. IBM already has a substantial business in its Information Network, recently increased with the addition of a half-interest in Advantis (along with Sears).

Jim Cannavino has promised to talk a little more about this at Wednesday's session. He'll also field the inevitable questions about the Personal Systems businesses' increasing independence and IBM's new ceo.

PERSONAL DEVICES COMPLEMENTING THE NET

In our world model, the personal digital assistant is an interface to your desk machine, which holds the applications and the data repository. As the pc becomes more powerful and becomes more and more of a corporate asset,
hooked into a corporate database and part of an information-distribution network running corporate-standard software, the PDA is your last refuge of personal computing. Personal device software tools aren't heavy-duty applications with their own identities; they're more like extensions of yourself.

Thus, PDAs have little need to be compatible with what's on your desktop, although they have to be able to talk to it, read its data, and so forth. Handwriting recognition is not the point; the point is "meaning recognition." That is, the system should be able to figure out what you want -- and expand your brief, cryptic signals into a lot of data.

The marketing approach will also be much more personal. The closest thing is probably a cellular phone: It's a business tool, but you probably buy it yourself. You charge it on your credit card; you don't order it through corporate. It's a personal choice.

And unlike pc hardware, personal-device hardware will take a while to become a commodity. For a pc, the main considerations are performance and screen quality; appearance counts, but it's not a major factor for most people. But for a PDA, overall form factor matters much more. The most obvious feature is weight -- but how convenient is the device to hold and manipulate? What does it say about the user/wearer? It will be part of his image far more than whatever he has on his desk -- and so he'll care more. It will be a while before they come in designer colors, but they will have to enhance someone's appearance.

Then there's the question of durability; these things will be treated about as well as the address book in the AT&T ad a few years back: On the left, a pristine, new address book -- "Value: $10." On the right, an old, beat-up address book with ragged corners, bits of paper sticking out of it -- "Value: priceless."

And the PDA market? "Value: enormous."

ROSSMANN, EO -- WIRELESS BUT WELL-LINKED

EO has the advantage of early entry into what is sure to be an overcrowded market of personal communicators (although it's not early enough in volume for us to get 500 of them for PC Forum!). The EO Personal Communicator is one of the cheapest, lightest implementations of PenPoint (see Release 1.0, 12-92). Because of its Hobbit chip, optimized for speed and low power, the machine should continue to outperform more standard models built on Intel chips. Its communications focus will now become much clearer because president Alain Rossmann can talk about its use of Telescript; it should be one of the first Telescript systems out there -- but not before mid-1994.

Overall, the EO PC illustrates the nature of this marketplace: The physical machine is simply a delivery vehicle for a collection of partners including OS software (PenPoint), communications software (General Magic), communications services (AT&T), the Hobbit chip (AT&T/EO), as well as EO itself, which pulled them all together and will sell the machine. All this means EO will have to share its profits, but it also makes it harder for any single company to compete with. Only team-minded competitors need apply!
DUBINSKY, PALM -- CONSUMERS ARE OUR GAME

Palm Computing comes at the personal device market from another angle, with less emphasis on communications than General Magic or the slightly repositioned PenPoint. (The pen is no longer the point.) Palm is an application software developer for PDAs; its first platform is Pen/GEOS from GeoWorks, an operating system optimized for constrained environments developed by Brian Dougherty (PC Forum 1992). Other operating systems will follow in due course. Palm's basic product line is personal tools: a personal information manager, a calculator, a content-viewer, and PalmPrint, a 40K handwriting recognizer. Its products are distinguished by a consumer focus, says CEO Donna Dubinsky, formerly with Claris: "We offer breadth over depth."

Founded by Jeff Hawkins, who designed the GRiD Convertible when he was at GRiD, Palm is non-doctrinaire: It aims to emulate paper where appropriate, and to improve on it when possible, as in the automatic scheduling of repetitive appointments or the indexing of information. You get the pen's ease of input combined with the computer's power once the information's put in. Although its systems can communicate, Palm's focus is on users who have their own data and want it handy -- with software efficient enough to run on devices that weigh ounces, not pounds. Its major partners so far include Casio and Tandy, which will be shipping the Zoomer next fall at somewhere not much over $600.

Major funding comes from Merrill, Pickard Anderson & Eyre, Sutter Hill Ventures and Tandy.

RABURN, SLATE -- A NEW VISION FOR PEN/MOBILE

Slate Corporation has been in the pen computer business since long before there were pen computers. It was the first notable software developer for GO's PenPoint system, and broadened its base to PenWindows when Microsoft weighed in. Slate is open-minded when it comes to choosing platforms, and a has a fine vantage point from which to assess them.

The company's goal is to be a broad-based supplier of pen software, whether it's on mobile or desktop devices. Fundamentally, Raburn believes, pen-centricity is a characteristic of software, not of a market. Its widespread adoption is likely to be led by current pc users, because pc users are inherently early adopters, and this is after all a new technology.

Slate believes the pen is the next evolutionary iteration of the user interface, not just an input device. In addition to being more natural to use than a mouse and translating written input (more or less), the pen enables a kind of unstructured expression that's impossible with keyboard or mouse, such as doodling or taking notes. The pen can capture that input as ink, and then manipulate it as data in a way that pen and paper can't.

Chairman Vern Raburn has been active in the pc business since before there were pcs (sound familiar?), and has a broad perspective on the development of new markets -- which is why he's optimistic about pens! He has worked at Microsoft, Lotus and Symantec, but he plans to stay at Slate, which is the first company he started.

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Although it was one of the first PDA platforms announced, the Newton is still a little mysterious to most of the world. In part, that's because the system is probably the most content-dependent of any discussed here, and it can't really be adequately described in the abstract. Its personality will change depending on what's inside. As we discussed in Release 1.0, 6-92, the Newton is uniquely intelligent because of its support for object recognition -- broadly speaking, the ability to interpret intelligently information it receives, whether it's cryptic, terse commands from a user, or vague or inexplicit information from a foreign data source. All this, of course, is more content-dependent than your typical mass-market pc application.

Larry Tesler, former head of Advanced Technology for Apple and now head of the Newton group, won't say much about the Newton itself, but he has a unique understanding of how to integrate content and software. A researcher at Xerox PARC for seven years before joining Apple in 1980, he has worked for years on how to make machines intelligent enough to take over people's day-to-day workloads -- as opposed to expert-system-style logic problems.

PREVIEW: OPERATING SYSTEMS

We end with a preview of future Forums' platforms...

JOE GUGLIELMI -- TALIGENT IS IMMINENT

Taligent, which once looked like nothing more than an alliance of two hardware vendors against a common enemy, has come into its own with a clear strategy and some software that looks to be out earlier than expected. Fundamentally, Taligent will focus on application frameworks, not just an object-oriented operating system. (The approach is derived from Apple's MacApp but Taligent is object-oriented all the way down, so that developers can avoid some of the complexity they face in today's objects-over-legacy OSes.) What that means is that there will be a fair amount of application-style functionality floating around, to which developers can add specific functionality -- what we might define as content. For example, Taligent is looking not just for the big guns but for smaller, more innovative developers who might want to build workflow systems for legal offices or a resume-matching system with case-based reasoning.

The object-oriented/framework architecture should make it easy to add functionality incrementally, says CEO Joe Guglielmi. "Only half the job is writing software; the other half is shopping for modules to reuse." The company hopes to roll out its software incrementally too, slipping modules of functionality onto other platforms -- although we all know that you get the real benefits only when you're object-oriented all the way down.

NeXT -- MID-LIFE KICKER?

No one disagrees that NeXT is a beautiful machine; its software is the embodiment of what everyone is striving for. And now that software will be available without the encumbrance of a non-mainstream machine. NextStep is a superb development environment, fully object-oriented, with class librar-
ies and tools galore. People who use the machine love it. The problem is that you generally have to use the environment itself or some custom software; there aren’t many canned applications for it. It’s easy to build for, but few commercial developers have done so. The business model -- proprietary and go-it-alone -- and an unwillingness to sacrifice principle for mainstream market acceptance have left the company on the sidelines.

Now founder Steve Jobs has shifted direction, dropping hardware, moving the NextStep environment onto Intel and working harder to raise industry support. He can correctly say, "We have it now!" But perhaps the market isn’t ready for it now; it’s too busy trying to absorb the move to Windows.

Certainly, Jobs can point to a number of successful customers, and products such as Pages and Boss Logic here at PC Forum. However, Boss Logic and Pages, as well as Lotus’s Improv, are now moving to other software platforms. How can NeXT get others to stay -- or even to come?

OUR FOREIGN FRIENDS FROM EASTERN EUROPE

We’d like to highlight a few of our foreign attendees. Eduard Mika and Ondrej Felix are ceo and vp systems integration, respectively, of APP Group, the Czech Republic’s largest systems integrator (revenues of almost $27 million last year) and Oracle’s leading VAR in Eastern Europe. Evgeni Veselov is the author of Lexicon, Russia’s most widely used (about 50 percent of all pcs, or several hundred thousand users) and best-selling (6000 copies) word-processor. A one-man band, he also wrote Master, a multi-function package similar to Framework, now in its second, C++ release. Veselov is now chief technical officer of Microinform, a leading office-automation vendor that specializes in Master-based systems. Roustem Akhiarov is head of software development for Steepler Ltd., a Moscow-based developer and reseller that specializes in graphics markets such as publishing and advertising. Steepler produces a line of products including a spreadsheet and a fax manager, and also distributes products for Microsoft, Corel and HP. Igor Agamirzian is president of Astro Soft Press, a St. Petersburg software house specializing in document/image processing and networks. It is also a distributor for Revelation Technologies, and a dealer for Lotus, Microsoft and Symantec.

Tibor Gyuros is president of Rolitron Software, a leading systems integrator and Progress Software VAR in Hungary; his partner, Laszlo Rozsahegyi, founded Rolitron and is now starting a new venture, Hi-Care, to launch a network-based information service in Hungary. Pal Vadasz and Hedi Kover are co-founders of Montana, another Hungarian systems integrator specializing in office automation and database applications; it is a VAR for Verity’s Topic, which it has sold to customers including the Hungarian president’s office. Tomek Sielicki runs ComputerLand’s Polish franchise, founded in 1991 and with $9 million in sales last year. Andrzej Florczyk is director of the bureau of data information systems at the Council of Ministers of Poland, and helps to set the Polish government’s IT strategy. Borut Rismal is president of Atlantis, Microsoft’s distributor in Slovenia, which also handles Symantec, Corel and Software Publishing.

By the way, for those who wonder if there’s a market in Eastern Europe, all of these people (with one exception) paid their registration fees!
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COMING SOON

- Directory services.
- Network navigation.
- Performance support.
- Pen stuff.
- Constraint-based reasoning.
- And much more... (If you know of any good examples of the categories listed above, please let us know.)

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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 former Soviet units. Editor: Esther Dyson; publisher: Daphne Kis; contributing editor: Jerry Michalski; circulation & fulfillment manager: Robyn Sturm; executive secretary: Denise Dubois; editorial & marketing communications consultant: William M. Kutik. Copyright 1993, 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.

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Publisher