UNIFIED MESSAGING, PART I
by Jerry Michalski

What makes a big market? It starts with a problem that has frustrated a large number of people for a long time. The problem's longevity and ubiquity make it appear impossible to solve, so users adapt, modifying habits in ways they hardly notice. Still, we have a nagging feeling that it could be better....

Take, for example, the communications infrastructure we all use -- and hate: The phones that nobody can program, the pagers that beep in the theater, the embarrassing e-mail that goes to "all employees" by mistake and the videophone that makes you look like M-m-max Headroom run amuck. The market opportunity lies in reducing the friction that keeps users from spending when trying to communicate, freeing them to add value to the content of communications, instead of wasting time with the tools.

This issue covers unified messaging: Bringing disparate messaging systems -- data, voice, fax or video; real time or store-and-forward -- together into value-added channels that not only foster collaboration and communication, but also create new platforms for services. In this issue, the difference between a live phone call and voicemail (a shift in timing, a change in interaction) is as important as the one between e-mail and voicemail or fax (a shift in the medium).

As we give people more means of communicating with each other, we also give them more things to check, more things to memorize and more uncertainty. It begins with your phone number and mailing address. Then add a fax number, and possibly separate numbers for voicemail, pager and cellular phone. E-mail? Which one? How about a video link? Worse still, when you're on the road, you have to check five different sources for messages. Though we don't measure it today, this complexity imposes heavy costs on end users.

To add to the problem, your behavior is governed by the devices you use. You pick up the phone when it rings, even if the caller is someone you want to avoid or redirect. You call someone when you would prefer to fax him a short note, because you don't know his fax number -- and you have to call to get that anyway. Or you call him when you expect him to be away from his desk (say at →

HAVE YOU REGISTERED YET? -- PAGE 14
5 am), because you really just want to leave a voicemail note. You seldom use the helpful features built into the devices (e.g., speed dialing and out-to-lunch settings) because they’re too much bother. You remain reactive and overwhelmed by the ever-increasing communication options.

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A man with a watch knows what time it is;
a man with two watches is never quite sure....
-- a fortune cookie
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Soon, if the unified messaging vendor community has its way, users will have more control over the devices and the messages themselves. That means not only that users can elect to answer the phone or not, but more broadly that the way they decide to communicate will be based on the task at hand, freed from infrastructural constraints. Ultimately, the user chooses the timing and medium that she would prefer for a given message. The rest is coordinated by the infrastructure.

For example, Zoe’s in a rush. She’d like to tell someone something, but doesn’t have time to engage in a conversation. An intelligent messaging system will record her words, figure out how to reach the recipient, and see that the message ends up in the appropriate message queue. It may even convert text to voice, or vice versa. Any contextual cues simplify the interaction: If she is replying to a message, the default recipient is known; if she uses the keyboard, the message will likely be text. In the meantime, a profile with rules and procedures shields her from unwanted messages, automatically responding to some, forwarding others and sorting the remainder. She need not miss a long-awaited phone call, because it can be given priority treatment.

Unified messaging begins with these questions:

- How can we make it easier for users to set up a collaborative event?
- How can we give the user the power to enrich or simplify that event?
- How can the user control this and other communication events to make the best use of her time?

The goal is to make the user’s experience more valuable, or at least less costly in terms of time.

The players

Various kinds of suppliers of information products and services all have converging stakes in the future of unified messaging. They also have very different points of view:

- The pc industry’s latest pitch is that e-mail is the killer app, that applications will be mail-enabled, and that multimedia mail (riding the e-mail backbone) is the proper home for unified messaging. This view largely ignores real-time communications, since the focus is
bringing together deferred messages. It also ignores infrastructural reality: For example, voice-annotated e-mail is unlikely to replace voicemail anytime soon. PC vendors largely underestimate the difficulty of telephony, and run the risk of missing a great opportunity.

- Videoconferencing-system vendors say they already have unified messaging: After all, isn't video the richest data type? Don't we all need video on the desktop? Yet these systems need extra resources (processing power and bandwidth), they don't connect to other message systems, and they view the video component as central and complete, rather than as just another medium to use as appropriate (see page 16).

- Cable TV companies also suffer from video blindness: Until recently, they didn't see that their principal asset is (collectively) a high-capacity point of presence (POP) in two-thirds of US households. Besides unscrambling video signals, this POP can serve as a platform for cordless phones, faxes and printing; that's just the start of the list. Any camcorder is a videophone input device. But most cable companies are bewitched and distracted with interactive TV and other iffy markets. Also, cable companies have little user-centered device or software design expertise.

- Phone-equipment vendors -- selling everything from PBXs to voicemail systems -- missed a big chance to play an integrating role some time back; they were bewildered by data networking. Now they are leading the way in unified messaging, but on disparate, proprietary platforms and with the phone keypad as the basic user interface. Granted, the keypad will remain the lowest common denominator for some time, but the power of unified messaging comes from other interface technologies. Phone-equipment vendors are working with PC vendors on PC/phone linkages, but their interface software too often looks like rows of autodial buttons and a list of pending messages. Given trends towards open switches and ultrafast, media-independent data transports (with ATM), PBX vendors are in jeopardy of losing their franchise to their data counterparts. The local phone-system vendors are selling to thinning ranks of phone-system managers as corporations shift that function to IS. There will still be a need for VARs and integrators, but only the top phone dealers and integrators will be able to make the leap away from the present model.

- Telephone companies and other carriers have taken a network-centric view of the world, where features are delivered from the central office and just add a few dollars to the monthly bill. These companies -- local, long-distance and cellular alike -- are now grasping the power of a collaborative architecture, where tasks are appropriately divided between devices, servers and the ever-present network cloud. Wireless communications make the link to the handheld device more transparent.

- Software developers are uncertain which horse to bet on. On one hand, powerful pen and mobile operating systems such as PenPoint and GeoWorks are emerging; on the other, projects such as Apple's Newton seem to be discouraging traditional software developers (although developers are invited to provide apps on traditional platforms to complement the Newton, Apple VP PIE engineering Larry Tesler points out).
The most interesting horses are those working new ground, taking good ideas from one arena and extending them into another, helping to plow the terrain between well-known markets. One example is the current collaboration between phone-equipment and PC vendors (page 14) to deliver more integrated functions such as full-screen call management (as opposed to remembering those cryptic codes). Another is the relationship between AT&T and EO.

Ask any three companies in this realm what their corporate missions are, and they'll likely cite some variant of "information anytime, anywhere." But few of these companies have thought through the implications for communications. Unified messaging is a major opportunity for commodity platform vendors to differentiate on top of standards.

However, in many cases, a company's strength will also prove to be its weakness. A company that does video programming or consumer marketing of miniaturized DOS devices extremely well may be blind to opportunities outside those markets.

Collaboration, not rocket science

Some of the functions of unified messaging are so simple it's surprising they haven't yet taken hold. For example, autodialing involves seizing a line and generating Touch Tone sounds. This is not rocket science; it can also save money. Compared to the dubious value and high cost of bringing videoconferencing to the desktop, this should be a no-brainer. In fact, some sales-force automation packages (e.g., tk's ACT) include autodialing and sophisticated contact management; so do some phone-in-a-PC enhancement kits. But these systems are stymied by hostile PBXs, and generally sell only to small businesses.

Most of the requisite technological widgets for a unified messaging environment already exist, and are in use in niche markets. The next two years promise to be filled with activity on the unified messaging front. Not only will the computer vendors deliver long-awaited personal electronics devices tied to carriers' wireless voice and data networks, they will also be announcing extensions to their operating environments to bring messaging media closer together.

The systems approach

Unifying the messaging infrastructure is a systems problem, not one that a single device can solve, no matter how brilliantly designed. The organizing question for this issue of Release 1.0 and the following one is: Where in the system should one put the functions? We begin this quest on the person, move to the desk, then to the hall-closet server, the basement and finally the network cloud (aka the voice and data networks). This issue goes only as far as the desktop; we will cover the rest next month.

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Decisions about the core feature set of an operating system are evidence of designers' priorities.
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ON THE PERSON

There are two broad approaches to delivering handheld communications devices. One approach extends a familiar metaphor -- the virtual desktop -- and its business model. The other approach will establish a new metaphor and a new business model.

Extending the desktop

Apple, Microsoft and NeXT are taking the first tack. We cover them in the Desktop section, page 12, but we mention them here because their direction has much in common with GO's. GO's chosen metaphor is the notebook, not the desktop, yet its basic business model is that of a desktop operating system vendor. In contrast, Apple's Newton project is an effort to design a new market dynamic, not just a new handheld consumer product.

This approach starts with the familiar desktop metaphor. To turn the desktop into a unified messaging platform, the vendors offer drivers and viewers that bring messages together behind a common interface as multi-media mail. Some, such as Apple and GO (but not Microsoft), make messages look like other documents on the desktop; the features dovetail nicely, with minimal disruption of the original concept. Messages and documents alike are kept and found in a consistent manner. The action to delete a text file will also delete an e-mail message or voicemail note. The "send" function extends beyond printing to include faxing and other forms of messaging. The address book that once contained only e-mail names now holds fax numbers, software preferences (for viewing or file conversion) and even personal data.

The desktop metaphor has an economically attractive business model, too: There is a solid base of third-party software developers, a working channel for getting products to market, and other necessary components for incrementally growing an existing market. But it will be difficult for anyone but the top few companies to make money.

A mobile platform with an extended desktop metaphor and compatibility with desktop systems will appeal to experienced users of pcs who want mobility and integration, particularly corporate buyers looking to mobilize their work forces.

Such a platform will have limited appeal to new, less sophisticated audiences. Especially for those unaccustomed to it, the desktop metaphor still has its failings and inconsistencies. For one thing, people typically lack the discipline to reverse the desktop's tendency toward entropy: Files get lost; documents get messed up.

Reinventing the business

The other approach, much riskier, posits a new metaphor, a better way of representing interaction. One example is Apple's Newton, with its endless roll of smart paper; there will be others, such as General Magic's. Personal electronics devices are supposed to sell at lower prices than traditional pcs. Apple is betting that the software model must change, too, so it is designing not only a new software interface, but also an information market appropriate for Newton-style devices. This approach requires dif-
ferent alliances (across industries), hardware distribution (the mass mar-
ket; consumer electronics), software development (third parties? one
party?), content development (D&B? Mom & Pop?), and software distribution
(vending machines? subscriptions? wireless downloads?). Each component
must be rethought and tuned to make financial sense.

Properly designed, such systems can complement desktop systems -- or work
without them altogether. Not everyone needs a full-fledged pc. (Also,
many functions can be shared with a more intelligent network, which we will
address in the next issue of Release 1.0.) Reinvented systems will appeal
to people who feel they don't need a computer, but just want help getting
organized or keeping in touch.

At its most ambitious, this approach redefines the act of communicating.
It's about fighting the law of entropy by introducing mechanisms to
preserve some order and minimize human effort. More on that in a moment;
first a closer look at PenPoint as a unified messaging platform.

Go onma do it all

Although GO's audience is clearly the portable pen-system buyer, PenPoint
is a model for how desktop operating systems are evolving. GO has built a
highly configurable, scalable, device-independent, polymorphic, standalone
operating environment.

PenPoint avoids a profusion of overlapping windows (which don't work on
small screens anyway) by using a notebook metaphor with tabs as navigation
aids. PenPoint also manages messy stuff that users have to do in other
OSs, such as making sure messages are received intact. In fact, rather
than define new network protocols, PenPoint can map to different protocol
stacks, and can switch between them transparently and automatically.

Closer to the application layer, GO provides PenPoint with serviceable,
bare-bones implementations and encourages third parties to differentiate
themselves by providing better functions. Commonly performed tasks are
eventually generalized and become a part of the PenPoint environment, ei-
ther as dynamically linked applications (which become available to all doc-
uments) or as parts of the core operating system. As a result, there is
little redundant code; applications are smaller and better suited to port-
able environments.

Recently, GO engineers added more messaging functionality to PenPoint with
the GO Message Center, now in beta testing, which handles a variety of mail
services. The first such service interface, to be bundled with all Pen-
Point systems, is AT&T Mail. This is a new channel for AT&T; conversely,
it opens new avenues of distribution for PenPoint software. For example,
AT&T Mail can become a transport for software upgrades delivered over a
wireless network, then automatically installed. Other additions include GO
Fax, a deferred-fax driver, and a Dialing Location Sheet that lets users
register their current location so PenPoint can add prefixes or drop area
codes as appropriate.

PenPoint's Address Book Protocol is a linchpin for its unified messaging,
and a model that other vendors should emulate. The Protocol specifies
methods for the exchange of simple, loosely structured information such as
business cards, to-do items and calendar events. Without APIs for the inter-
change of such items, we would be doomed to rekey and reenter this stuff
forever. Avoiding redundant work is central to the success of personal in-
formation management, and therefore to personal electronic products. With-
out APIs to let people with dissimilar platforms exchange event and object
information, the whole infrastructure grinds to a halt.

The Address Book Protocol GO is developing will communicate with many other
directory services through agreed-upon APIs. (We will deal more with di-
rectories and address books in next month's Release 1.0.) Eventually,
calendar events from PenSoft's Perspective might be posted to Microsoft's
Scheduler+ (in Windows for Workgroups) or on a Macintosh network. Also,
the Address Book will have automatic synchronization capabilities and in-
terfaces to host directories, though not in its first release.

The business-card API alone is a powerful concept. Far more than a per-
son's name and phone number, the card object could contain the person's e-
mail addresses, fax numbers, picture, office hours, itinerary (tied to dif-
ferent phone numbers) and allergies (well, if you wanted to publish them).
It could have a voice print for authentication. With the API, PenPoint ap-
plications can exchange semantically rich information. Communication with
external applications will necessarily be more limited. GO is interested
in such integration, but is not devoting resources to it now; a third party
would do well to develop APIs that help make this initiative interoperable
with others (see Apple's OCE, page 13).

Juan: Can I run your card through my reader?
Alice: Well, my machine uses infrared;
no need for touching, thank you.

GO's mission is not to invent the best interface, but instead to provide
licensees with an independent, stable and efficient platform, sharing func-
tions across applications as its object-oriented nature supports. The
visual user interface is thus secondary. GO is betting that independent
software vendors will come up with useful new ideas, including new inter-
face technology (licensees can strip the Notebook User Interface out com-
pletely if they wish to, replacing it with their own). This is where
things could get sticky: Even if some of the ISVs' interface ideas are
great, many are likely to get lost in the fray. Buyers will see many dif-
ferent faces on PenPoint machines, which could make it difficult for one
particularly brilliant one to reach broad acceptance.

By Jupiter, it's EO!

EO, the AT&T-backed startup that is licensing PenPoint for a family of per-
sonal communicators, has taken a pragmatic approach: Get products to mar-
et quickly in order to learn from customer reaction. EO started with ad-
vanced components ready-made from third parties. GO's PenPoint was ported
in its entirety to AT&T's state-of-the-art Hobbit and ROMed. (EO's engi-
neers had worked for GO as hardware types when it was still designing both
hardware and software.) EO also acquired low-power RISC expertise through
UK startup Active Book, which had designed a portable electronic book (which didn't make it to market) with the ARM chip now in Apple's Newton. The EO designers did not spend much time reengineering or rethinking PenPoint as a personal communicator OS, but rather built some additional functions into PenPoint that would help integrate other communications media. To everything it inherited from PenPoint, EO added EO Phone (a cellular phone driver) and EO Sound (a voice annotation feature). EO will also bundle a pared-down ROM version of PenSoft's Perspective with its Communicators (as Personal Perspective).

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The more effort it takes people to do something, the less likely they are to do it.
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Perspective is important: Without it, a user has to look a person up in the directory list, then invoke the autodialer to place a cellular call. With Perspective's linking ability, users can autodial a person whose name appears somewhere else inside Perspective -- say in the calendar or in a note. This may sound like a feature that only the laziest person would want, but a great personal communicator will remove even trivial barriers to communication. Switching tasks, looking things up and changing defaults all stand in the way of a phone call or note.

EO is in a pretty good position. It has product in the market; strong marketing partners in AT&T (though NCR's role is not clear), Matsushita and Marubeni; and a more progressive and flexible OS than Microsoft's Windows for Pen Computing. It's not hard to imagine an EO machine replacing any of the cellular/laptop briefcase office systems on the market today: EO is a smaller, better integrated, more portable platform. Throw in a keyboard and you have a complete mobile office. For those who want full-fledged mobile computing and automatic communications in a single package, EO should do nicely.

There is already room for improvement: The EO machine is not simple enough for a user to exploit to its full power without training or assistance. User profiling is scant. Built-in intelligence is limited to Perspective's Associate feature. There is no software help for setting up conference calls or rulesets for handling message events (Beyond, this one's for you). An EO machine looks like any other mail client to AT&T's EasyLink; no functions are shared between the network and the EO Communicator. Users have to manage their documents just as if they were using a desktop machine. Moving documents in this notebook is difficult (drag to the bookshelf, scroll, put back in right folder).

Some important ergonomic issues seem unresolved: How will the screen be protected when you slip an EO in your briefcase? What about that phone handset clipped to the top? Won't it get knocked off every time you throw the EO on the car seat? Eventually, we expect EO to replace the optional phone handset with a Norris EarPhone or some such in-the-ear device that plugs into the EO with a minijack. No muss, no fuss. Much less bulk.

The key, though, is that EO is part of an alliance that potentially could shift the division of labor between devices and network services, bypassing
PBXs and other recalcitrant system components. Through the AT&T/McCaw deal (Release 1.0, 11-92), opportunities abound to engineer a system that harnesses the increasingly intelligent public network. An EO machine could very well capture a voice message and upload it to a voicemail system (Audix or otherwise), or forward it to someone else. Rather than have a user's onboard fax attempt a broadcast, the fax could be uploaded to AT&T's Enhanced Fax service, along with a distribution list. An ISV could write rule-management software that not only does local message filtering, but also uploads call-management rules to the network. The user sees a single interface, not caring which rules are where.

Communicators with an attitude

A personal communicator could come with activity profiles that you can adopt and customize, so you don't have to build the profiles from scratch. For example, there could be a traveling-salesperson profile that understands the patterns typical in a sales job. Before an appointment, you download information from the corporate prospect database and check for voicemail messages (Did he cancel? Have they paid?). Afterward, you write a thank-you fax and plan the next steps in your sales campaign. All of this is predictable and can be staged for the user. Third parties will customize profiles that incorporate a look and feel consistent with their client corporation, complete with stationery, brochure templates and filtering rules.

The profiles can have personalities, which we try on the way we try on clothes today. Want an aggressive type? Try the senior executive assistant, which comes pre-loaded with a who's-who of your industry, ranks included, the better to screen callers. Want polite? A diplomat. Organized? A military clerk. Better still, as a shorthand, the personalities could license the names of people we can readily identify: Would you like the Willie Loman model, the Lee Iaccoca, or the Donald Trump?

Notable's collaboration tool

Notable Technologies, a startup run by Ron Brown (previously at ComputerLand) that is writing applications for GO's PenPoint, showed an alpha version of its Shared Whiteboard software at Comdex. The Whiteboard turns PenPoint machines with wired or wireless communications into remote sketch pads that help two people work with a common screen image. A page image is transmitted from the originating machine to the receiving one as a TIFF file. If the two devices have different screen sizes, the software puts a small map on the smaller machine's screen so it knows when the other party is marking beyond its view. Then icons appear that allow each user to erase, mark or type on the screen image. The conferees can't share the actual file or application tools. It will take some time for Notable's engineers to design protocols that permit remote manipulation of objects within a document (rather than screen images), a task that ShareVision (page 15) seems to have mastered, albeit with substantial hardware support.
Can Newton reduce friction?

Newton technology is about a particular user experience. Using built-in intelligence, a Newton device actively tries to help as the user works. Information is richly linked, but the links often happen as the work is created. That is, a user doesn't have to select a memo format to create a memo; instead, the user writes the note, then does things to it (e.g., put this on letterhead in the corporate style and fax it; put this in memo format and e-mail it). The communication and the work are smoother, less premeditated. Where possible, the most likely next step is presented, ready to be approved or modified.

With Newton, the intelligence is inside; the visual interface is secondary. (See Release 1.0, 6-92.) Contrast this with the more traditional user experience, where the user is perpetually tracking down information and filing it.

By managing contexts, patterns, possibilities and assumptions in the background, Newton will make communication easier. This kind of interaction will be useful, perhaps ideal, for some users; others will find it intrusive or annoying.

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Newton is not a special-purpose machine, but rather a machine tunable to a specific user experience that teams an active user with a helpful user interface, both working with richly linked information on a communications-savvy platform. Like the Macintosh, which changed our visual landscape with icons and windows, Newton will offer a new, complementary geography.

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Newton assumes an evolving, collaborative system architecture. To minimize drag, Newton will offload any tasks it can. For example, where PenPoint can deal with multiple communication protocols, Newton will establish strong links to the Macintosh or an online service, which will in turn manage the protocol jungle. This allows the Newton team to focus, making one set of complementary channels work well, then adding others. One can imagine a Newton handheld device at the center of a coordinated set of services hosted by Newton partners: A SkyCard pager message might notify the user to get near a Macintosh equipped with an infrared access point so it can download an urgent message sent over AppleLink/America OnLine. Or the pager might signal that a call is on hold. By dialing a central number from any phone, the user connects with the inbound caller.

The Newton model rejects the existing software development and distribution model as inappropriate and expensive, and will bypass it with an integrated platform and channel for content developers. The software model has more in common with HyperCard than with the traditional desktop-software business. In the pc world, software companies saturate their original markets, then add features to their products that other companies do better. That's why some leading word-processing packages have rotten graphics modules. PenPoint overcomes this by sharing software modules across the platform.
The Newton business model implicitly asserts that its built-in word processing is sufficient; the platform's focus is on facilitating activity and funneling information to the right people at the right time.

The opportunities for software developers in a Newton environment are not in traditional desktop software tools, but rather in server software that improves the coordination between Newton and other platforms, in services that can be delivered over Newton devices, and in small packages of code combined with specific information targeted to a particular audience. Profitable niches in the software industry can be built around knowledge or expertise that is of narrow interest (see Release 1.0, 11-92). For example, a company could offer services that customize Newtons to a corporation's guidelines, linking the devices to the corporate message network and creating applications that broadcast information to the Newtons.

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A standalone device can streamline one person's use of communication tools to interact with others; cooperating devices can transform the interactions themselves.
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PenPoint is a do-it-all platform; alone, it can comfortably replace a portable pc. Newton technology is not intended to be a pc replacement (though we can see many workers who might do perfectly well with a Newton and no pc at all), but rather a rethinking of the way people access and use information. Newton is a get-it-done platform, dependent on content, with components to be spread across the architecture.

Apple's Newton is almost the opposite of the desktop model. Apple is taking a huge risk in reinventing so many things at once. Given the known limits of the current pc industry, however, we believe this change is needed, and look forward to watching Newton open new markets.

Your wireless comments encouraged

RAM Mobile Data recently loaned me a Viking Express kit, which combines RAM's wireless network with an HP 95LX, an Ericsson/GE Mobidem (radio modem) and a RadioMail account from Anterior Technology. If you have comments on this issue, ideas for future issues, or anything else to say, I encourage you to send mail to:

jmichalski@RadioMail.net

My permanent address is: spiff@well.sf.ca.us

-- Jerry Michalski

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ON THE DESKTOP

Phone people have long resisted the trend to pc-telephone integration with a few simple arguments: You'd have to leave your pc running all the time. Pcs aren't as reliable as phone equipment, so you'd be phoneless every time your pc crashed.

Yet our phone systems provide little value beyond a reliable dial tone: Modern PBXs have countless functions that go unused because they require unbelievable sequences of keystrokes; setting up conference calls or transferring callers is as iffy a proposition as ever.

Phone-system vendors never mastered the sale of pc systems. Now they're facing attack on their home turf: The pc operating-system developers are working on pc-phone integration and have added abstract call-control functions to their machines. PBX vendors that want to play must develop device drivers as easy to install as a printer driver.

The opportunity for pc companies is huge: Every phone out there is a candidate for a better cpu and an operating system. Development of a standard API for multiple phone systems will open the door for pcs to manage the phone system. Fortunately, the features needed for unified messaging are moving from specific applications into the operating system/messaging backbone. Much of this activity centers around the various vendors' collaboration and communication protocols, notably OCE from Apple and MAPI from Microsoft. The way GO is modifying PenPoint (page 6) illustrates how other companies are changing their desktop operating systems.

Emerging from the call center: NATA and CTI

The North American Telecommunications Association's Alliance of Computer-Based Telephony Application Suppliers (ACTAS) has been advancing desktop media integration under the name Computer-Telephone Integration (CTI). Although the Association's call-center heritage gives it a distinct PBX and ACD flavor, ACTAS has become an important forum for the discussion of unified messaging ideas. Jim Burton, a longtime industry consultant who coined the term CTI, says payoff time is near: Practically every major computer vendor has CTI initiatives going, many of which will be announced in 1993.

There is deep-seated mistrust between voice and data professionals in most organizations; this means that the cultural work is as important (and difficult) as the technical work. ACTAS is a good forum for bringing people to the table on an industry level, but cannot replace the unifying work that must happen inside companies.

The convergence of computing and telephony will force changes in the channel. Phone equipment manufacturers and distributors will face extinction: Their switches may be replaced by ATM switches, their handsets manufactured by pc vendors. Voice-processing products that phone system vendors would normally have integrated and resold will sell through traditional pc wholesale and mail-order channels. Yet this is not a product market; it is a system market, and will require system sales channels.

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We want it now

For the impatient, there are inexpensive, task-specific systems from companies such as National Semiconductor and AG Communication Systems (AGCS) that don’t require new operating-system features. Both of these are small projects within larger companies with very different agendas: AGCS is exploring pc-phone integration; National is looking for new silicon-intensive markets.

National’s TyIN2000, a pc-chassis board and software set for Windows, debuted at Comdex. TyIN2000 manages the functions of data and fax communications, as well as voicemail and voice notes. Although TyIN2000 doesn’t use Caller ID information, it dynamically reprograms its DSP to manage faxes, file transfers and e-mail communications.

AGCS’s WindowPhone is one of the few products on the market that make use of Caller ID information. WindowPhone enhances its basic call-management functions (e.g., autodialing, list maintenance, call logging) by looking up inbound callers’ names when Caller ID information is present. So if Caller ID is being turned on in your neighborhood, you can be first on your block with this system. AGCS celebrated its 100th birthday some time ago. The company, a joint venture between AT&T and GTE with $300 million in annual revenues, invented the automatic telephone exchange and now sells digital central-office switches. Interestingly, there is not much activity between AT&T and this relative.

Both products work best on an outside line, which is why they are targeted to small businesses or home offices. Go through a PBX and everything changes... for the worse. Finally, both are examples of functions that may soon be built into hardware platforms directly, coupled with features added to major operating systems.

Apple: Extending desktop operating systems

Gursharan Sidhu joined Apple in 1982 to help Apple figure out how to enhance the communications environment to foster collaboration. Now he is the guiding force behind Apple’s far-thinking Open Collaboration Environment. OCE is an architecture for unifying store-and-forward systems for a variety of media at the operating system level. In fact, with OCE messages and documents become indistinguishable. All can be sent or shared. Users need to learn only one way to manage them.

OCE’s Compound Mailbox is like PenPoint’s Address Book, but with some powerful twists. For example, in OCE, a directory service is part of a more general object class that can point to humans and their phone numbers (or birthdays or hat sizes), to devices on the corporate network, or to files on local and remote hard disks. In that sense, the Finder is just one type of directory and shares functionality with the other kinds of directories in OCE. Like GO, Apple is especially interested in business-card protocols as a new medium for personal information exchange.

A significant number of AppleEvents are defined around call processing, a sign of Apple’s seriousness about controlling voice functions. Apple is also working on a Telephone Manager that will do for phone systems and calls what QuickTime does for multimedia peripherals and files. With Novell promising to support OCE, the number of potential users skyrockets.

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Other important players are making similar advances in the integration of various messaging transports. **Microsoft** is focusing its efforts on **MAPI**, the Microsoft Messaging API; it is also developing telephone-management capability for Windows. The company is working with **InteCom** and **Intel** to develop products that will provide users with call-management features. **NeXT**, a leader in multimedia mail, offers an object class called **PhoneKit**, with which an application can control a phone device, establish sessions and manage individual calls. Third parties have developed applications using **PhoneKit**.

**PC FORUM UPDATE: CONTENT IS KEY**

Where can you go when the software business is dominated by giants? many smaller companies are asking these days. As we survey the pc establishment, we see discomfort and even despair over the increasing power of Microsoft. Build a cool application, the theory goes, and it will find its way into Microsoft's next OS or application suite. There's no way to win.

Of course there isn't, if you keep playing the same mug's game. The next PC Forum is about a new game, one of inherently fragmented, discrete markets where smaller players can carve out a lucrative, satisfying niche, markets where size bestows no advantage and where the absolute returns in each individual niche don't justify investment by a giant. It's also about the necessary infrastructure that will support the delivery of content — and flexible communications among the people who create and use it.

Content is not just jazzy multi-media that performs great demos, but useful business information embodied in software that performs actual work. Aside from its potential value to users, the appeal of content to vendors is that it may provide sanctuary and even opportunity for the smaller software company in a business dominated by giants. Content is inherently specific; the "content" market is a collection of niches. By contrast, the communications market requires nationwide and ultimately global connectivity — and business alliances.

The Forum also includes a special panel called "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)? As both provider and user, the computer community has a broad interest in these questions. Three industry leaders will discuss their views in a panel led by Mitchell Kapor, founder and chairman of the Electronic Frontier Foundation.

Our program this year includes a record number of new speakers:

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<td>John Atcheson</td>
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<td>Jim Cannavino</td>
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<td>Connie Galley</td>
<td>TSI International</td>
<td>Cliff Reid</td>
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<td>Taligent</td>
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<td>Jeff Hawkins</td>
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<td>Alain Rossmann</td>
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<td>Dick Horn</td>
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<td>Bob Stein</td>
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<tr>
<td>Mitchell Kapor</td>
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<td>Bob Kavner</td>
<td>AT&amp;T Systems</td>
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<td>Ken Koppel</td>
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ENTER VIDEO -- CAUTIOUSLY

Besides its other drawbacks (see box below), videoconferencing's data-intensiveness requires special hardware and special high-bandwidth lines (though nowadays this is more a deterrent than a barrier, given falling communications prices and rising travel costs). A video system, however, often leaves surplus bandwidth to steal for other forms of communication, such as fax or pc-document conferencing. Combined with an audio link, a shared-document session can provide far more value to users than a video link alone. But few videoconferencing vendors offer systems that optimize collaboration this way.

A couple of videoconferencing vendors go beyond video and shared-image work. One, VideoTelecom, set the pace early by encouraging users to switch to the most appropriate medium for a given collaboration session. To do this, VideoTelecom allocates some of the video channel capacity to allow users to mark up an image or share a live pc file. Despite requiring special phone lines, though, VideoTelecom's system does not deliver a superior conference: Full motion requires an upgrade, and the software tools are awkward (an opaque tablet similar to Wang's ill-fated Freestyle provides screen markup; printed overlays offer session control). If the system migrated to pen computers and provided better application support, it could provide more value than its larger and more visible competitors, Compression Labs and PictureTel.

ShareVision: All this on POTS?

The other company is ShareVision, which at MacWorld will debut an elegant desktop system that can transmit video as well as other kinds of data over ordinary phone lines (or POTS, for plain old telephone service). The technology, which ShareVision calls desktop visual communications, requires a hefty hardware assist: ShareView Plus costs $4500 and consists of two NuBus boards, a camera, a handset and headset, and software. The system dynamically reallocates surprisingly little bandwidth (14.4 Kbps), using idle time in one medium to improve performance in another. In a way, ShareView tricks the infrastructure: It gets around the lack of easy wide-area data links by opening a point-to-point modem connection; then it digitizes and compresses the voice signal to make room for other signals. This limits the system to two sites at a time; multipoint conferences, which ShareVision is not pursuing, require sophisticated switching gear.

Standalone, ShareView helps place and manage calls (though at quite a cost, considering products such as AGCS's WindowPhone, page 13, which can do simple call management for far less). Its well-crafted interface is reminiscent of the CD remote-control desktop accessory for the Mac; ShareView's emulates a cellular phone.

When you autodial another ShareView user, the systems automatically synchronize and make video- and document-conferencing features available. The video motion is not fabulous, but is impressive given that it is coming over a plain vanilla phone line alongside other information. Users can easily exchange document files at any time; the files are folded into the data stream. They can also take (and save) snapshots or segments of video. Caller ID is not supported.

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This system would be moderately interesting if it were only desktop video-conferencing, but the really nifty feature is its document conferencing (as opposed to file transfer or image sharing). ShareView lets a user launch an application and share an active document with the other party, even though she does not have the application on her system. Your counterpart can do anything you can do with the application; it is under joint control, even with a voice or video session running. All over one phone line.

ShareView encourages spontaneous collaboration by making it easy to do. A version with far less hardware (or none at all) that omitted the video would bring tremendous value to desktop-system users. A system that would harness LAN features and work through a PBX would be even better.

---

**Video, schmideo**

Although videoconferencing is showy, it is not the most efficient means of communicating. There are times when video can dramatically heighten remote communications. But videoconferencing technology suffers from several human-factors problems that make it undesirable as a full-time collaborative environment. Eye contact, very important for rapport and trust, is made difficult by the combination of two factors: People are very good at perceiving where other people's eyes are focused, and most videoconferencing systems have a camera mounted above the screen.

One useful answer to this problem was proposed at a recent CSCW conference by researchers from NTT. Their prototype, the ClearBoard, projects the other party's image onto the back of a desktop-sized translucent screen that also displays the common work session. As a worker looks down at a ClearBoard, she sees not only the documents she is working on, but also the image of her distant colleague. He sees her looking directly at him.

Where's the beef?

Not only does video bring low incremental value relative to the value that remains to be mined from more conventional data types; you also lose some freedom in a videoconference. You have to keep your head in roughly the same place. You can't shuffle around with your papers, show how disorganized you are or yawn. You have to monitor far more than your voice, which takes extra effort. It's odd to see people use a handset; headsets, though practical, look goofy. A speakerphone is more natural, but is not private.

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ShareVision will sell through manufacturer's representatives with experience working in the Macintosh reseller channel. Its president and ceo, John Meyer, founded Ventura Software and later sold it to Xerox. He and Dean Tucker (vp of marketing, co-founder of SuperMac) were brought to ShareVision after its launch in 1991 by four Apple video-image processing experts. ShareVision has raised over $6 million in venture funding so far, initially through MK Global and Walden; for the recent second round, the first-rounders were joined by Venrock, Mayfield and management.

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RESOURCES & PHONE NUMBERS

Roger Heldt, AG Communication Systems, (602) 581-4230; fax, (602) 582-7320
Gursharan Sidhu, Apple (OCE), (408) 974-4047; fax, (408) 974-9078
Susan Schuman, Apple (Newton), (408) 974-0310; fax, (408) 974-8120
Jim Burton, CT Link, (617) 737-1277; fax, (617) 737-7796
Alain Rossmann, EO, (415) 903-8112; fax, (415) 988-8333
Robert Carr, GO, (415) 358-3010; fax, (415) 345-9833
Susan Ryba, North American Telecommunications Association, (202) 296-9800; fax, (202) 296-4993
Reuven Marko, National Semiconductor, (408) 721-7928; fax, (408) 721-7662
Dave Larson, Notable Technologies, (415) 312-0800; fax, (415) 312-9253
John Meyer, Dean Tucker, ShareVision, (408) 428-9866; fax, (408) 428-9871
Dick Moeller, VideoTelecom, (512) 834-2700; fax, (512) 834-3792

COMING SOON

- Simulation for education.
- Pen stuff.
- Performance support.
- Synchronization and reconciliation.
- 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 Calendar

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<td>February 1-4</td>
<td>Object World - Boston. Sponsor: BU's Corporate Education Center. Call Susan Granata, (508) 879-6700 or (800) 225-4698; fax, (508) 872-8237.</td>
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<td>February 3-5</td>
<td>Infobase 1993 - Salt Lake City. All the world's an Infobase. For Folio users. Call Mike Judson, (801) 375-3700.</td>
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<td>February 21-24</td>
<td><strong>E</strong>d<strong>V</strong>enture Holdings PG (Platforms for Computing) Forum - Phoenix (not Tucson). &quot;Content is key.&quot; Sponsored by us: You read the newsletter; now meet the players and check out some of the wonders described in this issue. The usual suspects, plus Bob Knaver, Craig McCaw, Alain Rossmann, Dick Brass, Tom Ray, Jeff Hawkins, Vern Raburn... Call Daphne Kis, (212) 758-3434; fax, (212) 832-1720; MCI 511-3763.</td>
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<td>March 14-16</td>
<td>Inside the yellow pages '93 - Boston. Sponsoring Communications Trends/SIMBA. Call Elaine Rosa, (203) 358-9900.</td>
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<td>March 24-31</td>
<td>CeBIT '93 - Hannover, Germany. Sponsor: Hannover Fairs USA. Everything you're interested in, and a lot more. Call Mette Fisker Peterson, (609) 987-1202; fax, (609) 987-0092; Geide Schlichting, 49 (511) 89-0; fax, 49 (511) 89-3 2626.</td>
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<td>April 24-29</td>
<td>*INTERCHI '93: Human factors in computing systems - Amsterdam. Interfaces and intelligibility. Sponsored by ACM. Call Carol Klyver, (415) 738-1200.</td>
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Please let us know about events we should include. -- Denise DuBois

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