Time is all we’ve got. Our challenge is allocating that time, intersecting our time with that of others, managing the disposition over time of the resources we control. Now at last we’re getting better tools to help us. Time itself is abstract, but it takes on value as a measure of unique, un-tradable things: Juan’s presence, the use of Alice’s spare apartment, the time of a particular doctor or the attention of a specific audience. One night is nothing; one night with you, per Elvis Presley, would make my dreams come true.

But computers know nothing of this, even though time is intrinsic to their operation and they can measure it with precision. Its meaning is as foreign to them as the meaning of a mile or a kilometer. They don’t understand how people value time, nor how time changes value – both its own value, and the value of the things it measures.

Over time (to coin a phrase), many applications have incorporated time – everything from length of employment to depreciation curves and net present value calculations. But developers are just beginning to understand the meaning of personal time. Most obvious is calendars, scheduling, events, resource allocation over time (aka project management). But there are also less obvious ways time matters in software: how people work and think over time; how human relationships, article relevance, and purchase intentions and other commercial considerations change over time; how time patterns infuse a variety of applications; and how a sense of timing can improve the utility of everything from search results to social-network-driven tools.

And finally, there’s the future. We can predict it, or we can start paying intelligent attention to users’ stated intentions and desires.
can detect threats or opportunities or simply trends that aren’t yet visible and thereby improve our timing – the better to generate a response, avert a threat or catch a customer.

In this issue, we first consider traditional time-based applications and tools, starting with calendars and including scheduling tools and events databases. We show that while time can measure, a better way to manage may be by first defining discrete activities that fill our time. In the second part, we consider a number of applications that use time in order to perform other functions better – ranging from face recognition to behavioral targeting.

One message becomes clear: The online world needs to get better at time-stamping content and activities and at standards for representing time and events – both times and durations, and all the patterns in time: speed, decay, growth, recurrence, (changing) frequency of events. Many applications spend lots of effort on interoperability that wouldn’t be necessary if we had standards.

Adding Value to Time: Calendars and Schedules – and Maps

You can’t create time. You can only steal it, reallocate it, use it or waste it. Every living and non-living thing has its span of existence. Calendars are a way to map the path of each thing through time. Scheduling tools try to create intersections across those paths. And events databases show possible events through which you could pass.

There are lots of parallels between calendars and maps. Both enable us to visualize – maps in two dimensions, and calendars in one. As with maps, the visualization of a single aspect of a geography or a single person’s schedule is easy; the tough part is when you combine two or more layers in a map – for example, a street map plus satellite images plus, say, the layout of an underlying sewer system. Geocoding serves to tie the different layers together. In theory, it’s all clean and tidy, but the reality is much messier.
The same is true of schedules: No man (‘s calendar) is an island; the default is figuring out how to share events. The challenges of mingling schedules are fairly easy when it concerns your typical corporate environment, with a (potentially large) number of users all running off a single Exchange server. But now, more people are trying to schedule events outside the confines of that controlled environment.

Any single person’s life should be quite simple, but in fact, lots of related things happen in parallel. Most things that take time involve other people; otherwise, they wouldn’t be so hard to schedule! And your own schedule may contain commitments, possibilities, meetings requested by others, deadlines and so on, which together represent a multiplicity of possible, contradictory futures. (Divining possible pasts is a task called forensics.)

Indeed, the issues around scheduling also have to do with social algorithms: Whose busy-ness takes precedence over who else’s? Can Juan see Alice’s calendar, or only that she is busy? What if she’s busy for Juan but not for, say, her boss or a valued client? The current set of scheduling tools is adding social affordances for people who value their time. What should be the defaults for disclosure? And how should they change over time?

There is also secret time, which may show on a calendar as revealing gaps – akin to contacts with whom you have no visible (or anyway, saved) communication. That’s something we talked about with Microsoft CTO Ray Ozzie, who works in the same building as Bill Gates; that building is the only one whose layout is not freely available over the Microsoft intranet.

Finally, there are subtle cues to take into account. Schedule a meeting at 3 pm, and people will assume they’ve got an hour. Schedule it at 4.40, and they’ll take 20 minutes. But schedule it at 4.50 and they’ll be confused – until you explain that you’re serious and that you can actually handle their “issues” in 5 minutes.

**Something to watch over me**
The best applications would watch what the user does and how she allocates her time, and then start predicting those decisions. Suddenly, instead of making decisions, the user would need only to correct the wrong ones.

Calendar applications would also do well to take into account all the high-level objects associated with each calendar item: participants, resources (a conference room), documents, e-mails, associated expenses, tickets or reservations. How can
these be represented and linked to or from? If Juan meets with Alice and puts her in his calendar each time, shouldn’t Alice be a defined object in Juan’s calendar. . .so that later he can look her up in his address book and find references to each time he met with her? (That could be very helpful to a prosecutor when Juan gets into trouble, but also useful to Juan himself or to a corporate application trying to find out the strength of his connection to Alice — whether in order to get an introduction to Alice, or to find out who in the company knows about the top-secret Doodle project once Juan leaves.)

This is what IBM calls activity management. It’s in its infancy, but in the end, we can’t manage time, we can manage only what we do with our time. Representing activities in a meaningful, goal-focused way that allows us to coordinate all the resources we need for any particular task will be a huge win.

Finally, most schedulers don’t handle location (other than as a descriptor) — say, that the series of meetings in San Francisco should be contiguous, and that the meetings in Palo Alto should also happen contiguously. That’s a task on their to-do list.

Why now? A short history
Modern calendar times began with the launch of Microsoft Outlook, with Office 97. Now in its fifth release (as Office Outlook 2003), it has about 300 million users, most of them tethered to a corporate Exchange server. It’s worth noting that Outlook has a profusion of functions, but most people don’t know about them. Ease of use and intuitiveness will be key to making the next generation of time- and activity-management tools broadly used — and useful.

In addition, Lotus Notes has about 120 million users. (See Release 1.0, June 2004). However, most individuals use electronic calendars for business schedules but not for personal matters — odd considering how “personal” a tool a calendar is. In particular, says Joyce Park, who researched the market before co-founding Renkoo (Page 18), few women use electronic calendars, even though they tend to be responsible for families’ shared calendars. There just hasn’t been a compelling offering. For example, we personally use Microsoft Word to keep our calendar; we’re waiting for something good enough that we will never have to switch again. There was a brief flurry of more consumer-oriented calendar offerings along with a variety of other applications during the dot-com boom, but few have survived. Most are now mostly neglected offerings on big portals. When.com was absorbed by AOL; Jump.com lives on as MSN
Calendar. Part of the problem – now being addressed – is that none of them play well
together – and in the end most scheduling requires coordination with other people.

On the scheduling side, Interactive Corp. owns Evite, which has tens of millions of
users, while Yahoo! Groups includes a group calendar…which doesn’t communicate
especially well with Yahoo!’s own MyCalendar. Online scheduling application Time-
Dance got to 1 million users a month in 2001, and then fizzled as its new manage-
ment tried to generate revenues by selling greeting cards.

But now the field is heating up again.

On the private side, more people are interacting with more other people online, try-
ing to reconcile busy schedules and to set up meetings. Now they are looking for a
repository for all the as-yet unstructured data they are creating and all the scheduling
e-mails they are sending back and forth. They want to share schedule information
with others, but selectively, so that they can protect both their time and their privacy.

On the public side, new event portals are aggregating event announcements from
the Web and offering RSS feeds. Users need something to import those feeds into
that will know what to do with them – in short, a calendar.

Web publishers and calendar applications are beginning to use microformats and
standards to represent events. But so far, the information in most calendars is strings
of text, rather than explicit objects – contacts, locations, venues, resources, clients,
business expenses or time sheets – that can be tied to projects, goals and the like.
Books have ISBN numbers, planes have tail numbers…but there’s no registry of
venues, let alone of events themselves.

And at a completely different level of abstraction, IBM and the Open Source Ap-
lications Foundation (OSAF) are beginning to define ways to represent and man-
ge “activities” – not times and dates, but collections of events, content and people
that are linked by a common endeavor, whether it be the building of a cathedral, the
election of a dark-horse candidate or the generation of next month’s sales forecast.
Time is a measure and an organizing principle; activity is, well, the purpose of it all.
But there’s only one stream of time that you can represent simply in a calendar or
timeline (such as the timeline in Outlook’s Journal view, which has some notion of collecting data into activities), whereas almost everyone has multiple activities.

Yes, that threatens greater complexity, but it’s just a reflection of reality. Tools that actually simplify the complexity and that automate routine work – rather than just share data – may provide the payoff that will get people to use these tools.

The market emerges
Different start-ups are focusing on different facets of these puzzles, including interoperability of their tools across platforms such as cell phones and PDAs. The union of scheduling and mail – still the primary communication tool for setting up appointments – is a development we discussed at length in our June 2004 issue on Meta-mail. At the time, most of the discussion was theoretical, with pointers to bits of functionality here and there, plus IBM/Lotus’s more-inclusive but closed-group Unified Activity Management (see page 9). Now things are beginning to happen.

My Schedule, Your Schedule
Four leading independent calendar contenders currently are Chandler (being developed in public, together with the Cosmo server, as a project of OSAF), Trumba (which debuted at last March’s PC Forum; see release 1.0, march 2005), Airena’s AirSet and Zimbra.

Chandler is a client and can share data with other clients through its own server, Cosmo, whereas Trumba’s OneCalendar is a Web service that works with both browser-based calendar applications (Yahoo! Calendar, MSN Calendar) and desktop calendars (Outlook, Apple iCal) and is more focused on providing schedule-publishing and -sharing tools for organizations and group organizers. AirSet offers a richer but more complex user experience and back-end than Trumba – it supports overall group activities (contacts as well as scheduling) – while Zimbra is a mail-centered server that supports Outlook and other clients (replacing Exchange); it can recognize events and contacts (among other things) in mail, and can semi-automatically insert them into the user’s Outlook calendar.

Finally, there is the management of activities as well as time. In Chandler, it’s just a new capability, offered in a lightweight way; in IBM’s Unified Activity Management (UAM) project, it’s the center of attention.
OSAF’s Chandler: The schedule knows

Chandler, in the works at OSAF for four years, became the cornerstone of a suite of personal tools. Says lead designer Lisa Dusseault, “We saw what happened to our sister non-profit, Level Playing Field Institute. It was a small organization falling into a black hole of calendaring – unable to hire a person just to manage an Exchange server and finding other calendar software unusable.”

Chandler is a desktop application that can share data with other applications using Cosmo, a general information-sharing server that handles other content as well as schedule data. There’s also a Web-based user tool called Scooby that offers similar functionality directly in and out of Cosmo. They all use the same data represented in CalDAV, the IETF-developed calendar language/protocol. CalDAV supports full sharing with multiple readers and writers and fine-grained access control. It also scales, so that arbitrarily large numbers of events (for instance, a full BART schedule or an entire year’s television programming) can be efficiently shared. CalDAV also supports enterprise use cases including the ability to view somebody’s busy time and browse through calendars. Most importantly, all this works across the Internet, with native HTTP URLs for every calendar and each event.

Dusseault led the charge for CalDAV’s development as an individual even before she joined OSAF in March 2004. CalDAV potentially brings capabilities equivalent to those of Exchange, Notes or some of IBM’s office tools to a much broader user base. It is already supported by Mozilla Lightning, Oracle and Novell.

And it talks to – or at least offers the possibility to talk to – cell phones and PDAs. Notes Dusseault: “It doesn’t make sense to synchronize your calendar from your PC to your PDA. The time when you most want up-to-date schedule information on your PDA is precisely when you’re far away from your laptop and you can’t synch.”
Modern PDAs with connectivity should be able to access the calendar server directly and selectively – getting current information only.

The second big innovation in Chandler is its ability to link different kinds of data around the user’s activities – or what it calls “collections.” For example, says Dusseault, any incoming e-mail – not just specially formatted invitations as in Outlook – can be turned into an event. However, the user must make that link, while a formatted Outlook invitation already “knows” what it is. So, says Dusseault, “If Jane sends me e-mail saying ‘I’ll try to call you Sunday, I can turn that into an event on my calendar for Sunday. When I look at my day or weekend plans, I’ll see that as a
time-related piece of information. Note that this turns the e-mail into a calendar event but it remains an e-mail too – it’s still also the message from Jane.”

Events, e-mails and tasks can live together in the same collection – or activity. Activities are represented not just within a single user’s Chandler schedule, but also can be replicated in Cosmo, so they can be shared across users. By default, all members of an activity can see all of the related items.

In addition to collections, Chandler/Cosmo also support tags – what an earlier generation of mail users might have called “labels,” and a more flexible option than hierarchical folders. Any data item – not just a message – can have one or more tags. This enables powerful search across the combined applications.

OSAF is announcing an experimentally usable, but early beta version of Chandler (“download this only if you’re willing to help us fix the bugs”) early this month (December). As for Cosmo, says Dusseault, “We’re going through the glitches of hosting it ourselves first.” Given that it’s free, Chandler/Cosmo has good hopes of attracting individual users and groups of those users. “We don’t need to fund a marketing organization,” says Kapor. “All we need is about $3 million a year for the development team.” That could come from the current funders, individuals or new sources.

**IBM Unified Activity Management: Managing activities, not time**

As we described last June (see **RELEASE 1.0, JUNE 2004**), IBM Research is doing groundbreaking work in what can best be described as personal workflow – or activity management. Says Tom Moran, an IBM Distinguished Engineer and leader of the Unified Activity Management project: “I usually contrast flexible ‘activity’ adapted to local circumstances with rigidly determined ‘workflow,’ and I prefer ‘interpersonal’ to ‘personal.’ Lotus has made clear to us that personal productivity tools per se are of no value to their enterprise customers, and that their concern is with ‘organizational productivity.’ We take that to mean the informal collaborative work that business people actually engage in – vs. the idealization of formalized business processes.” Moran has been working on this kind of thing since he developed Notecards at Xerox PARC in the ‘80s; it was an attempt to support “informal work practices and let analysts organize information in a natural yet structured way. There’s always a
delicate balance between being too rigid – automating some work but turning people off – and too loose – not providing any help to organize the work.”

In short, the idea is to give users tools to manage not just their information – such as search, contacts databases and calendars – but to manage their activities. An activity may be a defined project with an end (or a deadline), or it can be a continuing process, such as managing a particular sales team (or even a particular person). Consider what the spreadsheet did for financial modeling; IBM is essentially trying to create an equivalent tool for project management – changing it from a mainframe-style application into something flexible, ad-hoc, user-friendly and malleable.

At the When 2.0 workshop Moran’s colleague at IBM Almaden Research, senior software engineer and lead “activities” architect Stephen Farrell, will be demoing Wax, a prototype service which provides a server for representing shared activity descriptions, a Web-based user interface for viewing and manipulating activity descriptions, and Web-based API’s for using the service.

Some of the UAM work is moving out of research into products. The Almaden/Cambridge Research UAM group is working with the IBM WPLC (Workplace, Portal and Collaboration Software) division, which includes the Lotus brand. The first activity-based product is called Activity Explorer and runs on the IBM Workplace platform: UAM has added an Activity Pattern plug-in to Activity Explorer that will come out early next year and will be shown at Lotusphere in January. IBM is also working on incorporating many of the UAM ideas to provide activity support across a wide range of products using open standards which can work as a back-end to other services in the Web 2.0 world. Call it IBM 2.0.

**Eight days a week**

In essence, unified activity management creates a representation of activity itself as a “first-class computational object,” which is a specific but flexibly structured collection of metadata that links associated people (with contact information), phone
calls, calendar items, documents, e-mails and the like. That flurry of e-mails, calls, documents and people actually has an identity and can have an arbitrary internal structure. It can be referred to, copied and modified with new participants and documents, and considered open or closed. People can be part of it (or not), with specified permissions, roles and responsibilities (i.e. documents or sub-activities that they are responsible for).

For example, the activity of preparing a workshop includes (sub)activities such as inviting speakers, writing an accompanying newsletter and organizing meeting space. The overall skeleton of the activity is the same for all workshops, but the specifics vary for each workshop. Some sub-activities occur some times but not others, such as organizing a field trip, renting a separate space for a cocktail party or hiring a performing elephant. The specific objects used by the activity – such as a customer list – can be shared and sub-setted, used by multiple activities, etc.

The beauty of this approach is that it recognizes (unlike a project management tool) that elapsed time or schedules are not necessarily as important as the articulation of different sub-activities comprising the project, their statuses, participants, and other facets of these sub-activities. Using a variety of interfaces and visualizations, user can query for all open items, can see who has most tasks to complete, etc. It’s the equivalent of being able to find e-mails that need an answer, but across a much broader range of objects than just e-mails. People, documents or other items can be flagged for follow-up, forwarded to others to handle, and the like.

Beyond that, the idea is to develop a standard, generic (“unified”) representation of an activity and services to support this representation for all comers. The service has standard Web APIs. People can build tools and applications that put, retrieve, and manipulate activity information from this service. Moran says, “We encourage plugins to other tools that interface with the activity service, so you can manage your activities from whatever context or environment works for you. For example, we have a plug-in to the Firefox Thunderbird e-mail system that connects to UAM. It allows you to manage your e-mail as activities, not just folders. A new e-mail comes in; the plug-in queries the activity service for possibly relevant activities and a list appears; you then plop it into the right activity. Or you create a new activity.”

I know what we’re doing this summer
Likewise, UAM has a plug-in for Firefox that allows you to stick any Web page you visit into an activity or to query what activities refer to this page. And anyone can do it. An IBM summer intern connected a cell phone to UAM. “So now if I get a I get a
call from you, a query goes to the activity service for the activities we’re jointly involved in, and displays them on the phone screen,” says Moran.

But this is not just for “personal” applications. One notion being discussed within IBM is linking to a business modeling tool used by IBM Global Services. “Modeling is a complex collaborative activity between analysts, technologists, and the customer being modeled,” says Moran. “Of course, there are also IBM methodologies for doing modeling – which are often worked around because they are seen more as overhead than help. So the idea is to embed a UAM interface in one panel of the tool. This allows the participants to manage their collaborative activity of modeling. Also, methodologies can be presented as activity patterns. These are more likely to be adopted because they directly help you get started on the modeling activity rather than staring at a blank slate.”

Adds Moran, “We believe that activity management needs are everywhere, and we aspire to make our activity management services a ubiquitous mash-up like Google Maps. For example, Craigslist apartment listings can not only be mapped out, but apartment-hunting activities should be able to be managed. If such activity patterns are openly available, then people can learn from each other’s hunting techniques and experiences.” He adds, “This kind of vision makes sense for IBM, where our real strength is the ability to do integration. I would never have conceived of this at [Xerox] PARC.”

**Trumba: Shared lives**

Trumba, by contrast, is a commercial venture, founded by Visio co-founder and CEO Jeremy Jaech and a team of about 27. The initial business model is to sell a Web-based calendar-consolidation and publishing service (OneCalendar) to group organizers and other time-middlemen, such as sports teams, schools, churches, clubs and other groups that organize meetings and events for their members. Then, Trumba hopes, some of those members will realize that they too are group organizers or “schedule sharers” – for family members and other partners – and subscribe to Trumba for their own use as calendar consolidators. Somewhat to the company’s surprise (especially since the pitch is sharing calendars from the server), many individual users are appearing, no doubt attracted by its ability to overcome a basic challenge – merging data from one calendar to another. On the other hand, says Jaech, he’s surprised how hard it is to get people even to enter an e-mail address for a free trial in this world of spam and mistrust. The company won’t say how many users it has, but it says it has 15 million events in its database that appear on users’ calendars.
Trumba's Mix-In feature lets individuals view any combination of calendars using the OneCalendar server; it doesn’t automatically find openings or conflicts but allows users to visualize their schedules across multiple calendars. (A new release currently in the works will add conflict-resolution capability.) Users can also e-mail entire calendars or specific calendar entries – as invitations or just for information – to others with Event Actions, a service that can translate among calendar formats including Outlook, Yahoo! Calendar, MSN Calendar, iCal and any CalDAV-compatible calendar including Trumba's own OneCalendar. rOneCalendar shows you the sum of all the schedules you select; you can selectively mix them into the calendar view you want to see. Event aggregators such as newspapers or ticketing sites can link to their calendars at the Trumba site, or embed a Trumba-hosted calendar into their own site.

Trumba’s business model allows anyone to see and save (events from) Trumba calendars for free. However, a user who shares his calendars with others on Trumba’s website or who uses Trumba’s hosted calendar service must pay a yearly charge of $39.95 (after a two-month free trial). Says Jaech: “The benefit we offer to event communicators and event publishers is the communication and promotion of events to their audiences. We think this benefit is worth paying for. The benefit we offer to schedule sharers is Exchange-like calendaring tools without the need for IT support. We think that is worth paying for, too.”

He adds, “The benefit of using OneCalendar as a personal calendar is having a consolidated view of multiple calendars. We don’t think that is compelling enough to charge money for, and we figure all the personal calendars already in the market are going to add this functionality anyway.” With this in mind, the company will release a free client early in 2006.

Right now, Trumba has rudimentary privacy mechanisms. You can share a calendar for someone else to see or modify, or keep it private, but that’s about it. Of course, you can create multiple calendars of private or public meetings and share each of them selectively. Inelegant, but it does the trick.

The event fields in Trumba’s database are basically text strings, which can be copied or set as recurring events for, say, every Tuesday, every five days or other periods a user can specify. However, other than selecting recipients of reminders or invitations from one’s address book, Trumba doesn’t offer much in the way of integration with contact lists. Some might consider this a disadvantage, but for the broad market Trumba is trying to reach, it’s probably about right – at least for now, while people
are new to the intricacies of sharing calendars. Although Trumba does have ambitious plans – including “an open, event-router service that is interoperable with the leading calendar services and applications, along with invitations, updates, notifications and reminders,” the challenge is not more features; it’s getting users to take advantage of the basic capabilities in the first place.

**Airena’s AirSet: Precision planning for the complicated life**

On the calendar side, Trumba and AirSet are the two most directly competitive. Trumba is easier to use, while AirSet wins on functionality…and also as a broader group-support tool (assuming you want that). AirSet’s name and positioning focus on its ability to operate on mobile phones – a specialty for Dougherty, who founded and ran Geoworks, the company responsible for graphical operating systems and applications for the Apple II, Commodore 64, and IBM PC, as well as mobile phones and PDAs including Nokia’s first Smartphone, the Nokia 9000. That’s also key to AirSet’s future business model, which is to offer the basic service for free, but to charge for access to it over the air. Because its aim is to use each user as a viral marketer to other members of all his various groups, that mostly-free business model is important. Thus, in addition to calendar functions, AirSet offers more support for contact management – another function that’s really handy when you’re out in the field or on the road trying to get hold of someone from your Treo.

What AirSet also brings to the party is granularity and natural support for the overlapping groups any single user may be a member of. It treats the participants in a calendar entry not as text strings, but as participants, and can manipulate appointments and show calendar subsets on that basis. That is, Juan can see all of Alice’s events; he can also choose to see only those to which he is invited or which he has chosen to attend. (In the future, he’ll also be able to filter his own appointments by which ones include Alice or other third parties; this will be part of a grid view where you can see events by user participation.) Currently, the “personal calendar” tab filters in all events you’re participating in, from all groups/calendars that use the AirSet back-end. That granular filtering will enable a user to selectively consolidate schedules automatically. Adds Dougherty: “It is configurable so that you can sync all your AirSet data into Outlook [or a CalDAV calendar] or just do a one-way pull of Outlook data into AirSet.” You may not want to add family events into Outlook, but you may want to pull work events into AirSet to explain to your family why you are never home…or perhaps you’ll see the error of your ways and cancel some appointments!
While IBM and to some extent Chandler use “activities” as a way for users to handle the complexity of all their disparate but overlapping obligations, AirSet does so through group functions, which also include shared to-do lists and (its own) blogs. AirSet has an overall P2P flavor: A particular group’s contact list and calendar is shared by default, and any member can update it. That devolves responsibility...and control.

AirSet is likely to appeal to a more business-oriented user – one who is probably using Outlook and may be loath to switch. That’s why the cell-phone support – including an easy way to subset events to ones that matter in real time – is so key.

**Zimbra: Total control by owners**

Zimbra, an open-source project, is complementary to Chandler’s open-source messaging client, though it competes with the Cosmo server to some extent. Since so many of our mail transactions concern our time (the financial ones we have already made more explicit, with purchase orders and the like), Zimbra necessarily has a heavy calendar component. “People spend their lives in Outlook,” says founder Satish Dharmaraj, “but it’s broken. We’re an enterprise company, but our pitch isn’t total cost of ownership or e-mail on Linux; it’s innovation in administration of the server and innovation in end-user functionality.”

Zimbra comprises a mail/messaging server that attempts to detect the implicit transactions within mail and provides hooks for corporate developers to do interesting things from within mail – everything from seeing a map for an appointment, to flowing a purchase order into an inventory system or flagging a request into a follow-up folder or to-do list. That’s the appeal of open source; it invites users to define and automate their own workflows.

In short, Zimbra wants to offer Total Control for Owners – letting people stay inside the familiar environment of mail, but using it both as a dashboard to personal applications/data such as address books and calendars, and as a kind of client-side mashup between a user’s own desktop applications, plus specified corporate applications ranging from Salesforce.com to an SAP inventory management system. (Of course, it also offers better searching, foldering, tagging and the like.)
Dharmaraj was previously VP of Messaging Products at Openwave Systems, responsible for the e-mail, unified messaging, voicemail, and instant messaging product lines. But he’s just one of a team of about a dozen developer/managers who have worked together since they worked together on Javasoft at Sun Microsystems in the mid-’80s. During the days when e-mail on the Web became popular, the team decided that it was time to bring voicemail and fax to the Web as well — so they moved on to start Onebox, a unified messaging company that was sold to Phone.com for $850 million in 2000. Phone.com subsequently merged with Software.com to become Openwave in 2001. At Openwave, the team ultimately deployed 180 million mailboxes worldwide, including 20 million mailboxes at JPhone and KDDI in Japan.

That record made it fairly easy for the new start-up to raise $4 million from Benchmark and Redpoint in early 2004, with another $12 million from Benchmark, Redpoint and Accel Partners together this year. (Only one key figure, president and CTO Scott Dietzen, was not part of the persistent Javasoft team. He joined Zimbra from IBM, WebLogic and BEA.)

Because it’s open-source, Zimbra is designed to be extensible and to allow internal business managers or IT departments to customize the applications and “recognizers” (to detect, say, a purchase order, an expense item or a for-review request). The business model is to offer the server free to all comers, and then to charge for customers who ask for 24x7 support or for a variety of “enterprise” features such as disaster recovery, replication, cross-mailbox search for legal discovery and compliance-related functionality on the back end, and “over-the-air” sync on the end-user functionality side. “We expect to charge about $30 per mailbox per year,” says Dharmaraj. “We won’t do it the traditional way, with a northeast regional manager of sales in New York [or more likely Montclair, NJ]. Our customers will self-qualify. If they’re smart enough, they’ll download it for themselves and never bother us. But if they want more, they’ll call us for support and extensions, and we’ll sell them add-ons and special features.”

This model might not have worked even a few years ago, but in a world MySQL, SugarCRM and JBoss, it may be the first thing to offer a credible alternative to Exchange. (Ironically, Zimbra won’t get most of the revenues Microsoft stands to lose, but it will erode the overall value of that market.) Zimbra has had several thousands of downloads in the last three weeks. The company has 36 employees in the US and 10 in Pune, India. It has also attracted a far-flung developer community that has already created local-language versions for Russia, Romania and Brazil.
So, what does Zimbra actually do as far as time and scheduling are concerned? Mostly, it detects references to specific times, for which it can open calendar entries, and contacts, for which it links to (or creates) the appropriate address book entries. (Shades of Anagram; see release 1.0, June 2004.) That enables mail to operate naturally as an interface to corporate data. It can do this for a variety of mail clients, including not just Outlook but also Eudora (hurrah!), and with calendars including iCal and therefore Trumba, Chandler and Sunbird.

Zimbra does not offer a fat calendar client itself, but relies on its Web-based AJAX client for end-user functionality. It expects users to choose a desktop client for themselves, but if asked, Dharmaraj recommends Chandler...or will, once it is fit for broad use. He adds, “The Zimbra AJAX client allows overlays of different personal calendars as well as overlays of calendars of other end-users who have given explicit permission to do so. It also allows subscription to any of the iCal-based calendars on iCalshare.com, the calendar-sharing site. Zimbra also allows users to publish their calendars for others to subscribe to, via a website or an RSS feed.”

However, Zimbra doesn’t do “activity management” in the sense of “knowing” about activities. It doesn’t actually hold links between, say, a calendar item and a related e-mail. It can simply find them through a powerful search capability. Thus, you can’t associate purchase orders with an activity as in, say, IBM’s UAM model or even Chandler; you have to reference them within a calendar item or e-mail, and then the system can find them for you quickly.

**Scheduling: The Transaction Side of Calendars**

Calendars are really just a fancy kind of structured data store. The better ones have a variety of capabilities for data reconciliation and display, but in the end they are repositories for meetings scheduled by users.

How those meetings get scheduled is another, orthogonal business of social transactions, and one that is heating up as more people schedule more meetings. Of course, you can simply compare schedules – by hand or with the shared-calendar tools described above. In a more automated approach, many business people use Outlook to schedule meetings within an enterprise or other shared-server community, or to send invitations outside it. But people familiar with such capabilities want a way to use them outside their own corporate walled campuses.
One benefit of scheduling tools as opposed to shared–calendar tools is that they don’t contain much specific calendar data, which helps to maintain privacy. The users expose only the times they want to, according to the particular event and participants. But that leaves most of the work up to the participants.

The leading “public” scheduling service is Evite, the most-used (and probably therefore most disliked) of them all. It was launched in 1998 and sold to Ticketmaster in 2001, and is now part of Barry Diller’s Interactive Corp. It boasts impressive monthly stats: 6 million unique users, 100 million page views, 250,000 events created and 8 million invitations sent.

Evite is basically a unilateral invitation tool: The event organizer specifies the event and invites the prospective attendees. Evite collects the responses. It also adds value by allowing recipients to post responses and answer polls – either for others to see or only for the inviter. Registered users can store all their events and see related data. It’s a solid old tool, but inflexible and ridden with incongruities. For example, it allows recipients to specify which times they can or cannot attend a meeting, but they can’t specify the same for a location. (Don’t we all know people for whom we would travel across town – and others for whom we would not?) In the end, one gets the sense that the main purpose of all this is to provide content around which to display ads.

There are a number of newer, more flexible scheduling services. The most capable appears to be TimeBridge, but it is not yet even at the beta stage. Other, lighter-weight entries include Renkoo and Skobee (who will be present but not formally presenting at the When 2.0 workshop).

**Renkoo: My time or yours?**

Renkoo was originally designed as a lightweight personal scheduling tool. It started its private alpha in November. For now, it has limited functionality, but it exemplifies many of the opportunities and challenges around scheduling.

While Renkoo performs functions similar to Evite’s, it is totally different in practice, focused on negotiating and scheduling events that don’t already exist rather than inviting people to ones that do, and then allowing users to import the appointments they make into their calendars. While the average Evite goes to about 40 people, Renkoo expects its users to focus on “lightweight” gatherings averaging closer to five or six people. (Certainly, you wouldn’t want to try to negotiate a single time or venue with more than that number, although many people do!)
In addition, Renkoo provides more group context: It can maintain a personal/shared list of user-entered (or selected from ads) favorite venues and meeting templates – i.e. the same bridge group as last time, but at a different person’s house, or the same restaurant as last time, but with a different group of friends. . .

Also, Renkoo wants to avoid pushing people to the site. Ambitiously, it hopes to pull people to the site, by offering more functionality and more information. “Our goal is to let each user have the Internet experience he or she wants to have – whether that be coming to a website, living in Outlook or getting real-time notifications via SMS,” says co-founder Adam Rifkin, who previously co-founded KnowNow, a Kleiner Perkins-funded middleware company, in 1999. Co-founder and CTO Joyce Park is most famous for being fired from Friendster for blogging, but she is also the author of “The PHP5 and MySQL Bible.” She was a lead engineer at Friendster and also at KnowNow, where she met Rifkin. They have worked together on a variety of projects since.

Over time, Renkoo sees its business model as local advertising rather than the brand advertising Evite features. Most interesting to local advertisers, Renkoo will get to users while they are still negotiating on where to meet, eat and spend money. (Of course, Evite and Yahoo! Groups may pick up some new tricks. . .)

The most novel and useful part of Renkoo, not yet implemented but promised for When 2.0 in December, is its voting capability, which will let users negotiate on times and eventually places. “Everyone said they wanted Outlook integration [which is also promised for later],” says Park. “But when we mentioned voting, even though they hadn’t asked for it, they got much more excited.” That’s ironic, since Evite already has voting. . .but most users don’t seem to know about it.

The Renkoo service currently has a somewhat cutesy, consumery-flavor. It may end up with two versions, or it simply may include more business options such as meetings and interviews as well as parties and movies.

**TimeBridge: Game theory for meetings**

You are invited to try out TimeBridge – but not until next quarter. No negotiating!

Back in 1997, Yori Nelken founded Banter, a company that used AI (statistical modeling, natural language processing and machine learning) to help automate call cen-
ters and improve agents’ productivity. Now the Banter technology is doing well as part of IBM, and Nelken is tackling the wider and much more common productivity problem of scheduling meetings. His new company, TimeBridge, is still under wraps, but he’s prepared to talk about the problems without disclosing the solutions.

After seven years at Banter, including two stints as CEO and two as CTO, he took some time off to think about other interesting problems and settled on the challenge of scheduling; it intrigued him that this common problem attracted so little attention and that no technology seemed to be available to support the process of getting a group of busy people together.

Take the simple problem of us arranging our two initial meetings with him: Should it be in Palo Alto or San Francisco? The first meeting was in San Francisco, the second in Palo Alto. Should/could co-founder and VP marketing Bill Glazier, formerly of PlaceWare (now Microsoft, page 23), join us? Yes the first time and no the second. We don’t know what alternatives Nelken had, but we were trying to meet with a number of calendar-oriented companies over the course of several days – some in San Francisco and some on the Peninsula. Were we busy at the times suggested? Yes, we already had lunch plans the first time – but we changed them. As for the second meeting, Nelken opted for a time slot we proposed, but by the time he confirmed, that slot was not available. Back to square one.

The lesson: Most scheduling involves other people and external constraints – the schedules of people more important, outside events such as conferences, airline schedules, financial quarters, availability of resources. Moreover, there’s an invisible hierarchy to the constraints, and it is all very, very dynamic.

In fact, says Nelken, “People frequently make scheduling decisions on the basis of who’s asking and who else will be there...and only then do they look at their own schedule to see whether they are busy. For the right meeting, they’ll cancel what they’re already scheduled to do.” So for everyone except for the inviter, the schedule is only one consideration – and not necessarily the first one.

Scheduling meetings is a negotiation, not an invitation, says Nelken. However, adds company advisor Mark Drummond, founder of TimeDance (circa 2001), “Playing calendrical battleship is a bad idea. You have to expose something – just not necessarily your entire free-busy schedule.”
The challenge for TimeBridge is to figure out what to expose and how to handle the responses, creating a de-facto ad-hoc workflow. A two-way negotiation is easy enough, but suppose you want to have lunch with four people – and you are free next Tuesday, Wednesday and Friday. Should you ask Juan first, because he matters most? But then he’ll pick a single day, even though he may be available all three days. You could invite all four of them in a single message, but then the danger is that someone else will pick a day that Juan, the most important person, can’t do it. (Or you may want to have lunch with each of them separately, which creates a different but similarly complex scheduling problem.)

Should you be transparent and let all of them pick – seeing which day Juan picked? You’re taking the risk that Juan will come in last, with a date the others didn’t pick. “Sometimes the pressure of the other three can get someone to change his schedule, and sometimes not,” notes Nelken. The company won’t yet disclose its solution, but Nelken leans towards transparency and openness as a default, in part because it fosters better behavior. Nonetheless, the TimeBridge system will also allow double-blind operation, where attendees specify their meeting desires and constraints, and the system produces a match of free times without compromising anybody’s privacy.

We assume that TimeBridge, like so many Web 2.0 start-ups, will start free and charge later for premium services “. . not inconsistent with Microsoft’s recent announcements,” says Nelken. He adds hopefully, “Once 100 HP salespeople are using it as individuals, we’ll call HP’s head of sales and offer the corporate, branded version.”

Also worth a mention is Skobee, another start-up. It addresses the same functions as Renkoo, but it has a completely different take on privacy. Rather than hosting private negotiations about where to meet, it posts all the information on the site, just as if you were still living in the same dorm with all your friends, says co-founder Noam Lovinsky, 25. For now, the system has three levels of visibility: Public, all my contacts, and just my friends. The goal is to create a lively social space and let people keep up with one another’s activities, check out where the gang is going Friday night, or see who you can run into at the pizzeria before you head out. Advertisers, of course, should love this.

Suppose you’re shy? If Juan and Alice really don’t want anyone to know they’re seeing each other, yet they still want a meal out, they can each separately and publicly arrange to meet with someone else at the same time and place. Then they just need to figure out how to ditch their public partners before the evening is out.
Microsoft: Time of change

Ray Ozzie's arrival at Microsoft as CTO both reflects and drives fundamental changes at the company. His entire ethos – from flat organizations and peer-to-peer to a certain sensitivity to the human element – is a shift from Microsoft's more traditional command-and-control structure, yet without the pure Darwinism of the Google approach. We expect to see the company paying more attention to human factors and to collaboration, both in its products and in its development process.

This is all part of a new attitude at Microsoft. The power shift in the industry – with Google taking both the glory and the barbs that were formerly Microsoft's – seems to have left Microsoft with new freedom and a willingness to change. We expect to see the company experiment more. Microsoft Live, Microsoft's move from the desktop to the Web and to software as a service, is just the first of many new experiments.

Another innovation is peer-to-peer information feeds; that is the approach of the Simple Sharing Extension, a recent Microsoft initiative led by Ozzie to address calendar and other sharing issues people have today. Ozzie, of course, created Groove, the secure, shared-workspace software designed for users working across corporate boundaries. (See Release 1.0, March 2001.) Groove is now part of the Microsoft Office system. Using feeds across borders is exactly the kind of approach Groove took, but only within a closed circle.

We don't know what Microsoft plans to do with it, but this Simple Sharing Extension initiative is an interesting development – two-way feeds replicating between servers (or between clients and servers) rather than typical one-way RSS feeds. Rather than just editing calendars within the context of a single server or website (e.g. Exchange or MSN), individuals or sites can share and co-edit sets of calendar appointments (or other data) among such calendar stores directly through Notes-style replication, via an RSS feed made bi-directional by a set of RSS 2.0 extensions. As with Notes (no surprise!), this replication could occur client-to-server, or server-to-server or site-to-site; they're all peers. (If it weren't for firewalls, it could even occur directly client-to-client, as it can through Groove.)

Feeds might be created or edited by the Outlook client, or by the Exchange server, or by any website with calendaring capabilities. Any SSE-enabled feed can then swap appointments or events with any other. Though this method doesn't address multi-user scheduling negotiations such as those handled by Exchange or TimeBridge (Page 19), the offsetting value is that users can share such information without being limited
to a community of people on a single calendaring server, and by extension they can edit all their shared information in the calendaring UI of their choice. Stay tuned.

**Negotiating changes: Bob and Carol and Ted and Alice**

Sometimes time doesn’t matter but timing – or the sequence of events – does. That’s behind another project at Microsoft, led by Pavel Curtis. Curtis started his career at Xerox PARC, where he created LambdaMOO and was hailed for shaping that decade’s vision of multi-user environments. He went on to co-found PlaceWare, a Web conferencing service. He and his partners and investors sold it to Microsoft in 2003 in the recognition that ownership by Microsoft was likely the best way to get their service into the hands of multitudes.

Curtis is still working on multi-user collaboration, but now he’s focused on the intricacies of reconciling multiple users’ changes to a single shared work product and obliterating the impact of timing – the sequence of the edits – on the outcome. We use documents as an example here, but the approach addresses any kind of content, including spreadsheets, presentations and source code.

Working with colleagues at Xerox a decade ago, Curtis had already solved this problem once, but primarily for the special case of only two users. That solution scales to more users only if you stick to a client/server architecture, where clients talk only to the server and never directly to one another, as in PlaceWare/Microsoft’s Web conferencing software (called Office Live Meeting).

The general problem, with multiple users all talking to one another peer-to-peer, is much more difficult. “I had left this area behind [during PlaceWare],” says Curtis, “but I’d heard rumors several times about it being solved in a number of different ways. But when I came back to it, I discovered that things really weren’t much further along. Mostly, we just understood better why the problem was hard, because so many attempted solutions were proved wrong.”

The general goal is to let all the users work independently, as if each was the only one editing the data. There are no locks, no turn-taking, no barriers to making progress, even if other users are working at the same time.

The trick is to understand the *intent* of the edits, so that they can be transformed appropriately for intermediate changes. For example, suppose one edit was “delete the fourth character” and someone else has deleted the second character. The inde-
pendent edit needs to be transformed to preserve the original user’s intention, into “delete the third character,” before it gets applied. In practice, of course, edits tend to be much larger, but the idea is the same.

(In case you were wondering, no, the software doesn’t recognize paragraphs (unlike, say, document-compare tools); it simply sees the document as one long string, says Curtis. “Paragraphs don’t really exist, per se; they’re just the sequence of characters that happen to appear between two carriage-return characters.”)

This example is pretty simple, but it can get very complicated very quickly: What if Alice has seen all of Bob’s edits but none of Carol’s when she receives new edits from Ted, who has heard from Carol but not Bob? It’s hard to visualize all of the possible interactions, let alone create software that can sort it all out.

Curtis figured out the math of precisely defining the low-level intent of individual document changes and then preserving those intents across other changes. “It has to look, in the end, like all of those intended edits were performed in the same order on every user’s computer, even though different users saw them happen in different orders.” The order may be arbitrary, but it must be consistent for all users. At the end, the “owner” can see the net effect of all the changes, decide which ones to accept and resolve any clashes of intent – either lower-level or at the “do we support evolution or intelligent design?” level.

“I don’t have a proof yet that these transformations are always correct,” says Curtis, “but I wrote a program that simulates four users pounding away randomly on the keyboard and ran it for about half a million edits. Their documents stayed in sync the entire time, so the statistical evidence is pretty solid.”

Of course, the point isn’t to resolve all the conflicts; it’s to “remove” timing, so that the order of the edits (which is unknowable in the disconnected situation described here) doesn’t affect the outcome. Instead, it presents the results of the edits in a way that preserves the editors’ original low-level intentions, and that lets the party in control resolve the higher-level conflicts, either by himself or by checking back with Ted (who has changed “evolution” to “intelligent design” throughout) and Alice (who wants it changed back).

How will this be applied? We can see lots of uses for it within Word, for editors trying to collect changes from colleagues – or from the sources and subjects covered in a newsletter. Likewise, changes in business-modeling spreadsheets, presentations to
senior management, and software source code are frequently made collaboratively, involving the synchronous or asynchronous participation of multiple people. Today’s solutions to these situations are pretty clunky, time-wasting and difficult. Most people resort to laboriously taking turns making edits or just appointing one member of the team to be the only one who can make changes. With luck, Curtis’s work will eventually make all of this a lot easier.

Currently, Curtis is part of Microsoft’s Real-Time Collaboration group, still involved with Office Live Meeting. But his goal is eventually to support other groups as well, including all the Office products.

**Events on Parade – In Public Portals**

At the other end of the spectrum from fine-grained scheduling tools are public event databases, which hold a registry of events and allow you to download them selectively. Most notable in the straightforward public-events space are Upcoming.org, recently acquired by Yahoo!, EVDB/Eventful.com, and Zvents. Then there are other takes on “events”: Columba focuses on market-moving events of interest to banks and investors; Meetup helps create meetings bottom-up; EventWeb (ambitiously) wants to index and annotate all the news about all events; and Demand ID wants to collect demand for events and get musicians and others to schedule live events in response to those demands. They all interact and intersect, both in concept and in some cases, in the market.

Finally, we include Technorati, in the person of chief technologist Tantek Çelik. Technorati’s business of searching blogs and analyzing the dynamic blogosphere depends on time and makes the movement in the blog world explicit and visible. But Çelik also wants to add explicitness at a lower level by making references to events (and other social phenomena such as people or venues) concrete and precise, by fostering the use of the hCal microformat to represent them. Then events portals can continue to add value, but the “identity” of an event will be easier to represent and more portable across the Web.

Indeed, in the absence of ubiquitous standards such as hCal, all events sites face a variety of delicate business problems around how to get and define event content – from asking users to do it all and scraping websites, to sucking in feeds and forming actual business partnerships with a variety of event organizers and promoters.
Although this isn’t like downloading tunes or even providing an index to all the world’s books, there are still some delicate IP issues to consider.

In a world where standards reign, it will be easier for anyone to share calendar information either publicly or to defined lists of counterparts. Rather than publishing to calendar portals such as EVDB, Zvents and Upcoming, event managers – along with bloggers and random other folks – will be able to share calendar entries and (if they wish) allow users to edit or create entries.

This means that event aggregators will need to do more than just operate as event registries or search engines – something that their direct competitors and Google already do quite effectively, thank you. Says EVDB’s Brian Dear, “Just because more publishers or event managers are publishing straight to the Web – thanks, we hope, to tools we have a hand in making – doesn’t mean that aggregators serve no useful purpose anymore. On the contrary – their usefulness will flourish as we become awash in a sea of events.” Over time the challenge will become not finding, but filtering.

So, the events portals need to become, well, a Flickr for events, where users can comment about events, share them with their friends, point to them, tag them, rate them and so forth. (Note that Flickr is now a sister company to Upcoming.org.) Certainly there are differences. Users don’t “own” events the way users own photos. And event creators are closer to advertisers than photographers in their motivations. Events are also more complicated – in the sense of having moving parts – than a photo. They may have venues, performers, participants, tickets, attendees…all fodder for a variety of interesting business models and complex ancillary functions and services. And of course they have formatted information that can be imported into a user’s personal calendar, or sent to a third party as an invitation or notification. (Imagine Alice posting an event link on Facebook with a request for someone to buy her a ticket…)

Same time, next year
Over time, event databases will become potentially powerful social spaces, where users plan events (or at least plan to go to them), request events (see demand id, page 36), discuss and recommend them, purchase related content or travel services or invite their friends. After the fact, they can rate events, post photos (or link to photos elsewhere), discuss what happened, and possibly plan follow-up activities. Individuals would register in order to post, comment and rate events, which would reduce spam and support a reputation system. They could also determine who could see their own participation plans, though in general the number of intentions for
any particular event could be disclosed without individuals’ permission. There are
numerous social conventions that remain to be addressed.

Other business models include selling not just ads but market information back to
event organizers (e.g. Demand ID), and also to related parties: travel and hotel com-
panies, vendors of related content, and planners of all kinds.

Long-term, we can also imagine a spot market for individual performers. For exam-
ple, if Bruce Sterling happens to have a five-hour layover in Denver on his way from
Austin to Seattle to see Neal Stephenson, there’s certainly a critical mass of fans in
Denver that would be willing to haul out to the airport to hear him. For his part, he
could have some fun, sell some books and perhaps collect a fee or at least get a free
meal at the airport deli.

That’s if these companies do it right.

Overall, EVDB sees itself as a user-driven site, whereas Zvents is more advertiser-dri-
ven, focused on “the official story” and on reliability of information. Even though
Zvents offers roughly equivalent tools for individuals and groups to post events,
share calendars, add related content/comments and integrate with blogs and other
sites, EVDB sees each event as a blog with its own permalink, whereas Zvents sees it
more as a posting. Although the overall functionalities are similar, the EVDB
approach is likely to result in a site that is livelier, noisier and intrinsically more sus-
ceptible to spam, although active users are good at policing their own turf. . For its
part, Upcoming is totally a user-driven site, although it is likely to change character
somewhat under the influence of Yahoo!’s ownership and also Yahoo!’s users.
Lurking in the background somewhere is an offering from Google.

**Upcoming.org/Yahoo! Local: Up and coming**

Upcoming.org, an early innovator in the events/calendaring space, launched in
2003. It was the first site to syndicate events using RSS, and the first with a public
API for events. It was also one of the first sites to foster social networks around any-
thing other than meeting people.

“It stemmed from a problem I wanted fixed,” says founder Andy Baio. “I was losing
track of the events I knew about, and not finding out about other things until they
ended.“ He bought the domain name early in 2003 and launched the site in
September 2003, focusing on Los Angeles events but providing a platform for users
to add events globally. “I let the roads pave themselves,” he says. “It ran itself for a good period of time, with minimal effort from me.” Users were the sole source of events, which has kept the site’s database relatively small but has given it much more of a community feeling than either EVDB or Zvents.

In fact, it was so casual that Baio kept his day job as webmaster at Dimensional Fund Advisors until the Yahoo! acquisition this fall. However, he began taking Upcoming more seriously back in March 2005, when tech columnist Jon Udell mentioned the site in his Infoworld blog. He praised it for the most part, but wondered why it hadn’t caught on. Recalls Baio, “He proposed adding tagging and a public API, which got me motivated to do more development. At that point, two friends of mine volunteered to help with the coding and make something great.” Those friends, Gordon Luk and Leonard Lin, are now listed as co-founders of Upcoming.org, but were never hired as developers – until Yahoo! “acquired” them.

Unlike EVDB, which had investors and a profit motive, Upcoming hadn’t focused much on growing as a business. When Yahoo! showed up, says Baio, things clicked: “Yahoo! has a staggering amount of resources and they’re very interested in fostering innovation. They were a perfect match for us, and the opportunity to develop our work full-time and introduce it to a much wider audience is very exciting.”

Moreover, Baio feels that he can learn from Flickr in particular. Another recent Yahoo! acquisition, Flickr focuses on the social interaction around photos; Baio wants to focus on the social interaction around events. “Friends’ events are inherently more interesting than others’ events,” says Baio. “Yet you still want some serendipity. You want to be able to stumble upon things and have them surfaced for you the way you do in Flickr, rather than search for something or get lost in Google images. Right now, for example, I have over 10,000 items in my feed reader. I’d love to have some interestingness measure” – akin to what Flickr offers, based on measuring various kinds of user reactions including views, tags, favorites and comments, but discounting friends’ assessments in favor of those of objective strangers.

...and from Yahoo!’s corner
Yahoo! has been active on the acquisition front lately, often going after people as much as properties. Its most notable acquisition this year, Flickr, brought only a paltry number of users compared to Yahoo!’s own millions. The same is true of
Upcoming. And last year’s acquisition, Stata Labs and its mail tool Bloomba, has gone quiet. (See Release 1.0, June 2004.)

But Stata Labs’ founder, Raymie Stata, is still with Yahoo! and now, as chief architect of its Search and Marketplace business unit, he plays a key role in its technical strategy. He sees time and events as central to Yahoo!’s mission to help people “find, use, share and expand human knowledge.”

In the past, he says, “The industry took enterprise functionality in calendars and presented it to consumers and said, ‘You know that calendar stuff you hate so much in the office? Now you get to use it at home. Lucky you!’ But recently there’s been innovation driven by players like Upcoming who started from a consumer perspective.”

He sees these new consumer players focusing on four “buckets of functionality:” discovery (for example, through search), logistics (such as setting up a meeting), commitment management (keeping track of your own commitments, a part of IBM’s larger ‘activity management’) and annotation (sharing content about the content). “Older products – including Bloomba – were caught in a rut,” he says. “They focused on logistics and commitment management, and did so within a rather narrow design space. It’s exciting to see these new players like Upcoming inject new life and new ideas into the mix. I expect to see ideas from these products — such as community-based discovery and annotation — make their way into enterprise products.”

Stata’s take on time was reflected in Bloomba, which was notable for its strong search capabilities as well as for functions such as automatic filtering and archiving of mail after a defined interval. For example, if you didn’t process something within three days, it would be discreetly tucked out of sight but still be easy to find. In fact, Stata would tend to extend a mail point of view to many things, including search. He says, “If you rank things by time, as most mail systems do implicitly, it is a strong predictor of relevance. More speculative is allowing people to browse by time – as blogs do.”

Moreover, he adds, when users search their own information they tend to remember things by time. That doesn’t mean necessarily by dates, he says: “People remember things off events. They’ll say, ‘I remember where you told me that and when. . . . Ah, now I remember what you told me.’ We had a patent at Stata Labs, which Yahoo! now owns. The idea was to use events rather than formal time. Key events for various time periods would pop up. . . .either from your calendar, or public events such as 9/11. . . .which would help you more quickly identify the desired time period.”
He adds, “In many of these ideas for using time, place is a part of the story as well. For example, photos have time stamps in them [although the mistimed camera may be almost as common as the blinking VCR]. Getting location as well would be handy. At Yahoo! Labs in Berkeley, we are playing with joining the time stamps from your camera with GPS data from your phone, so we can determine where you were for each photo.”

**EVDB: Eventfully yours**

EVDB, like Upcoming.org, was one of those I-want-it-for-myself projects. Launched at PC Forum last March, the company recently re-launched as a platform (EVDB) supporting the site Eventful.com. (Disclosure: Esther Dyson sits on the board.) Founder Brian Dear bought the domain evdb.com and founded the company in January 2004, but he had wanted to develop such a service since back in the ’90s; at that point, the vision was a personal notification service, but the issue of getting the content and the lack of funding made the idea a non-starter. There was no ready source of content for alerts such as the Web offers today, even though it is still mostly unformatted and needs to be scraped and parsed rather than seamlessly “fed.” (See page 40.) And certainly there weren’t enough users (or tools) around for user-generated content.

Later on, as director of Web development at mp3.com in 1999, Dear worked on its notify-me service, which alerted users when bands they had selected appeared in their city. The music thread goes beyond the notion of musical events; Dear had online CD registries CDDB (see Release 1.0, September 2003) and IMDB in mind when he named EVDB. Like the CDDB database of CD listings and the IMDB movie database, EVDB is a database of information about events. It doesn’t “contain” the events themselves, but it links you back to the source site or data.

EVDB is busily adding – or attracting – value to Eventful.com, most notably in the form of user-generated content and community features. Dear sees each event as a high-level object akin to a blog, with its own identity, ping and trackback capabilities. Users are invited to comment about events, share and point to them, cross-reference them and so forth. His goal is to foster community around the events as a way of getting them to attend. . .whereas Zvents is more focused on reaching would-be attendees in a more traditional publisher/reader model.

The Eventful site also uses a variety of tools and techniques to generate event entries, from deals with third parties such as Meetup.com to crawling event-laden sites such
as Ticketmaster.com (with permission), to encouraging users and event-heavy organizations such as training companies and booksellers to add their own events.

Dear says he expects it will take until late 2006 or early 2007 to achieve what he calls the “flip” – to get to 51 percent user-generated content. Currently the proportion is less than 10 percent. “The ‘user’ in user-generated doesn’t mean individuals,” he adds. “It could be organizations or other third parties. But the point is that we don’t need relationships with them. It’s self-serve. They can use our tools and don’t need personal attention.” The attention – and the spam-catching, one hopes, come from other users. Much of the quality control, he adds, will happen within groups (coming soon), self-selected groups of users who can set their own privacy controls and filters.

One notable feature on Eventful is the SmartCalendar, a prospective search tool that lets users “search the future” for events that have not happened yet. EVDB added SmartCalendars as a response to failed searches – i.e., when a search has no results. SmartCalendars generate RSS and iCalendar feeds, either of which a user can subscribe to. At first the feeds may be empty, but as soon as one or more events match the original search, the feeds are populated. A user can also choose to receive an e-mail alert when matches occur. That keeps them coming back – presumably to find more richness each time they visit.

**Zvents: Suddenly last summer**

Zvents is an upstart, beginning with its snarky “delta” launch last month. Indeed, the site is full-featured in a world of shameless alphas and persistent betas. The company was incubated by Net Service Ventures, a consulting company that counts several large non-US telcos among its clients. “This was the most interesting of the 12 ideas we proposed to one of them,” says Ethan Stock, then a partner at NSV and now CEO of Zvents. “We started thinking about what people would want on their phones and what they could generate on them.” Zvents has no particular relationship with that client, and it’s targeted squarely at the US market to start, but in the back of Stock’s mind is the notion that some day a lot of traffic about events will be real-time – both searching and photo-posting. For now, the site assumes a regular PC screen.

Stock uses traditional city guides and newspapers as his model; he sees his job as aggregating and making sense of “a cacophony of disastrous formats” with the help

---

**EVDB INFO**

| Headquarters: San Diego, CA |
| Founded: January 2004 |
| Employees: 7 |
| Funding: $2.4 million from Draper Fisher Jurvetson, Omidyar Network and angels including Esther Dyson |
| Key metric: 300,000 events in database |
| URL: [www.evdb.com](http://www.evdb.com) |
of a variety of scraping and parsing tools. The team of 10 includes a couple of natural-language experts along with editors with a human touch – and only one marketer, he says.

Zvents itself uses a dynamic calendar interface to display group or personal calendars of user-selected events in day, week or month modes, though the main response to a search is a list.

“We want to get people out and doing things,” says Stock. The chatter about events is secondary. That’s partly a reflection of Stock’s own point of view; it also resonates well with event promoters – as opposed to people who just enjoy posting about events. So the site already includes links to maps and a “when” search, with an inherent “action-oriented focus on today or right now,” Stock points out.

He adds, “We do only real events, with a specific time and place – no broadcasts on NPR, for example.” But he would consider an event in, say, Second Life (an online virtual world managed by Linden Labs), at a specific time and virtual place, to qualify. Another restriction is no invitation-only events; the events must be open to anyone, even though pricy tickets are not a problem. So far the system has about 80,000 events listed, mostly in the Bay Area, where Stock aims to gain critical mass first.

“When you start digging around,” he adds, “you find a ferment of niches – singles mixers in San Francisco, art weekends in the Hamptons, square dances for seniors or swimming lessons for kids in the Bay Area.”

Users can have a personal calendar page. This is more a listing than a social page, without (yet) much information about the individual’s plans – which my be just as well since for now it is visible to anyone. Any user can also place a Zvents widget in a blog or on a Web page; it can show either a single event or a dynamic calendar, which shows a list of current events or a single-day view that can be scrolled within or from day to day by readers of the site.

The distinctions between Eventful and Zvents are subtle: While Eventful focuses on user-defined groups and calendars and a list interface more conducive to discussion than scheduling, Zvents considers a vendor-sponsored calendar of, say, all Release 1.0 events to be a fine idea. The two companies are likely to become more different over time, just as twins growing up together and competing are often more different than twins growing up apart.
Columba Systems: Time and money

Some people might find all these personal events a little, well, frivolous. At the other end of the spectrum is Columba Systems, a UK company reincarnated from a Reuters dot-com experiment called Kalends (Latin for the beginning of the month) that cost about £20 million (roughly $40 million). The beneficiaries of that expensive education, which ended in early 2002, regrouped as Columba Systems later that year.

CEO Dean Ratcliffe had always been interested in the interplay between structured data and the softer, less formal stuff of journalists’ reports. He helped build a Reuters tool that would let reporters fill in a form and would then produce a formulaic story such as an earnings announcement, in multiple languages. But the reporters would never use it, he recalls; they preferred to “write creatively” in flat, routine sentences that carried no more information than the forms. It’s this interplay between unique information and standard representations that continues to intrigue Ratcliffe and to underlie Columba Systems.

Kalends and then Columba (for pigeon, an oblique reference to Reuters and its bird-carried-news heritage) reflected Ratcliffe’s realization that the Reuters journalists were swimming in real-time information but had only spotty knowledge of future events, a condition that also afflicted Reuters’ mostly financial-sector customers.

Columba now has 18 people (vs. 52 for Kalends at its peak), and is focused strictly on the paid-subscriber market of customers in financial services. Its event structures are fairly routine: mostly earnings announcements, public forecasts, trading statements, analyst calls, investment conferences, trade shows, private board meetings [reading the minutes is not the same as being there!] and public annual meetings, as well as public holidays, bond maturities, and official statements of various kinds ranging from financial statistics to budget forecasts. These aren’t necessarily events you can attend, but they are events that can move markets. And now, with Columba’s aggregated data, it’s also easier to detect historical patterns, looking at, say, oil or auto stock movements following OPEC meetings over the past 10 years, or, more mundanely, bond yield movements following the publication of labor-market statistics.

These are not secret events, notes Ratcliffe, but in the past they were difficult. . .not so much to predict as to find. Any transportation analyst, for example, could tell you when FedEx was scheduled to announce earnings, but the information wasn’t aggre-
gated. All the analysts in a bank would fill in their own spreadsheets and send them to the head of research; they would be consolidated and sent back out, but that rarely happened before the events themselves had occurred. Now, Columba lets customers consolidate both their own private events and Columba’s public ones, and offer that to their clients as a service. In the future, we expect Columba will move beyond letting people know when events occur, to providing data around events so as to make other events – or price movements – easier to analyze and predict.

Columba currently has ten customers; each of the top 10 City of London investment bankers is either paying for the service already or using it on a trial basis. For now, pricing is negotiated with each client on the basis of seats, usage and the like; the company expects revenues of about £500,000 this year (2005) and “significant growth” next year, says Ratcliffe. Meanwhile, he points to a counterpart, StreetEvents (originally called CCBN for Corporate Communications Broadcast Network), a subsidiary of Thomson Financial. StreetEvents has a slightly different, more content-rich model, but it’s worth noting that Thomson paid $175 million for it two years ago. Conclusion: Reuters doesn’t get timing. Let’s hope that Columba does!

Seraja, the EventWeb: A million single points in time and space
Perhaps the most ambitious events project we have come across is EventWeb, the brainchild of Ramesh Jain, now Donald Bren Professor in Information and Computer Sciences at University of California, Irvine. Prior to this he was a titled professor at Georgia Tech.

But he’s not just a theorist. His background as a successful serial entrepreneur gives some credibility to his undertaking: Born in India and educated at Nagpur University and the Indian Institute of Technology at Kharagpur, he started the AI labs at the University of Michigan in 1986. During that time, he founded a company to work on the reverse-engineering of mechanical parts commonly used in automobile, aerospace and entertainment industries – an intriguing notion. You aren’t just reverse-engineering a product, but trying to reverse-engineer the constraints and design considerations – i.e. the intelligence behind the design. He sold that company, called ImageWare, to SDRC in 1998.

He then went on to found another university lab, this time the Visual Computing Lab at UC San Diego in 1993. That same year he started Virage to develop its Visual Information Retrieval engine, which could detect objects in video streams and classify the videos. Autonomy, the previously text-only taxonomy and classification
company, eventually bought Virage in 2003. And finally in 1996, Jain co-founded Praja, which was designed to pick out the magic moments in sports videos; i.e., which sequence is a touchdown versus just the usual scramble of football players charging into one another? That company was before its time, and in 2002 it was sold to Tibco, which uses the underlying event application to monitor business processes for specific events and generate alerts, security warnings and the like.

Now, Jain is taking all that he has learned over the years – and all that the Web has created over the years to support such ambitions – to build what he calls EventWeb. The vehicle is a company called Seraja (which has no meaning, but did have a URL available). He is chairman; the company’s CEO, Arun Katiyar, is based in Bangalore along with the development team; the primary investor, Rajesh Jain (no relation), is also based in India. “We’re moving from the document Web to the event Web,” he says with the smoothness of a popular professor. “We want to move beyond the Gutenberg legacy and reverse-engineer the environment. You should be able to follow your own course through an event online.”

So far, Jain points out, most calendars are devoted to planning. He wants to use the calendar as a high-level index and create something he compares to Pensieve in the Harry Potter books: “You take out someone’s memory, put it into Pensieve and everyone can share it.”

The idea is to index and display content by time and place – i.e. to index events. And then – here’s the magic – EventWeb will process the content it finds or gets from users using the sorts of pattern- and object-recognition tools that characterize much of Jain’s previous work. What makes it interesting is that it will can process video objects as well as text-based event information. The service relies on indexing, classification and recognition algorithms... and people. As a service, it will both host its own content and object recognition, annotation and editing tools, and let users use the tools to manage and host both shared and their own content, with links to EventWeb. Imagine Wikipedia-style collaboration to generate metadata for any event-related content anyone can find.

The tools will do much of the work, and then humans (mostly paid contributors in Bangalore – at least at the start) do the rest. For example (for now), while it might take a human to distinguish the individual players on the field, the system could recognize a winning hit, strike-out or other sports action. The company will launch its

<table>
<thead>
<tr>
<th>SERAJA INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headquarters: Bangalore, India</td>
</tr>
<tr>
<td>Founded: June 2005</td>
</tr>
<tr>
<td>Employees: 10, plus outsourced technical team</td>
</tr>
<tr>
<td>Funding: $1 million from one of the founders</td>
</tr>
<tr>
<td>Key metric: still an early-stage project</td>
</tr>
<tr>
<td>URL: <a href="http://www.seraja.com">www.seraja.com</a></td>
</tr>
</tbody>
</table>
service first in India, with a focus on Bangalore and ever-popular sports events, as a test market to iron out the kinks and gain some critical mass before, he hopes, users start driving the system with their own content and metadata contributions. That gives it a natural, highly involved audience, an initially constrained content space and a skilled workforce to do the human tagging and annotation.

EventWeb is designed both for public events, and as a way for individuals to store and manage (with a variety of tools) their own memories – for a subscription fee. “I know my daughter got married,” says Jain. “I don’t need a calendar to remind me. But I enjoy watching the video again and again, and picking out [and tagging] my favorite parts.”

The challenge, of course, is finding the event content in a world where content is not generally geocoded or time-stamped (including time-stamps that refer to the content, rather than when it was created, so that, for example, both Juan’s pre-birthday hints as to what he would like and his post-birthday thank-you letters are time-stamped to the date of his birthday). That’s why, of course, EventWeb is starting in a fairly constricted space with an audience of likely-to-be-active users who can add tags and structure to the data.

This is still an early-stage project, but it makes use of most of the technologies Jain has developed in his long and productive life.

**Demand ID Systems: If you demand it, he will come**

Demand ID Systems turns the traditional model around: Instead of looking for what scheduled event exists, users ask for it to happen. Specifically, instead of live-music-events producers marketing to customers, customers express their interest to artists and event organizers. Live music is an amazingly inefficient market, says Demand ID founder Ben Cruz. He cites executives of Ticketmaster and Clear Channel Entertainment, who told him that half the available audience capacity of music venues went unsold – despite $1.5 billion in direct advertising and another $1.3 billion in sponsorship funding (to generate revenues of about $10 billion in the US). And that’s only for those venues during a performance; many of them are ”dark” several nights a week. Compare that to the airlines, which currently have load factors around 70 to 80 percent. . .and fly most of their aircraft every day. Clearly this part of the music business, as much as the copyrighted-content side, needs some rationalization.
The company was started three years ago, but mostly as a part-time, underfunded project by Cruz, a longtime marketing and technology executive. After 11 years managing international marketing, licensing, and product development for companies including Black & Decker and Noise Cancellation Technologies, Cruz founded Sychromedia, a dot-com city guide that was among the most popular information services on Motorola’s ill-fated iKno service. Neither service lasted through the end of 2001.

Demand ID is a different take on things. The idea is to get users to vote on which acts or performers they want to see, by their own ZIP codes, and to sell that information to promoters, venues and the artists themselves. “We don’t want to be a destination site ourselves,” says Cruz. “We just want to put the TourVote polling application wherever music lovers congregate online.” By aggregating across sites, Demand ID can gather more (and more valuable) information than it could by operating at just one destination – much as an ad network benefits by showing ads and collecting targeting information across multiple websites. The difference is that TourVote asks permission and gets explicit information, unlike behavioral targeters who can only watch and guess.

Meanwhile, Cruz hopes, the destination sites will take the information and enrich it for their own user bases – for example, exposing Juan’s picks to Alice (with permission), or allowing Alice to see how many of her friends have also voted for kd lang. Kd lang’s own site could also allow Alice to suggest that her friends vote for kd lang – but only if they really want to hear her, too. In the end, music promoters and artists want to know about real demand, not voting by people who won’t actually attend a performance. Of course there’s a soft line here; people who are indifferent to kd lang could become enthusiastic supporters if encouraged by friends to attend a concert.

The music industry is in a delicate state right now, but Demand ID and similar ventures could help make it into a better industry for its most vital participants: the artists, who typically make the bulk of their earnings by performing live, and the audiences. With actual demand being reflected, rather than artificial demand being created, the “best” artists (as defined by those who excite listeners rather than those who pay marketers) may get more visibility. Music-industry veterans, while initially skeptical, won’t turn away good leads, says Cruz. “Nine out of ten promoters, venue owners and talent agents who start out skeptical become believers upon viewing our market intelligence prototype,” he claims. “Many of the venues I’ve met with now have our TourVote polling application on their own websites.”
He adds, “Today the value chain takes guesses on where shows should be produced. Then they spend big on advertising to try to reach consumers who will buy tickets. This is increasingly difficult as consumer attention is fragmented by more and more media.” And beyond ticket sales, demand to see a particular artist’s live show reflects demand for ancillary products – everything from CDs and track downloads to books, ringtones, T-shirts and other paraphernalia.

Right now the service is limited to the Baltimore/Washington area, where Demand ID is based, and it is working on only 30 websites, mostly for local venues. The company is currently collecting just a few hundred votes a month as it tries to avoid disappointing people outside its home base. But Cruz has finally decided it’s time to go for broke and raise serious capital.

We’re not sure of the business model. Certainly we’d prefer to see this kind of service widely implemented across multiple sites. . .and perhaps the only way to get it to be ubiquitous is indeed to offer it as a back-end service to Eventful, Zvents et al., rather than as a social tool that is visible to users, but unique to one particular events destination. Of course, these sites could provide their own competing service for their users and sell the data not just to musical acts but to all kinds of live performers, from book readings and magic acts to lectures by Stephen Hawking (who addressed an audience of 3000 at Oakland’s Paramount Theater recently) or performances by Tom Peters, Faith Popcorn or other business gurus. We guess that’s why Demand ID is now trying to move a little faster.

**Meetup.com: Bowling together**

Meetup’s goal is not to register meetings, but to help create them by providing a platform for local interest groups to form, grow, and arrange regular meetings – or Meetups, where people can find community, share their concerns, find people of similar interests and get reinforcement for those interests. It also helps local meeting organizers band together in larger, topic-specific groups that give their local meetings more weight. That is, one Mom or Mac Fanatic is just a person, but a group of Moms or Mac Fanatics is a Meetup, and, says founder Scott Heiferman, “Hundreds of Mom Meetups or Mac Fanatic Meetups, every second Tuesday around the world. . .that’s a movement.” In essence, Meetup is a way of finding the long tail of diverse interests locally and making people feel part of the fat front worldwide. (DISCLOSURE: ESTHER DYSON SITS ON THE BOARD.)
Heiferman started the company with the mission of using online tools to bring people together offline. September 11 had impressed him with the importance of local community. Then he read Robert Putnam’s “Bowling Alone,” about how Americans are spending too much time alone. Heiferman wanted to get them together again; all he needed was a business model. As a former advertising guy (and founder of iTraffic, the original online ad agency), he came up with a clever idea: Create a platform for people to organize Meetups and sell the “traffic” – i.e. the real people trooping into a Starbucks to buy coffee or into Hank’s Bar & Grille to buy beer – to the venue owners. It was an elegant, clever idea, though in the end it proved too complicated to implement profitably. Among other things, venue owners weren’t eager to host the partisan political meetings that Meetup was famous for during the Presidential elections.

Nonetheless, even after the elections member numbers continued to grow, to the extent that last spring Meetup started charging the community itself for the service. Charging for what used to be for free took some courage; it cut the number of active Meetups in half. And six months later, there are now almost as many Meetups as when it was free, with Meetups and sales growing better than 15 percent each month. Better yet, the people who remain, and the new members since, are more committed and enthusiastic, says Heiferman: “Not everything in the world will be funded by ads. We wanted to be ‘Of, By, and For The People,’ so we decided to be funded by the people. Nothing says ‘We love your product’ more than paying customers.”

Organizers pay Meetup for the service of helping them find group members and for the online resources to manage the meetings and create continuity. The organizers also get a place in a larger community of like-minded Meetuppers for any particular topic across the planet. To help things along, Meetup both encourages individuals to sign up for existing groups, and allows them to place alerts, for example: “Know when Wheel of Time Meetups start near you! See other Wheel of Time Enthusiasts near New York!”

Time is a key element of Meetups. “It’s like an auction,” says Heiferman. “The deadline for an auction, or the constraint that a Meetup is happening at a certain time on the same day around the world . . .that mobilizes people and creates urgency. And it can make you feel you’re part of something bigger.” Now, however, it’s not Meetup that sets the day anymore; it’s the members de-facto voting: The day on which most Meetup groups on a particular topic have their meeting has become the “official"
Meetup Day; others are free to deviate, but there is some norm to adhere to. “There’s this constant tension between freedom and control,” says Heiferman.

Meetup’s relations with the event portals are friendly, though of course there’s also a constant tension between competition and collaboration. “We spark events, events that wouldn’t have existed without us,” says Heiferman. “We gladly feed all our basic information to Eventful and others, and we even pay EVDB for referrals.”

He adds, “At almost any given moment in time, there’s now a Meetup happening somewhere in the world – a gathering of strangers that share some common interest. Whatever you’re interested in, whether you’re thinking of buying a Prius or you’ve just been diagnosed with something, there can be a Meetup scheduled about it. It won’t happen just by indexing all the world’s events. There must be a catalyst like Meetup.com.”

Technorati: Net future value
Tantek Çelik came to Technorati after 15-plus years knocking around Silicon Valley as a developer at Oracle, Apple and Microsoft, and participating in a variety of standards efforts. He also founded 6prime, a company that developed a tool called Rev that automatically tracked and managed versions of documents over time by computing and saving changes between versions. It was sold to Aladdin Systems in 1997.

Now Çelik has found his dream role at the intersection of many of these interests, as chief technologist at Technorati. (Disclosure: Esther Dyson is an advisor.) He’s designing services to parse formats he’s creating, and giving the blogosphere the tools to design and analyze itself.

One of the key constructs of Technorati is time. Though blogs are searched for the key words (and synonyms and related concepts) that a user enters, the results are ordered by time, by default. Of course, you can explore farther. You can see how topics or particular blogs rise or fall in popularity over time. You can assess the derivatives of growth – not which blog is gaining most readers, but which blog’s percentage increase in readers over time is highest. You can watch as growth rates increase or decrease over time. And so forth. Nothing is static in this world.

Çelik aggressively values his own time – which makes him willing to spend time now to develop tools that will save time later. Says he: “If I’m going to be investing my time to enter or search for event information, I must be able to copy and move that
information anywhere of my choosing. [Italics his!] Most of these new services, companies, features are all based on the assumption that you'll use their system to solve all your event-based needs, and that they can provide for all your event-based needs. But they are wrong.”

He continues: “The software, the services, the features are all irrelevant in comparison to the data. That’s why we and apparently other efficient geeks use Word or some other text editing environment (e.g. Joi Ito uses a wiki) to keep track of our events. The sides of the road are littered with the remains of failed (or acquired and neglected) events/scheduling applications, services and companies from the ‘80s and ‘90s. Some of them took all their user’s data to the bit bucket along with them. That pain is still fresh in enough technologists’ minds, that it will not be forgotten any time soon.”

Thus, he says, the most important aspects of data are longevity, integrity and portability. He concedes that these are not new ideas, and there are standards to provide them. However, those standards have mostly lacked an important component – users. By and large, time and contact standards – the infamous .vcf card – just haven’t gotten broad traction. Instead, lots of proprietary systems – most notably Outlook – hold sway.

Enter microformats. Unlike most standards, they are simple, designed for humans, and relatively easy both to create and to use on the Web.

One of the first microformats was hCalendar, conceived in 2004 at O’Reilly’s Foo Camp. It’s basically a short, simple set of metadata specs for describing an event, including title/summary, start/end times, location, description and other common fields, all based on the IETF RFC 2445 “iCalendar” standard.

Using the open-source hCalendar-creator available at microformats.org, any blogger can post and discuss events on her blog in a form that can be easily discovered, parsed, aggregated or subscribed to by other services or by other users using a subscription proxy available free from Technorati. And any application developer can use the format in order to make its event/schedule data easily tradable with the end-user’s other applications. Eventful, Zvents, Upcoming.org and Laughingsquid.com all support hCalendar.
Indexing and searching these event sources across the Web is next. Says Çelik: “Whatever event/calendaring applications/service/feature you are using, the most important aspect of it is how it treats the data you have entered – and thus the time you spent. And the most important aspect of your data itself is how easily you can reliably move it around. We’re just beginning to see the impact.”

Adding Value With Time

The first part of this issue covered applications that concern time in the traditional sense – calendars, scheduling, events. This second half looks at applications that use time more as a mechanism to do other things (although the distinction can sometimes be blurry). Specifically, the first section focuses more on the absolute placement of things in time: when they happen, which things happen together and how to manage the activities of people through time. Call it time as location.

In this second part, we look at applications that use time more as a measure, looking at the frequency of events, the rhythm of activity and patterns of use. Call it time as distance.

Worktopia, though it is concerned with scheduling of space now, fundamentally looks at time and space as commodities in a spot market. It will ultimately be concerned with pricing and yield management, watching the rise and fall in demand for office space in real time.

Detection and recognition

So, how can time help us manage other things? In large part, it’s an important element in defining and understanding what’s going on in the real world. The better we can identify patterns and objects in the increasing amounts of data we collect and use, the easier it is for us to find things, predict things...and to let software handle those things automatically.

Rather than have humans looking through information, computers can do so, and simply deliver the high-level information: “These pictures all depict your uncle Sanjay.” Or, “These few hundred Web-surfers are probably interested in buying a car [because they have visited several car sites in the last three days].” Or, “There’s an unusual spike in purchases of fever medications in New Jersey; perhaps there’s some
infectious disease going around.” Or, “Someone seems to be trying to get into our database of Christmas merchandise orders.” And if you can define things precisely and explicitly enough, software can deal with many of the details, from tagging photos to fending off computer-virus attacks.

Indeed, as software starts to handle the real world, it needs to deal with unprecedented volumes of data, whether it’s the myriads of data points generated by RFID, the hundreds of e-mails generated by humans or the millions of clickstreams generated by all of us on the Web. Or the millions of people and resources and the events in which they intersect – meetings, e-mails and moments captured in photos.

Running through this whole issue are applications of pattern recognition, detection, figuring out intentions, etc. That’s because the underlying task is to figure out what’s going on and to represent it. In order to make sense of what’s happening in the real world and to deal with the proliferation of events at scale, we need automated tools for recognizing and annotating them. That’s everything from detecting references to meetings in e-mail (Zimbra), figuring out what changes someone meant with a document edit (Curtis) and detecting people in photos (Riya, below), to recognizing objects in videos (EventWeb) and of course seeing patterns in blogs (Technorati), disease incidence (CDC, below), security anomalies (Sana Security, below) and buying intentions (Revenue Science and Dan Doman, below).

**Worktopia: Office arbitrage**

Our increasingly hurried society measures everything in smaller and smaller chunks of time. Two centuries ago, citizens were happy to listen to three-hour speeches from politicians; now they tune out after a two-minute soundbite. Moreover, in the old days, we used to think of things as things. You could own them or trade them, but only economists and landlords thought much about the value of most things over time.

In the ’80s and ’90s we discovered yield management (see **Release 1.0, February 1989**). Now, we’re rediscovering spot markets, not just for commodities and advertising minutes, but for vacation rentals, temporary offices and jet planes. Soon to come, we believe: A spot market for speakers – matching an expert on a layover at DFW with a Dallas user group, for example, or a recent author of a book about witches with a series of Wiccan Meetups. The promise of car-sharing continues to be just a promise, but ride-sharing services may gain more traction as gas prices go up and express lanes become more appealing.
Meanwhile, there’s Worktopia, bringing efficiency and market timing to the world of temporary office space.

Worktopia founder John Arenas previously started another office-space company, called Stratis Business Centers, back in 1997. In the ‘80s he had started off working for Turner Construction and then for Citigroup’s workout loan group, so he had a good understanding of real estate, and specifically of office space, from a practical and a financial/valuation point of view. His initial idea was to create a network of office space facilities that would license short-term space (hourly, monthly and annually) to customers nationwide as an alternative to conventional long-term lease commitments. In order to grow without much capital, he created a franchise network. And in order to offer something special, Stratis developed the technology to control the office space and equipment centrally, including interfaces with Nortel phone systems, Pitney Bowes meters and Konica copiers as well as its own proprietary reservation system.

The firm grew nicely, to 20 locations in 30 months, but Arenas still felt hampered by lack of expansion capital. In 2001 he sold out to UK-based Regus, the world’s largest temporary office-space company, then operating in 50 countries and which wanted to expand more quickly in the US. But, he recalls ruefully, “I wanted to make it tick; they wanted to make it sizzle.” In short, Regus overexpanded in the US and Arenas spent most of his time restructuring leases rather than building the network of on-demand workspaces he dreamed of. In the end, he had the “learning experience” of leading Regus through bankruptcy in the US in 2003.

By January of 2004 he had brought Regus out of bankruptcy and, his job done, he left in February to start Worktopia. This time, he’s operating as a marketplace rather than as a workspace supplier. The properties on offer with Worktopia are more varied than at Stratis or Regus: from office business centers offering short-term office space, to last-minute hotel meeting rooms, movie production and staging facilities on demand... and of course university facilities outside class hours (such as Stanford’s Schwab Residential Center, where we are holding our When 2.0 workshop – but not – yet – a Worktopia customer).

At this point, however, short-term office space and hotel meeting rooms are the biggest part of Worktopia’s inventory, in part because hotels and business center operators understand the short-term and last-minute resource models better than
most conventional real-estate owners. But that also means they are the most efficient part of the market; over the long run, as Worktopia introduces other players into the game, the opportunities for arbitrage between unused space and needy customers should be even greater.

An MIT/Gartner study estimates that about up to 10 percent of office space will be used on a flexible/short-term basis by 2010, up from only about 1 percent today. There will be some growth in demand, but this means that a significant proportion of the nation’s 3 billion square feet of Class A office space market is currently under-used, misallocated or overpriced. Or looked at another way, the current market for short-term office space is about $2 billion, and it’s growing rapidly. The day-meeting market is already $7 to $10 billion, according to whom you ask.

**Space to match pace**

In essence, just as eBay allowed people to turn stuff collecting dust in attics into valuable inventory (see [Release 1.0, April 2004](#)), Worktopia is allowing not just unused office and meeting space, but the chunks of time that any particular piece of space is unused, to be turned into valuable inventory. Industries such as airlines – notably! – and hotels, where fixed costs were higher, got into this early on; they couldn’t afford to hold airplane seats or rooms and not use them. But most other companies treat real estate as an unoptimized asset, and only recently started thinking about it strategically.

And now, says Arenas, “Space users want a sense of control. They want real-time information to compare alternatives, from a trusted, unbiased source. Typically, they’re buying with a lead time of weeks – not two years like for a convention – with no time for research.” Until now, there was no marketplace where they could find this. Many of them resort to calling hotels directly – hardly an unbiased source – or rely on local colleagues.

Enter Worktopia – which opened to the public last June. So far it is handling about 12,000 searches – or $1 million in transactions – per month. Its revenues include 8- to 10-percent commissions on temporary office space (payable by the supplier). Hotels and other meeting-room marketers can also subscribe for $2000 to $4500 per hotel per year to offer rooms commission-free (which overcomes the touchy issue that hotels make much of their money not on the meeting rooms but on the ancillary services and accommodations).
Finding the long tail of customers is relatively easy compared with finding the long tail of suppliers – and certifying quality. Those who rent out the space are grateful to find Worktopia. But even among big suppliers such as hotel chains, only Hyatt and Hilton have central databases of availability. For now, Worktopia is building out a supplier base through direct sales. Eventually it will probably use customer feedback to create a reputation system, following the lead of many other marketplaces.

As for sophisticated yield management, that’s an obvious development but still in the future. Although a couple of the hotels have sophisticated pricing algorithms and booking-limit strategies in place, most suppliers and customers still work by feel in a fragmented, opaque marketplace. Eventually, Worktopia hopes to provide its customers (on both sides) with analytical tools to help them operate more effectively in a more transparent market. But right now, both sides are losing as much space goes unused, while the space that is used is often incorrectly priced. A better understanding of both time and space would help a lot!

**Centers for Disease Control and Prevention: Time is money life**

The Centers for Disease Control and Prevention is an old, established institution, founded in 1946 – though young in government years. Its initial mission was to control malaria; its initial staff of 400 comprised mostly entomologists and engineers, and only seven doctors. Since then, it has grown to 9300 people, including many IT specialists serving people such as Robert Pinner, MD, director of the Office of Surveillance in CDC’s National Center for Infectious Diseases.

Pinner himself trained in internal medicine and then became a specialist in infectious diseases. For him, medicine is an intellectual pursuit as well as a service career. As a kid, he says, “I did all the things you can do with baseball cards and batting averages. And now, I like math more than most doctors. I’m fascinated by the challenges of understanding how diseases spread, how they can be controlled, and evaluating whether control measures are working. For example, in evaluating the efficacy and impact of vaccines, the math is the least of it. The harder challenge is design of studies in the real world that can give answers that will be useful for public health. In particular, post-licensure evaluation of drugs and vaccines is a tough challenge.”

After getting his MD from Emory, he stayed in Atlanta for medical residency, a couple of years as a primary care physician and postgraduate clinical training in infectious diseases. At the time, AIDS was just making the transition from being viewed as a syndrome to being understood as a disease caused by a particular virus. As an infec-
tious disease, notes Pinner, it was something of an anomaly: “Formerly, when faced with a problem in several organ systems, it made the most sense to think about how to get to a unifying diagnosis. But once a patient was diagnosed with AIDS (usually because of an opportunistic infection), you had to consider not only HIV infection itself but the variety of opportunistic infections that patient was susceptible to.”

Living in Atlanta, home of the CDC, Pinner gravitated towards the CDC’s Epidemic Intelligence Service, a two-year applied epidemiology training program (sometimes called “shoe-leather epidemiology”) which he took from 1988 to 1990.

His work now involves surveillance, managing CDC’s Emerging Infections Programs (EIPs), a network of CDC and 10 state health departments and their academic collaborators, with a $20-million annual budget. One basic tool is data and charts depicting changes over time in everything from reported diagnoses, to purchases of drugs, use of specific kinds of lab tests and a variety of other indicators of underlying diseases and symptoms.

There are also lots of practical questions about getting the data: How do you detect disease in the first place? In the balkanized US health care system (see RELEASE 1.0, JANUARY AND SEPTEMBER 2005), there’s no single database of health records, let alone common standards for reporting disease.

*Desperately seeking symptoms*

But there are ways to pick up hints, he points out, other than a central database. For example, he was part of a team responsible for monitoring cases in New Jersey during the post-9/11 anthrax bioterrorism-related outbreak, when six cases of anthrax occurred resulting from circulation of contaminated mail. The team investigated the outbreak, conducted environmental sampling of postal facilities, and did surveillance to monitor for additional cases. “This is an example of where electronic exchange of clinical information from emergency rooms would have saved a lot of labor-intensive surveillance work if it had been available,” says Pinner.

And sometimes there are false positives, such as a seeming outbreak of heart problems, as signaled by a three-day surge in the number emergency room complaints of chest pain in the late summer of 2004. The cause? As far as the New York City health department could figure it out, it was former President Clinton’s announcement that he would undergo heart surgery, which evidently either sensitized people to their pain or triggered them to take it more seriously. Often, it may be easier to identify patterns than to figure out what caused them.
Timing matters, too. The earlier you detect something, the better off you are, in theory. But in practice, it’s more difficult to be sure what it is. For example, data from over-the-counter pharmacy sales for drugs to treat flu symptoms may be available earlier than specific diagnoses of flu cases, but they are not at all specific for influenza. And early on, it’s hard to know whether an increase in some indicator is an anomaly, or the start of a steady rise in, say, flu cases.

So, says Pinner, he and epidemiologists in general continually face a balancing act between time and uncertainty. “The better we get at early detection, the more ultimately harmless ‘threats’ we will detect.” For example, you might see a “blip” because a data entry person was catching up with chores after being out for a few days, or because a process that had been down, went back up and was catching up; or if you were monitoring over-the-counter drug sales, you might pick up a “threat” that was nothing more than a sale at CVS. False alarms can cost money and disrupt people’s lives; missed alarms can also cost money and result in needless death. Concludes Pinner, “Lots of experimenting is going on now with efforts to identify earlier signals. People need to evaluate carefully what works and what doesn’t, what’s effective – and cost-effective – to detect and what isn’t.”

**Sana Security: Time and security**

Steven Hofmeyr, a computer scientist specializing in immunology with ties both to the MIT AI Lab and to the Santa Fe Institute, founded Company51 in 2000 to apply some of his insights about biological immune systems to computer security (see **RELEASE 1.0, MARCH 2002**). The company, now called Sana (as in “health”) Security, has just released a standalone desktop product called SafeConnect. (Disclosure: Esther Dyson is an investor.) Hofmeyr is now a consultant to the company and is working on a new start-up, exploring new ways of building distributed storage systems.

Underlying Sana’s products is Hofmeyr’s understanding of the “organic” nature of security. Time is a key factor in assessing behavior as suspicious. Someone sending out files at 4 pm is probably normal; the same person sending the same files at 4 am — assuming he’s not traveling in some other time zone — is suspicious. Any security system probably assesses such factors and then — if it’s not in the system — some human will check to see where Juan was that particular morning. Was he traveling in France on business? Or was he — supposed to be — on vacation? It’s the combination of factors that counts. But there are many more subtle uses of time, says Hofmeyr.
Any suspicious event becomes more suspicious if it occurs along with another suspicious or non-routine event – for example, a file upload that happens around the time of a door-lock malfunction, or the attempted use of an expired password shortly after an employee retires.

But, notes Hofmeyr, “After the first detection of something odd, you can’t act immediately or you’ll end up on constant alert. You have to wait to see if it’s a real threat...but you can’t wait too long...”

He resorts to immune-system analogies. “The immune system exploits time. You bet that you have the time to build up an effective response...Besides, if you react immediately to something you think is bad, that reaction itself could hurt you, so you have to wait for some damage before reacting. The problem is that what appears unusual may be benign – so the immune system waits until damage occurs because then it can be sure that the unusual behavior is not benign – but then of course the immune system has to play catch-up – it’s a case of giving the pathogen ‘enough rope to hang itself’.”

Knowing precisely what that timing should be is what distinguishes good security from ineffective responses.

Now that Hofmeyr is leaving, one of Sana’s key employees is Matt Williamson, who came up with the concept of “virus throttling” at HP Labs. Viruses are most harmful (obviously) when they spread rapidly...and that’s something that “normal” programs don’t do. Even P2P music files, spread by individuals, don’t spread as fast as viruses; most P2P software limits the number of concurrent downloads from one computer to a just a couple.

An individual using a computer, even a busy browser, is unlikely to connect to more than five or so new addresses in a minute. (Any security system knows how to make an exception for a mass mailer, though an ISP’s security system monitoring a customer base of consumer machines might rightly not make such an exception.) “For a virus, that’s slow. An infected machine might try to connect to thousands of other systems in a minute,” says Hofmyer. So you can just default to prevent such behavior by limiting the number of new connections a computer makes per minute, and alert a monitor when it is attempted.
“That slows the propagation of viruses, but doesn’t bother people. We exploit the different meaning that time has for people and machines,” he says.

*Don’t kill the cop*

Yet the similarities are useful too. There’s a truism in immunology that pathogens don’t want to be too harmful because they want their hosts to survive. As software becomes more and more malicious, it also becomes benign in some way because it wants the host to stay alive. So a virus inside a host population – if the population doesn’t fight it – tends to become benign. But if other pathogens are around, then it may become virulent – if only because it has little to lose. “Whoever kills the host first wins, because he gets the most out of it,” says Hofmeyr. And then there’s the phenomenon of pathogens attacking one another, while the host is simply an innocent bystander/environment. All this happens over time; the security expert’s task is to figure out these cycles and exploit the vulnerabilities.

In the spyware world, for example, there is the phenomenon of spyware packages trying to de-install one another in order to gain exclusive access to the host.

Or, notes Hofmeyr, “there were 11 variants of the Zotob worm competing ferociously, all trying to delete each other. They were so busy harming one another they may have done less harm to the host – even though they may also have spread faster in an attempt to get to the vulnerable hosts first. Imagine a worm that spreads and makes you less vulnerable to other guy [worm], but then it does its own damage three months later.”

And finally, he notes, time is important in consumer anti-malware. Most security software, he points out, lets you know after the fact that you have a problem. By operating in real time, Sana’s tools have two benefits, aside from the obvious one of averting damage quickly: The user is more likely to be able to determine the source of the malware: “What website are you surfing?” as opposed to “What websites have you visited since the last time you’re sure your machine was clean?” And also, because the tool is watching behavior rather than results, it has more understanding of what the malware did so that it can reverse the effects. “Because we monitor the system as it’s running, we can see what it did, take off the bad stuff and clean up the mess. It’s a pleasure to watch this in operation cleaning off stuff. For example, it knows which registry keys a program changed and how they were changed so that it can reverse the changes. That could be impossible to figure out after the fact.”
Riya: Eyes only for you

Munjal Shah started Ojos – now renamed Riya, after the daughter of a co-founder – after co-founding and running Andale (the company that manages the auction process for eBay sellers) from 1999 to 2004, bringing it to profitability on double-digit-million revenues.

The idea came before the technology: Newly retired, Shah had been spending time at various photo sites and poring through his own collection of 30,000-plus photos, and was discovering how tiresome it can be to tag all those photos. He started with a vague idea of automating the tagging process, and he had the time and money to do some research. Among the interesting findings: on the typical consumer photo-sharing site, 80 percent of the photos contained faces of people, as opposed to distant figures or no people at all. (That percentage is lower for professional sites or for Flickr, incidentally.) Shah also surveyed consumers in Korea, which he considers a proxy for the cell-phone culture of the future. He found numerous people who had more than 10,000 photos, mostly of their friends in a variety of situations.

He decided that figuring out how to identify all those people in the photos and tagging them semi-automatically would be a big win. The next step was to find the leading facial recognition experts; he found Burak Gokturk, an experienced, widely published expert in the field. Development started in October 2004; the service is now in alpha. (Disclosure: Esther Dyson is an advisor.)

Clearly, the thing that most distinguished the photos was time – easy to get – and the people in them – hard to get. Thus, the system uses timing and other cues to improve the accuracy of facial recognition. It also leverages the existence of social networks by getting individuals to share their “training sets” – that is, a set of photos that can train its engine to recognize that particular person. Those sets are sent to Riya, which then uses, say, Alice’s photos in order to recognize Alice in the photos from other Riya users she designates as friends. That is, her friend Juan gets to use Alice’s training set (via the Riya service) on his own photos. It makes sense: Friends take photos of friends, so the network supplies both the data and the constraints to support effective recognition.

Time, of course, figures in things too: Photos taken close together are more likely to contain the same person than photos taken apart. The system applies any tags it generates across similar photos taken at the same time. It also uses time to weight train-
ing-set examples, so that, for example, if you grew a beard in October 2003, then your examples from that time will be weighted higher in assessing photos from that period onward. Now add to that (someday!) a link to everyone’s calendars, and the recognition accuracy will become even higher.

Over time, even as Riya will use social networks information to enhance its recognition capabilities, other tools may work in the opposite direction. Whom do you take the most pictures of? Who was seen next to whom most frequently? (Will Riya evidence end up in divorce court someday?)

And of course, yes, there are endless privacy issues floating around, starting out with who owns the training set. Basically, it’s Riya plus the individual concerned – Alice, for example.

Riya does have a site of its own that retains the training set for each recognizable user as well as some user photos, but we expect it to succeed primarily on the basis of a back-end distributed model that supports a broad range of third-party photo-sharing sites.

Here’s how it will work: Alice gives Riya access to all her photos on, say, Flickr and Picasa. Following *their* rules for acknowledging friends (which may need to be updated to accommodate Riya), it recognizes all of Alice’s friends who have agreed to let her use their training sets on Riya. Then it uses each service’s API to apply the Alice tag automatically to all his photos that contain Alice.

Of course, Riya will control a hugely valuable (and vulnerable) asset in the ability to recognize all those people. And by collaborating with third-party sites rather than competing with them, it has some hope of becoming a central utility – with all the responsibilities and accountability that that implies.

**Time and Intentions: The Commercial Meaning of Time**

Nothing interests marketers more than customers’ intentions. Advertisers and publishers spend millions trying to divine them. But those intentions change over time. What is the curve in time of a person’s intention to buy, say, a car? You’re pretty sure Juan wants to buy a car, but if you try to sell him one too soon, it’s like trying to rush a first date through dinner. You have to wait for the kiss until dinner is over. . .but if
you wait too long, someone else will already have stolen your date or sold Juan a car before you can make your offer. Figuring out those curves is not something you can do in a vacuum or even in a psychologist’s study: You just have to watch how (lots of) people behave.

Learning how to time things better will be a key challenge for the growing field of behavioral targeting – something of an extension of the Amazon recommendation engine on one side and cookies and spyware on the other – which is just beginning to emerge as a respectable market. Revenue Science and Tacoda are doing it with publishers; Compete Inc. is doing it in conjunction with UPromise and, it hopes, other marketing partners. ChoiceStream is doing the equivalent of behavioral targeting for commerce (for customers such as Yahoo! and AOL), and others are applying it to search.

So far, the targeting has mostly to do with detecting the presence of potential customers and showing them ads without much respect for timing. That’s partly because the volume of good data is so low (or almost drowned out in noise) and the practice is so new.

There are also a broad range of shopping tools designed to show shoppers competitive offers (see Release 1.0, June 2005), but most operate in a fairly rote fashion, displaying a range of competing offers from various vendors and merchants simultaneously. We haven’t yet seen the user-controlled tool that can figure out what you want before you know it yourself, that can guess your proclivities rather than see your explicit intentions. You may or may not want to discover your own hidden greedy child, but marketers do.

Thus you can expect to see a lot more behavioral targeting, even though in the past it has been associated with adware/spyware companies. You don’t need a download to recognize a user’s cookie as he moves from site to site, and, as consultant Dan Doman (below) points out, “You don’t need to know any personally identifiable information at all. You just need to know where you saw the person before – but not who the person is.”

Yes, behavioral targeting has bad associations, but it’s one of those wonderful things that makes just about everyone happy: more relevant ads for the consumer, higher revenue per ad for the publisher, and higher click-through rates on the ads – which generates an increased ROI for the advertisers even at those higher prices.
Revenue Science: Take me to your gold mine!

Revenue Science began life as Digimine, a data-mining firm that analyzed user behavior on behalf of e-commerce sites. The company recognized the big win it could gain if it could use behavior data to generate incremental revenue for media sites, and in 2003 it changed its name and its focus to work with publishers and advertisers rather than just individual commerce sites. Revenue Science media customers now include Fortune 500 advertisers and media properties such as The Wall Street Journal Online, ESPN.com and Jumpstart Automotive Media.

Once Revenue Science had a following of premium properties using its behavioral segmentation within their sites, it embarked on a plan to persuade its publisher-customers to let it use their data on behalf of other customers across a network. That is, if Juan visits the auto pages of a leading auto research site, Revenue Science can use that information to show Juan car ads not just on other pages within the auto site, but also on the weather pages of, say, the Washington Post. Two important points: One, the auto publisher doesn’t share its data, but it does allow Revenue Science to use conclusions based on the data – that Juan may want to buy a car – to serve an ad for another publisher. Two, the auto site gets to share in Revenue Science’s revenue for that ad.

Over time, that proposition has proved compelling for several customers, and more are likely to sign up. Revenue Science has just launched a network with dozens of publishers providing data and many more agreeing to serve ads. The audience reach for the network is already greater than 50 percent of the US online population.

The economics are compelling. A regular ROS (run of site, or generic) ad on, say, the news page may go for several dollars per thousand impressions. An ad targeted at a potential car buyer may bring in 10 times that (especially since most “inventory” on car sites is not just expensive but often unavailable). The net result is that the auto site gets money it wouldn’t have earned otherwise and loses nothing directly.

For example, says Revenue Science’s Omar Tawakol, senior VP and general manager of Behavioral Targeting Marketplace, “For most response advertising, you can get pretty much double or triple the response of not using targeting at all, without even paying much attention to timing details.” Yet, he expects, timing details will matter. If you can get three times the detail without effort, imagine what you could do if you
could catch buyers at precisely the right time. The limit, of course, is the actual number of buyers waiting to be discovered.

Because it’s a new field, with most such campaigns just rolling out, there’s still a lot to learn. Revenue Science is currently serving several billion behaviorally targeted ad impressions a month across a couple of hundred publishers. That generates a lot of data to analyze. Which combination of factors yielded click-throughs, and which didn’t? “Psychology is driving user behavior, but it’s the math that discovers it,” says Tawakol. “However, learning something conclusive is hard because there are so many variables. It’s almost depressing if you’re a scientist. The noise is so tremendous that you need to be very deliberate about your experiments. There can be a factor you’re not even aware of – such as the amount of white space in two different ads – that affects your response rate more than the variable you’re measuring.”

The rhythm of buying

Right now, Revenue Science (and its competitors) are just experimenting. “We get such an uplift doing simple targeting,” says Tawakol, “that we haven’t yet refined the timing.” However, they are working on it. “Recent is usually better, but you don’t want to miss people by making the window too short.” Of course, the precise figures will end up being proprietary, though the overall approach is clear: “We’ve been experimenting with the time window for cars. Six months is too long; two weeks may be too little. Six weeks is probably about right. Certainly, it’s not linear; there’s a decay function which means there’s a rapid drop-off after a certain point; we just don’t know where it is, yet.”

Moreover, the timing will be different for different items. For now, direct response marketers are focusing on big-ticket items such as cars, mortgages, insurance and travel. These bring the greatest return on advertising investment, and they are also considered purchases. People don’t usually decide to buy a car in the morning and arrange delivery that night.

Time also plays another role in advertising. The trick isn’t just to figure out which customers have which intentions; it’s the very practical question of optimizing the use of ad inventory. Suppose Juan shows up at your site. Based on his recent behavior, he could be in the market for a car. Meanwhile, there’s Alice. Based on her behavior, she definitely wants a car and may want a mortgage. Should you show Alice the lower-yielding, but surer-bet car ad and “waste” the mortgage ad on Juan? Or should you show Juan the car ad and Alice the mortgage ad? It’s not a question of principle;
it’s a question of statistics – and the better your data, the better you can assess the potential of each strategy.

Tawakol himself is a reflection of how online advertising has evolved over time. Previously, he was co-founder and CEO of CoRelation, a behavioral segmentation and personalization company acquired by Revenue Science in 2001. Before that he managed consumer messaging products at Netscape spinoff Liberate, which provided interactive TV technology for AOL and Comcast, among others. He began his career as an AI researcher at Stanford University’s Logic Group and HP Software Labs.

**Dan Doman: Intentions and inclinations**

As we said above, “The limit, of course, is the actual number of buyers waiting to be discovered.” But there’s another approach, which is to create buyers by divining their proclivities and making them offers that will induce them to buy things they weren’t actually looking for. (Yes, and you thought this is what *all* advertising was about!)

Dan Doman, a happily independent consultant who formerly worked for DoubleClick and Direct-Revenue as well as Mediaport (a dot-com ad-agency joint venture that imploded after 9/11), has spent much of the last decade working on advertising engines and exploring the differences between intentions and proclivities. An intention is an explicit plan to buy something, as when you are looking for a car or a good deal on a Nano. A “proclivity” is a tendency (or a vulnerability) that can be triggered by a good ad or even just an offer. “For example,” says Doman, “I walked past Best Buy five times in the last week with no intent to buy a Nano [which they were showing in the window]. But I did have a proclivity – being a music-lover and a boomer male – and finally I went in and bought one.”

You can guess individuals’ proclivities from their demographics, he points out: Teenagers like ring tones; women like perfume; young single men like violent games and DVDs. And you can guess their demographics and proclivities – as well as their intentions – by the sites they visit. There are also negative cues for marketers, such as someone visiting a high-risk loan site (unless you’re in the high-risk loan business yourself).

Of course, all these are generalizations, but marketers work with statistics, not with unique, discrete individuals. And from a privacy point of view, that’s a good thing. You don’t need to know who they are, says Doman. “You get a certain liberation from identity when you are treated as a statistic.”
But proclivities and especially intentions change over time. Figuring those things out is the marketer’s black art. “There are different wavelengths to intentions and proclivities, varying by person and by product,” says Doman. It’s fairly simple to show a car ad to someone who was browsing Volkswagen’s, but when is the best time to do so (if you have enough traffic and enough visitors to pick)? “It’s like seduction,” says Doman. “You can’t start right away with the offer.” From an advertiser’s point of view, it’s best to let other advertisers or sites educate the consumer, and then show up with your ad at the time the prospect is ready to make a decision. When is that?

Says Doman, “You can work a lot of these things out. The more data you have, the better you can fine-tune your timing. You can also come up with things that aren’t obvious.” For example, he says, someone looking at DVDs is probably looking to buy a movie. But someone looking at flat-screen TVs is not likely to be looking for a small-screen DVD player, whereas a frequent traveler who is browsing DVDs may well have a proclivity for a compact DVD player. However, Doman notes, “The accuracy of proclivity measures also decays over time. If you don’t allow for proclivity decay, the real peaks get lost in the noise. This is also why negative indicators are so important. The guy shopping for high-end ‘guy-oriented’ consumer electronics such as large-screen TVs suddenly shifts into a different demographic when he starts looking at baby furniture, carriages and family/new-born stuff. But demographics persists: These same BOBOs [Bohemian Bourgeois, from David Brooks’ book “BOBOs in Paradise”] will translate their need for Bang & Olufsen stereos, granite kitchen counters and showers with skylights into high-end Hummer baby carriages selling for $800 to $1000. The same lust [and income] is there, but the proclivity manifests itself in different objects.”

However, notes Doman, the long-term advantages will accrue to services that analyze their data to divine patterns that are not immediately visible or guessable — the online equivalent of the fabled insight that men buying diapers late at night have a proclivity to purchase beer as well...leading thousands of groceries to stock the beer with the Pampers.

“The point of statistically based behavioral targeting is that it helps you to refine your targeting using combinations of patterns that are not so obvious anecdotally. This is where computers and data mining comes in. The traditional marketer knows these things at a high level through intuition or experience, but doesn’t have the data to make the right trade-offs. Grinding through vast amounts of data can reveal patterns that are less obvious. If you can figure out exactly when they peak you can get a better return than someone working just with averages.”
Conclusion: The End of the Beginning

Everything you have read so far simply sets the scene – both for our When 2.0 workshop and for continuing developments in the role of time in software. In the end the challenge isn’t managing time, but managing other things within the constraints of time. Beyond the calendar, scheduling and events tools described in the first half, there is a tremendous amount of variety in how time can be used, as illustrated in the second half. As we move into a world of cell phones, GPS devices and RFID more and more of our systems are collecting continuing streams of data in real time. Without a better understanding of how things change through time, we’ll become overwhelmed with waterfalls of meaningless data. But with better historical data and real-time analysis, we’ll be able to understand our world much better, seeing not only what is happening but what’s about to happen and what has already happened. Just as you can get value from understanding that a text string is in fact a crisp and parsable description of an event with a defined location, participants and timing.

The ability to see more things more clearly through the lens of time is invaluable. It gives us better information with which to make decisions, and it will allow us to automate more decisions. If we can define situations and rules clearly enough, we can have software execute them.

In short, time is the measure of anything else we do or have. Any child instinctively knows that a bicycle today is worth more than a bicycle at Christmas. And any parent knows through experience that back-to-school is the time to buy clothes, that the teen years are troublesome, and that childhood friendships (like adult ones) wax and wane over time. For some people, it takes five minutes in the morning to make six useful decisions, while five minutes at night are good for little more than watching Jon Stewart or Adult Swim or slitting open paper envelopes. For other people, vice versa.

People also know how challenging it can be to schedule all those magic moments; that’s why rich or important people have appointments secretaries. Their money is fungible; you can trade it freely. But their time is not.
Resources & Contact Information

Dan Doman, Consultant, 1 (212) 289-1024; dan@danieldoman.com
Brian Dougherty, CEO, Airena, 1 (925) 677-0600; fax, 1 (925) 677-7360; brian.dougherty@airenainc.com
Robert Pinner, Director, Office of Surveillance in the National Center for Infectious Diseases, Centers for Disease Control and Prevention, 1 (404) 371-5360; fax, 1 (404) 371-5445; rpinner@cdc.gov
Dean Ratcliffe, CEO, Columbia Systems, 44 (20) 7739-9902; dean.ratcliffe@columbasystems.com
Ben Cruz, Founder & CEO, Demand ID Systems, 1 (410) 466-7467; fax, 1 (301) 330-5962; bcruz@demandid.com
Brian Dear, Founder & CEO, EVDB, 1 (858) 964-0697; fax, 1 (858) 964-4640; brian@evdb.com
Thomas Moran, Distinguished Engineer, IBM Almaden Research Center, 1 (408) 927-3844; tpmoran@us.ibm.com
Scott Heiferman, CEO, Meetup, 1 (212) 255-7327; fax, 1 (212) 255-7310; scott@meetup.com
Pavel Curtis, Software Architect, Microsoft, 1 (425) 722-0920; fax, 1 (425) 936-7329; pavelc@microsoft.com
Ray Ozzie, CTO, Microsoft, 1 (425) 722-7703; rozzie@microsoft.com
Mitchell Kapor, President & Chair, Open Source Applications Foundation, 1 (415) 946-3016; fax, 1 (415) 946-3001; mitch@osafoundation.org
Lisa Dusseault, Lead Designer, Open Source Applications Foundation, lisa@osafoundation.org
Joyce Park, Co-founder & CTO, Renkoo, 1 (650) 315-7241; jp@renkoo.net
Adam Rifkin, Co-founder & CEO, Renkoo, 1 (650) 906-4652; rifkin@renkoo.net
Omar Tawakol, Senior VP, Marketing, Revenue Science, 1 (425) 216-1827; fax, 1 (425) 216-1777; omart@revenuescience.com
Munjal Shah, Co-founder & CEO, Riya, 1 (650) 278-2304; fax, 1 (650) 887-0375; mshah@riya.com
Steven Hofmeyr, Founder, Sana Security, 1 (650) 292-7100; steve@nthworld.net
Tim Eades, Senior VP, Sales & Marketing, Sana Security, 1 (650) 292-7100; fax, 1 (650) 292-7110; tim.eades@sanasecurity.com
Ramesh Jain, Chairman, Seraja/EventWeb, 1 (949) 824-0133; fax, 1 (949) 824-4056; jain@ics.uci.edu
Tantek Çelik, Chief Technologist, Technorati, 1 (650) 335-9558; tantek@technorati.com
Yori Nelken, CEO, TimeBridge, 1 (650) 472-3655; ynelken@timebridge.com
Jeremy Jeaeh, CEO, Trumba, 1 (206) 625 2262, x106; fax, 1 (206) 625-1437; jeremy@corp.trumba.com
John Arenas, CEO, Worktopia, 1 (914) 468-0811; fax, 1 (914) 931-2180; john.arenas@worktopia.com
Andrew Bai, Co-founder, Upcoming.org, Yahoo!, andy@upcoming.org
Satish Dharmaraj, Co-founder & CEO, Zimbra, 1 (650) 212-0505; fax, 1 (650) 212-0504; satish@zimbra.com
Ethan Stock, CEO, Zvents, 1 (650) 234-9629; fax, 1 (650) 234-8322; ethan@zvents.com

Further reading:
Unified Activity Management project: http://www.research.ibm.com/uam
HTML for Calendars, from Foo Camp: http://wiki.oreillynet.com/foocamp04/index.cgi?HTMLForCalendars
hCalendar: http://microformats.org/wiki/hcalendar
IBM’s Activity Explorer: http://www-128.ibm.com/developerworks/lotus/library/ae/
Release 1.0 Subscription Form

Complete this form and join the other industry executives who regularly rely on Release 1.0 to stay ahead of the headlines. Or if you wish, you can also subscribe online at www.release1-0.com.

Your annual Release 1.0 subscription costs $285 per year, and includes both the print and electronic versions of 4 quarterly issues; 25% off the cover price when you order from our online archives; a Release 1.0 binder; a discount on attendance to our live events; and membership to our website, which includes access to all site content and discussions.

NAME ____________________________________________

TITLE ___________________________ COMPANY ____________________________

ADDRESS __________________________________________

CITY ___________________________ STATE _______ ZIP ________ COUNTRY __________

TELEPHONE ___________________________ FAX ___________________________

E-MAIL* ___________________________________________ URL ___________________________

*personal e-mail address required for electronic access.

☐ My colleagues should read Release 1.0, too!

Send me information about multiple copy subscriptions and electronic site licenses.

☐ Check enclosed

☐ Charge my (circle one): AMERICAN EXPRESS  MASTER CARD  VISA

CARD NUMBER ___________________________ EXPIRATION DATE __________

NAME AND BILLING ADDRESS __________________________________________

SIGNATURE __________________________________________

Please fax this form to Brodie Crawford at 1 (212) 924-0240.

Payment must be included with this form. Your satisfaction is guaranteed or your money back.

If you wish to pay by check, please mail this form with payment to: Release 1.0, 104 Fifth Avenue, 20th Floor, New York, NY 10011, USA. If you have any questions, please call us at 1 (212) 924-8800; e-mail us@release1-0.com; www.release1-0.com.