MAKING SOFTWARE WORK BETTER
By Kevin Werbach

Dirty little secret: Software doesn’t always work. You, our technically savvy readers, have probably never experienced a crash, but we assume most of you know someone who has. Is there any hope for those poor souls?

There are many ways to make software run more reliably and to address problems more efficiently when they arise. Over time operating systems and architectures will evolve to eliminate many of the conflicts that plague software today. In the near term, however, we’re stuck with what’s already out there. Java is making significant headway, but it’s unrealistic to expect users to junk their existing platforms for NC nirvana. The trouble is that evolutionary software releases tend only to make problems worse, because any new code has to work with the installed base. The Web is a great self-service tool for technical support, but many problems still require a developer or support representative.

Recognizing the Internet’s power, vendors are offering new products to automate information flows between users and developers, leading to more reliable software and better support.

The software industry has traditionally developed products through cycles of internal alpha testing, beta testing among controlled volunteers and general public release. In theory, the development process ends there, but of course all software has bugs or incompatibilities (not to mention features some customers don’t like). Corporations have IS staffs and software vendors have technical support lines to handle these problems. Information gradually filters back to the software designers working on the next version. For such a technical business, it’s a haphazard process. Last year customers in the US made 300 million technical support calls and wasted 11.4 billion hours waiting for problems to be resolved.

Customer-service software has made technical support centers more efficient, and Web-based self-service gives users additional tools to solve their problems (see Release 1.0, 9-98). But neither

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fundamentally changes the process of creating and servicing software. Users are often not equipped to diagnose or even describe the problems they experience, and the path between a crash and a developer able to fix the relevant bug remains tortuous.

In other ways, things have gotten worse with the emergence of the Web. Companies such as Netscape and Microsoft realized early on that electronic software distribution allows them to open up the beta-test process and compress their release cycles. Many products, even market leaders, seem to be in eternal beta. The increasing complexity of operating systems and the growing number of applications that need to work together have also exacerbated the challenge of developing, testing and servicing software.

Closing the interactive loop, part 2

Fortunately, the Internet provides a partial answer. Why not use the network connections that exist today to relay information about software performance back to developers or network managers automatically? This may sound like a narrow function for one market, but more and more products are becoming software-driven. As Internet connections mushroom in all sorts of consumer devices, software reliability will become less the concern solely of engineers and early adopters. Moreover, it's hard to think of a better proof-of-concept market for Internet-driven interactivity than the software business itself.

The problem with traditional notions of software development and support is that they assume a one-way publishing model. Developers assemble software and then ship it out to users; the only thing that comes back (they wish) is money.

This approach fails to take full advantage of information. As we discussed last month, customers generate information all the time, but it has little value to vendors unless it can be fed back into the appropriate databases and business processes. The companies we described last month, such as BroadVision, Vignette and Silknet, use customer information to drive transactions (see Release 1.0, 9-98). The same interactive model, however, can also work for software development and support. Once again, the emergence of the Internet as a ubiquitous return channel is the critical factor that enables these valuable feedback loops.

Full Circle, VitalSigns, Computer Support Technologies and Motive all use client-side agents to close the loop between software users and those responsible for making software work. The companies aren't all direct competitors, at least not yet, because they address different problems. If they are successful, however, there will doubtless be a battle over who controls the client-side monitoring software. All the vendors acknowledge the value of standards, de facto or otherwise, in building support for interactive approaches among users and developers. Yet standards processes are seldom as neutral and open-ended as they seem (see Release 1.0, 6-88 and 7/8-95). Moreover, as portions of the closed-loop software development and support process become standards-based commodities, vendors must somehow add sufficient value.

At some point Microsoft will likely build such a monitoring service into the OS. VitalSigns ceo Montgomery Kersten says the possibility has already
been the subject of concern among the company's cio advisory board, which includes representatives from Bay Networks, 3Com, Citibank, Checkpoint Software and Hewlett-Packard. These companies see monitoring and support systems as a valuable independent check on the performance of both Microsoft's operating systems and its applications, one they fear will be lost if this functionality moves into Windows. So far, however, Microsoft has assisted companies such as Motive and Computer Support Technologies by making it easier to obtain low-level information about user activity.

Whatever happens, the gap between clients and servers, and between developers and users, is closing. To take full advantage of this shift, software developers must rethink their quality-assurance and support processes. In all likelihood that will be a tougher challenge than building the new return channels, but companies willing to make the effort will ultimately have a significant competitive advantage.

SOFTWARE DEVELOPMENT

Software reliability starts with the developer. Developers spend huge amounts of money and employee time to eliminate bugs and to make sure their software doesn't interfere with other applications resident on a machine. The trouble is, no matter how hard they try, developers don't know what those users' systems will look like.

Developers of packaged software should be just as interested as Web-based services in tracking how people use their products. One of the benefits of Websites is that vendors can watch customers as they browse or shop, and can build profiles to target information (see Release 1.0, 9-98). Traditional software can offer some of this functionality through agents that learn and respond to user behavior, such as the Microsoft Assistants in Office 97. But these tools fail to give developers themselves any real-time information. Instead developers rely on guesswork, beta testers and usability studies.

Full Circle: Software that talks back

Full Circle compares its TalkBack product to an airline "black box." Software developers deploy the 350K TalkBack client with their applications. It includes a small amount of "glue" code inserted directly into the application, an agent that the glue code dynamically loads upon triggering events such as crashes, an application monitor to communicate with the TalkBack server and a manifest file that stores preferences and other data.

The client is available for Macintosh, Windows and Unix applications; the server component runs on NT and works with both Microsoft and Netscape Web servers. In the future, Full Circle hopes to provide much of the same functionality without code embedded in the application, but at this point the glue code is necessary to get the appropriate low-level data. An advantage of this approach is that the software developer can set the agent to track information linked to specific application features and functions.

When triggered, the client gathers information such as the values of key machine registers and the hardware configuration. After allowing the user
to add additional comments, view the data to be sent or opt out entirely, TalkBack sends the information securely to the server and into a SQL-based knowledgebase. Developers can generate reports viewable through a Web browser, and can track information such as feature usage and bugs. The system has enough intelligence to correlate many bugs that appear different from a low-level perspective, such as the same error on three different hardware platforms.

Konstantin Othmer and Chris Derossi, both Apple veterans, founded Full Circle in March 1997, with funding from Menlo Ventures and Brentwood Associates. The company officially launched in July. TalkBack has already been incorporated into the preview version of Netscape Communicator 4.5. This high-profile placement should give TalkBack a good workout, and Netscape plans to use the technology in other products such as Suite Spot and Application Server. Other initial customers include Apple, Remedy, Rational and Sabre Group. Pricing starts at $50,000 for a server license, and Full Circle is building relationships with channel partners.

Other companies including Compuware, a much-larger development tools vendor, offer client instrumentation products, but only Full Circle takes full advantage of the Internet as a communications channel. Because of this approach, TalkBack can support not only client-server applications on an internal network, but also remote and desktop applications.

Full Circle also sees itself as the only performance-monitoring company to cover the full software life-cycle. The company plans to expand from its initial beachhead of software development to support, and it sees its primary market as server-based mission-critical applications rather than desktop software (cf. VitalSigns, below).

Because the company's agents sit inside deployed applications, they can collect information even before a problem occurs and can pro-actively suggest solutions without requiring a technical support call. Software developers can also use TalkBack to track actual user behavior. Examples include which features are most commonly invoked, how long it takes to complete a certain transaction, or which commands are most frequently used to invoke certain functions.

Full Circle tries to address concerns about privacy and security through complete disclosure. Users can view exactly what information is sent back to developers, and can opt not to send any information at all. Ceo Othmer reports that only about 1 to 2 percent of Netscape 4.5 users are unwilling to send information using TalkBack.
Monitoring and Support

Even with tools to make software less crash-prone, there is still a need for systems to monitor and correct application problems when they occur. VitalSigns, Motive and Computer Support Technologies have all developed products that automate the transfer of information between clients and management systems.

VitalSigns: Monitoring server-based applications at the client

VitalSigns Software is best known for its Net.Medic utility, which lets users diagnose and monitor their Internet connections. Net.Medic created a splash because it allowed dial-up users to isolate what CEO Montgomery Kersten calls the "crushing disappointment" of connection glitches and slowdowns. Users for the first time could determine whether their local hardware, the ISP, the remote server or some other element was the cause of the problem. Over 10 million copies of Net.Medic are now installed, and a freeware version is bundled with both Netscape Navigator and Microsoft Internet Explorer. Thanks to Net.Medic, VitalSigns is already profitable.

Net.Medic, however, was a Trojan horse to raise awareness of VitalSigns' technology. Kersten says VitalSigns never meant to be an end-user software company, but planned from the beginning to focus on corporate customers. The Visibility into Applications (VIA) architecture behind Net.Medic is also the core of the new VitalSuite product family, which is designed for enterprise applications.

VitalSuite offers a complementary but missing function: application performance monitoring using client-side agents. Monitoring network-based applications such as Web servers, databases and custom applications from the client seems counter-intuitive. After all, the applications are running on a server. Moreover, instrumenting one server seems far simpler than distributing hundreds or thousands of clients.

But client-side monitoring isn't as hard as it seems. Thanks to the dominance of Windows and of TCP/IP as the lingua franca of networks, enterprise clients increasingly run on one platform. Pentium-class machines can track packet flows using only 1 or 2 percent of their processing power. Managing application performance from the client can actually provide more accurate measurements, because the system can capture the end-to-end path of transactions and identify the source of any failures. Moreover, a client-side approach makes it much easier to tell the user how to fix the problem.

Meanwhile, a few other companies including Landmark Systems and FirstSense have developed performance-monitoring agents deployed on desktop clients. These solutions, however, primarily measure simple parameters such as response time. VitalSigns' VIA technology, for which it has filed 12 patent applications, provides a more holistic view of network performance. VitalSigns is a subsidiary of Computer Associate.

1 Companies such as Computer Associates, HP and Tivoli provide enterprise management suites for PCs, networks and servers. These solutions typically manage applications by instrumenting either the servers or the network transmission links on a LAN. But they have limited ability to measure end-to-end performance.
Suite also supports business-oriented metrics tied to user productivity rather than raw speed.

VIA analyzes the dynamics of TCP/IP packet flows between client and server. VitalSuite uses the round-trip times of packets leaving and entering a given machine to dynamically generate flow signatures for applications. Over time, the software develops baseline signatures against which it can compare anomalous performance. Because the system tracks packets end-to-end, VitalSigns can also identify problems in the client machine or the network connection. The company's VitalHelp and VitalAnalysis products aggregate the information delivered from clients to provide IS departments with a network-wide view of application performance.

Does anyone really want software that works?

On some level, software developers don't want their products to function perfectly. Debugging and quality assurance cost money. And version 1.0's flaws are often the best marketing pitch for version 2.0. For all their complaints, consumers have consistently rejected faster and more-stable "lite" versions of software in favor of more feature-heavy alternatives.

Two major trends, however, are creating pressure for better software development and support tools. The first is the spiraling cost of technical support. As user numbers grow and software gets more complicated, it's increasingly difficult for vendors to keep up with technical-support demands. Hiring and training support representatives is extremely expensive and time-consuming. Motive (see page 7) estimates that high-tech companies and internal helpdesks spent $69 billion worldwide on technical support in 1997. The pressure to cut those costs is compelling.

The other trend is the move toward appliances and more mass-market computing devices. As computers become more ubiquitous, they must also become more reliable. Users may tolerate a malfunctioning PC, but they expect a consumer device to work. The embedded software industry has always lived with this constraint, but at the cost of limited functionality and extensibility. The move towards Internet appliances is creating pressure to meld the reliability of consumer devices with some of the flexibility of desktop PCs.

VitalSuite supports the leading ERP, database, groupware, mail and Web protocols out of the box, and includes templates and APIs to handle custom in-house applications. VitalSuite also supports the Application Response Measurement (ARM) standard for integrating with network management applications such as Tivoli TME and HP OpenView. ARM has been slow to take off because many companies are reluctant to modify their source code to make ARM calls; VitalSuite addresses this problem by making the calls for the application. The software can automatically create trouble tickets that integrate with Remedy, the leading helpdesk management system.

The privately held company has been funded by Sequoia Capital and Austin Ventures. Its customer list includes technology companies such as Dell,
Hewlett-Packard and Netscape, as well as other large enterprises such as John Deere, Simon & Schuster, General Electric and Merrill Lynch.

Much of VitalSigns' management team comes from the networking industry, including Kersten (formerly vice president of Bay Networks) and chairman Bill Lanfri (formerly a senior vice president at SynOptics). Kersten thinks one reason no one has taken the same approach before is that network management has evolved from a mainframe model, assuming that a central point can control everything on the network. Oddly enough, hardware engineers used to building distributed networks may be better positioned to understand the power of the client return channel (see page 9).

**Motive: Technical support as conversation**

Motive Communications, an Austin-based startup founded in May 1997, refers to its market as support-chain automation. Where VitalSigns helps IS departments manage network software, Motive's clients are technical-support departments, internal helpdesks and support-outsourcing companies. Motive sees this as a category parallel to sales and the supply chain. Given the success of Texas neighbor i2 and Siebel in those areas, who can blame Motive for jumping on the automation bandwagon?

Before releasing its product, Motive conducted a time-and-motion study of major technical-support centers, and found that three-fourths of a typical support call are taken up with triage, diagnosis and data gathering before problem resolution even begins. The company set out to build an integrated system that automates as much of the support process as possible.

Motive's fundamental insight is to treat technical support not as one-way publishing, but as an interactive conversation. Many companies have developed customer-support systems based on chat or voice over IP to connect customer service representatives and users in real-time. Motive instead emphasizes the broader framework of the relationship. The Motive Assistant sits on the user's machine and establishes a closed loop mediated through the Motive Server. The conversation draws upon technical-support objects that technicians and developers create to automate the support process.

Effective conversations require a common language. Motive's system is built on an XML-based Diagnostic Language for representing support objects. Motive provides an XML schema (see Release 1.0, 5-98) along with JavaScript class libraries and APIs. Its Diagnostic Language forms the basis for Motive Maps, which are programmable objects that automate repetitive support tasks for specific situations and applications.

Motive's Diagnostic Language is currently a proprietary framework on top of XML, but the company may open it up in the hopes of making it a de facto standard. Ceo Scott Harmon sees standardized interchange languages as important elements of any interactive domain, whether electronic data interchange, electronic commerce or technical support. Motive is currently working most closely with Microsoft on the potential standard, but the Customer Support Consortium (see Release 1.0, 9-96) and the World Wide Web Consortium are other possible venues. The Microsoft connection is no accident: Former Microsoft executive vice president Mike Maples sits on Motive's Board, and his son Mike Maples, Jr., is the company's vice president of marketing. Harmon and Maples, as well as most of the other founders,
were at Tivoli, the network-management company now owned by IBM. Motive raised $4.8 million in first-round financing from Accel Partners, Austin Ventures and SSM Venture Partners.

Harmon sees a need for technical support to evolve toward more flexible intermediation, much like electronic commerce. Just as BroadVision or SMART Technologies can generate unique Web pages dynamically (see Release 1.0, 9-98), support organizations should be able to route service requests automatically to the appropriate service provider. Microsoft reports that some 50 percent of its technical support calls should actually be directed elsewhere, but it has no automated way to hand off calls about broken disk drives to the PC or drive vendor. Companies would also like to provide transparent tiered support, the analogue of one-to-one marketing, so that a "gold" customer automatically gets a higher level of service. Motive supports such distinctions, and also allows support providers to distribute Maps to customers, enabling them to resolve problems themselves.

Harmon says that many potential customers are concerned about privacy and security. After all, Motive's Assistants can automatically extract information from users' PCs and send it to a technical-support operation. The company has tried to make its technologies and user interface as explicit as possible, so that users understand exactly what is taking place. If they wish, users can review and decide whether to approve each transaction with the support center.

Motive complements helpdesk and front-office automation applications, which track support calls but don't necessarily alter the support delivery process. It can exchange data with products from Clarify, Remedy, Vantive, Tivoli and Scopus. The Motive system costs between $50,000 and $150,000, depending on the number and size of servers; customers can deploy unlimited Motive Assistants at no extra charge.

Computer Support Technologies: Smoothing the move to automated support

Motive is not alone in seeing the value of a closed-loop technical support system. Computer Support Technologies, an Ann Arbor-based startup, offers a similar product called Rescue. The 15-person company has received initial funding and is currently seeking a venture round. The corporation was formally incorporated in October 1997, although the principals have been developing Rescue for more than two years.

Ceo John White got the idea for Rescue while working with the Haley Enterprise to develop an artificial intelligence system for technical support knowledgebases. He came away convinced that before such technologies could be effective, there had to be an automated mechanism to obtain information about the user's system. Rescue, like Motive, uses a client-side agent to collect information that a service provider specifies, and transmits it over the Internet to a technical-support agent. Also like Motive, CST uses an XML-based language to define data to be collected.

CST takes a more evolutionary approach than Motive, based on the belief that users and technical-support operations need systems that are easy to implement. Motive goes farther in trying to automate problem resolution
with its reusable maps. At this stage, CST considers it more important to integrate the data-collection function with a range of different communications functions, including chat, video conferencing, telephone and remote control of a user's machine.

White believes that overburdened support providers will balk at radical process changes, and that users accustomed to talking on the phone with a live human being won’t always accept Web-based systems as a substitute. Web-based self-help costs less than a conversation with a support representative, but if a user can’t find the answer on a Web page he or she will need an alternative. As a result, Rescue emphasizes communications capabilities such as a hyperlink that launches a phone call to the user, and one-way videoconferencing so that the user can see the support representative. The system currently uses Microsoft's Net Meeting for these functions, but CST is developing its own more lightweight software.

The network is the software

In a world of increasingly ubiquitous IP networks, all software is Internet software. Even if an application has no communications functionality, developers can reasonably assume that an Internet connection will be available, especially in enterprise environments. One consequence of this development is network computers (NCs), with the center of gravity shifting from the desktop PC to the server. But there are other effects that point in the opposite direction.

The companies discussed in this issue are adding more intelligence at the edge of the network — effectively the model of the data networking world. Tracking application performance from a server is like managing traffic flow from a central switch. Cisco and others have demonstrated that ceding control to distributed routers offers more flexibility and better performance (see Release 1.0, 6-98).

Perversely, hardware decentralization has often led to continued centralization in software management. With client-server systems taking the place of mainframes, network managers have kept their attention on the central hardware they can most directly control. This approach worked for networks of dumb terminals (and may work again for closed Java-based NCs), but when users have PCs on their desktops running Windows and client software, a server-centric worldview misses a critical portion of network activity.

In line with its emphasis on ease of use, CST has developed “disk of last resort” technology that allows a user to call into the technical-support system even if his or her Internet connection or modem is malfunctioning. In fact, the system can load even in many cases where the user’s computer fails to boot.

The primary distinguishing feature of CST is its business model. The company offers Rescue primarily as a hosted application. All the software runs on CST’s servers, and both end-users and technical-support representatives get information through a browser. Rescue piggybacks on call centers’ existing call distribution and e-mail management software, so that companies need not deploy a whole new system to gain the additional func-
Companies can choose to pay CST $1.49 per transaction or can pay $2,500 per quarter for up to 10,000 transactions.

CST believes the trend towards outsourced applications is an important opportunity and one it is well-positioned to exploit (see Release 1.0, 9-98). Large support operations and Fortune 1000 companies may be willing to commit $50,000 or more for a server license, but a vast amount of support is provided by smaller companies and resellers.

Rescue has several paying customers and is currently in trials with others. CST is developing partnerships with helpdesk management and knowledgebase vendors that complement its product.

THE WAR OF COMPLEXITY AND SIMPLICITY

Something deeper than support is at stake here. Technology is a constant dialectic of the simple and the complex, and software is among the purest expressions of this tension. Technologies need not be understood to be useful. Rather, they must seem natural and their behavior should be predictable. That's why we use metaphors (see Release 1.0, 4-97). Metaphors shape user expectations, and products that meet those expectations consistently create the illusion we call ease of use.

Successful technologies must have a funneling effect, hiding their inherent complexity behind walls of apparent simplicity. The software we use today goes through multiple rounds of such winnowing, from the electrical pulses that pass through the microscopic logic gates of integrated circuits up to the familiar icons that grace the desktop interface. The paradox is that simplicity must be added through new layers of complexity. The earlier text-based applications were harder to use but simpler to write. As operating systems become more graphical and simpler to use they also become bulkier, creating ever more potential conflicts.

One answer to this problem is to split it into pieces and define standard ways for those pieces to interact. Hence, component architectures and object-oriented programming (See Release 1.0, 3-87, 3-91 and 5-94). The reality of these technologies has never quite matched the expansive promises. However, developers have seen substantial benefits from the ability to connect small, reusable piece-parts of code in C++, Java and other languages, and to integrate components through standards such as COM and CORBA.

Another strategy is to rethink the operating system and the development environment, much as Apple did with the Macintosh and NeXT with its eponymous system. The notion of Java-based NCs replacing the desktop PC also reflects this vision. Such approaches tend to be elegant, but must overcome a high hurdle to gain a critical mass of users and developers. The larger the installed base of Windows, the harder it is to imagine any alternate platform emerging, other than in new markets such as appliances and handheld devices.

All the products we describe above take a second-best approach. They are designed to fix problems, or even to prevent them in the first place, through yet another layer of complexity. The Internet adds additional
data to the mix, but that data is external to the system itself. By analogy, circuit-switched telephone networks use offline SS7 signaling, and supplemental quality of service management systems are being developed for packet-switched networks (see Release 1.0, 6-98).

This method won't eliminate bugs and crashes, but at least it takes into account the full sweep of the development and support process. Most software failures are emergent properties of complex systems. If they could be predicted from the component parts far more of them would be addressed before they affected users. The best way to identify possible points of failure is often to run the application many times and observe the results. Real-world problems can also be a starting point to feed back into development efforts or customer self-service materials.

**The custom customer**

An important aspect of the closed-loop model is that it works for both packaged and custom software development. A large amount of mission-critical software is developed either in-house or by systems integrators. Products in most of the hot enterprise software categories today, including enterprise resource planning, sales-force automation and electronic commerce, are usually replacements for internal efforts. The increasing power and simplicity of middleware means that even when companies use packaged applications they often supplement them with custom code.

These custom applications tend to be less robust and less standards-compliant than their packaged counterparts, which increases the challenge of monitoring and supporting them. Smaller numbers of users and technical-support staff mean less extensive knowledgebases compared to commercial desktop software. The automated information-gathering functionality of these products has particular value in such an environment. By concentrating on user activity and leveraging the universality of Internet protocols, these systems can support an extremely wide range of applications.

The top and the bottom of the market present greatest market opportunity for these new software development and support tools. Users of high-end mission critical systems will pay almost anything to ensure more reliable performance and reduce downtime. At the other end of the spectrum, small software developers that cannot afford massive technical-support efforts are looking for an alternative to existing solutions. Outsourced offerings such as Rescue (see page 8) will appeal to such customers.
TWO VIEWS ON PORTALS

Seems like every successful Website wants to call itself a portal. Once reserved for search engines, the "P" word has recently been attached to Amazon.com, E-Trade and Microsoft's revamped MSN site, to name a few. Other than Wall Street analysts sucking their own fumes, what's going on here? We think portals are an interesting development, but it takes a more detailed look to understand their true significance.

In our quest to make Release 1.0 the premier "analysis portal" in print, we offer two different yet related takes on this phenomenon.

The Geometry of Cyber-Spacetime
By Kevin Werbach

"Portals" is this year's Internet buzzword. Such sites have risen to prom-inence so quickly it's hard to believe how recently we were all deluded by the siren song of push media. Even the recent dip in the stock market has barely dampened enthusiasm for the concept. As with every killer app from groupware to relational databases, portals are defined so vaguely that anyone with a Website and a marketing department can trumpet their membership in the category. Beyond the hype lies a measure of truth, although not necessarily what everyone thinks.

Portals are usually described in terms of geography, with emphasis on the "valuable screen real-estate" on popular sites. In reality, portals are more about geometry. The goal of a portal is to manipulate the apparent shape of the network for end-users.

The Internet is not a defined physical space like a shopping mall or a highway. In such environments particular locations have inherent value because potential customers are forced to pass them. The Internet, by contrast, personifies Einstein's four-dimensional relativistic spacetime, where everything folds back upon itself and appears infinite to those on the inside. Measurements of location are always relative, not immutably fixed. (And unlike physical space, the speed of light does not bar users from quickly hopping between widely divergent sites.)

Portals seek to give the Internet a definite starting point, middle or endpoint. By aggregating content and features, they create gravity wells to suck users in and keep them there. The goal is to become completely self-contained black holes, from which no click escapes.

Despite the sinister implications of our tortured metaphor, we actually think portals can provide value to customers and to shareholders... in some cases. The three television broadcast networks built a profitable $35-billion annual industry by aggregating large numbers of eyeballs for advertisers, and the handful of highest-traffic Websites (including Yahoo! and AOL) seem well on their way to building viable businesses using the same model. There is also something to be said for the convenience of getting a suite of services from the same provider, who can offer tighter integration and personalization than competitors.
You're a portal? Wow, what a coincidence, so am I!

At some point the portal model breaks down. All network businesses experience increasing returns as they grow, but for advertising-based businesses scale is the critical determinant of success or failure. Advertising revenues already follow an inverted bell-curve distribution, in which the bulk of sites can't generate large enough traffic volumes to recoup their costs. No matter how broad the service offerings at a portal site, users will always have other choices and the ability to vote with their fingers. (The same dilemmas arise in connection with communities and boundaries. See Release 1.0, 5-98.)

Therein lies the rub. Portals are fundamentally about advertising, which imposes a particular business logic (see Esther Dyson's essay in Release 1.0, 9-98). All the flavors of portals share this characteristic. A portal in the physical world is something you pass through, and the original portal sites were just that: search engines that took users somewhere else. The search engines generated heavy traffic, but had limited ability to develop customer relationships and were therefore vulnerable to competitors.

In response, the leading portals have aggregated content and community features to convince users to stick around. But their primary goal is still to attract as much traffic as possible. As Esther points out below, anyone can call themselves a hub or destination site, but it takes focus to add sustainable value for customers.

Large e-commerce sites such as Intuit's Quicken.com are really not portals, they are category killers in the tradition of physical retailers such as Home Depot and Circuit City. What drives the success of these sites is transactions, not eyeballs. Although the two metrics are often correlated they are not identical.

The overwhelming emphasis today on driving traffic belies the fact that some sites depend more on quality of hits than quantity. E-commerce players can put ads on their sites, but these will probably represent only a small portion of revenues. Users who want convenient online shopping will become annoyed if they encounter too many pitches from unrelated sponsors. And Amazon.com is unlikely to attract advertising dollars from e-commerce heavyweights such as Barnes and Noble, CDNow and, well, Amazon.com.

Portal-mania also goes overboard by attributing far too much durability to the imposed geometry of today's portals, rather than seeing users themselves as the center of the Internet universe (see Release 1.0, 9-98). The genius of the Internet is that it has no inherent structure or boundaries, only simple rules that enable interoperability. Most efforts to reshape the Internet in favor of one company simply cancel each other out.

Even if Yahoo! were to buy up all the other search sites, it couldn't stop Internet service providers, or Microsoft, or PC vendors from channeling users somewhere else before they even get to their home pages. If any of these companies are too heavy-handed in their efforts, users will resist, and will find alternate ways to get what they want. Netscape effectively gained a portal for free when it made its Website the default home page for Navigator, but that linkage only works so long as it maintains its browser market share.

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Out with the new media, in with the old!

The dynamics of advertising-based businesses also explain why several major media companies have recently bought into portal sites. Disney now controls Infoseek, NBC has Snap, and other similar deal seem likely. Internet analysts love to dismiss these old-media brands as dinosaurs, grasping feebly for a share of the future. Yet in an eyeball business the successful print and broadcast media will have a decisive edge for some time. Ninety-eight percent of US homes have televisions, more even than have telephones, let alone PCs or Internet access. A 30-second commercial during ER will reach tens of millions of viewers simultaneously, something no Website can hope to achieve. And NBC has had decades to develop successful techniques for building traffic and generating revenues.

This is not to say that the portal business is simply an extension of traditional media. The Internet is a brave new world for everyone, and some new brands such as Yahoo! have thus far proven more successful than old-media stalwarts like Time-Warner in generating revenues and earnings. There may well be two or three independent portals five years from now, competing against the online presences of the major media conglomerates. There will be many smaller portal-type sites, just as there are scores of cable TV channels. But it is hard to imagine as many relatively evenly-matched portals contending for the top spot as we are now witnessing.

The Problem with Portals

By Esther Dyson

As Kevin ably describes, the problem with portals is that people consider themselves the center of the world, while the aim of the portal is to be the single center for everyone. In fact, there's nothing wrong with either approach. It's fine to want to be a portal and to be one, but no one should think that any one portal can ever "win," or that portals are the best possible business model.

The most important lesson businesspeople need to learn on the Net is that decentralization implies coexistence: A number of models will exist simultaneously, portals will never achieve world domination, and implementation rather than strategy will win. The message is: Choose a model, execute it well, and you will succeed if you are among the best with that strategy (or in a particular market niche).

By contrast, a portal in some sense is trying to implement all strategies. The essential aim of portals is to centralize the decentralized Internet, to get everyone to reach the Net's riches through a single tollgate. But the market works: Unless the portal adds value (and merely collecting people is not a differentiable enough skill), it is unlikely to build a sustainable position. The portal is merely an aggregator, a maker of deals... and anyone willing to lose enough money long enough can make deals.

In the end, power resides with the destinations: the places people actually want to go (and stay), the products they actually want to buy, the
content they want to read or watch and the other people they want to mingle with. In theory, a rich conglomerate could buy up all of these, but I believe the major theme of the Net long-run will be outsourcing rather than conglomeration. The Net market is fluid enough that you can’t buy the most creative people; you can merely rent them at a market-clearing price.

In the world of efficient markets, easy outsourcing and empowered individuals, people will prefer to run their own shows rather than dance to a corporate beat. The world will be dynamic rather than centrally controlled, and companies will succeed by delivering value every day rather than clinging to static ownership/contract positions. Those positions erode quickly. In the profusion and confusion of the Net, selectivity and selection rather than breadth often add value. But to actually create value, you need to build something with personality, with individuality, something that you can’t buy elsewhere in the efficient market. That said, let’s consider some of the better selective strategies to implement well.

One good place to look for strategic wisdom is, surprisingly, the airline business. The airlines learned more than a decade ago (see Release 1.0, 2-89) how to segment a commodity market, one in which in principle any customer could get the cheapest price. Somehow they managed to get their most price-insensitive customers to pay many times more than the impecunious students and travel groups filling up the cheap seats. (The recent market entry Priceline, for example, is an outsourced way for airlines to reach the most price-sensitive market — so price-sensitive, in fact, that most established airlines still won’t sell through the site.)

How can Net suppliers accomplish the same goals by packaging and repackaging content in a variety of forms, some with ads, some with extra attention, some with posting privileges? What kinds of destinations will offer the value that the portals will negotiate for? Who will have the upper hand in this decentralized world? Part of the trick is defining your market properly along the spectrum from portal to market-of-one. Consumers behave in a variety of ways over the course of a day and join various groups, just as a businessperson can also be a leisure traveler.

We believe there are a number of good models to build on, some familiar and some less so:

The personal data center. This is the company that helps a person build his own Website and manage his own airline miles, checking accounts, personal profiles (with discretionary release of data according to vendors' data policies), and the like.

The family hub. This is the company that offers a sort of “Friends and Family” approach to the personal data center. Remember Jerry’s fridge door (see Release 1.0, 11-97)? This is it. The extended family is the center of the action, and an outsourcer manages the intricacies of reconciling calendars, posting messages, working with outside vendors. It’s like the personal data center, but a little “stickier.” (Maybe we had the right idea when we founded the short-lived “Dyson Gazette” at the age of eight!)

The community. This is the alumni club, special-interest group, or other collection of like-minded people. The commercial version has its own news sources, preferred vendors, field trips, professional and geographical subgroups, special-interest mailing lists, career assistance and the like. It may live on membership fees, commissions, advertising or sponsorships. As
noted elsewhere, communities take an impressive variety of forms (see Release 1.0, 6-93 and 7-93). The most important point is that the people in them feel some affiliation with one another.

The content-provider. This service may provide content to or turn into a community. (It's not just individuals' identities that are confused on the Net!) It generally lives off advertising revenues, unless it provides high-value business information to a small subscriber base.

The merchant. This is someone who actually has something to sell, whether books (guess who and who and an increasing number of whos?), groceries, airline tickets, flowers, DVD videos, or perhaps plumbing supplies or industrial chemicals. These markets are attractive to customers who want to choose among a variety of vendors' products, compare prices, and perhaps engage in an auction or two. Certainly such customers appreciate relevant objective content about the things they are buying.

The vendor. This entity has its own products to sell. Some vendors create quite exciting sites — and as we said last month, the trick is to support and add value to what you sell, not to advertise it. Most of them decide to add others' products to their own, with varying degrees of success... It's that portal-mania again.

The point about them all is that they don't try to do everything, but to do a single set of things well. The best will have personality, not breadth. They will target relatively defined groups of people. If you want a broader reach, you need to add different flavors rather than create a single bigger service. The biggest challenges of these models will be determining proper scale and segmentation.

Of course, portals can point to all these sites, but then where's the value of the portal?

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- Vending machines and the Net.
- Home-based local area networks.
- Wireless synchronization.
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- And much more... (If you know of any good examples of the categories listed above, please let us know.)
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John White, Computer Support Technologies, (888) 414-7200; fax, (734) 994-9046; jwhite@rescue.me.net
Konstantin Othmer, Chris Derossi, Full Circle Software, (650) 404-8040; fax, (650) 404-8060, kon@fullcirclesoftware.com; chris@fullcirclesoftware.com; www.fullcirclesoftware.com
Scott Harmon, Mike Maples, Jr., Motive Communications, (512) 339-8335; fax, (512) 339-9040; mmaples@motive.com.
Montgomery Kersten, Jim Goetz, VitalSigns Software, (408) 980-8844; fax, (408) 980-8707; mkersten@vitalsigns.com, jgoetz@vitalsigns.com


Desktop Management Task Force, www.dmtf.org

Except as noted otherwise, all companies' Websites are at the likely address, http://www.domain_name.com.
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Oct 26-28  Internet Service Providers' Forum - Atlanta, GA. By and for ISPs. Call (800) 798-2928; fax, (408) 354-2571; e-mail registration@ispf.com; www.ispf.com.

Oct 26-28  @d:Tech - New York, NY. Internet marketing, advertising and commerce. For information call (800) 535-1812; www.ad-tech.com.

Oct 26-29  #ISP Forum - Cannes, France. The business cases, revenue streams, and challenges of ISPs, telcos, and new carriers. Call Monika Udofah, 44 (171) 915-5055; fax, 44 (171) 915-5056; www.totaltele.com/iir-conferences/.


Nov 2-3  NDA 98 - La Jolla, CA. The CEO summit on technology's future. Sponsored by the Red Herring. Invitation only; e-mail events@nda98.com; www.nda98.com for more info.


Nov 3  Critical Infrastructure: The Path Ahead - Crystal City, VA. Organized by the Cross-Industry Working Team. To register call Pam Memmott, (703) 620-8990; e-mail pmemmott@cnri.reston.va.us; www.xiwt.org.

Nov 4-6  HR Technology Conference and Exposition - Philadelphia, PA. Explore systems for managing human intellectual capital. Call (800) 727-1227; fax, (703) 739-0489; lrp-conf@lrp.com; www.lrp.com/Conferences/hrtfbro.htm.

Nov 8-10  *Wisdom to Action: Ideas and Practices that Transform Organizations - Los Angeles, CA. Presented by the Peter Drucker Foundation. For information call Andrew Feniman (212) 224-1174; info@pfdf.org; www.pfdf.org.

Nov 9-10  The Knowledge Advantage: Building the Knowledge-Based Business - Cambridge, MA. Co-hosted by Ernst & Young and Xerox. Speakers include Lester Thurow, E.O. Wilson and Michael Hawley. Call Kathy Peterson, (617) 761,4015; fax, (617) 761-4040; e-mail kathy.peterson@ey.com; www.businessinnovation.ey.com/whatsnew/KA5/ka.html.
Nov 11  *Forbes Executive Women’s Summit - Washington, DC. Call (212) 499-3521; fax, (212) 499-3324; executivewomen@forbes.com; www.forbes.com/execwomen.

Nov 12-14  Participatory Design Conference - Seattle, WA. Making technology and social institutions more responsive to human needs. For information e-mail pdc98@cpsr.org; www.cpsr.org/conferences/pdc98.

Nov 15-17  #IBand: The Internet Bandwidth Management Summit - San Jose, CA. Technical conference on new Internet bandwidth technologies. E-mail Martin Hall, Stardust Forums, martinh@stardust.com; more information available at www.stardust.com/iband/conf.htm.

Nov 16-20  *COMDEX/Fall ‘98 - Las Vegas, NV. Over 2,000 exhibitors and over 200,000 attendees from over 100 countries. Will anyone notice if you’re not there? Registration information available at www.comdex.com.

Nov 18-20  Virtual Systems and Multimedia ‘98 - Gifu, Japan. Virtual reality meets engineering and art. Call 81 (58) 293-3155; e-mail vsmm-sec@vsl.gifu-u.ac.jp; www.vsmm.vsl.gifu-u.ac.jp/vsmm98.

Nov 19-21  Annual Conference on Technology & Society: Washington, D.C. vs. Silicon Valley - San Jose, CA. Cosponsored by the Cato Institute and Forbes ASAP. Contact Bethany Blue, (202) 789-5203; fax (202) 371-0841, bblue@cato.org; http://www.cato.org/events/technol2.html.

Nov 26-28  Doors of Perception 5: Play - Amsterdam. The Netherlands Design Institute’s conference on multimedia, the Internet, design and culture. To register call 31 (20) 420-1711; fax, 31 (20) 626-5845; registration@doorsofperception.com; www.doorsofperception.com.


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February 7-10  Demo 99 - Indian Wells, CA. Chris Shipley picks the hot startups. Call Alexa Hanes (650) 286-2730; e-mail alexa@demo.com; www.demo.com.


March 21-24  **PC Forum - Scottsdale, Arizona. Sponsored by EDventure Holdings. You read the newsletter; now meet the players. Call Daphne Kis, (212) 924-8800; fax, (212) 924-0240; daphne@edventure.com; www.edventure.com.

* Events Esther plans to attend.
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Please let us know about other events we should include. - Mari Katsunuma
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