Mashups were initially developed by the music industry. Disk jockeys—at first in England and later in the United States and other countries—developed a new style of remix, known as mashups, in which two songs are melded together. Often, the resulting track features the melody of one song and the vocals of another. The idea is to take different sources and produce a new work that is “greater” than the sum of its parts. Generally, the more the sources differ from one another, the more fun they are to listen to, and the more humorous the process of discovering the source soundtracks.

On the Web, the term mashups is taking on a whole new meaning. Part of a movement called Web 2.0, and in the spirit of musical mashups, Web mashups combine the capabilities of two or more online applications to create a hybrid that provides more customer value than the original sources alone. So far, the area of greatest innovation involves the mashup of mapping and satellite image software with local content. For instance, Paul Rademacher, a Silicon Valley programmer, created a Web site called Housingmaps.com that makes it possible to display real estate listings in local areas from Craigslist.com overlaid on Google Maps. The site has attracted more than 500,000 visitors and receives about 10,000 visits a day. Rademacher got the idea while hunting for an apartment. He printed out a map showing the location for each apartment he wanted to visit. Then he realized that it would be nice to have all this information on a single map, and even nicer if he could bring up an image of the apartment building. What resulted is a single map with pushpins showing the location of each apartment.
While building communication links among software applications using Web-based tools is not new (this is called Web services), online mapping applications are driving a whole new set of recombinant applications. Underlying the movement toward Web services is a new language for describing records and documents called XML—eXtensible Markup Language—and a new set of computer communication standards that will make it possible for computer programs to talk with one another without special programming.

For Calin Uioreanu, creator of a site called Simplest-shop.com, Web services means that he can offer his customers the same functionality as Amazon—because it is Amazon’s system he is using. Uioreanu rents a server that communicates with Amazon servers throughout the day and night to obtain continual updates on prices, availability, products, and shipping information. On some items, customers have a choice of buying from Amazon or from Simplest-Shop.com. Uioreanu makes a 15% referral fee on Amazon sales, and a full mark-up on products he sells. Uioreanu won’t discuss profits or revenue, but claims he has about 2 million monthly hits.

Other map and satellite image-based mashups are in the works, encouraged by Google and Yahoo, both of which in 2005 released the APIs (application programming interfaces) that allow other applications to pull in information from Google’s and Yahoo’s map and satellite images. Microsoft will release a competing map and satellite service called Virtual Earth, which programmers will also be able to use. What’s different about Google’s program, however, is that it has simplified the process of using mapping data down to the level of inserting four lines of Java script into a program. This simplification has made the process of integrating maps into other applications extremely easy for Web site designers. With publicly available APIs, programmers are to get the tools needed to pull data from many different Web sites and to combine it with other information to make an entirely new Web service. The result is that instead of the Web being merely a collection of pages, it is becoming a collection of capabilities, a platform that enables programmers to create new services quickly and inexpensively.

Some other recent mashups include Cheapgas.com, which provides maps showing where gas can be purchased for less; Chicagocrime.org, which uses Google Maps to display where crimes occur in Chicago; Bookburro.com, which allows users to compare book prices based on Amazon’s API and other screen-scrapping tools that scour the Web for other book sites’ prices; and Indeed.com, which pulls job listings from many different Web job sites and organizes them by city. A potential application might be traffic avoidance: a map showing the output of Webcams placed at major intersections in a city. Even the browser developers are getting into the action. A new add-on to the Firefox browser called Greasemonkey allows users to install scripts on their computer that customize the way a Web site works on a specific computer.

So where’s the e-commerce in all this tech innovation? Mashups are likely to cause an eruption of e-commerce tied to local destinations—an area today where the Web is somewhat weak. The advertising industry is looking for ways to contact consumers when they are seeking local addresses: contextual advertising tied to specific locations. Suppose that when a user seeks a map of a community or street location,
advertisements for nearby restaurants, convenience stores, pharmacies and other local service providers appear. Potentially there are billions of dollars of e-commerce revenues waiting to be developed by local advertising that occurs just at the right moment for consumers.

While mashups are one more way that Internet developers and users are taking control of their Internet experience, they raise some interesting copyright and commercial issues. For instance, who "owns" the resulting applications? Mashups usually take only the data from Web sites and not the advertisements. Potentially, mashups could drain ad revenues from contributing sites. Yahoo has denied one mashup permission to use its traffic data, and Amazon has requested one mashup site to change how it linked to rival sites. Amazon's Web services evangelist, Jeffrey S. Barr, says, "All this definitely keeps us on our toes."

IN SIGHT ON BUSINESS

PEER-TO-PEER COMPUTING GOES TO WORK

In June 2005, the Supreme Court ruled that peer-to-peer (P2P) file-sharing networks such as Grokster, StreamCast, and Kazaa can be held liable for copyright infringement. However, the Court did not rule P2P networks themselves illegal, and the ruling does not impair the future development of this technology for legitimate purposes. Whether or not the Court's ruling has an impact on illegal music file sharing, there are many legitimate uses of this technology which are bound to expand in the next five years.

A P2P network uses the computing power and bandwidth of participants rather than the power of central file and application servers in a typical client/server network. In client/server computing, client computers—usually powerful personal computers—are linked together in a local area network that is controlled by even larger personal computer called a server. The server provides a network operating system, and serves files and data to applications running on the desktop. The network uses a network communication protocol (usually TCP/IP) that allows the client computers to send messages to the server, one another, and to other computers on various networks throughout the Internet.

In peer-to-peer computing, two things happen. First, client computers can establish file sharing and sharing workspaces with one another without the intervention of a central server. Second, idle computers on the network can be used to share hard drives, processing power and bandwidth for collective complex tasks. Studies by Intel find that only 13% of the processing power of the average personal computer in the United States is utilized at any given time. Of course, when computers are idle at night, they are using 0% of their capacity.

Currently, according to one British research firm, given the popularity of music file sharing, about 50% of all Internet traffic today is the result of file-sharing networks. Another firm estimates 10% of the P2P traffic is legal. Are there any legal uses of P2P computing? The answer is yes. P2P computing can be an answer to the problems of central server congestion, poor collaboration tools, inefficient use of high-powered client computers, and the high cost of broadband communications. Several companies as diverse as Intel, GlaxoSmithKline, Raytheon, and the accounting firm Ernst & Young are discovering that P2P computing can help them do business faster and better.

The most widely known provider of P2P software for business is Groove Networks, founded in 1997 by Ray Ozzie, the inventor of Lotus Notes. Ozzie invented Groove's P2P platform (called Groove Workspace) as a solution to what he saw as the rising glut of e-mail on people's desktop computers; the problem arose as workers tried to use an older coordination tool to cope with modern digital organizations. Billions of business e-mails are sent each day, in part because people have no other tools to coordinate small teams. Ozzie believes central corporate servers are primarily servicing e-mail accounts! Groove Workspace works over the Internet and permits two or more users to set up a virtual workspace on their own desktop computers without central server knowledge or intervention. In 2005, Microsoft purchased Groove Networks as a complement to its other office collaboration tools, most of which require significant changes in

(continued)
a company's infrastructure to operate. Groove Workspace does not require additional servers or bandwidth but instead relies on the idle processing power of all computers in the network.

Intel uses Groove Workspace to coordinate teams of engineers in the United States and Israel. GlaxoSmithKline, a pharmaceutical firm, has provided Groove Workspace to 10% of its workforce to promote close interaction between its research teams. Ernst & Young is using a different P2P provider that enables accountants working for the same client to coordinate their work efforts despite being separated by many time zones. Groove Workspace creates for these companies a collaboration space where users and their selected contacts can interact both in real-time and "asynchronously" while being able to effectively share documents, files, ideas, Web pages, and more.

One major user of P2P networks is Skype, a free Internet telephone service. Skype uses the collective power of network participants to route calls and provide storage services. Red Swoosh and Kontiki are two commercial P2P networks that offer legal file-sharing, storage, and transfer services that essentially lay-off the bandwidth costs of such an operation onto users of the network. P2P networks can also be useful for hiding the identity of file downloaders. The Free Network Project (Freenet.sourceforge.net) offers an anonymizing P2P service called FreeNet designed to foil even the best efforts of governments around the world to censor the Internet and punish people who download files with prohibited content.

While promoters of illegal file sharing claimed that the Supreme Court's decision would prevent P2P technology from flourishing, this is most likely not the case. P2P networking promises to greatly enhance our ability to collaborate and share information, while also increasing the efficiency of existing bandwidth.


**Simple Mail Transfer Protocol (SMTP)**
the Internet protocol used to send mail to a server

**Post Office Protocol 3 (POP3)**
a protocol used by the client to retrieve mail from an Internet server

**Internet Message Access Protocol (IMAP)**
a more current e-mail protocol that allows users to search, organize, and filter their mail prior to downloading it from the server

E-mail is one of the oldest, most important, and frequently used Internet services. Like HTTP, the various Internet protocols used to handle e-mail all run in the Application Layer of TCP/IP. **Simple Mail Transfer Protocol (SMTP)** is the Internet protocol used to send e-mail to a server. SMTP is a relatively simple, text-based protocol that was developed in the early 1980s. SMTP handles only the sending of e-mail. To retrieve e-mail from a server, the client computer uses either **Post Office Protocol 3 (POP3)** or **Internet Message Access Protocol (IMAP)**.

You can set POP3 to retrieve e-mail messages from the server and then delete the messages on the server, or retain them on the server. IMAP is a more current e-mail protocol supported by all browsers and most servers and ISPs. IMAP allows users to search, organize, and filter their mail prior to downloading it from the server. For more information about SMTP, POP3 and IMAP, you can consult RFCs 2821 (SMTP), 1939 (POP3) and 3501 (IMAP) (Internet Society, 2001; 1996; 2003). You also can see how your browser handles SMTP, and POP or IMAP by looking in your browser's Preferences or Tools section, where the e-mail settings are defined.
GOVERNMENT REGULATION OF THE INTERNET

Who controls the Internet? Some people believe that no one controls the Internet and that "information wants to be free." But there are a lot of institutions and interest groups that do not agree. In fact, just about all governments want some kind of control over how the Web operates within their countries. For instance, the French government wants some control, at least over what its citizens can access on the Web. In France, the sale of Nazi paraphernalia is illegal. So when some Nazi items appeared on a Yahoo! France auction site, the Union of Jewish Students in France (UEJF) and the League Against Racism and Anti-Semitism (LICRA) sued Yahoo. In November 2000, French judge Jean-Jacques Gomez ruled that Yahoo must block French users from access to the items on the site.

But should the French government have the authority to determine what all other Internet users can and can’t see and buy? Yahoo did not agree, and contested the ruling both on the grounds that it was impossible to block access and that the French court did not have jurisdiction. While the company did remove all Nazi items in January 2001 from its French site (Yahoo.fr), it kept them on its American site, Yahoo.com. The U.S. site runs on servers in California but is accessible from around the world. The French courts have fined Yahoo more than $13,000 per day, for a total bill of $5 million so far.

In 2001, the Federal District Court of Northern California found that the French order was unenforceable on First Amendment grounds of freedom of expression. However, in 2004, the U.S. 9th Circuit Court of Appeals ruled that the district court acted prematurely because UEJF and LICRA had not sought enforcement of the French judgment. In February 2005, however, the Court of Appeals agreed to rehear the arguments in the case and once and for all decide what, if any, liability Yahoo incurs by posting material on its U.S. site which is legal in the United States, but illegal abroad. As of December 2005, the court had not yet issued a decision.

The attitude of the French government with respect to what its citizens can access on the Web is extremely liberal, however, when compared to the attitude of the Chinese government. With 94 million users, China is the world's second largest online population and promises to be a very lucrative market for American Internet companies. In June 2005, the Chinese government ordered all Chinese Web sites to register with the Ministry of Information (MI), including about 700,000 private, non-commercial bloggers. At least 54 people have been jailed for failing to register. The Chinese government has enhanced its censoring filters on the Internet according to the Open Society Institute, which recently completed a study of methods used by the Chinese government to censor the Web. Much of the censorship occurs at the backbone level, but individual Internet service providers and cybercafe operators also must participate in the censorship. The most effective kind of censoring is keyword censoring. Keyword censorship is very fine-grained: words such as freedom, democracy, Taiwan independence, and demonstration are forbidden. Web sites using these words are blank—not just the offending Web pages, but the entire site! The government employs Web crawlers to search for forbidden words, and also to identify all URLs available and tag those that are not registered. Censorship, in other words, can be automated using the very same technology that brings the Internet.

(continued)
Censorship in China is aided and abetted by large American Internet companies. Google, for instance, does not return search results from Web sites forbidden by the Chinese government. Microsoft’s new MSN China Internet venture, MSN Spaces, censors words requested by the Chinese government on its free online blogging service. Brooke Richardson, MSN lead product manager, says “MSN abides by the laws, regulations, and norms of each country in which it operates.” Yahoo!, eBay, and IAC/InterActive Corp also agree to censor their content on Chinese Web sites.

The growing restrictions on the Internet in other countries are making many people concerned. In the United States, there are very few restrictions on Internet content although there are many groups who would like to ban entire topics or Web sites (such as those related to sex, drugs, tax-free cigarettes, Internet pharmacies, and gambling). Just the fact that Web sites are taking action to appease various governments and groups within selected societies has raised strong objections from Internet bloggers in the United States and Western Europe.

There is the distinct possibility that the single World Wide Web will become a collection of loosely connected country Web sites, each with its own form of censorship. The irony here is that the Internet was developed as a means of fostering global communication. Yet it is now very clear that many countries will put stricter limits on freedom of expression than is true in the United States.


- **Language development limitations.** HTML, the language of Web pages, is fine for text and simple graphics, but poor at defining and communicating “rich documents,” such as databases, business documents, or graphics. The tags used to define an HTML page are fixed and generic.
- **Wired Internet.** The Internet is based on cables—fiber-optic and coaxial copper cables. Copper cables use a centuries-old technology, and fiber-optic cable is expensive to place underground. The wired nature of the Internet restricts mobility of users.

Now imagine an Internet at least 100 times as powerful as today's Internet, one that is not subjected to the limitations of bandwidth, protocols, architecture, physical connections, and language detailed previously. Welcome to the world of Internet II, and the next generation of e-commerce services and products!

**THE INTERNET2® PROJECT**

Internet2® is a consortium of more than 200 universities, government agencies, and private businesses that are collaborating to find ways to make the Internet more efficient. Their work together is a continuation of the kind of cooperation among government, private, and educational organizations that created the original Internet.

"The Internet2® project is just one aspect of the larger second generation Internet we call Internet II."
In the early 1960s, Joseph Weizenbaum, a professor of computer science at the Massachusetts Institute of Technology, created a software program known as Eliza. Eliza was one of the first software programs to allow a computer to "converse" with a human in natural language. Weizenbaum programmed Eliza so that it was able to recognize certain key words in a statement or question. Eliza would then respond based on a set of preprogrammed rules. Sometimes Eliza was able to carry on a passable conversation—for a short period of time. More often than not, though, the conversation quickly degenerated into something no person would mistake for a human interaction.

From this rudimentary beginning sprang chatterbots: intelligent agents that can converse with a user over the Web. Since the early days of Eliza, tremendous advances have been made in artificial intelligence and natural language processing. Chatterbots today have become surprisingly articulate and responsive, and in many cases are represented graphically as animated characters that respond with facial expressions and gestures that are linked to a huge database of words. For instance, bots created by Artificial Life, one of the leaders in intelligent agent technologies, can smile, laugh, wink, blink, and scowl, all in context-specific situations. The most sophisticated bots also learn as they interact and remember the actions users took and the preferences they expressed. Now, chatterbots developed in the computer science community are being put to work. In the workplace they are more commonly called "virtual representatives" and they are being viewed as one possible answer to the customer service difficulties plaguing many e-commerce sites, problems that will cost e-tailers billions of dollars in 2006. For instance, one study found that the response times of Fortune 100 companies to simple e-mail queries left much to be desired, with only 13% responding within 24 hours; 37% of Fortune 500 companies did not respond to general inquiries submitted to their Web sites at all. Another study found that over 65% of those who start to fill up a shopping cart abandon it before going through the check-out process, for a variety of reasons, including poor Web site design, a confusing check-out process, or questions that were unanswered.

One of the leading providers of online virtual customer relations solutions is Verity, a software company based in California. Verity markets a product called Verity Response (formerly a product of NativeMinds Inc.) that uses vReps that act like tour guides to Web sites for visitors and respond to customer questions. vReps can perform a number of functions online that real-world sales assistants might normally handle—greeting you when you visit a Web site, engaging you in chat, remembering your preferences, and answering questions about products, delivery, and prices. They can serve as a virtual tour guide to the Web site, whisking you to the page you need without drill-down menus, click-throughs, or site maps. In addition, the cost of a vRep is much less than that of a representative working via the telephone—less than $1 per incident for a vRep compared to $20-$35 per incident for a telephone representative.

vReps are being used by Coca-Cola to answer questions about the company (ask Hank about employment at Coca-Cola). Ragu has a vRep named Mama who shares recipes, ingredients,
and advice on cooking. And Ford has created a virtual agent called Kate that supports dealerships and consumers. In the largest application to date, the Defense Logistics Information Service created Phyllis to answer questions about its 6.5 million items ordered by 18 wholesale sites, 578 retail outlets, and 2.25 million Defense Department employees.

Conversive Inc. is another firm that creates online chatterbot software. Conversive, formally known as Virtual Personalities, was formed in 1997 by Dr. Michele (“Fuzzy”) Maudlin (founder of Lycos) and Peter Plantec, a clinical psychologist. Maudlin had previously created a prototype chatterbot named Julia, which competed in the famous Loebner Prize Turing test competition (in which judges are challenged to distinguish human conversation from that generated by a computer). Maudlin teamed with Plantec to create a virtual human interface that would incorporate real-time animation as well as speech and natural language processing. The Verbally Enhanced Software Robot, or Verbot, was released in 2000. Since then, Verbots and their friends, Conversive Agents, have been deployed in a number of different environments. For instance, in May 2005, Conversive was hired by Qantas Airways USA to create an online customer help representative called “Vic”. Using an Australian-accented text-to-speech voice, Conversive created an entire user experience based upon their AnswerAgent solution, featuring a natural language processing technology. With Conversive’s technology, “Vic” was able to greet visitors, answer their questions and encourage them to enter a sweepstakes. Vic also offered Web site visitors the chance to participate in a marketing survey, to join the eTravel Club, and to leave feedback. You can see Vic perform first hand at www.qantasusa.com.

In August 2005, the 14th-annual $100,000 Loebner Prize competition took place. The result: The humans won again, but several bronze medals for distinguished effort were given away. Although chatterbots may be getting closer to mimicking human conversation, they still have a way to go before they become truly believable customer service representatives.


provides a container for various discussions (or “threads”) started (or “posted”) by members of the forum, and depending on the permissions granted to forum members by the forum’s administrator, enables a person to start a thread and reply to other people’s threads. Most forum software allows more than one forum to be created. The forum administrator typically can edit, delete, move, or otherwise modify any thread on the forum. Unlike an electronic mailing list (such as a listServ), which automatically sends new messages to a subscriber, an online forum typically requires that the member visit the forum to check for new posts. Newer forum software often offers an “e-mail notification” feature that notifies users that a new post of interest to them has been made.

**Online chat** differs from an online forum in that, like IM, chat enables users to communicate via computer in real time, that is, simultaneously. However, unlike IM, which works only between two people, chat can occur among several users. Typically,