Network effects from user contributions are the key to market dominance in the Web 2.0 era.

—Tim O’Reilly

*Link by link, click by click, search is building possibly the most lasting, ponderous, and significant cultural artifact in the history of humankind: the Database of Intentions.*

—John Battelle, The Search

*Web 2.0 is a massive social experiment...this is an opportunity to build a new kind of international understanding...citizen to citizen, person to person.*

—Lev Grossman, TIME

*One of the powerful things about networking technology like the Internet or the Web or the Semantic Web...is that the things we’ve just done with them far surpass the imagination of the people who invented them.*

—Tim Berners-Lee, interviewed by Peter Moon, IDG Now
OBJECTIVES

In this chapter you will learn:

- The defining characteristics of Web 2.0.
- Why search is fundamental to Web 2.0.
- How Web 2.0 empowers the individual.
- The importance of collective intelligence and network effects.
- The significance and growth of blogging.
- Social networking, social media and social bookmarking.
- How tagging leads to folksonomies.
- How web services enable new applications to be quickly and easily "mashed up" from existing applications.
- Web 2.0 technologies.
- Web 2.0 Internet business and monetization models.
- The emerging Semantic Web (the “web of meaning”).
3.1 Introduction

- Mosaic browser introduced in 1993, web exploded in popularity.
- Continued to experience tremendous growth throughout the 1990s—“dot-com bubble”
- Bubble burst in 2001
- In 2003, noticeable shift in how people and businesses were using the web and developing web-based applications
  - Web 1.0 = companies use the web as a platform to create collaborative, community-based sites (e.g., social networking sites, blogs, wikis, etc.)
- Growth of Web 2.0 key factors
  - Hardware keeps getting cheaper and faster, with memory capacities and speeds increasing at a rapid rate
  - Broadband Internet use has exploded
  - Availability of abundant open source software has resulted in cheaper (and often free) customizable software options
    - Makes it easier to start new Web 2.0 companies and greatly decreases the cost of failure
  - Unlike Web 1.0, there are many easy-to-employ models available to monetize Web 2.0 business

3.2 What Is Web 2.0?

- Web 1.0 focused on a relatively small number of companies and advertisers producing content = “brochure web”
- Web 2.0 involves the user. Web 1.0 is as a lecture and Web 2.0 is a conversation.
- Many Web 2.0 companies are built almost entirely on user-generated content and harnessing collective intelligence.
- Google, MySpace, Flickr, YouTube and Wikipedia, users create the content, while the sites provide the platforms.
- The user is not only contributing content and developing open source software, but directing how media is delivered, and deciding which news and information outlets you trust.
  - Social bookmarking sites such as del.icio.us and ma.gnolia
  - Social media sites such as Digg or Reddit
  - Social networking, MySpace, Facebook, Bebo, LinkedIn, and Second Life
  - Web 2.0 businesses leverage the Long Tail
    - Long Tail = economic model in which the market for non-hits could be significant and sometimes even greater than the market for big hits
3.2 What Is Web 2.0? (Cont.)

- Web development technologies = Ajax, XHTML, Cascading Style Sheets, JavaScript, the Document Object Model, XML and the XMLHttpRequest object and popular Ajax toolkits—Dojo and Script.aculo.us.
- Rich Internet Applications (RIAs)—web applications that offer the responsiveness and rich GUI features of desktop applications.
- Key tools for building RIAs = Adobe’s Flex, Microsoft’s Silverlight, ASP.NET Ajax and Sun’s JavaServer Faces.
- Other Web development tools and technologies = Adobe’s Dreamweaver, JSON, the web servers IIS and Apache, MySQL, PHP and ASP.NET.
- Web services allow you to incorporate functionality from existing applications into your own applications quickly and easily.
  - Amazon Web Services
  - Google Maps web services
  - eBay web services

---

**Fig. 3.1 | Web 2.0 and related conferences.**

<table>
<thead>
<tr>
<th>Web 2.0 and related conferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>AdTech</td>
</tr>
<tr>
<td>Affiliate Marketing Summit</td>
</tr>
<tr>
<td>AjaxWorld Expo</td>
</tr>
<tr>
<td>All Things Digital</td>
</tr>
<tr>
<td>Always On</td>
</tr>
<tr>
<td>Blog Business Summit</td>
</tr>
<tr>
<td>eBay Live</td>
</tr>
<tr>
<td>Emerging Technology</td>
</tr>
<tr>
<td>Emerging Telephony</td>
</tr>
<tr>
<td>Future of Online Advertising</td>
</tr>
<tr>
<td>JavaOne</td>
</tr>
<tr>
<td>Microsoft MIX</td>
</tr>
<tr>
<td>Microsoft Tech Ed</td>
</tr>
<tr>
<td>MySQL Conference and Expo</td>
</tr>
<tr>
<td>Open Source (OSCON)</td>
</tr>
<tr>
<td>RailsConf</td>
</tr>
<tr>
<td>Search Engine Strategies</td>
</tr>
<tr>
<td>Tools of Change for Publishing</td>
</tr>
<tr>
<td>Ubuntu Live</td>
</tr>
<tr>
<td>Web 2.0 Expo</td>
</tr>
<tr>
<td>Web 2.0 Summit</td>
</tr>
<tr>
<td>Where 2.0</td>
</tr>
</tbody>
</table>
3.3 Search

“Content is King”

Search engines are the primary tools people use to find information on the web.

Traffic to the major search engines is growing rapidly – Americans conducted 8 billion search queries in June 2007, up 26% from the previous year.

Attention economy = constant flow of information in today’s world causes attention to continually be diverted.

Search engines have gained popularity by helping users quickly find and filter the information.

Google Search

Google is the leading search and online advertising company.

- founded by Larry Page and Sergey Brin
- Google’s success in search is largely based on its PageRank algorithm and its unique infrastructure of servers
- Google offers specialty search engines for images, news, videos, blogs and more.
- Google web services build Google Maps and other Google services into your applications
- AdWords, Google’s pay-per-click (PPC) contextual advertising program
- AdSense is Google’s advertising program for publishers

Yahoo!

- Yahoo! started in 1994 by Jerry Yang and David Filo as a web directory rather than a search engine
- Yahoo! also expanded into other areas, becoming a popular provider of e-mail, user groups and more
- Yahoo! acquired Overture (now Yahoo! Search Marketing)

MSN

- MSN search was created in 1998, a year after Google was launched
- MSN’s Live Search includes a new search engine, index and advertising market through Microsoft adCenter

Ask

- Ask (formerly known as AskJeeves.com)

Vertical Search

- Vertical search engines are specialists (focusing on specific topics) in comparison to generalists (e.g., Google and Yahoo)
- Goal of providing you with a smaller number of more relevant results
- Popular vertical search engines include travel sites (such as Kayak or Expedia), real-estate sites (such as Zillow or Trulia), job search sites (such as Indeed or Monster) and shopping search engines (such as Shopzilla and MySimon)

Location-Based Search

- Location-based search uses geographic information about the searcher to provide more relevant search results
3.3 Search (Cont.)

- **Creating Customized Search Engines**
  - Rollyo—a build-your-own customized search engine website—allows you to explore, create and personalize search engines (“searchrolls”) created by others

- **Search Engine Optimization (SEO)**
  - Process of designing and tuning your website to maximize your findability and improve your rankings in organic (non-paid) search engine results
  - Maximize traffic

- **Link Building**
  - Process of increasing search engine rankings and traffic by generating inbound links to a particular website
  - Search engine result pages (SERPs)
  - Reciprocal linking
  - Link building
  - Natural linking

- **Search Engine Marketing (SEM)**
  - Method of promoting your website to increase traffic and search results by raising the site’s visibility on search engine results pages

- **Search Engine Watch and Search Engine Land**
  - Search Engine Watch is a search engine marketing resource site

- **Search Engine Strategies Conferences**
  - Search Engine Strategies is a global conference series focused on search engine advertising (including current SEO and SEM issues).

- **Discovery**
  - Refers to finding new content you would not have otherwise sought out.

3.4 Content Networks

- Content networks = websites or collections of websites that provide information in various forms
  - articles, wikis, blogs, etc
  - filters the vast amounts of information on the Internet
About.com—Acquired by the New York Times, About is a collection of information on a wide variety of topics. About was founded in 1996 and provides over 500 guides written by topic experts. The guides include new content as well as links to other websites.

b5media—A blog network with over 200 blogs related to travel, entertainment, technology and more.

Corante—A blog network authored by leading commentators in technology, business, law, science, and culture.

Deitel—Deitel Resource Centers (currently about 80 sites and growing rapidly) include links to, and descriptions of, key tutorials, demos, free software tools, articles, e-books, whitepapers, videos, podcasts, blogs, RSS feeds and more. Resource Centers are grouped into major topic areas, including Web 2.0, Internet business, programming languages, software development and open source. See Fig. 2 in the Preface for a complete list of Resource Centers.

eHow—eHow claims over 35,000 articles explaining “how to do just about everything.” The articles are written by members, and the site also features a section of “how to” videos.

Gawker Media—A blog network that includes 14 blogs, such as Gizmodo, Gawker, Valleywag and Lifehacker. The blogs cover a range of topics including technology, gossip and more.

HowStuffWorks—HowStuffWorks offers articles explaining “how the world actually works.” Articles are written by freelance writers, and experts from Consumer Guide and Mobil Travel Guide.

LifeTips—LifeTips provides short articles on both work and general life issues from hundreds of writers. Tips are voted on by readers (who can also mark their favorites for easy access).

9rules—A blog network with a wide range of blog topics. The site also includes social networking aspects.

Suite101—Suite101 offers thousands of articles on a variety of topics written by freelance writers. In addition to the articles, the site also provides discussion areas and free courses.

Weblogs, Inc.—A blog network of 90 blogs, including Engadget, Autoblog and Joystiq. Users can apply to write for one of the blogs (and get paid) or suggest topics for potential new blogs.
3.5 User-Generated Content

- Key to success for many of today's leading Web 2.0 companies = user-generated content
  - articles
  - home videos
  - Photos
  - implicitly generated
- Collective Intelligence
  Collaboration can result in smart ideas
- Wikis
  - Allow users to edit existing content and add new information
  - Wikipedia
  - WikiMedia
  - MediaWiki open source software
  - SocialText
  - Using wikis for project collaboration reduces e-mails and phone calls between employees, while allowing the ability to closely track a project's changes
- Collaborative Filtering
  - Users might submit false or faulty information
    - Wikipedia: people deliberately adding false information to entries
    - Web 2.0 companies rely on the community to help police their sites
    - Collaborative filtering lets users promote valuable material and flag offensive or inappropriate material

3.5 User-Generated Content (Cont.)

- Craigslist
  - Popular classified ads website that has radically changed the classified advertising market
  - Ad postings on Craigslist are free
  - Newspapers have experienced a decline in classified ad sales
- Wisdom of Crowds
  - Large diverse groups of people can be smarter than a small group of specialists
3.6 Blogging

**History of Blogging**
- Blogs are websites consisting of entries listed in reverse chronological order
- Grown exponentially in recent years because of easy-to-use blogging software and increasingly economical Internet access
- Blogs can also now incorporate media, such as music or videos
  - Xanga or LiveJournal

**Blog Components**
- Reader comments
- Trackbacks
- Blogroll

**Blogging and Journalism**
- Encouraged citizen journalism
- Significant news resource
- Many bloggers are recognized as members of the media

---

3.6 Blogging (Cont.)

**Growth of Blogging**
- Doubling about twice a year
- Large number of abandoned blogs
- Companies are reaching out to the blogosphere, or blogging
- Increased use of mobile devices has also lead to moblogging, or mobile blogging

**Blogging and RSS Feeds**
- Let readers know when new content is posted
  - Feedburner

**Blogging Software**
- WordPress
- TypePad
- Blogger
- Movable Type
- Textpattern

**Blog Networks**
- Corante, Weblogs, Inc., 9rules, b5media and Gawker Media

**Blog Search Engines**
- Technorati
- Google Blog Search
- Feedster
- IceRocket
- Blogdigger
3.7 Social Networking

- Social networking sites
  - Allow users to keep track of their existing interpersonal relationships and form new ones
- Network Effects
  - Increased value of a network as its number of users grows
  - Example = eBay—the more buyers and sellers that use the site, the more valuable the site becomes to its users
  - Set the user preferences to default to share content so users will automatically contribute to the value of the network
  - Network effects make it difficult to break into markets already claimed by successful companies
- Friendster
  - Early leader in social networking
- MySpace
  - Most popular social networking site
  - Pages are personal and customizable
  - News Corp, which acquired MySpace in 2005 for $580 million

3.7 Social Networking (Cont.)

- Facebook
  - Hitwise named Facebook the “preferred network among college students
  - Facebook held an 85% market share of four-year U.S. universities and had over 31 million users
- LinkedIn
  - Business-oriented social networking site
    - stay in touch with professional contacts
    - network with new contacts
    - check references
    - find a job or a potential employee
    - privacy concerns are more
- Xing
  - Xing is a professional networking site based out of Germany and popular in Europe
- Second Life
  - Second Life, developed by Linden Labs, is a 3D virtual world with millions of inhabitants
  - Users create avatars, digital representations of themselves that they can use to meet other users with similar interests, conduct business, participate in group activities, take classes and more
  - Users can create objects and add scripts (to animate the objects) in the virtual world
  - Users to maintain rights to whatever they create, a dynamic marketplace has emerged that does millions of dollars in transactions
3.7 Social Networking (Cont.)

- **Gaia Online**
  - Popular teen virtual world
  - Play games, make friends and express their creativity

- **Mobile Social Networking**
  - Google’s Dodgeball.com provides users with mobile access to a network of friends in many cities
  - Uses GPS

- **Other sites**
  - Twitter provide similar services, accessible by text message, IM or a web client
  - Microblogging service

3.8 Social Media

- Social media = any media shared online (e.g., videos, music, photos, news, etc

- **YouTube**
  - Launched in late 2005 and is the leading Internet video site
  - Entire site is based on user-generated content
  - Can browse videos by category, tag, or by following “related video” links
  - Users can subscribe to other users’ content, share videos with friends by e-mail, or embed videos directly into their blogs or other websites
  - YouTube was acquired by Google for $1.65 billion.

- **Internet TV**
  - Many mass-media companies now offer full-length episodes of popular television shows
  - Limited by copyright issues
  - Internet TV allows advertisers to target their markets more precisely than with broadcast television

- **Digg**
  - Features news, videos and podcasts, all posted and rated by users
  - Gained popularity by allowing users to “digg” or “bury” posts and user comments
  - Digg uses collaborative filtering

- **Last.fm**
  - Last.fm is an Internet radio website that uses Web 2.0 concepts to make music recommendations and build communities
3.8 Social Media (Cont.)

- **Digital Rights Management (DRM)**
  - Add software to media files to prevent them from being misused
  - Protect digital products from illegal distribution

- **Podcasting**
  - Popularized by Apple’s iPod portable media player.
  - Podcast is a digital audio file (e.g., an .mp3) that often takes on the characteristics of a radio talk show
  - Introduced a more democratic form of radio broadcasting

3.9 Tagging

- **History of Tagging**
  - Tagging, or labeling content, is part of the collaborative nature of Web 2.0
  - Tag is any user-generated word or phrase that helps organize web content and label it in a more human way

- **Tag Clouds**
  - Visual displays of tags weighted by popularity.

- **Folksonomies**
  - Classifications based on tags
  - Formed on sites such as Flickr, Technorati and del.icio.us

- **Flickr**
  - Flickr—a popular photo-sharing site—was launched in February 2004 and acquired by Yahoo! in 2005
  - Key content-tagging site

- **Technorati**
  - Social media search engine that uses tags to find relevant blogs and other forms of social media
3.10 Social Bookmarking

Social bookmarking sites = share your Internet bookmarks (e.g., your favorite websites, blogs, and articles) through a website.

- del.icio.us
- Ma.gnolia
- Blue Dot
- StumbleUpon
- Simpy
- Furl
3.11 Software Development

- **Key to Web 2.0 software development**
  - KIS (keep it simple; keep it small)
  - Important given the “attention economy” (too much information, too little time)

- **The Webtop**
  - Web has now become an application, development, delivery, and execution platform
  - Webtop, or web desktop, allows you to run web applications in a desktop-like environment in a web browser
  - Operating-system-independent applications

- **Software as a Service (SaaS)**
  - Application software that runs on a web server rather than being installed on the client computer
  - Many benefits
    - Fewer demands on internal IT departments
    - Increased accessibility for out-of-office use
    - Easy way to maintain software on a large scale
    - Examples: Most Google software and Microsoft's Windows Live and Office Live.
  - Collaborating on projects with co-workers across the world is easier
  - Information stored on a web server instead of on a single desktop

- **Perpetual Beta and Agile Development**
  - Shift away from the traditional software release cycle (i.e., new software releases take months or years)
  - Now a greater focus on agile software development, which refers to development of fewer features at a time with more frequent releases
    - Made possible by using the web as a platform
    - The Internet is a dynamic medium
    - Should not “overuse” betas

- **Open Source**
  - Not always free, but the source code is available (under license) to developers, who can customize it to meet their unique needs
    - Linux operating systems Red Hat or Ubuntu
  - Because the source code is available to everyone, users can look to the community for bug fixes and plug-ins
  - Over 150,000 open source projects are under development
    - Examples: Firefox web browser, the Apache web server, the MySQL database system, DotNetNuke and PHPNuke
3.11 Software Development

- **Licensing: GNU Licenses and Creative Commons**
  - GNU General Public License (GPL)
    - Allows redistribution of the project provided the source code is included and the copyright information is left intact
    - Others: GNU Lesser General Public License and the GNU Free Documentation License, BSD license and the MIT license
  - Creative Commons
    - Deals with licensing issues for all types of digital media

3.12 Rich Internet Applications (RIAs)

- **Rich Internet Applications (RIAs)**
  - Web applications that offer the responsiveness, “rich” features and functionality approaching that of desktop applications
- **Ajax**
  - Asynchronous JavaScript and XML
  - Allows partial page
  - Creates a more responsive GUI allowing users to continue interacting with the page as the server processes requests
  - Technologies that make up Ajax—XHTML, CSS, JavaScript, the DOM, XML, and the XMLHttpRequest object
- **Dojo**
  - Dojo is an open source JavaScript
- **Flex**
  - RIA framework that allows you to build scalable, cross-platform, multimedia-rich applications that can be delivered over the Internet
3.12 Rich Internet Applications (RIAs)
(Cont.)

- **Silverlight**
  - Microsoft app formerly known as Windows Presentation Foundation Everywhere (WPF/E)
  - Competitor to Flex and Flash
  - Uses a compact version of the .NET framework
  - User interfaces built in Extensible Application Markup Language (XAML)—Microsoft’s XML-based format for describing user interfaces

- **JavaFX**
  - Sun Microsystems’ counterpart to Flex and Silverlight
  - Consists of the JavaFX Script and JavaFX Mobile (for mobile devices)

- **Ruby on Rails**
  - Open source framework based on the Ruby scripting language that allows you to build database-intensive applications quickly, easily, and with less code
  - Core effects include opacity, scale, morph, move, highlight and parallel

- **Script.aculo.us**
  - Library for creating “eye candy” effects
  - Built on the Prototype JavaScript framework
  - Encapsulates the DOM and provides cross-browser processing capabilities

- **JavaServer Faces**
  - Java-based web application framework
  - Separates design elements from business logic and provides a set of user-interface components (JSF components) that make developing RIAs simple

---

3.12 Rich Internet Applications (RIAs)
(Cont.)

- **ASP.NET Ajax**
  - Extension of the .NET framework for creating Ajax-enabled applications

- **Adobe Integrated Runtime and Google Gears**
  - AIR allows users to run Flex web applications on their desktops even when they are not connected to the Internet
  - Google Gears allows use of web applications while offline
3.13 Web Services, Mashups, Widgets and Gadgets

- Incorporating web services into new programs allows people to develop new applications quickly
- **APIs**
  - Provide applications with access to external services and databases
  - Examples: Sun’s Java API and Web Services APIs
- **Mashups**
  - Combine content or functionality from existing web services, websites and RSS feeds to serve a new purpose
  - Housingmaps.com
  - Yahoo! Pipes

---

**Fig. 3.4**

*Mashup examples.*

<table>
<thead>
<tr>
<th>Mashup</th>
<th>Combines</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.housingmaps.com">http://www.housingmaps.com</a></td>
<td>Google Maps and Craigslist real-estate listings to create a map marked with available housing listings.</td>
</tr>
<tr>
<td><a href="http://www.chicagocrime.org">http://www.chicagocrime.org</a></td>
<td>Google Maps and crime data from Citizen ICAM to create a map of Chicago marked with crime locations.</td>
</tr>
<tr>
<td><a href="http://www.feedmashr.com">http://www.feedmashr.com</a></td>
<td>RSS feeds from Digg, ClipMarks, the <em>New York Times</em>, del.icio.us, Reddit and Slashdot to create a listing of the most popular stories from all sources.</td>
</tr>
<tr>
<td><a href="http://www.secretprices.com">http://www.secretprices.com</a></td>
<td>Amazon, Epinions.com and Shopping.com to create a comparison shopping site.</td>
</tr>
<tr>
<td><a href="http://paul.kedrosky.com/publicloos/">http://paul.kedrosky.com/publicloos/</a></td>
<td>Google Maps and Bathroom Diaries to create a map of San Francisco marked with the locations of public restrooms.</td>
</tr>
</tbody>
</table>
3.13 Web Services, Mashups, Widgets and Gadgets (Cont.)

- **Widgets and Gadgets**
  - Mini applications designed to run either as stand-alone applications or as add-on features in web pages
  - Personalize your Internet experience by displaying real-time weather conditions, aggregating RSS feeds, viewing maps, receiving event reminders, providing easy access to search engines and more.

- **Amazon Web Services**
  - Amazon is a leading provider of web services

- **REST (Representational State Transfer)-Based Web Services**
  - Architectural style for implementing web services
  - Identified by a unique URL
  - RESTful web services are alternatives to those implemented with SOAP

3.14 Location-Based Services

- **Location-Based Services (LBS)**
  - Applications that take your geographic location (city, state, location of your mobile device, etc.) into consideration
  - Global Positioning System (GPS)
  - Local search

- **Global Positioning System (GPS)**
  - Uses numerous satellites that send signals to a GPS receiver to determine its exact location.

- **Mapping Services**
  - Google Maps is one of the most popular mapping applications available online.
  - Google Earth provides satellite images of virtually any location on the planet
  - MapQuest provides similar mapping services
  - Additional mapping services include Yahoo! Local Maps and MSN Live Search
  - Companies such as NAVTEQ and Tele Atlas provide digital map data for in-vehicle and portable navigation devices, websites, location-based services and more

- **GeoRSS and Geotagging**
  - Set of standards for representing geographical information in an RSS feed (GeoRSS)
  - Geotagging can be used to add location information (longitude, latitude, etc.) to websites, images, RSS feeds, videos and more
3.15 XML, RSS, Atom, JSON and VoIP

- **XML**
  - Extensible Markup Language that is a markup language that allows you to label data based on its meaning
  - Describes data in a way that is meaningful to both humans and computers
  - Document Type Definition (DTD) or a schema, which defines the structure for the document
  - XML Vocabularies
    - XHTML for web content
    - CML for chemistry
    - MathML for mathematical content and formulas
    - XBRL for financial data

- **RSS and Atom**
  - Sites that offer RSS and Atom feeds can maintain an “open connection” with their readers
  - Most major web browsers support RSS and Atom feeds

- **JSON**
  - JavaScript Object Notation (JSON)
  - Text-based data interchange format used to represent JavaScript objects as strings and transmit them over a network
  - Commonly used in Ajax applications

- **VoIP**
  - Voice over Internet Protocol (VoIP) is the technology used to make free or inexpensive phone calls over the Internet.

3.16 Web 2.0 Monetization Models

- Many Web 1.0 businesses discovered that popularity (“eyeballs”) was not the same as financial success
- Web 2.0 companies are paying more attention to monetizing their traffic
- Web 2.0 monetization is heavily reliant on advertising
  - Example: Google’s AdSense
Web 2.0 monetization models

**affiliate network**—A business (such as Commission Junction and LinkShare) that connects web publishers with cost-per-action affiliate programs. See affiliate programs.

**affiliate program**—A deal offered by a company to share a portion of the revenues earned from traffic coming from web publisher websites. Affiliates provide text and image ads to post on the publishers’ sites. If a user clicks through to the affiliate site and takes a specified action (e.g., makes a purchase, fills out a registration form, etc.) the publisher is paid a portion of the revenue or a flat fee. Companies offering affiliate programs include Amazon (the Amazon Associates program), Indeed, ClickBank, eBay and thousands more.

Web 2.0 monetization models

**banner ad**—An ad that consists of an image, often placed at the top of a page.

**blog advertising**—Advertising specifically designed for display on blog sites. Companies include Federated Media and Blogads.

**contextual advertising**—Advertising that is targeted to the content on a web page. Contextual ad programs include Google AdSense, Yahoo! Publisher Network, Vibrant Media, Kontera and Tribal Fusion.

**cost-per-action (CPA)**—Advertising that is billed to the advertiser per user action (e.g., purchasing a product or filling out a mortgage application). Companies include Amazon and Indeed. See also performance-based advertising.
<table>
<thead>
<tr>
<th>Monetization Models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>cost-per-click (CPC)</strong> — Advertising that is billed by user click. The web publisher receives revenue each time a user clicks an ad on the publisher’s site, regardless of whether the user makes a subsequent purchase. Companies include Google AdSense and Yahoo! Publisher Network.</td>
</tr>
<tr>
<td><strong>cost-per-thousand impressions (CPM)</strong> — Advertising (usually banner advertising) that is billed per thousand impressions, regardless of whether the user clicks on the ad. Companies include DoubleClick, ValueClick and many more.</td>
</tr>
<tr>
<td><strong>e-commerce</strong> — Selling products and/or services directly through a website. Companies include Amazon, Dell, CafePress.com and thousands more.</td>
</tr>
<tr>
<td><strong>interstitial ad</strong> — An ad that plays between page loads. Companies include Tribal Fusion, DoubleClick, and many more.</td>
</tr>
<tr>
<td><strong>in-text contextual advertising</strong> — Advertising that is marked by double-underlined keywords or phrases in the content of a web page. When a reader hovers the mouse cursor over a double-underlined word or phrase, a test ad pops up. By clicking on an ad, readers are taken to the advertiser’s page. Companies providing in-text contextual advertising include Vibrant Media, Text Link Ads, Kontera and Tribal Fusion.</td>
</tr>
<tr>
<td><strong>lead generation</strong> — Leads are generated when a visitor fills out an inquiry form so that a salesperson can follow through and potentially convert the lead to a sale. Lead generation is a subset of cost-per-action advertising. See cost-per-action (CPA).</td>
</tr>
<tr>
<td><strong>paid blog post</strong> — A blog post (often a product review) that an advertiser pays a blogger to write. Some argue the ethics of this practice, and bloggers are encouraged to disclose that they are being paid for the posts. Companies that match bloggers and advertisers include PayPerPost, SponsoredReviews and ReviewMe.</td>
</tr>
<tr>
<td><strong>performance-based advertising</strong> — Advertising that pays based on user action, such as making a purchase, filling out a registration form, etc. Those are also often part of affiliate programs such as Amazon and ClickBank. See cost-per-action (CPA).</td>
</tr>
<tr>
<td><strong>premium content</strong> — Content on a website that is available for an extra fee (e.g., e-books, articles, etc.). Companies that offer premium content include The Wall Street Journal Online and Search Engine Watch.</td>
</tr>
<tr>
<td><strong>RSS ad</strong> — An ad included in RSS feeds. Companies include Feedster, Feedburner and Yahoo! Search Marketing.</td>
</tr>
<tr>
<td><strong>tagging for profit</strong> — A site that buys inbound links or tags from other sites to help increase traffic, and thus increase potential advertising revenue. High-traffic sites can sell tags or links to other websites for a profit. (Caution: Search engines may lower the ranking of sites with paid links.) An example is 1000tags.com.</td>
</tr>
<tr>
<td><strong>virtual worlds monetization</strong> — Selling products, premium services, virtual land and more in an online virtual world website. Virtual worlds include Second Life, IMVU, Habbo, Gaia Online and There.</td>
</tr>
</tbody>
</table>
3.17 Web 2.0 Business Models

- Technologies and collaborative nature of Web 2.0 have opened up new business models

<table>
<thead>
<tr>
<th>Web 2.0 Business Models</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advertising Exchange</strong></td>
<td>An online marketplace where web publishers can sell their advertising inventory (ad space) to advertisers. Companies include DoubleClick Advertising Exchange and Right Media Exchange.</td>
</tr>
<tr>
<td><strong>Affiliate Network</strong></td>
<td>A business that connects web publishers with cost-per-action affiliate programs, which are a form of cost-per-action advertising. Companies include Commission Junction and LinkShare. (See Fig. 3.5 for more information on affiliate programs.)</td>
</tr>
<tr>
<td><strong>Blog</strong></td>
<td>A website with a series of posts in reverse chronological order. Many blogs attract significant traffic and monetize with advertising and affiliate programs. Popular blogs include BoingBoing, Gizmodo, TechCrunch, John Battelle's Searchblog, ProBlogger and Scobleizer.</td>
</tr>
<tr>
<td><strong>Blog Search Engine</strong></td>
<td>A search engine devoted to the blogosphere. Companies include Technorati, Feedster, IceRocket and Google Blog Search.</td>
</tr>
<tr>
<td><strong>Blog Network</strong></td>
<td>A collection of blogs with multiple editors. Popular blog networks include Corante, 9rules, Gawker Media and Weblogs, Inc.</td>
</tr>
<tr>
<td><strong>Buying and Selling Domain Names</strong></td>
<td>A company that purchases domain names with the intent of selling them in the future as Internet real estate becomes more valuable. Companies include Afternic.com and GreatDomains.</td>
</tr>
<tr>
<td><strong>Competitive Intelligence</strong></td>
<td>A company that analyzes Internet usage for use by client websites. Companies include Hitwise and Compete, Inc.</td>
</tr>
<tr>
<td><strong>Content Network</strong></td>
<td>A site (or collection of sites) that provides content including articles, wikis, blogs and more. Companies include About.com, Deltad, Llifetips and Suitetips.</td>
</tr>
</tbody>
</table>
**Web 2.0 business models**

- **discovery**—A site that introduces users to valuable content they would not have looked for otherwise. Sites include StumbleUpon, Aggregate Knowledge, MOG and Del.icio.
- **domain registrar**—A site that sells domain names. Companies include Register.com, GoDaddy and NetworkSolutions.
- **encyclopedia and reference source**—An online reference encyclopedia, dictionary, thesaurus, etc. Sites include Wikipedia, Reference.com and Citizendium.
- **feed aggregator**—An application that combines RSS or Atom feeds so the user can view all subscriptions in a single location. Applications include NetNewsWire, Google Reader and Bloglines.
- **file sharing**—An application where users can share files, music, software and more. Companies include BitTorrent, LimeWire, Kazaa, AllPeers and Shareaza.
- **infrastructure for distributing open source projects**—A site that hosts collaborative open source software projects. Sites include SourceForge, freshmeat.net and Tuxoss.
- **Internet and web conference organizer**—A company that organizes conferences on Internet and web topics. Companies include O’Reilly Media, CMP and Jupiter.
- **Internet radio**—A site that distributes music and radio shows over the Internet. Companies include Last.fm and Pandora.
- **Internet TV**—A site that distributes television shows (or allows you to distribute your own shows) over the Internet. Companies include Joost and Brightcove.
- **Internet video**—A video sharing site where users upload and share content. Companies include YouTube and Yahoo! Video.
- **job boards and job search**—A site that connects job seekers with employers and/or job search engines. Job boards include Monster, CareerBuilder and Dice. Job search engines include Indeed, Jobster and SimplyHired.
- **mashup**—A combination of two or more existing web services and feeds to create a new application. For example, http://www.housingmaps.com combines real estate listings from Craigslist with Google Maps so you can view the listings on a map. For a list of popular mashups, see http://www.programmableweb.com/popular.
- **massively multiplayer online game**—An online role playing or strategy game where Internet users interact with one another. Games include World of Warcraft, Guild Wars and Lineage.
- **mobile social networking**—A social network oriented towards mobile devices (such as cell phones). Companies include Twitter, Dodgeball and MocoSpace.
- **music distribution site**—An online music site where you can purchase electronic versions (e.g., mp3) of single songs or entire albums. Companies include iTunes, Rhapsody and Amie Street.
- **online advertising**—An online advertising company that offers contextual advertising, banner advertising, in-text contextual advertising and more. Companies include Google, Yahoo!, Microsoft, DoubleClick, Vibrant Media, Tribal Fusion, Kontiria, Quigo, Yahoo!Tack, Federated Media and many more.
- **online auction**—A marketplace where visitors bid for products (and services) over the Internet. Companies include eBay, Overstock.com and Amazon Auctions.
- **online classifieds**—A classifieds “advertising” site where users can post jobs, real-estate listings, personal ads, etc. Companies include Craigslist, Yahoo! Classifieds and Google Base.
<table>
<thead>
<tr>
<th><strong>Web 2.0 business models</strong> (Part 4 of 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Online survey site</strong> — A site that offers survey services to other companies. A popular example is SurveyMonkey.</td>
</tr>
<tr>
<td><strong>Open source</strong> — Software that is available (under license) for anyone to use and modify with few or no restrictions. Many Web 2.0 companies use open source software to power their sites and offer open source products and content. Companies include the Free Software Foundation, Apache, Mozilla, Zimbra and many more.</td>
</tr>
<tr>
<td><strong>Outsourcing marketplaces</strong> — An online marketplace where contractors and freelancers can connect with potential clients for short-term work. Companies include Elance and Guru.com.</td>
</tr>
<tr>
<td><strong>Payments</strong> — A site that handles secure payments for e-commerce sites. Companies include PayPal and Google Checkout.</td>
</tr>
<tr>
<td><strong>People-assisted search</strong> — A search engine or search-driven content site that is filtered and organized by people to provide users with more relevant search results. Companies include Mahalo and Distel.</td>
</tr>
<tr>
<td><strong>Photo sharing site</strong> — A site where users can post and share their photos with other users. Companies include Flipe and Photobucket.</td>
</tr>
<tr>
<td><strong>Real estate</strong> — A site that offers online real estate listings and information. Companies include Realtor, Trulia and Zillow.</td>
</tr>
<tr>
<td><strong>Recommender system</strong> — A system that collects data using collaborative filtering systems to determine users' tastes and interests. Sites can gather information about your personal interests, compare you to other users with similar interests and make recommendations. Popular examples of sites using recommender systems include Pandora, Netflix, CleverSet, ChannelStream, MyStrands, StumbleUpon, Last.fm and Movielens.</td>
</tr>
<tr>
<td><strong>Reputation system</strong> — A system used by businesses like eBay and Amazon to encourage trust. For example, after each eBay transaction, the buyer and the seller can each leave positive or negative comments about the other party.</td>
</tr>
<tr>
<td><strong>Search engine</strong> — The primary tool people use to find information on the web. Companies include Google, Yahoo!, MSN, Ask and many more.</td>
</tr>
<tr>
<td><strong>Selling digital content</strong> — An ecommerce site that sells digital media (e.g., ebooks). Companies include ClickBank, Blurb, Lulu and more.</td>
</tr>
<tr>
<td><strong>Social bookmarking site</strong> — A site that allows users to share their bookmarks with others. Users bookmark their favorites sites, articles, blogs and more, and tag them by keyword. Companies include del.icio.us, Ma.gnolia and Blue Dot.</td>
</tr>
<tr>
<td><strong>Social media site</strong> — A site that allows digital media (text, photos, videos, music, etc.) to be shared online. Companies include Digg, YouTube, Flickr, Reddit, Wikipedia and more.</td>
</tr>
<tr>
<td><strong>Social networking site</strong> — A site that helps users organize their existing relationships and establish new ones. Companies include MySpace, Facebook, Bebo, LinkedIn, Second Life, Gaia Online and more.</td>
</tr>
<tr>
<td><strong>Software as a Service (SaaS)</strong> — Software that runs on a web server rather than being installed on a local client computer. By modifying the version of the software on the server, a company can simultaneously update all users to the latest version. SaaS applications include Salesforce.com, Microsoft Office Live, Microsoft Windows Live, Zoho Office Suite and many Google and 37Signals products.</td>
</tr>
<tr>
<td><strong>Subscription site</strong> — A site that offers member-only areas and premium content (additional content for a fee). Examples include Safari Books Online and the Wall Street Journal.</td>
</tr>
<tr>
<td><strong>Webmail</strong> — A web-based email system that allows you to send and receive email using a standard browser. Popular webmail services include Google Gmail, Mac, Yahoo! Mail and MSN Hotmail.</td>
</tr>
</tbody>
</table>
travel site—An online travel resource site that allows you to find and book hotels, air travel, rental cars and more. Companies include Expedia, Travelocity and Orbitz.

vertical search engine—A search engine that allows you to focus your search on a narrow topic. For example, travel search engines include Yahoo! Fare Finder, SideStep and Kayak; source-code search engines include Keugle and Koole.

virtual world—A social networking site (or program) where users create an avatar (their online image and persona) that they use to meet other users with similar interests, conduct business, participate in group activities, take classes and more. Companies include Second Life, Habbo, Gans Online and There.

Voice over Internet Protocol (VoIP) site—A site that offers inexpensive or free telephone services over the Internet. Companies include Skype, PacketR, Lingo and Vonage.

Web 2.0 software—Software designed to build Web 2.0 sites and applications (e.g., blogging software). Companies include Six Apart, 37Signals, Adobe and Microsoft.

web analytics—Software (desktop and SaaS) and companies that analyze Internet traffic, demographics, navigation and more. Companies include Alexa, WebTrends, ClickTracks, Google Analytics and WebSideStory.

web and mobile messaging—A service that allows you to chat with your contacts from various Internet messaging services (AIM, Yahoo! Messenger, MSN Messenger, Google Talk). Companies include Meebo and eBuddy.

web conferencing—An application that enables users to collaborate remotely. This often includes chat, VoIP and desktop sharing. Companies include WebEx, GoToMeeting and DimDim (open source).

wiki—A site that offers collaborative, editable documents online. Companies include Wikipedia, Wikia and SocialText.

3.18 Future of the Web

- Computers have a hard time deciphering meaning from XHTML content
- Web today involves users’ interpretations of what pages and images mean, but the future entails a shift from XHTML to a more sophisticated system based on XML, enabling computers to better understand meaning.
- Web 2.0 companies use “data mining” to extract as much meaning as they can from XHTML-encoded pages

- Tagging and Folksonomies
  - Early hints a “web of meaning.”
  - “loose” classification system

- Semantic Web
  - Next generation in web development,
  - “web of meaning”
  - Depends heavily on XML and XML-based technologies

- Microformats
  - Standard formats for representing information aggregates that can be understood by computers, enabling better search results and new types of applications
3.18 Future of the Web (Cont.)

- **Resource Description Framework (RDF)**
  - Based on XML
  - Used to describe content in a way that is understood by computers
  - Connects isolated databases across the web with consistent semantics

- **Ontologies**
  - Ways of organizing and describing related items, and are used to represent semantics.
  - Another way of cataloging the Internet

---

**Fig. 3.7 | Web 2.0 news, analysis, technology and business resources.**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TechCrunch <a href="http://www.techcrunch.com/">http://www.techcrunch.com/</a></td>
<td>Edited by Michael Arrington, this blog is the leading Web 2.0 news resource that profiles innovative and important Internet companies and products.</td>
</tr>
<tr>
<td>Deitel Resource Centers <a href="http://www.deitel.com/resourcecenters.html">http://www.deitel.com/resourcecenters.html</a> (See Fig. 2 in the Preface for a list of Resource Centers)</td>
<td>Numerous Web 2.0 technology and Internet business Resource Centers that include links to, and descriptions of tutorials, demos, free software tools, articles, e-books, whitepapers, videos, podcasts, blogs, RSS feeds and more.</td>
</tr>
</tbody>
</table>