WT

1 Web 1.0, 2.0, 3.0

2 WWW vs Internet

3 Tech & Eco Benefits of IPv6

6 Website technology Stack

7 How Cloud Storage Works

9a How E---commerce Works

9b How Creating an Online Business Works

10b Types of Websites

1. Compare the following - Web 1.0, 2.0 & 3.0
2. Compare the WWW vs Internet
3. Technical and economic benefits of IPv6
4. Characteristics of Web
5. What is Web? What is its purpose ?
6. Stack for a Website - technology
7. Virtues of Data on cloud
8. Web based business models
9. E-Commerce / E-Business
10.   Steps for creating a website & what are the types of website ?
11.   Content of a website (Transaction, Entitites, Outcome, Nature, Business model)

**Simple Compare & Contrast of Web 1.0, 2.0, and 3.0 (Update 1)**

	Web 1.0	Web 2.0	Web 3.0
Simple Definition	Interactive / Visual Web	Programmable Web	Linked Data Web
Unit of Presence	Web Page	Web Service Endpoint	Data Space (named structured data enclave)
Unit of Value Exchange	Page URL	Endpoint URL for API	Resource / Entity / Object URI
Data Granularity	Low (HTML)	Medium (XML)	High (RDF)
Defining Services	Search	Community (Blogs to Social Networks)	Find
Participation Quotient	Low	Medium	High
Serendipitous Discovery Quotient	Low	Medium	High
Data Referencability Quotient	Low (Documents)	Medium (Documents)	High (Documents and their constituent Data)
Subjectivity Quotient	High	Medium (from A-list bloggers to select source and partner lists)	Low (everything is discovered via URIs)
Transclusence	Low	Medium (Code driven Mashups)	HIgh (Data driven Meshups)
What You See Is What You Prefer (WYSIWYP)	Low	Medium	High (negotiated representation of resource descriptions)
Open Data Access (Data Accessibility)	Low	Medium (Silos)	High (no Silos)
Identity Issues Handling	Low	Medium (OpenID)	High (FOAF+SSL)
Solution Deployment Model	Centralized	Centralized with sprinklings of Federation	Federated with function specific Centralization (e.g. Lookup hubs like LOD Cloud or DBpedia)
Data Model Orientation	Logical (Tree based DOM)	Logical (Tree based XML)	Conceptual (Graph based RDF)
User Interface Issues	Dynamically generated static interfaces	Dyanically generated interafaces with semi-dynamic interfaces (courtesy of XSLT orXQuery/XPath)	Dynamic Interfaces (pre- and post-generation) courtesy of self-describing nature of RDF
Data Querying	Full Text Search	Full Text Search	Full Text Search + Structured Graph Pattern Query Language

What Each Delivers	Democratized Publishing	Democratized Journalism & Commentary (Citizen Journalists & Commentators)	Democratized Analysis (Citizen Data Analysts)
Star Wars Edition Analogy	Star Wars (original fight for decentralization via rebellion)	Empire Strikes Back (centralization and data silos make comeback)	Return of the JEDI (FORCE emerges and facilitates decentralization from "Identity" all the way to "Open Data Access" and "Negotiable Descriptive Data Representation")

A ◉ Discovery Company

What's the difference between the Internet and the World Wide Web?

by Jessika Toothman

Browse the article **What's the difference between the Internet and the World Wide Web?**

Image Gallery: Get Connected to the Internet
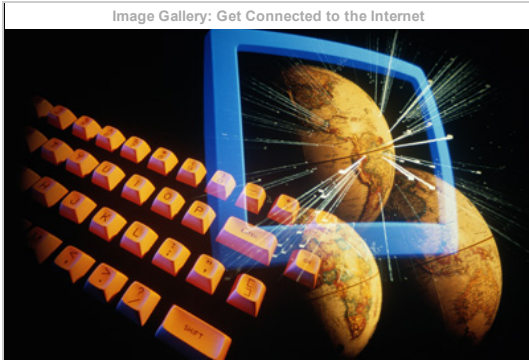
The rapid growth of the Internet was greatly aided by the invention of the World Wide Web. See more Internet connection pictures.
Stephen Marks/The Image Bank/Getty Images

MORE ON THE INTERNET

- Web 3.0
- Internet Quiz
- How did the Internet start?
- ScienceChannel.com: China Internet Addicts

What's the difference between the Internet and the World Wide Web?

The Internet has become so ubiquitous it's hard to imagine life without it. It's equally hard to imagine a world where "www" isn't the prefix of many of our online activities. But just because the **Internet** and the **World Wide Web** are firmly intertwined with each other, it doesn't mean they're synonymous.

Let's go back to when it all began. President Dwight D. Eisenhower started the **Advanced Research Projects Agency** (ARPA) in 1958 to increase U.S. technological advancements in the shadow of Sputnik's launch. By October 29, 1969, the first **ARPANET** network connection between two computers was launched -- and promptly crashed. But happily, the second time around was much more successful and the Internet was born. More and more computers were added to this ever-increasing network and the megalith we know today as the Internet began to form. Further information about ARPA can be discovered by reading How ARPANET Works.

But the creation of the World Wide Web didn't come until decades later, with the help of a man named Tim Berners-Lee. In 1990, he developed the backbone of the World Wide Web -- the **hypertext transfer protocol** (**HTTP**). People quickly developed **browsers** which supported the use of HTTP and with that the popularity of computers skyrocketed. In the 20 years during which ARPANET ruled the Internet, the worldwide network grew from four computers to more than 300,000. By 1992, more than a million computers were connected -- only two years after HTTP was developed [source: Computer History Museum].

You might be wondering at this point what exactly HTTP is -- it's simply the widely used set of rules for how files and other information are transferred between computers. So what Berners-Lee did, in essence, was determine how computers would communicate with one another. For instance, HTTP would've come into play if you clicked the source link in the last paragraph or if you typed the http://www.howstuffworks.com **URL** (**uniform resource locator**) into your browser to get to our home page. But don't get this confused with Web page programming languages like **HTML** and **XHTML**. We use those to describe what's on a page, not to communicate between sites or identify a Web page's location.

To learn more about the dawn of the Internet age, visit How did the Internet start? For our purposes, we're set to explore the fundamental difference between the Internet and the World Wide Web, and why it's so easy for us to link them together in our minds. Go to the next page to find the answers.

▶ Launch Video

Download: Web 2.0

To answer this question, let's look at each element. And since the Internet seems to be the more easily understood component, let's start there.

Simply, the Internet is a network of networks -- and there are all kinds of networks in all kinds of sizes. You may have a computer network at your work, at your school or even one

The Internet may be the physical connection, but the World Wide Web is what really gets you tapped in.
Cristian Baitg/Photographer's Choice RR/Getty Images

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at your house. These networks are often connected to each other in different configurations, which is how you get groupings such as **local area networks** (LANs) and **regional networks**. Your cell phone is also on a network that is considered part of the Internet, as are many of your other electronic devices. And all these separate networks -- added together -- are what constitute the Internet. Even satellites are connected to the Internet. To learn more about how this interwoven mega-network operates, check out How Internet Infrastructure Works.

The World Wide Web, on the other hand, is the system we use to access the Internet. The Web isn't the only system out there, but it's the most popular and widely used. (Examples of ways to access the Internet without using HTTP include e-mail and instant messaging.) As mentioned on the previous page, the World Wide Web makes use of hypertext to access the various forms of information available on the world's different networks. This allows people all over the world to share knowledge and opinions. We typically access the Web through **browsers,** like Internet Explorer and Mozilla Firefox. By using browsers like these, you can visit various Web sites and view other online content.

So another way to think about it is to say the Internet is composed of the machines, hardware and data; and the World Wide Web is what brings this technology to life.

Now that we know the difference between the Internet and the World Wide Web, put your newfound knowledge of hyperlinks, HTML and home pages to use and click onto the next page for more great information.

INTERNET INNOVATORS
There are several groups of people who work to keep everything standardized and running smoothly across the Internet and the World Wide Web. If you want to learn more about what it takes to keep systems compatible, a good place to start is the **World Wide Web Consortium** (**W3C**). W3C's aim is to help develop standards and guidelines for the Web. The group is run by Tim Berners-Lee who, if you remember, is the person who invented the World Wide Web. You can also try the **Internet Society**, which was founded in 1992 to provide leadership in many aspects of Internet-related information, initiatives and activities.

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- How Internet Infrastructure Works
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- How Web Pages Work
- How Web Servers Work
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More Great Links
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- Defense Advanced Research Projects Agency
- Internet Corporation for Assigned Names and Numbers
- Internet Network Information Center
- National Science Foundation

Lots More Information

Related HowStuffWorks Articles

- How ARPANET Works
- How Bits and Bytes Work
- How C Programming Works
- How did the Internet start?

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The Difference between the World Wide Web and the Internet

People now talk about the *Web* more than they talk about the *Internet.* The World Wide Web and the Internet are not the same thing — the World Wide Web (which we call the Web because we're lazy typists) lives "on top of" the Internet. The Internet's network is at the core of the Web, and the Web is like an attractive parasite that requires the Net for survival.

The Web is a bunch of "pages" of information connected to each other around the globe. Each page can be a combination of text, pictures, audio clips, video clips, animations, and other stuff. (People add new types of other stuff every day.) What makes Web pages interesting is that they contain *hyperlinks,* usually called just *links* because the Net already has plenty of hype. Each link points to another Web page, and, when you click a link, your browser fetches the page the link connects to. (Your *browser* is the program that shows you the Web.)

The other important characteristic of the Web is that you can search it — all ten billion or so pages. For example, in about ten seconds, you can get a list of Web pages that contain the phrase *domestic poultry* or your own name or the name of a book you want to find out about. You can follow links to see each page on the list to find the information you want.

Each page your browser gets for you can have more links that take you to other places. Pages can be linked to other pages anywhere in the world so that when you're on the Web, you can end up looking at pages from Singapore to Calgary, or from Sydney to Buenos Aires, all faster than you can say "Bob's your uncle," usually. Most of the time, you're only seconds away from any site, anywhere in the world. This system of interlinked documents is known as *hypertext.*

Links can create connections that let you go directly to related information. These invisible connections between pages are like the threads of a spider web — as you click from Web page to Web page, you can envision the Web created by the links. What's so remarkable about the Web is that it connects pieces of information from all around the *planet,* on different computers and in different databases (a feat you would be hard pressed to match with a card catalog in a brick-and-mortar library).

Every Web page has a name attached to it so that browsers, and you, can find it. The name of this naming convention: *URL,* or *Uniform Resource Locator.* Every Web page has a URL, a series of characters that begins with http://. (Pronounce each letter, "U-R-L" — no one says "earl.*")*

2   Benefits and Costs of Adopting IPv6

Industry stakeholders and Internet experts generally agree that IPv6-based networks would be technically superior to IPv4-based networks.[44] The increased address space available under IPv6 could stimulate development and deployment of new communications devices and new applications, and could enable network restructuring to occur more easily. The redesigned header structure in IPv6 and the enhanced capabilities of the new protocol could provide significant benefits to Internet users, network administrators, and applications developers. IPv6 could also simplify the activation, configuration, and operation of certain networks and services.

Widespread adoption of IPv6, however, could entail significant transition costs because the Internet today is composed almost entirely of IPv4-based hardware and software. Furthermore, as noted above, many of IPv6's enhanced capabilities have also been made available in IPv4, albeit with varying levels of performance. As a result, producers and consumers may continue to use IPv4 for some period of time (perhaps with further augmentation) to avoid or to defer the costs of upgrading to IPv6. Many of the prospective benefits of IPv6, moreover, appear to be predicated on the removal or modification of "middleboxes" that affect direct Internet communications between end-user devices, such as Network Address Translation (NAT) devices (see Section 2.1.1.2), firewalls, and intrusion detection systems (IDS). It remains to be seen whether or when such devices will be either phased out or made transparent to end-to-end (E2E) Internet communications and applications.

In this section, we discuss the benefits and costs of adopting IPv6. After first evaluating the potential benefits of deploying IPv6, we discuss the nature and relative magnitude of the costs that enterprises and individuals may incur to deploy IPv6. To make this general discussion more concrete, we also provide a case study in Appendix A that illustrates potential transition costs for a small or medium-sized business. Finally, we discuss transition issues and costs that are of particular importance in assessing the net economic impact of adopting IPv6.

2.1   Relative Benefits of IPv6 vs. IPv4

A general consensus appears to exist regarding the technical improvements of IPv6 versus IPv4 and the types of benefits that could follow from widespread adoption of IPv6. Disagreement exists, however, regarding the size of those benefits and whether the incremental benefits of IPv6 (versus IPv4) for some or all users would outweigh the costs of a greatly accelerated transition from IPv4 to IPv6.[45] This section

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[44] *See, e.g.*, Microsoft Comments at 4-6; Motorola Comments at 2-4.

[45] The timing of the transition from IPv4 to IPv6 for any particular adopter, as well as the existing network infrastructure, could dramatically affect the costs incurred and the benefits realized.

discusses the potential net benefits of adopting IPv6, as identified by RFC commenters, RTI's discussions with industry experts, the available literature, and participants at the July 28, 2004 public meeting.

2.1.1 Increased Address Space

A principal by-product of deploying IPv6 would be a large increase in the number of available IP addresses. The 32-bit address field in the IPv4 packet header provides about 4 billion ($4x10^9$) unique Internet addresses.[46] The 128-bit address header in IPv6, in contrast, provides approximately $3.4x10^{38}$ addresses, enough to assign trillions of addresses to each person now on earth or even to every square inch of the earth's surface.[47]

The vast pool of addresses available under IPv6 would, at a minimum, "future proof" the Internet against potential address shortages resulting from the emergence of new and unforeseen services or applications that require large quantities of globally routable Internet addresses.[48] Pressures on existing IPv4 address resources will likely increase in coming years, as more and more people around the globe seek IP addresses to enjoy the benefits of Internet access.[49] The burgeoning demand for "always-on" broadband services (*e.g.*, DSL and cable modem services) and the expected proliferation of wireless phones, wireless data devices (*e.g.*, PDAs), and eventually wireless video services may further deplete the available IPv4 address space.[50]

Further, if consumers are drawn to devices that can be remotely accessed and controlled via the Internet and that require fixed, globally accessible Internet addresses (*e.g.*, smart appliances, in-home cameras and entertainment systems, and automobile components or subsystems), demand for IP addresses may overwhelm the remaining pool of IPv4 addresses.[51] Although it is difficult to predict exactly when these developments may threaten the existing supply of IP addresses, the availability of virtually unlimited IPv6

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[46] *See* Microsoft Comments at 3 (4.3 billion addresses); Sprint Comments at 3 (same). Because some of these addresses are needed for administrative purposes, all 4.3 billion cannot be assigned for use by individuals or organizations.

[47] *See* Sprint Comments at 3 ($1x10^{30}$ addresses for every person); Joe St. Sauver, "What's IPv6 . . . and Why Is It Gaining Ground?", *at* http://cc.uoregon.edu/cnews/spring2001/whatsipv6.html (last visited Dec. 15, 2004) ($3.7x10^{21}$ addresses per square inch). As with IPv4 addresses, not all of these IPv6 addresses can be assigned to users.

[48] *See*, *e.g.*, NTT/Verio Comments at 10-11 (identifying future applications that could benefit from expanded IPv6 address space).

[49] *See* North American IPv6 Task Force (NAv6TF) Comments at 4.

[50] *See* Cisco Comments at 1; MCI Comments at 3; Motorola Comments at 4; NTT/Verio Comments at 5, 10. In contrast, one commenter questions whether each new mobile device will need its own IP address. *See* Network Conceptions Comments at 7.

[51] *See* Cisco Comments at 2; Dillon Comments at 1; GSA Comments at 2, 6; NTT/Verio Comments at 10. *See also* Public Meeting Transcript, *supra* note 41, at 65 (remarks of Paul Liao, Panasonic USA) (availability of IPv6-addressable electronic equipment in the home could make it easier and cheaper for companies to deliver software upgrades that could expand or modify the capabilities of that equipment); *id*. at 48-49 (remarks of Paul Liao and Stan Barber, NTT/Verio) (IPv6-addressed taxicabs in Tokyo can inform meteorologists when the cabs' windshield wipers are on, providing the weathermen with more detailed information about rainfall patterns in the city).

middleboxes that affect E2E applications,[88] and an absence of compelling applications that require E2E connectivity.

2.1.2 Simplified Mobility[89]

Mobile services and mobile users could be major beneficiaries of the massive address space available via IPv6. Various commenters anticipate a rapid growth in the potential number of mobile or portable devices that may connect to the Internet. NTT/Verio notes that the use of mobile phones for email and database browsing in Japan has been growing rapidly.[90] Sprint suggests that the emergence of mobile data services such as wireless data, picture mail, and text messaging could drive the adoption of IPv6.[91] Motorola argues further that IPv6 offers exciting opportunities for wireless sensor networks and for machine-to-machine communications, potentially leading to a large proliferation of devices that will connect to the Internet.[92]

Quite apart from IPv6's address benefits for mobile services, many experts believe that, whether used in a mobile or a portable environment, IPv6 can better support such devices than currently available options under IPv4.[93] According to Microsoft, "IPv6 better handles mobile applications and services."[94] The North American IPv6 Task Force suggests that IPv6 allows devices to attach to networks at different points more easily than is currently achievable using IPv4 alternatives, principally through the use of stateless address autoconfiguration and neighbor discovery capabilities.[95] Sprint suggests that IPv6 will permit more optimal routing of mobile traffic because IPv6 mobility specifications are being designed to eliminate "triangular routing."[96]

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[88] NAT boxes and firewalls can be modified, albeit at some cost, to coexist in an IPv6 networked environment, possibly allowing some forms of direct E2E communications to take place. March Streck Interview, *supra* note 82.

[89] For an IETF working document that describes how mobility support can be provided in IPv6, see D. Johnson, et al., "Mobility Support in IPv6" (June 30, 2003), *at* http://users.piuha.net/jarkko/publications/mipv6/drafts/mobilev6.html (expired Dec. 29, 2003) (last visited May 2, 2005).

[90] NTT/Verio Comments at 10.

[91] Sprint Comments at 11.

[92] Thus, devices commonly found in the home (such as lights, dishwashers, refrigerators, cameras, home computers, and other home appliances) can be assigned IP addresses, linked together on home networks, and connected to the Internet, allowing home owners to control such devices remotely. *See* Motorola Comments at 4; March Streck Interview, *supra* note 82.

[93] Cisco suggests that IPv4 networks can also handle any mobile applications that exist today. Cisco believes, however, that a large scale deployment of mobile IP "will be done more easily through Mobile IPv6 and its feature set." Cisco Comments at 6.

[94] Microsoft Comments at 5.

[95] NAv6TF Comments at 12-13. The autoconfiguration and neighbor discovery mechanisms of IPv6, which are used for node discovery, also eliminate the need for DHCP or foreign agents currently used to route mobile traffic. *See* Wolfgang Fritsche and Florian Heissenhuber, "Mobile IPv6: Mobility Support for the Next Generation Internet," at 18 (Aug. 16, 2000), *at* http://www.6bone.sk/zaujim/MobileIPv6_Whitepaper.pdf.

[96] Sprint Comments at 6. The mobility protocols within IPv6 are designed to avoid routing packets from a correspondent node to the mobile node via the home agent. This route optimization mechanism will reduce transport delay and save network capacity. Route optimization is designed to be an integral part of Mobile IPv6 and is also available as an added functionality for Mobile IPv4. *See* Fritsche and Heissenhuber, *supra* note 95, at 18.

The simplification of mobile networking in IPv6 could enable Internet users to remain seamlessly connected and easily reachable when portable or mobile devices move from their home networks to other unaffiliated networks.[97] The possibility of continuous Internet connectivity for laptops, mobile phones, PDAs, sensors, and other mobile or portable devices, in turn, could spur development of myriad new applications in both the public and private sectors.[98]

2.1.3 Improved Quality of Service (QoS)

Internet transmission currently is a "best effort" scheme—users cannot expect that "high priority" traffic will be handled any differently from other traffic.[99] For business IP-based services to flourish, service providers will likely need to provide Quality of Service (QoS)[100] support for those customers. This would require, among other things, the ability to identify different classes of traffic and to provide sufficient instructions to the connecting networks so that messages are delivered with acceptable performance characteristics (*e.g.*, error rates, delay).

Several commenters suggest that, as presently implemented, IPv6 provides no better QoS support than does IPv4.[101] Nevertheless, the IPv6 packet header contains a field—the "flow label"—that is not found in IPv4 and that is intended to assist with QoS. The flow label allows a user or provider to identify those traffic flows for which the provider requests special handling by network routers with greater specificity (or "granularity") than is available under IPv4.[102] The expanded capabilities of IPv6 are not yet available to users and service providers, however. According to IETF RFC 2460, "There is no requirement that all, or even most, packets belong to flows, *i.e.*, carry non-zero flow labels [such as QoS] . . . [and] protocol designers and implementers [should] not assume otherwise."[103] One expert has indicated, however, that "without the flow label and hop-by-hop option processing of IPv6, [optimal QoS operations] would not be possible."[104]

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[97] For example, a laptop linked to the Internet at home could be carried to work and then connected to the Internet there. Alternatively, a mobile phone user, who is browsing the Web, could remain seamlessly connected to the Internet while traveling from Boston to New York by linking to networks along the way. In both cases users can be reached by simply querying their home IP addresses.

[98] An improved ability to provide such seamless mobility services will likely be a significant incentive for mobile service providers to deploy IPv6. *See*, *e.g.*, Public Meeting Transcript, *supra* note 41, at 69-70 (remarks of Mark Desautels, CTIA).

[99] *See Wikipedia: The Free Encyclopedia*, "Internet Protocol", *at* http://en.wikipedia.org/wiki/Internet_Protocol (last modified Nov. 29, 2004).

[100] *See* hyperdictionary, "Quality of Service: Dictionary Entry and Meaning," *at* http://www.hyperdictionary.com/search.aspx?define=quality+of+service (last visited Dec. 21, 2004) (quality of service is "the performance properties of a network service, possibly including throughput, transit delay, and priority").

[101] *See* Hain Comments at 3; Internet2 Comments at 3-4.

[102] *See Protocol Dictionary*, "IPv6 (IPng): Internet Protocol version 6," *at* http://www.javvin.com/protocolIPv6.html (last visited Dec. 21, 2004).

[103] S. Deering and R. Hinden, "Internet Protocol, Version 6 (IPv6) Specification," 30 (Dec. 1998), *at* http://www.ietf.org/rfc/rfc2460.txt.

[104] Lawrence Roberts, "QoS Signaling for IPv6," § 1.1, at 2 (Dec. 11, 2003), http://ftp.tiaonline.org/tr-34/tr3417/Working/Dec-03 (last visited July 16, 2004) (document is only available with a password).

The IETF has begun to develop standards and specifications that would allow users and service providers to exploit the potential benefit of the IPv6 flow label. In March 2004, it released a foundation document that specified the flow label field and identified minimum requirements for IPv6 source nodes that wish to label packet flows, for IPv6 routers forwarding labeled packets, and flow state establishment methods.[105] Additional work will be needed to build on these basic requirements to create flow label specifications for particular uses, such as QoS.[106] It, therefore, appears that significantly more work is needed before a mature QoS standard is specified and, in turn, the potential QoS benefits of IPv6 can be realized.

Another constraint on the wide scale implementation of QoS, either in IPv6 or IPv4, would be the lack of QoS support in any one network segment of the transmission path.[107] Such a deficiency could negate QoS gains realized in the rest of the network path. Further, from a commercial standpoint, service providers will not offer QoS support unless the offered differential in service quality translates into increased revenues from customers (*i.e*., if QoS utilization translates to improved service for the user and higher revenue for the provider).

2.1.4   Reduced Network Administration Costs

Experts have suggested that IPv6 will reduce network administration costs in the long run if enterprises reorganize their networking structure and operating processes to take advantage of IPv6's capabilities and remove NATs from their networks.[108] For example, the autoconfiguration feature available in IPv6 can simplify the connection of hosts and other devices to the Internet, thus reducing management overhead for network administrators.[109] The vast number of addresses available under IPv6 could simplify (and thus reduce the costs of) subnet management because each subnet could be given substantially more address space than the number of nodes that could be connected to it.[110]
If adoption of IPv6 motivates an organization to dispense with NATs, network administrators could more effectively use ping, traceroute, and other tools to diagnose network problems or to debug applications

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[105] J. Rajahalme, et al., "IPv6 Flow Level Specification," Internet Society, RFC 3697 (March 2004), *at* ftp://ftp.rfc-editor.org/in-notes/rfc3697.txt. A "flow" is "a sequence of packets sent from a particular source to a particular . . . destination that the source desires to label as a flow." *Id*. at 1 (§ 1).

[106] *See id*. at 2 (§1).

[107] *See id*. at 3 (§ 4) ("To enable flow-specific treatment, flow state needs to be established on all or a subset of the IPv6 nodes on the path from the source to the destination(s)."). The presence of NATs may also complicate deployment of QoS. *See* Internet2 Comments at 4.

[108] March Streck Interview, *supra* note 82. The cost to upgrade to IPv6 and adjust a network to use the capabilities of IPv6 (*e.g*., remove NATs) could be very costly depending on the specific setup of a particular network.

[109] *See* Cisco Comments at 5; GSA Comments at 6; Microsoft Comments at 5; Sprint Comments at 8. *See also* Public Hearing Transcript, *supra* note 41, at 57 (remarks of Latif Ladid, NAv6TF) (research by Forrester Research Group suggests that autoconfiguration could pay for IPv6 implementation within one year). With autoconfiguration, a user can simply plug a host device into the network and it will automatically configure an IP address and network prefix and find all available routers. GSA Comments at 6.

[110] *See* Cisco Comments at 4.

between pairs of hosts.[111] Removal of NATs could also simplify use of multivendor networking solutions.[112] Furthermore, decreasing the number of processing functions in a network (*e.g.*, by eliminating NATs) could reduce the number of components that can fail, increase network resilience, and reduce management complexity and support costs.[113]

To the extent that the administrative cost savings of IPv6 depend on the removal of NATs, however, the potential savings may be constrained or even negated by the likely persistence of those devices in an IPv6 environment. More generally, immediate reductions in administrative costs flowing from adoption of IPv6 will likely not exist,[114] although the cumulative savings should eventually exceed transition costs. Many networks may not see a net reduction in costs for at least five or more years after initial IPv6 deployment, depending on the priority assigned to upgrading of systems, specific network complexities, and other issues that may arise during transition.[115]

Additionally, some experts have stated that aggregate administrative reductions will not be realized because new IPv6 issues related to new/advanced applications and projected increases in Internet traffic could incur added costs, including additional administrative activities.[116] However, this development still implies a decrease in the cost per unit of information exchanged.

In summary, during the extended transition period in which both IPv4 and IPv6 support will be required, total operational expenses (OPEX) for network operations will likely increase, rather than decrease. Any OPEX cost reduction will probably not be realized until significant operational experience has been gained at all levels of the network, including the application developer and user levels. This may not accrue for ten or more years.

2.1.5 Increased Overall Network Efficiency

Removing NATs, firewalls, and middleboxes, and/or restructuring network routing mechanisms (and administrative activities) would likely result in fewer processing steps and reduced transmission bottlenecks.[117] The change to a fixed header size in IPv6 could yield processing efficiencies, and deployment of IPv6 could also allow routing tables to be reduced in size and redesigned for maximum

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[111] *See* Internet2 Comments at 2-3 ("expert ISP engineers and ordinary users have their time wasted trying to debug network problems either caused by the NAT boxes or made more difficult to diagnose by the NAT boxes").

[112] NAv6TF notes that voice and data are converging into one platform. NAv6TF Comments at 23. If middleware, such as gateways and NATs, is required everywhere, the cost for single-vendor solutions may be containable, but multi-vendor solutions will be costly interoperability propositions.

[113] *See* Cisco Comments at 4.

[114] *See infra* Section 2.2 for more information on the sorts of costs that may be incurred in the transition to IPv6.

[115] This conclusion is based on RTI's analysis of RFC comments, extensive literature reviews, and discussions with stakeholders and experts.

[116] *See* March Streck Interview, *supra* note 82.

[117] Network processing to maintain NAT translation tables can cause a bottleneck if network traffic grows very rapidly.

efficiency.[118] Some experts have said that such benefits will result only when IPv6 use is widespread.[119] The potential increase in overall network efficiency, moreover, may be difficult to correlate with adoption of IPv6. A much better benchmark, and the metric of greatest interest to the user community, is whether the performance of E2E and other applications improves significantly when using IPv6 transport.

Table 2-1. Overview of IPv6 Benefits

Benefits	Magnitude of Potential Benefits	Timing Issues	Likelihood of Occurrence	Key Factors in Realizing Benefits of IPv6
Increased address space	Large	No near-term shortage in U.S.	Medium/High	Removal of NATs; growth in number of end-to-end and other applications
Simplified mobility	Large	New applications will likely flow from Asian test markets	Medium/High	Growth/demand for new applications
Reduced network administration costs	Modest	Cost may increase during transition	Medium (in the long term)	Removal of NATs
Improved overall network efficiency	Modest	Efficiency may not improve until after large scale transition	Low	Removal of NATs
Improved QoS capabilities	Modest/Small	Few benefits in the near future	Low	Ongoing standardization and subsequent implementation of QoS "flow label" field

Source: RTI estimates based on RFC responses and discussions with industry stakeholders.

2.1.6 Summary

As the foregoing discussion indicates (and as Table 2-1 summarizes), adoption of IPv6 can potentially produce measurable benefits for users, equipment vendors, and service providers. The largest likely benefits will be realized in the areas of increased address space (and associated innovations in services and applications) and improved mobility. Additional work must be done (*e.g.*, removal of NATs, restructuring of networks, and standards setting) to fully capture the potential benefits. Although the long-term benefits may be considerable, the short-term benefits for many organizations may not exceed the costs of moving from IPv4 to IPv6 on a greatly accelerated basis.

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[118] In this statement, "routing tables" generally refers to backbone routers and national DNS routing tables. As the number of IP addresses has grown, these routing tables have tracked individual IP addresses rather than utilizing hierarchical mapping, in which one IP address can afford entry to many others. In IPv6 routing tables, a more hierarchical approach could be used to reduce the size of backbone routing tables, as well as those of all routers. The potential network efficiency gains, however, would be experienced at the backbone level.

[119] March Streck Interview, *supra* note 82.

2.2 Stakeholder Costs of Adopting IPv6

The potential costs associated with deploying IPv6 consist of a mixture of hardware, software, labor, and miscellaneous costs.[120] The transition to IPv6 is not analogous to turning on a light switch; instead, many different paths to some level of IPv6 deployment can be forged. Each organization or user throughout the Internet supply chain will incur some costs to transition to IPv6, primarily in the form of labor and capital expenditures required to integrate IPv6 capabilities into existing networks.

Expenditures and support activities will vary greatly across and within stakeholder groups depending on their existing infrastructure and IPv6-related needs. By and large, ISPs offering service to large groups of customers will likely incur the largest transition costs per organization, while independent users will bear little, if any, costs.[121] Factors influencing these costs include:

- the type of Internet use or type of service being offered by each organization;
- the transition mechanism(s) that the organization intends to implement (*e.g.*, tunneling, dual-stack, translation, or a combination);
- the organization-specific infrastructure comprised of servers, routers, firewalls, billing systems, and standard and customized network-enabled software applications;
- the level of security required during the transition; and
- the timing of the transition.

Table 2-2 provides a list of relative costs that may be incurred by stakeholder group and gives a percentage breakdown by cost category. Table 2-3 provides an item-by-item list of the costs to deploy IPv6 by stakeholder group. This is a relative comparison of costs and should not be interpreted as representing the actual size of each stakeholder group's cost. Further, small Internet users (*e.g.*, home and small businesses) are not captured in Table 2-3 because they will likely incur virtually no costs. Small Internet users will receive software upgrades (*e.g.*, operating systems and email software) as new versions are purchased, that their IPv4-only hardware (*e.g.*, routers and modems) will be replaced over time as part of normal upgrade expenditures, and that IPv6 will eventually be provided at no additional cost.[122]

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[120] For a case study of how and at what pace an enterprise might adopt IPv6 and the sorts of costs it would likely incur, see Appendix A.

[121] This assumes that adoption occurs after routine cyclical upgrades provide IPv6 capabilities in hardware and software to the user community.

[122] This conclusion is based on RTI's analysis of RFC comments, extensive literature reviews, and discussions with stakeholders and experts *See also* Cisco Comments at 10 (as IPv6 becomes more prevalent, "customers will be able to transition based on their need to do so without excessive regard to hardware costs").

Table 2-2. Overview of Relative IPv6 Costs

Stake-holders	Relative Cost	Transition Cost Breakdown[a]			Timing Issues	Key Factors in Bearing Costs
		Hard-ware (HW)	Soft-ware (SW)	Labor		
Hardware Vendors	Low[b]	10%	10%	80%	Currently most are providing IPv6 capabilities	Rolling in IPv6 as standard R&D expense; international interest and future profits incentivize investments
Software Vendors	Low / Medium [c]	10%	10%	80%	Currently some are providing IPv6 capabilities	Interoperability issues could increase costs
Internet Users (large)	Medium	10%	20%	70%	Very few currently using IPv6; HW and SW will become capable as routine upgrade; enabling cost should decrease over time	Users will wait for significantly lower enablement costs or (more probably) a killer application requiring IPv6 for end-to-end functionality before enabling
Internet Users (small)	Low	30%	40%	30%	Availability and adoption schedules	With little money to spare, these users must see a clear return on investment (ROI).
Internet Service Providers (ISPs)	High[d]	15%	15%	70%	Very few offering IPv6 service; no demand currently; very high cost currently to upgrade major capabilities	ISPs see low or nonexistent ROI, high costs, and high risk

Source: RTI estimates based on RFC responses, discussions with industry stakeholders, and an extensive literature review.

[a] These costs are estimates based on conversations with numerous stakeholders and industry experts. Several assumptions underlie them. First, it is assumed that IPv6 is not enabled (or "turned on") or included in products and no IPv6 service is offered until it makes business sense for each stakeholder group. Hardware and software costs are one-time costs. Labor costs could continue for as long as the transition period and possibly longer.

[b] For hardware vendors producing high-volume parts that require changes to application-specific integrated circuits (ASIC), the costs could be very high and would not be offered until the market is willing to pay.

[c] Software developers of operating systems have and will incur a relatively low cost; however, application developers will incur greater relative costs, designated as medium.

[d] The relative cost for ISPs is particularly high if the ISP manages equipment at user sites, because premises equipment is more costly to manage and maintain.

Semantic Web Stack

From Wikipedia, the free encyclopedia

The *Semantic Web Stack*, also known as *Semantic Web Cake* or *Semantic Web Layer Cake*, illustrates the architecture of the Semantic Web₂.

Contents

- 1 Overview
- 2 Semantic Web Technologies
    - 2.1 Hypertext Web technologies
    - 2.2 Standardized Semantic Web technologies
    - 2.3 Unrealized Semantic Web technologies
- 3 Notes

Semantic Web Stack

Overview

The *Semantic Web Stack* is an illustration of the hierarchy of languages, where each layer exploits and uses capabilities of the layers below. It shows how technologies that are standardized for Semantic Web₂ are organized to make the Semantic Web possible. It also shows how Semantic Web is an extension (not replacement) of classical hypertext web.

The illustration was created by Tim Berners-Lee₂.[1] The stack is still evolving as the layers are concretized.[2][3]

Semantic Web Technologies

As shown in the Semantic Web Stack, the following languages or technologies are used to create Semantic Web₂. The technologies from the bottom of the stack up to OWL₂ are currently standardized and accepted to build Semantic Web applications. It is still not clear how the top of the stack is going to be implemented. All layers of the stack need to be implemented to achieve full visions of the Semantic Web₂.

Hypertext Web technologies

The bottom layers contain technologies that are well known from hypertext web and that without change provide basis for the semantic web.

- Internationalized Resource Identifier₂ (IRI₂), generalization of URI₂, provides means for uniquely identifying semantic web resources. Semantic Web needs unique identification to allow provable
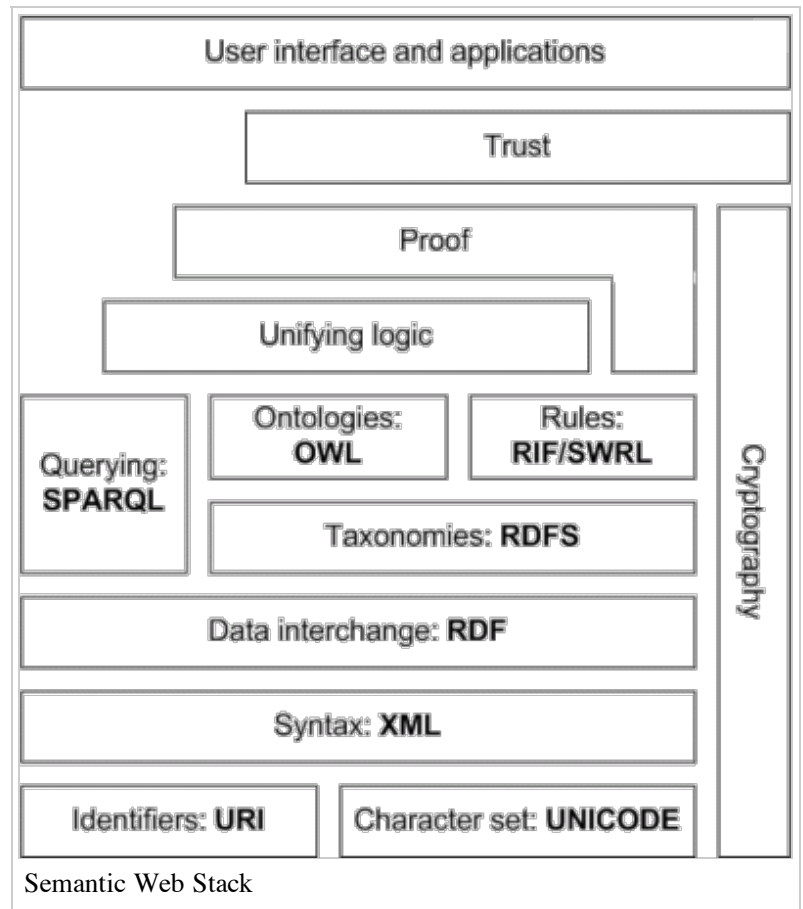
manipulation with resources in the top layers.

- Unicode₂ serves to represent and manipulate text in many languages. Semantic Web should also help to bridge documents in different human languages, so it should be able to represent them.
- XML₂ is a markup language that enables creation of documents composed of structured data. Semantic web gives meaning (semantics) to structured data.
- XML Namespaces₂ provides a way to use markups from more sources. Semantic Web is about connecting data together, and so it is needed to refer more sources in one document.

Standardized Semantic Web technologies

Middle layers contain technologies standardized by W3C₂ to enable building semantic web applications.

- Resource Description Framework₂ (RDF) is a framework for creating statements in a form of so-called triples. It enables to represent information about resources in the form of graph - the semantic web is sometimes called Giant Global Graph₂.
- RDF Schema₂ (RDFS₂) provides basic vocabulary for RDF. Using RDFS it is for example possible to create hierarchies of classes and properties.
- Web Ontology Language₂ (OWL) extends RDFS by adding more advanced constructs to describe semantics of RDF statements. It allows stating additional constraints, such as for example cardinality, restrictions of values, or characteristics of properties such as transitivity. It is based on description logic₂ and so brings reasoning power to the semantic web.
- SPARQL₂ is a RDF query language - it can be used to query any RDF-based data (i.e., including statements involving RDFS and OWL). Querying language is necessary to retrieve information for semantic web applications.

Unrealized Semantic Web technologies

Top layers contain technologies that are not yet standardized or contain just ideas that should be implemented in order to realize Semantic Web.

- RIF₂ or SWRL₂ will bring support of rules. This is important for example to allow describing relations that cannot be directly described using description logic used in OWL.
- Cryptography₂ is important to ensure and verify that semantic web statements are coming from trusted source. This can be achieved by appropriate digital signature₂ of RDF statements.
- Trust to derived statements will be supported by (a) verifying that the premises come from trusted source and by (b) relying on formal logic during deriving new information.
- User interface₂ is the final layer that will enable humans to use semantic web applications.

Notes

1. ^ "Semantic Web - XML2000, slide 10" (http://www.w3.org/2000/Talks/1206-xml2k-tbl/slide10-0.html). W3C₂. Retrieved 2008-05-13.
2. ^ "Representing Knowledge in the Semantic Web, slide 7" (http://www.w3c.it/talks/2005/openCulture/slide7-0.html). W3C₂. Retrieved 2008-05-13.
3. ^ "Semantic Web, and Other Technologies to Watch, slide 24" (http://www.w3.org/2007/Talks/0130-sb-W3CTechSemWeb/#(24)). W3C₂. Retrieved 2008-05-13.

Retrieved from "http://en.wikipedia.org/w/index.php?title=Semantic_Web_Stack&oldid=542880758"

Description of W3C Technology Stack Illustration

The W3C Technology Stack illustration depicts a model of two layers: the Web architecture (also labelled as "One Web") built on top of the Internet architecture. The illustration fleshes out the middle Web layer by showing the areas of interest and technologies developed at W3C.

The Web architecture is depicted as a series of layers, each building on the other. From bottom to top, these layers contain:

- URI/IRI, HTTP
- Web Architectural Principles
- XML Infosets; RDF(S) Graphs
- XML, Namespaces, Schemas, XQuery/XPath, XSLT, DOM, XML Base, XPointer, RDF/XML, SPARQL

On top of these layers sit six boxes, corresponding to groups of major W3C Activities: Web Applications, Mobile, Voice, Web Services, Semantic Web, and Privacy.

The Interaction box lists XHTML, SVG, CDF, SMIL, XForms, CSS, and WCID.

The Mobile box lists XHTML Basic, Mobile SVG, SMIL Mobile, XForms Basic, CSS Mobile, MWI BP.

The Voice box lists VoiceXML, SRGS, SSML, CCXML, and EMMA

The Web Services box lists SOAP, XOP, WSDL, WS-CDL, and WS-A.

The Semantic Web box lists OWL, SKOS, and RIF.

The Privacy box lists P3P, APPEL, XML Encryption, XML Signature, and XKMS

A red and yellow banner (representing horizontal coordination at W3C) ties these four areas together and reads: Web Accessibility, Internationalization, Mobile Access, Device Independence, and Quality Assurance.

Communications Team
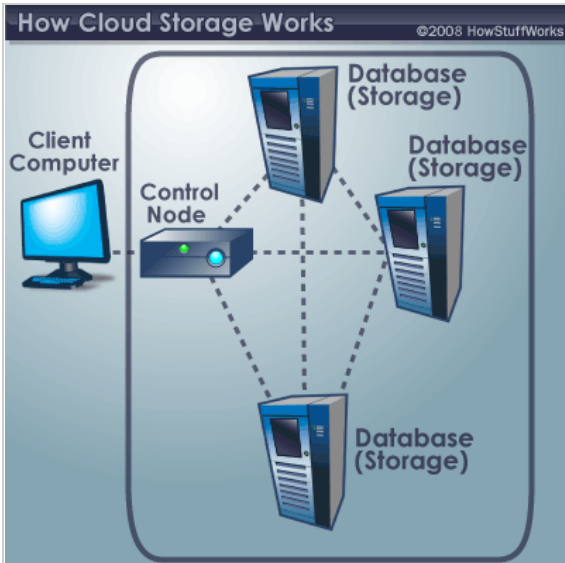*last revised $Date: 2010/03/02 13:33:22 $ by $Author: ijacobs $*
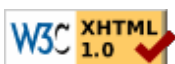
How Cloud Storage Works

by Jonathan Strickland

Browse the article **How Cloud Storage Works**

A typical cloud storage system architecture includes a master control server and several storage servers.
HowStuffWorks 2008

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Introduction to How Cloud Storage Works

Comedian George Carlin has a routine in which he talks about how humans seem to spend their lives accumulating "stuff." Once they've gathered enough stuff, they have to find places to store all of it. If Carlin were to update that routine today, he could make the same observation about computer information. It seems that everyone with a computer spends a lot of time acquiring data and then trying to find a way to store it.

For some computer owners, finding enough storage space to hold all the data they've acquired is a real challenge. Some people invest in larger hard drives. Others prefer external storage devices like thumb drives or compact discs. Desperate computer owners might delete entire folders worth of old files in order to make space for new information. But some are choosing to rely on a growing trend: **cloud storage**.

While cloud storage sounds like it has something to do with weather fronts and storm systems, it really refers to saving data to an off-site storage system maintained by a third party. Instead of storing information to your computer's hard drive or other local storage device, you save it to a remote database. The Internet provides the connection between your computer and the database.

On the surface, cloud storage has several advantages over traditional data storage. For example, if you store your data on a cloud storage system, you'll be able to get to that data from any location that has Internet access. You wouldn't need to carry around a physical storage device or use the same computer to save and retrieve your information. With the right storage system, you could even allow other people to access the data, turning a personal project into a collaborative effort.

So cloud storage is convenient and offers more flexibility, but how does it work? Find out in the next section.

OWNING UP

One issue that information experts, computer scientists and entrepreneurs debate is the concept of data ownership. Who owns the data stored in a cloud system? Does it belong to the client who originally saved the data to the hardware? Does it belong to the company that owns the physical equipment storing the data? What happens if a client goes out of business? Can a cloud storage host delete the former client's data? Opinions vary on these issues.

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It's All Geek To Me: Saving Past Data, Part 5

CASTLE IN THE CLOUDS
Cloud storage is a subcategory of **cloud computing**. Cloud computing systems offer users

There are hundreds of different cloud storage systems. Some have a very specific focus, such as storing Web

access to not only storage, but also processing power and computer applications installed on a remote network.

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e-mail messages or digital pictures. Others are available to store all forms of digital data. Some cloud storage systems are small operations, while others are so large that the physical equipment can fill up an entire warehouse. The facilities that house cloud storage systems are called **data centers**.

At its most basic level, a cloud storage system needs just one data server connected to the Internet. A client (e.g., a computer user subscribing to a cloud storage service) sends copies of files over the Internet to the data server, which then records the information. When the client wishes to retrieve the information, he or she accesses the data server through a Web-based interface. The server then either sends the files back to the client or allows the client to access and manipulate the files on the server itself.

Cloud storage systems generally rely on hundreds of data servers. Because computers occasionally require maintenance or repair, it's important to store the same information on multiple machines. This is called **redundancy**. Without redundancy, a cloud storage system couldn't ensure clients that they could access their information at any given time. Most systems store the same data on servers that use different power supplies. That way, clients can access their data even if one power supply fails.

Not all cloud storage clients are worried about running out of storage space. They use cloud storage as a way to create backups of data. If something happens to the client's computer system, the data survives off-site. It's a digital-age variation of "don't put all your eggs in one basket."

What are some examples of cloud storage systems? Keep reading to find out.

These servers store Electronic Health Records (EHR) for the Military Health System, allowing doctors to access health records of patients instantly.
David S. Holloway/Getty Images

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Examples of Cloud Storage

There are hundreds of cloud storage providers on the Web, and their numbers seem to increase every day. Not only are there a lot of companies competing to provide storage, but also the amount of storage each company offers to clients seems to grow regularly.

You're probably familiar with several providers of cloud storage services, though you might not think of them in that way. Here are a few well-known companies that offer some form of cloud storage:

- Google Docs allows users to upload documents, spreadsheets and presentations to Google's data servers. Users can edit files using a Google application. Users can also publish documents so that other people can read them or even make edits, which means Google Docs is also an example of cloud computing.

- Web e-mail providers like Gmail, Hotmail and Yahoo! Mail store e-mail messages on their own servers. Users can access their e-mail from computers and other devices connected to the Internet.

- Sites like Flickr and Picasa host millions of digital photographs. Their users create online photo albums by uploading pictures directly to the services' servers.

- YouTube hosts millions of user-uploaded video files.

- Web site hosting companies like StartLogic, Hostmonster and GoDaddy store the files and data for client Web sites.

- Social networking sites like Facebook and MySpace allow members to post pictures and other content. All of that content is stored on the respective site's servers.

- Services like Xdrive, MediaMax and Strongspace offer storage space for any kind of digital data.

Some of the services listed above are free. Others charge a flat fee for a certain amount of storage, and still others have a sliding scale depending on what the client needs. In general, the price for online storage has fallen as more companies have entered the industry. Even many of the companies that charge for digital storage offer at least a certain amount for free.

Is there enough of a demand for storage to support all the companies jumping into the market? Some people think that if there's space to be filled, someone will fill it. Others think the industry is destined to experience a crash not unlike the dot-com bubble burst in 2000.

We'll have to wait and see.

What are some potential cloud storage problems? Find out in the next section.

A STORM'S BREWING

Some people envision a future in which the entire Web becomes a massive storage cloud. People will constantly upload and download data to and from the cloud. The concept of data ownership will lose its meaning. Everyone will have access to everything and secrecy will cease to exist. Other people dismiss these ideas and say that cloud storage is just a tool like any other, and while some might use it to great advantage, it won't bring about the end of civilization as we know it. Who's right? We'll just have to wait and see.

DATA CENTER DESIGN

Concerns about Cloud Storage

- Physical security is just as important as network security. Data servers are valuable not only because the machines themselves are expensive, but also because the data stored on them could include sensitive information. Malicious hackers don't rely solely on cracking into a computer system electronically -- sometimes they try to infiltrate a system by gaining access to its physical computers.
- A single data server's power requirements aren't very taxing. But when a data center has hundreds of servers, it's crucial that the center's electric wiring can support the workload.
- Like all computers, data servers generate heat. Too much heat can impair or damage servers, so the data center needs an effective cooling system to prevent such problems.

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The two biggest concerns about cloud storage are **reliability** and **security**. Clients aren't likely to entrust their data to another company without a guarantee that they'll be able to access their information whenever they want and no one else will be able to get at it.

To secure data, most systems use a combination of techniques, including:

- **Encryption**, which means they use a complex **algorithm** to encode information. To decode the encrypted files, a user needs the encryption key. While it's possible to crack encrypted information, most hackers don't have access to the amount of computer processing power they would need to decrypt information.
- **Authentication** processes, which require to create a user name and password.
- **Authorization** practices -- the client lists the people who are authorized to access information stored on the cloud system. Many corporations have multiple levels of authorization. For example, a front-line employee might have very limited access to data stored on a cloud system, while the head of human resources might have extensive access to files.

Even with these protective measures in place, many people worry that data saved on a remote storage system is vulnerable. There's always the possibility that a hacker will find an electronic back door and access data. Hackers could also attempt to steal the physical machines on which data are stored. A disgruntled employee could alter or destroy data using his or her authenticated user name and password. Cloud storage companies invest a lot of money in security measures in order to limit the possibility of data theft or corruption.

The other big concern, reliability, is just as important as security. An unstable cloud storage system is a liability. No one wants to save data to a failure-prone system, nor do they want to trust a company that isn't financially stable. While most cloud storage systems try to address this concern through redundancy techniques, there's still the possibility that an entire system could crash and leave clients with no way to access their saved data.

Cloud storage companies live and die by their reputations. It's in each company's best interests to provide the most secure and reliable service possible. If a company can't meet these basic client expectations, it doesn't have much of a chance -- there are too many other options available on the market.

To learn more about cloud storage systems and related topics, follow the links on the next page.

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How E-commerce Works

by Marshall Brain

Browse the article **How E-commerce Works**

Introduction to How E-commerce Works

Unless you have been living under a rock for the last few years, you have probably heard about **e-commerce**. And you have heard about it from several different angles. You may have:

- heard about all of the companies that offer e-commerce because you have been bombarded by their TV and radio ads
- read all of the news stories about the shift to e-commerce and the hype that has developed around e-commerce companies
- seen the huge valuations that Web companies get in the stock market, even when they don't make a profit
- purchased something on the Web, so you have direct personal experience with e-commerce

Still, you may feel like you don't understand e-commerce at all. What is all the hype about? Why the huge valuations? And most importantly, is there a way for you to participate? If you have an e-commerce idea, how might you get started implementing it? If you have had questions like these, then this article will help out by exposing you to the entire e-commerce space.

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How E-books Work

Before we get into a complete discussion of **e-commerce**, it is helpful to have a good mental image of plain old commerce first. If you understand commerce, then e-commerce is an easy extension.

Merriam-Webster's Collegiate Dictionary gives a few definitions of commerce:

com.merce n [MF, fr. L commercium, fr. com- + merc-, merx merchandise] (1537) **1:** *social intercourse: interchange of ideas, opinions, or sentiments* **2:** *the exchange or buying and selling of commodities on a large scale involving transportation from place to place* **3:** *sexual intercourse*

We tend to be interested in the second definition, but that third one is interesting and unexpected -- maybe that's what all of the hype is about?

So commerce is, quite simply, the exchange of goods and services, usually for money. We see commerce all around us in in millions of different forms. When you buy something at a grocery store you are participating in commerce. In the same way, if you cart half of your possessions onto your front lawn for a yard sale, you are participating in commerce from a different angle. If you go to work each day for a company that produces a product, that is yet another link in the chain of commerce. When you think about commerce in these different ways, you instinctively recognize several different roles:

- **Buyers** - these are people with money who want to purchase a good or service.
- **Sellers** - these are the people who offer goods and services to buyers. Sellers are generally recognized in two different forms: **retailers** who sell directly to consumers and **wholesalers** or **distributors** who sell to retailers and other businesses.
- **Producers** - these are the people who create the products and services that sellers offer to buyers. A producer is always, by necessity, a seller as well. The producer sells the products produced to wholesalers, retailers or directly to the consumer.

You can see that at this high level, commerce is a fairly simple concept. Whether it is something as simple as a person making and selling popcorn on a street

corner or as complex as a contractor delivering a space shuttle to NASA, all of commerce at its simplest level relies on buyers, sellers and producers.

Launch Video

Shopping Online

When you get down to the actual elements of commerce and commercial transactions, things get slightly more complicated because you have to deal with the details. However, these details boil down to a finite number of steps. The following list highlights all of the elements of a typical commerce activity. In this case, the activity is the sale of some product by a retailer to a customer:

- If you would like to sell something to a customer, at the very core of the matter is the something itself. You must have a **product or service** to offer. The product can be anything from ball bearings to back rubs. You may get your products directly from a producer, or you might go through a distributor to get them, or you may produce the products yourself.

- You must also have a **place** from which to sell your products. Place can sometimes be very ephemeral -- for example a phone number might be the place. If you are a customer in need of a massage, if you call "Judy's Massages, Inc." on the telephone to order a massage, and if Judy shows up at your office to give you a massage, then the phone number is the place where you purchased this service. For most physical products we tend to think of the place as a store or shop of some sort. But if you think about it a bit more you realize that the place for any traditional mail order company is the combination of an ad or a catalog and a phone number or a mail box.

- You need to figure out a way to get people to come to your place. This process is known as **marketing**. If no one knows that your place exists, you will never sell anything. Locating your place in a busy shopping center is one way to get traffic. Sending out a mail order catalog is another. There is also advertising, word of mouth and even the guy in a chicken suit who stands by the road waving at passing cars.

- You need a way to accept **orders**. At Wal-Mart this is handled by the check out line. In a mail order company the orders come in by mail or phone and are processed by employees of the company.

- You also need a way to accept **money**. If you are at Wal-Mart you know that you can use cash, check or credit cards to pay for products. Business-to-business transactions often use purchase orders. Many businesses do not require you to pay for the product or service at the time of delivery, and some products and services are delivered continuously (water, power, phone and pagers are like this). That gets into the whole area of **billing** and **collections**.

- You need a way to deliver the product or service, often known as **fulfillment**. At a store like Wal-mart fulfillment is automatic. The customer picks up the item of desire, pays for it and walks out the door. In mail-order businesses the item is packaged and mailed. Large items must be loaded onto trucks or trains and shipped.

- Sometimes customers do not like what they buy, so you need a way to accept **returns**. You may or may not charge certain fees for returns, and you may or may not require the customer to get authorization before returning anything.

- Sometimes a product breaks, so you need a way to honor warranty claims. For retailers this part of the transaction is often handled by the producer.

- Many products today are so complicated that they require **customer service** and **technical support** departments to help customers use them. Computers are a good example of this sort of product. On-going products like cell phone service may also require on-going customer service because customers want to change the service they receive over time. Traditional items (for example, a head of lettuce), generally require less support that modern electronic items.

You find all of these elements in any traditional mail order company. Whether the company is selling books, consumer products, information in the form of reports and papers, or services, all of these elements come into play.

In an e-commerce sales channel you find all of these elements as well, but they change slightly. You must have the following elements to conduct e-commerce:

- A product
- A place to sell the product - in e-commerce, a Web site displays the products in some way and acts as the place
- A way to get people to come to your Web site
- A way to accept orders - normally an on-line form of some sort
- A way to accept money - normally a merchant account handling credit card payments. This piece requires a secure ordering page and a connection to a bank. Or you may use more traditional billing techniques either online or through the mail.
- A fulfillment facility to ship products to customers (often outsource-able). In the case of software and information, however, fulfillment can occur over the Web

through a file download mechanism.

- A way to accept returns
- A way to handle warranty claims if necessary
- A way to provide customer service (often through email, on-line forms, on-line knowledge bases and FAQs, et cetera)

In addition, there is often a strong desire to integrate other business functions or practices into the e-commerce offering. An extremely simple example -- you might want to be able to show the customer the exact status of an order.

Why the Hype?

There is a huge amount of hype that surrounds e-commerce. Given the similarities with mail order commerce, you may be wondering why the hype is so common. Take, for example, the following quotes:

- "...the estimate of U.S. retail e-commerce sales for the third quarter of 2005, adjusted for seasonal variation and holiday and trading-day differences, but not for price changes, was $22.3 billion, an increase of 5.7 percent (±1.7%) from the second quarter of 2005."-- U.S. Census Bureau

- "2004 online retail sales rose 23.8 percent to $89 billion, representing 4.6 percent of total retail sales. Including travel, online sales also rose 23.8 percent to $141.4 billion. Online retail sales will reach $109.6 billion [in 2005]. Online sales including travel will rise to $172.4 billion this year." -- Forrester

- "Online ad growth of 33.7 percent is expected in 2005 to $12.7 billion, raising a previous estimate of $11.5 billion for the year. eMarketer had estimated 2004 ad revenue at $9.5 billion." -- eMarketer

This sort of hype applies to a wide range of products. According to eMarketer the biggest product categories include:

- Computer products (hardware, software, accessories)
- Books
- Music
- Financial Services
- Entertainment
- Home Electronics
- Apparel
- Gifts and flowers
- Travel services
- Toys
- Tickets
- Information

The Dell Example

The hype doesn't explain the frantic rush by companies, both large and small, to get to the Web. Nor does it justify a small business making a big expenditure on an e-commerce facility. What is driving this sort of frenzy? To understand it a bit, let's take a look at one of the most successful e-commerce companies: Dell.

Dell is a straightforward company that, like a host of others, sells custom-configured PCs to consumers and businesses. Dell started as a mail-order company that advertised in the back of magazines and sold their computers over the phone. Dell's e-commerce presence is widely publicized these days because Dell is able to sell so much merchandise over the Web. According to IDG, Dell sold something like $14,000,000 in equipment every day in 2000, and 25 percent of Dell's sales were over the Web.

Does this matter? Dell has been selling computers by mail over the phone for more than a decade. Mail order sales is a standard way of doing things that has been around for over a century (Sears, after all, was a mail order company originally). So if 25 percent of Dell's sales move over to the Web instead of using the telephone, is that a big deal? The answer could be **yes** for three reasons:

- If Dell were to lose 25 percent of its phone sales to achieve its 25 percent of sales over the web, then it is not clear that e-commerce has any advantage. Dell would be selling no more computers. But what if the sales conducted over the web cost the company less (for example, because the company does not have to hire someone to answer the phone)? Or what if people purchasing over the web tend to purchase more accessories? If the transaction cost on the web is lower, or if the presentation of merchandise on the web is more inviting and encourages larger transactions, then moving to the web is productive for Dell.

- What if, in the process of selling merchandise over the Web, Dell lost no sales through its traditional phone channel? That is, what if there just happens to be a percentage of the population that prefers to buy things over the Web (perhaps because there is more time to think, or because you can try lots of different options to see what happens to the final price, or because you can compare multiple vendors easily, or whatever). In building its web site to attract these buyers, Dell may be able to lure away customers from other vendors who do not offer such a service. This gives Dell a competitive advantage that lets it increase its market share.

- There is also a widely held belief that once a customer starts working with a vendor, it is much easier to keep that customer than it is to bring in new customers. So if you can build brand loyalty for a web site early, it gives you an advantage over other vendors who try to enter the market later. Dell implemented its Web site very early, and that presumably gives it an advantage over the competition.

These three trends are the main drivers behind the e-commerce buzz. There are other factors as well.

The Lure of E-commerce

The following list summarizes what might be called the "lure of e-commerce":

- Lower transaction costs - if an e-commerce site is implemented well, the web can significantly lower both order-taking costs up front and customer service costs after the sale by automating processes.

- Larger purchases per transaction - Amazon offers a feature that no normal store offers. When you read the description of a book, you also can see "what other people who ordered this book also purchased." That is, you can see the related books that people are actually buying. Because of features like these it is common for people to buy more books that they might buy at a normal bookstore.

- Integration into the business cycle - A Web site that is well-integrated into the business cycle can offer customers more information than previously available. For example, if Dell tracks each computer through the manufacturing and shipping process, customers can see exactly where their order is at any time. This is what FedEx did when they introduced on-line package tracking - FedEx made far more information available to the customer.

- People can shop in different ways. Traditional mail order companies introduced the concept of shopping from home in your pajamas, and e-commerce offers this same luxury. New features that web sites offer include the ability to build an order over several days, configure products and see actual prices, easily build complicated custom orders, compare prices between multiple vendors easily and search large catalogs easily.

- Larger catalogs - A company can build a catalog on the web that would never fit in an ordinary mailbox. For example, Amazon sells millions of books. Imagine trying to fit all of the information available in Amazon's database into a paper catalog!

- Improved customer interactions - With automated tools it is possible to interact with a customer in richer ways at virtually no cost. For example, the customer might get an email when the order is confirmed, when the order is shipped and after the order arrives. A happy customer is more likely to purchase something else from the company.

It is these sorts of advantages that create the buzz that surrounds e-commerce right now.

There is one final point for e-commerce that needs to be made. E-commerce allows people to create completely new business models. In a mail order company there is a high cost to printing and mailing catalogs that often end up in the trash. There is also a high cost in staffing the order-taking department that answers the phone. In e-commerce both the catalog distribution cost and the order taking cost fall toward zero. That means that it may be possible to offer products at a lower price, or to offer products that could not be offered before because of the change in cost dynamics.

However, it is important to point out that the impact of e-commerce only goes so far. Mail order sales channels offer many of these same advantages, but that does not stop your town from having a mall. The mall has social and entertainment aspects that attract people, and at the mall you can touch the product and take delivery instantly. E-commerce cannot offer any of these features. The mall is not going to go away anytime soon...

Easy and Hard Aspects of E-commerce

The things that are hard about e-commerce include:

- Getting traffic to come to your Web site
- Getting traffic to return to your Web site a second time
- Differentiating yourself from the competition

- Getting people to buy something from your Web site. Having people look at your site is one thing. Getting them to actually type in their credit card numbers is another.

- Integrating an e-commerce Web site with existing business data (if applicable)

There are so many Web sites, and it is so easy to create a new e-commerce web site, that getting people to look at yours is the biggest problem.

The things that are easy about e-commerce, especially for small businesses and individuals, include:

- Creating the web site
- Taking the orders
- Accepting payment

There are inumerable companies that will help you build and put up your electronic store. We'll discuss some options in the next section.

Building an E-commerce Site

The things you need to keep in mind when thinking about building an e-commerce site include:

- Suppliers - this is no different from the concern that any normal store or mail order company has. Without good suppliers you cannot offer products.

- Your price point - a big part of e-commerce is the fact that price comparisons are extremely easy for the consumer. Your price point is important in a transparent market.

- Customer relations - E-commerce offers a variety of different ways to relate to your customer. E-mail, FAQs, knowledge bases, forums, chat rooms... Integrating these features into your e-commerce offering helps you differentiate yourself from the competition.

- The back end: fulfillment, returns, customer service - These processes make or break any retail establishment. They define, in a big way, your relationship with your customer.

When you think about e-commerce, you may also want to consider these other desirable capabilities:

- Gift-sending
- Affiliate programs
- Special discounts
- Repeat buyer programs
- Seasonal or periodic sales

The reason why you want to keep these things in mind is because they are all difficult unless your e-commerce software supports them. If the software does support them, they are trivial.

Affiliate Programs

A big part of today's e-commerce landscape is the **affiliate program** (also known as associate programs). This area was pioneered by Amazon. Amazon allows anyone to set up a specialty book store. When people buy books from the specialty store, the person who owns the specialty bookstore gets a commission (up to 10 percent of the book's list price) from Amazon. The affiliate program gives Amazon great exposure because it now has over 1,000,000 specialty bookstores all over the Web [ref]. Therefore this model is now copied by thousands of e-commerce sites. If you are setting up an e-commerce site you will want to consider an affiliate program as one way to get exposure. Link Share is a company that helps e-commerce sites set up affiliate programs.

Another twist on affiliate programs is the **CPC Link** (CPC=Cost Per Click), also known as affiliate links or click-thru links. You put a link on your site and the company pays you when someone clicks on the link. A typical payment ranges from 5 cents to 20 cents per click. Affiliate links represent the middle ground between banner ads and commission-based affiliate programs. With banner ads, the advertiser takes all the risk -- if no one clicks on the banner then the advertiser wastes money. Commission-based affiliate programs place all the risk on the Web site. If the Web site sends a bunch of people to the affiliate e-commerce site but no one buys anything, then it has no value for the Web site. In CPC links, both sides share risks and rewards equally. You may want to consider setting up this sort of affiliate program to gain exposure for your e-commerce site.

Implementing an E-commerce Site

Let's say that you would like to create an e-commerce site. There are three general ways to implement the site with all sorts of variations in between. The three general ways are:

- Enterprise computing
- Virtual hosting services
- Simplified e-commerce

These are in order of decreasing flexibility and increasing simplicity.

Enterprise computing means that you purchase hardware and software and hire a staff of developers to create your e-commerce web site. Amazon, Dell and all of the other big players participate in e-commerce at the enterprise level. You might need to consider enterprise computing solutions if:

- You have immensely high traffic - millions of visitors per month
- You have a large database that holds your catalog of products (especially if the catalog is changing constantly)
- You have a complicated sales cycle that requires lots of customized forms, pricing tables, et cetera
- You have other business processes already in place and you want your e-commerce offering to integrate into them.

Virtual hosting services give you some of the flexibility of enterprise computing, but what you get depends on the vendor. In general the vendor maintains the equipment and software and sells them in standardized packages. Part of the package includes security, and almost always a merchant account is also an option. Database access is sometimes a part of the package. You provide the web designers and developers to create and maintain your site.

Simplified e-commerce is what most small businesses and individuals are using to get into e-commerce. In this option the vendor provides a simplified system for creating your store. The system usually involves a set of forms that you fill out online. The vendor's software then generates all of the web pages for the store for you. Two good examples of this sort of offering include Yahoo Stores and Verio Stores. You pay by the month for these services.

For lots more information on e-commerce and related topics, check out the links on the next page.

Lots More Information

Related HowStuffWorks Articles

- How Creating an Online Business Works
- How Credit Cards Work
- How Electronic Payments Work

How Creating an Online Business Works

by Lee Ann Obringer

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GET STARTED

- Create a Web Site
- Web Advertising
- Promote Your Online Business
- TreeHugger.com: Google Maps CleanTech Startups

Introduction to How Creating an Online Business Works

What does it take to put together a nice and effective e-commerce Web site? Is it a lot of money? Sometimes. Is it a lot of skill? Many times. Is it a lot common sense and lot of patience? Always! Creating your online business can be a long and arduous process, or it can be done relatively easily. Just read all of the Web-hosting ads and it sounds like your site will be up and taking order before you can say "huh?"

There are many ways you can get your site developed and selling. In this article, we're going to focus on making it happen. We'll cover some of your options as far as the simplified tools you can use, the more complicated programs that can be used, as well as farming it out to the pros, and some of the other issues that you have to settle like your Web host and making your customers feel secure giving you their credit card numbers.

Looking for ways to help your online business succeed? Click here to see how electronic notifications can help.

▶ **Launch Video**

How To Make Millions: J. Calacanis on Weblogsinc

Depending on your site's purpose in life, you may need few or many tools in order to make your online business venture work. First, ask yourself these questions:

Are you going to design your site yourself? If so, you'll need:

- experience and /or training in Web design (unless you go with the template or wizard-based tools that many all-inclusive services offer)
- a good computer with plenty of RAM (128 Mb and up) and hard drive space (6 GB minimum)
- web design software -- either WYSIWYG (what you see is what you get) or a text editor (if you know html)
- a scanner or digital camera -- for product or service photos
- image editing software
- illustration software to create graphics
- FTP software for uploading files to your Web site

Are you going to sell products from your site? If so, you'll need:

- a merchant account -- or some way to accept payments
- shopping cart software -- or some other way for shoppers to enter and keep up with their orders

- secure servers if you're accepting credit card payment or other personal payment information online
- software (or other process) to keep track of inventory and orders

Do you have a large number of products or services that need listing on your Web site? If so, you'll need:

- a database of product names, descriptions, pricing, and photos
- a system for establishing product numbers
- a system for inventory management
- technical know-how in incorporating the database into your Web site

Does your product or service require sound, video or animations? If so, you'll need:

- equipment to capture video and/or audio
- software for editing your video and/or audio clips
- software (and training) to create animations
- a broad-band Internet connection (helpful, but not absolutely necessary)
- or, a resource to whom you can farm these out

Regardless of how you answered the above questions, you'll need a computer with a good Internet connection for e-mailing and maintaining your site.

E-Commerce Tools: Merchant Accounts

Since e-commerce is usually at the heart of an online business, let's go into some more detail about the tools required to make it happen. Basically, if you want to sell products and collect payment electronically, you're going to have to have:

1. a merchant account -- an account that lets you collect payment via credit card
2. software to collect information -- shopping cart programs
3. software to process the transaction and send information to all of the involved parties (your bank, their bank, etc.)
4. a secure server -- SSL (secure socket layer) will encrypt the data and send it to a secure server where it can't be intercepted by a third party.

Merchant Accounts

A Merchant Account allows you to accept and process credit card payments either manually by "swiping" or "keying in" a card number, or through your Web site. There are many charges associated with accepting credit cards including:

1. a "discount rate" -- usually a 1-4 percent charge based on the sale amount (although online rates can be much higher)
2. a transaction charge -- a $.20-$.40 charge per transaction
3. a monthly minimum charge -- a flat rate that is charged if the minimum is not met
4. a "statement fee" -- a monthly fee charged regardless of the amount of charges in a month
5. setup fees
6. application fees
7. batch header fees -- fees that are charged for a batch of transactions, usually every time a terminal is closed out. Some systems automatically "batch out" at the end of the day and you may be charged whether you had any transactions or not!
8. and... there are also a few fees for special circumstances.

If you don't plan on accepting credit cards then you don't have to worry about a merchant account. On one hand, with the increase in credit card fraud you may be saving yourself a lot of headaches by not accepting credit cards. On the other hand, some statistics say that you will be turning away 80 percent of your sales by *not* accepting credit cards. It really comes down to what you're selling and how you're delivering it. If it is a service that must be delivered then you may do just as well (and save money) by invoicing and requesting payment by check, wire transfer, or money order. If you're selling products directly on-line then you probably need to go the merchant account route.

If you have had problems getting a merchant account, you can also try going through an Independent Sales Organization (ISO) for electronic funds processing. These firms usually provide many options for transactions both electronically and in-person. Concord EFS is one vendor, but many others exist.

E-Commerce Tools: Manually Processing Cards

If you already have a brick and mortar business that accepts credit cards then you can simply take the credit card information and process the card manually using your existing merchant account. No special account is necessary for Web transactions.

Processing cards manually gives you the added advantage of being able to hold the card information and charge the customer when their purchase actually ships. Remember that if a product is not able to be shipped within 30 days of the order you must notify the customer of the delay. Most people don't like to be charged for something they haven't received yet and automated card processing on your Web site will do just that. The

card is processed and funds are transferred within hours or a few days rather than when the order ships.

E-Commerce Tools: Electronic Payment Options

There are also other alternatives like Paypal and Propay that let you set up accounts to accept payment from customers without having to have a merchant account. There are still charges and limitations, but these may also fit your needs and are worth investigating.

One thing to keep in mind too is that in order to accept American Express or Discover you have to go directly through them.

Electronic checks can also be accepted with the right printing software and validation programs. Your customers would input their checking account and other identification information and you would print the check on blank check stock and deposit it as you would a written check Yes, this is legal. According to Uniform Commercial Code, Title 3, a customer can authorize you to endorse a check on their behalf. You'll also need to authorize the check using national databases that look for bad payment histories, bad checks, stolen checks, etc. Vendors usually offer features that will help you collect for non-sufficient fund (NSF) checks as well. PayByCheck offers these features, as well as several other vendors.

E-Commerce Tools: Shopping Cart Software

Let's assume you now have your merchant account -- or alternative method of processing payments. Now you have to have a way to let your Web shoppers select the products they want, preview the sale amounts, delete items they change their minds about, enter in their payment and shipping information, and then cancel the order completely. (OK, hopefully they won't do that last part.) Having a good shopping cart interface is very important for a good e-commerce-enabled Web site. The easier and more intuitive you make it for your shoppers the more sales and the more repeat business you can have.

So how do you get that cute little shopping cart icon and "order me" button on your site? Well, you could pull out the Cold Fusion books and set aside a few months to code it yourself, or you could leave that fantasy world and get an off-the-shelf shopping cart program. I highly recommend the second option for several reasons. First of all, unless you're a programmer (or have good friends who are) it's going to cost quite a bit more, in terms of your time being money and all, to put together the code to do the job. Second, there are so many good programs out there now that have been proven and debugged over time that it just makes more sense. And third, you can get a lot of features for not a lot of money. Now don't get the idea that we're affiliated with any of these off-the-shelf companies-- we're not. I just recognize a time saver that's worth the money when I see it!

So what features do they have and what do you look for? Ready-to-go shopping cart programs usually offer simple template- or wizard-based tools to set up the ordering functions the way you want them. Most will also give you enough creative license to make the ordering pages have the same "look" and "feel" as the rest of your site, and then all it takes is cutting and pasting the generated code into your own html pages. Also look for:

- SSL (secure socket layer) capabilities
- interactivity with online authorization services
- shipping calculators -- some also offer real-time shipping links
- business administration tools for managing the sales cycle
- management tools to manage your store
- merchandising features that let you cross-sell more products
- inventory tracking functions
- product maintenance and categorizing tools
- order reviewing and confirmation tools
- sales tax calculators
- capabilities for selecting various product options
- e-mail order notifications
- help functions
- search functions
- discount functions
- frequent-shopper-point functions
- price variation capabilities based on product option choices
- database importers for the programs you are using to set up your product databases (e.g.. Microsoft Excel, Access, or even ASCII formats)

You may also find products that offer:

- web-based administration tools that will allow you to administer changes from anywhere
- tools to set up shopper groups to allow you to run specials for select customers
- vendor maintenance tools if you distribute products from different vendors
- editing capabilities for their pre-set templates

Here are some things to remember:

- Watch for products or services that take the shopper away from your site.

- Check out the support services and user documentation.

- Visit some sites that are currently using the product and test them out. (Talk to the store owners if possible.)

- If you are designing and building your own Web site, also check on development components for programs like Microsoft FrontPage or Macromedia Dreamweaver, or whatever program you are using to build your site. (Having these specific components makes integrating the shopping cart code with your site much easier.)

- Check on system requirements and platform compatibility -- if your site is being designed on a Macintosh system then it might help to have the shopping cart software compatible.

- Check out the payment services the program is compatible with such as Authorize.net, Cybercash, SurePay, etc.

So as you can see, there are many features to look at and compare so know your needs before you tackle it. Some programs out there to look at include: BugMall, PDG Software, and SoftCart by Mercantec (actually more of a full-site development tool).

E-Commerce Tools: Using Third-Party Vendors

Another is option is to use a vendor who includes everything you need to get your online business started. This is certainly a more painless way to go than designing and developing everything yourself and then hoping all of the elements will work together happily.

There are some reputable companies that offer these types of services, and many will include not only the Web site design, shopping cart software and merchant account, but also they will register your domain name(s) and host your site for you. Others provide templates and wizards that let you build your site yourself without having to know HTML coding. They include integrated shopping cart software that ties in with an included merchant account.

If you decide to go this route, keep these things in mind:

- watch out for hidden fees

- make sure you've read and understand all of the terms

- make sure you don't have limitations to how you design your site.

- check on importable file formats (like Microsoft Excel spreadsheets for product databases)

- compare different vendors!

Some vendors include:

- Wells Fargo

- Web Site Source

- Speedy Web

- Web Intellects

When comparing vendors, go to some of their clients' sites and see how the shopping cart interface works. Go through the ordering process and see if you like the way it looks and feels. Be sure to visit several stores from each vendor to make sure you're getting a good representation of the features.

Look at the variations of site layout and decide if the ideas you have for your site will work. You typically don't have the flexibility in design with templates and wizards that you have when you design your site the old fashioned way! There may also be limitations in size, database capabilities, etc. Take your list of site functions to the proposed vendor and see if they can accommodate your needs.

Security Issues

Making your visitors feel comfortable enough at your site to give you their credit card number may take some work and planning on your part, but will be infinitely worth the effort. Not only will the appearance and professional design of your site have an impact, but also the security features you build into it. More Web shoppers are wise to the ways of the Internet and know the things they should look for in a site before they enter their financial and personal information.

For instance, they know to look for the lock symbol at the bottom of the screen to signify that their information is being transmitted to a secure server. They also know that the more recognizable trusted names they see on your site the better. Look at one of the larger well-known and trusted retailers such as L.L. Bean or Land's End and see how their site security is put together and displayed. Let's look at some of the things you can do to create that trust in your site visitors.

Digital Security Certificates

Shoppers often look for a trusted third party (TTP) to approve your site and your methods. Companies like VeriSign can provide your site with a **digital security certificate** that authorizes that you are who you say you are. This helps *visitors* to your site have the confidence to become *buyers* and will often make a big difference in your perceived credibility. VeriSign also offers a program called WebTrust that was developed by the American Institute of Certified Public Accountants (AICP) and the Canadian Institute of Chartered Accountants

(CICA). This program also provides you with a seal to display on your site if you meet the criteria which includes an evaluation of business, accounting, and transaction practices, as well as protection of consumer information. The VeriSign site states that, "more than 75% of online users have had a favorable impression of the WebTrust seal and that almost half of them report that seeing the seal would make them more likely to conduct an online transaction."

Another security watchdog organization is Trust-e. Trust-e sets policies for the use of personal information, as well as the protection of consumers. There are four Trust-e seal programs:

- **Privacy Seal Program** -- Companies who display the general Trust-e logo have agreed to abide by special rules concerning the use of personal information.

- **Trust-e's E-Health Seal Program** -- If your site is health-related you should also investigate this program. It certifies that the site displaying the seal complies with specific principles concerning privacy, quality and best practices.

- **EU Safe Harbor Program** -- This is a program designed for companies who do business in Europe and wish to comply with the Safe Harbor Privacy Framework put together by the U.S. Department of Commerce.

- **Children's Privacy Seal Program** -- This program is compliant with the Children's Online Privacy Protection Act (COPPA) and has been approved by the FTC as an authorized COPPA safe harbor.

These TTPs control the use of their logos through various embedded links. For instance, the Trust-e site has a notice for people who landed on the site as a result of clicking on the trust-e logo while on a shopping site. The notice says that if they have arrived there through that method then they may have visited a fraudulent site and to click another link to report it.

Encryption and Secure Servers

Using SSL (Secure Socket Layer), an encryption protocol, along with a digital certificate, provides protection for sensitive data during its transmission to your secure server. This encryption requires two keys. One is a public key which is used to encrypt the data through your customer's browser, and the other is a private key which decrypts the data and is held only by you (or those you authorize). By using a digital certificate provider (like VeriSign), the holder of the decryption key is validated as the correct owner and can then use the data as they need.

In this system, each player has access only to the information they need. The TTP (in this case, VeriSign) assures the shopper, through use of the digital certificate, that the Web site is indeed who they say they are, and the shopper can buy with the knowledge and comfort that they aren't being scammed.

For more information on encryption, see How Encryption Works.

BBB Online Seals

Once you have been in business for one year, you can apply for the Better Business Bureau Online's Reliability seal program. To get into the program and display the seal you must:

- join your local BBB
- agree to abide by their standards including those for truth in advertising
- provide the BBB with information about your company
- have a satisfactory complaint record with the BBB
- respond promptly to all consumer complaints
- and agree to any consumer-requested dispute resolution.

Keep in mind that the BBB doesn't endorse companies, so don't add any text to your site saying you're BBB endorsed. They simply require that their participants have satisfactory complaint records.

Privacy Policies

You must have a privacy policy and a usage policy for your site. These policies will state how you intend to use the personal information from product orders and other information you collect about your site visitors. This is a very important step to take and should not be taken lightly. When you write the policy make sure you follow it to the letter. Not doing so may put you in violation of the FTC Act. You can read the transcripts of a public workshop put on by the the FTC about the use of consumer data at the FTC Web site. There is also a lot of other good information there. You might also visit some well-known commerce sites and see how they've done their privacy statements. If you get a seal from one of the TTP groups listed in the previous section then you'll have to also follow their specifications.

Display the link to your Privacy Policy in a conspicuous spot on your home page and your ordering pages. Make the language easy to understand and clearly state how the information will be used. It is generally recommended to give the consumer the option of *not* sharing their personal information (assuming you're planning on sharing the data with others). If you *are* sharing the information, state with whom you will be sharing it.

Include a statement about how you use cookies. Many people are still not clear about how cookies work and are not comfortable with idea. (You may also want to set up your system to *not* rely on cookies since many people have them disabled in their browsers.)

Merchant Security

Okay, so we've talked about how to make your customers feel more secure, but what about you? What about your liability? What about your losses!? Statistics from credit card companies say that 75 percent of online retailers are liable for the full amount of any credit card fraud they encounter, while 90 percent of consumers are reimbursed for fraud. When you don't have a face-to-face transaction where all three parties (the actual card being the third party) are present then you have the potential for problems. And to make matters even worse, there are now software programs (illegal ones) that can generate an unlimited number of mathematically valid credit card numbers. But haven't mail order retailers been facing this problem all along? How do they protect themselves? There are some ways you can keep your credit card fraud to minimum. Here are a few of the best ones:

- Work under the assumption that you will at some point face credit card fraud -- that keeps your defenses up

- Use Address Verification Service -- This at least works for products that must be shipped within the U.S. It provides no protection for downloadable products such as software or books. (Authorizer and NetVerify are examples.)

- Consider not allowing different "ship to" addresses -- Thieves can always provide you with the correct billing address and then request a different shipping address. By not allowing a different shipping address you could cut back some of your fraudulent charges. Or, you can always perform additional checks on these addresses. (Make sure you get a phone number for the ship-to address.)

- Get a faxed copy of the credit card and signature when in doubt.

- Watch out for large orders of high priced items that are asked to be shipped quickly. If it doesn't match your typical order, call the customer and verify the order and payment information.

- Don't process any order you can't verify by phone.

- Watch out for customers who give you an e-mail address from a free e-mail service like Yahoo or Hotmail. Those are an often used by thieves to help hide identities because any identification information can be submitted in order to get the e-mail address. Require a true ISP-based e-mail address.

- If the customer is - or appears to be - a business, check the Web address (Often the last part of the e-mail address is the Web address. Just add a www. to check it out.) If the Web site doesn't match up with the information you were given then don't fill the order until you can verify further.

- Code your form handler to collect the IP address of the computer sending the order. You can trace it back to the ISP and let them know about the fraudulent activity.

- Watch out for orders that originate, or are to be shipped out of the country. There has been particular fraudulent activity in the Eastern European countries.

Visit the AntiFraud Web site for more ways to protect yourself, as well as a list of free e-mail address providers. You should probably also set aside a sum of money for credit card fraud. Talk to your accountant about what a reasonable amount might be.

Build Your Own Web Site: Easy Way

Building and designing your Web site can be fairly simple, or very complicated. It all depends on the tools you use and the functions you need on your site. If your site doesn't require a lot of interactive features or complicated graphics, you may be just as well-off using one of the template- or wizard-based design tools that are available for sale, or offered free by many Web hosts. You can find more information about this type of software at these sites:

- KnowledgeStorm: Online databases for IT solutions

- Miva Merchant

Other links to storefront software are listed in our Links section under Shopping Cart Software.

If you go this route, make sure you get software specifically for designing a storefront so you'll have shopping cart and commerce tools available. It may also make sense for you to set up your site initially using this type of software, and then as your business grows, redesign the site with a program that has more features and gives you more flexibility (or have your site redesigned professionally). That way you are taking a little less of a gamble with your time and money.

Build Your Own Web Site: Harder Way

If you're up to the challenge, designing your site using a traditional Web authoring software program can give you a lot more control over the look and feel and even the functionality. You can add a lot of things like **rollovers** and simple animations using these programs. But -- and this is a pretty big but -- it takes time, skill, and a little creative talent. If you've never worked with HTML or Web pages and don't really understand how they work then it's going to take you quite a bit of time to get a good site up and running. If time isn't an issue then you may be fine.

It will definitely be worth the effort to get some training in either HTML or a specific WYSIWYG Web editor program. You should at the very least get a how-to book like Sams-Net "*Teach Yourself HTML in a Week*" by Laura Lemay, or one of Peach Pit Press's "Real World" books that get down to the nitty-gritty of how to use a specific program.

Build Your Own Web Site: Digital Images and Graphics

Don't forget about graphics. Because specific graphics are something you're going to need regardless of the type of program you use to set up your site, I'll go into a little bit more detail here than in the rest of the site

design sections.

There is a lot of canned clip art out there, but many times it looks the part -- like canned clip art. Visitors that see the same graphic on several sites don't go away with the best of impressions about any of the sites! If you can, create some of your own graphic icons and images using a good illustration program like Adobe Illustrator or Corel Draw. (Go to ZDNet or computer-oriented Web site for current reviews and prices of web-graphics software packages.) With an illustration program you can create **vector** images. These, as opposed to bitmap images are editable, scalable and usually small in file size.

A **raster** or **bitmap** image, like those you would get when you scan art or a photo, can be edited, but you need an image editing program like Adobe Photoshop. With this type of program you can change individual pixels or add filters or special effects to layers of the image to get the effect you want. The size, however, cannot be increased very much without loss of image quality and a big increase in file size.

Another option is to purchase some higher quality clip art. Sites like PhotoDisc and Artville have high quality photo images and artwork that aren't always that expensive, particularly for the low resolution (72 dpi) images you would need for your Web site. There are also several sites on the Web that offer free art and images. Our Links page can take you to some of those sites.

Build Your Own Web Site: Creating Your Own Images and Illustrations

If you're selling products on your Web site you're probably going to need photos of them. Most people don't like to buy something sight unseen. If you're distributing products for a manufacturer, the manufacturer may be able to send you prints, electronic files, or they may just direct you to their Web site to download the files yourself. If you are selling your own home-made Widgets and Widget accessories, however, you're going to need to get photos of those items in a format you can put on your Web site.

[INSIDER TIP 1: Use .JPG format for photos and .GIF format for illustrations or line art.]

You have three of options for getting digital images of your products, you, your cat, or whatever you want on the site. You can either buy a good digital camera (no, don't try to use the digital web-cam that you got free from your ISP to use for video chats on the web), or you can take photos with your regular camera and scan the prints using a flatbed scanner. You can get a decent scanner for less than $200 and most come with some kind of image editing software. Good digital cameras are still pretty expensive -- more like $400 and up. They do save time, however, and the image quality has improved substantially. Your third option is to use your traditional film camera and send them to a processor who will also give you digital copies on either diskette or CD. (If there is a chance that you will also want to use the photos in print for your brochures then ask for higher resolution images on CD. The files you get on a diskette or download from a photo Web site probably won't be high enough resolution for print.)

[INSIDER TIP 2: Scan images for the Web at 72 dots per inch (dpi). That is the resolution of most monitors, and higher resolution scans will make no difference in the appearance of the image on screen. If you plan on using the image in print, however, scan at 200-300 dpi or higher depending on the printer or output device.]

Remember, graphics files are usually pretty big files. In order to have them on your site without making your site a big bloated elephant, you'll need to make sure you optimize your graphics before you load them. (Some canned clip art may already be optimized.) Optimizing removes some of the unnecessary pixels and colors and makes the graphic file smaller. You may give up a little bit of the quality but there is usually a good middle ground where the graphic still looks good but its file size is significantly smaller. Some programs will show you a few variations and let you choose the version that you like. Many programs also show you the estimated download time at different connection speeds. NetMechanic offers GifBot a free service/tool that will optimize your graphics for use on your Web site.

Another thing to remember is to size and **crop** your images or clip art in your illustration program before you put them on your Web page. A lot of WYSIWYG Web authoring software will let you resize or crop images within the program, but the image size as far as kilobytes remains the same. In other words, all of the image data is still there you just can't see it. This means the graphic file is larger than it needs to be. Crop out any unnecessary information before you place the image on the Web page.

[INSIDER TIP 3: You don't want your total page size to be larger than about 50k. That's not very big, but your visitors will thank you for it.]

Build Your Own Site: Making Pre-Set Templates Your Own

This part of your site design gets a little trickier. Most of the WYSIWYG Web authoring programs come with templates that you can edit to suit your needs. It's a good way to introduce yourself to Web design -- by using someone else's! It can also produce some professional-looking results.

One way to personalize your site while still using a template is to create your own top and side navigation banners. By using the same dimensions of the template's navigation graphics, you can make sure yours still fit and don't throw off the rest of the page.

You can also change the color palette of the site. Matching the color of your logo and creating new graphics in the same style as your logo will help pull the site together and give it a more consistent look and feel. But what is look and feel? It's the overall impression you get when you look at something. Does it make you think of old money? Something trendy? The flower-power generation? That sort of thing. The feelings and images you think of when you visit the site. The impressions you have of the type of company.

Some Design Tips

- **White space is your friend.** Just like in printed brochures, your Web site will look much better with a good balance of graphics, text and white space. Use the white space to better define and draw attention to your

site's navigation system. Not only will your site look better, it will also load faster. One of your goals in designing your site is to make the experience a good one for your visitors. If you site is slower to load than molasses in Alaska then your potential customers will become someone else's potential customers! Not everyone has broad band Internet access -- in fact a pretty small percentage do (currently about 30% for 2001 according to Media Metrix) -- so keep your pages fast and lean.

- **Who you are and what you do.** It should be immediately obvious on your home page what your company does, and what the visitors can find on your site. Your navigation structure is critical. Don't make your visitors have to think about how they might find something -- make it blatantly obvious. In fact, some say you should never have anyone more than one click away from being able to purchase something (assuming, of course, you're selling products on your site).

- **Give them what they need.** Don't make your site too text-heavy. Keep it short, bulleted and to the point. People visiting your site won't read long passages of text ("pot, meet the kettle" -- I know, but our site has a different purpose!). It's true, but -- and this is another pretty big but -- you have to provide enough information for them to make a decision right then, or else you chance losing the sale to a site that does. For instance, if you're selling relatively complicated products that have a lot of specifications to compare, make it easy on your shoppers. Include links to all of the relative information they might need. The "Links" to more information are very important. Browsers (and I mean the shoppers not their Web software) don't want to wait on slow loading pages that are full of every scrap of information you have about a product. They want to see the general product description and be able to click a link to go to the meat of the subject. The same goes for product photos. Keep thumbnail size photos on the primary product description page, but have them linked to a larger image so if the shopper wants to see the fine crafted detail of the piece then they can click and see it in all its glory. Another helpful addition that may keep shoppers on *your* site as opposed to your competitor's, can be tables that compare specs from your products with those of competing products so you can show how your products are better and have more features. Or, if you have a lot of similar products that vary in certain areas, create a table comparing your own products. You can also include interactive tools that compare products the shopper has selected from your own product line by clicking a check box next to the item, and then clicking on a "compare" button. A table then comes up that compares those items side by side.

- **The good, the bad, and the ugly.** A good site can look great, a bad site can look great, and an ugly site can still *be* great. No matter how nice your site looks, if it's difficult to navigate, or if you don't know exactly what the site is about when you go there then you're still missing the boat -- and tossing a lot of money off the pier while your watching it sail away! The first thing you have to think about is the site's purpose and function -- not the cool graphics, or the colors, or the flash animations. In fact, those sites who start with a fancy animation that makes dial-up visitors bang their heads on their monitors while they wait for it to load really stomp on my last good nerve. (Yes, I still "dial-up.") Always -- let me stress this -- ALWAYS have a very obvious "SKIP THIS INTRO" button that people can click to get past your animation. Another unnecessary step many sites force their visitors to take is having a lead-in to their home page. There will be a page with the company logo on it and an "ENTER SITE HERE" button. Why? I don't know, but they get on my nerves too. Don't do it. Take your visitors directly to what they want to see -- your content. (Remember, many of them are surfing on company time and they have to speedy about it if they don't want to get caught!) The layout of your pages, which you hopefully have already drawn out and labeled, will help you (or your designer) determine the best design for your site. It's hard to come up with a design if you don't already have an idea of the number of category pages, types of site functions, etc. So, as I've mentioned in other sessions of this workshop, plan it out FIRST so your site has a better chance of being both good AND aesthetically pleasing.

- **Real live people, or at least an address.** Make sure visitors to your site can find you in the real world when they need to. Even if your business is only a 'cyber' business you should still have a physical address or PO box, and a phone number where someone can contact you if they have a question. Not only will it give those who are leery of online purchasing a way to still place an order, it will also give them a higher comfort level that your business is legitimate.

- Finally, if you want people to visit your site, jump ahead to our "Promotion" workshop and read about **optimizing your pages for search engines**. It's much easier to incorporate the information search engines look for into your pages as you design them rather than having to go back after the fact and add the information in.

Web Design Firms

So maybe after reading all of this you've decided your best bet is to hire a professional Web design firm to do it for you. One word of warning -- it's not cheap! If you know your business site is going to HAVE to HAVE some heavy hitting database-driven interactive functions then you are probably making a wise choice -- just don't say I didn't warn you.

So, get your quotes, pick yourself up off the floor, brush yourself off, and get to work. Yes, hiring someone else to do it still requires a lot of work and planning from YOU. You're going to have to provide them with words, images of your products, the purpose and outline of what you need, and a lot of direction. Many design firms do offer assistance in planning and pointers in what works and doesn't, but you still have to be very involved -- at least if you want to get what you want.

Web Hosting: What Does a Host Do?

When you think of a host you may think of a smiling man or woman greeting you at the door and handing you a cool beverage. Or, you may think of a body that supports another parasitic one. Your relationship with your Web site host is kind of a symbiotic combination of the two. You depend on them and they depend on you -- and it can be good, or it can be bad. The thing to remember as you plan and build your online business, is that your Web host is a very important part of it. Bad customer service and support when problems arise (which they probably will at some point) can cost you a lot of money in lost sales and bad first impressions for the visitors arriving at your site while the problem persists. So make sure you get all of the facts about the host you choose for your business.

A Web host leases space for your Web files on their server, which has a direct connection to the Internet. You can either choose a **Virtual Web Host** who will allow you to use your own domain name, or a **Non-Virtual Web Host** who will give you a subdomain name that uses their primary domain name. For example, with a non-virtual Web host, your Web address might be **http://www.earthlink.com/~yourname/yourwebfiles.html**. There are some non-virtual Web hosts, however, that will let you use your own primary domain name, so be sure to ask.

The good thing about non-virtual Web hosting is that it is usually free. Many times the ISP who provides you with your Internet connection and e-mail address will

also give you 5-10 MB of free space for a Web site along with a handful of simple tools for creating a Web site and uploading your files. While this might be great for your family or personal Web site, you probably don't want to use it for a business.

Some of the downside issues with non-virtual Web hosts are that the tools and capabilities are usually limited. Many of these hosts limit the types of CGI scripts you can use to their own pre-installed scripts for things like guest books, processing e-mail forms, etc. In other words, you may not be able to have an e-commerce site on a non-virtual site. You may also have to have advertisements on your site that you may not want. And finally, your Web address will not be easy for your customers to remember, and won't make your business appear to be very stable or legitimate.

Virtual Web hosting will typically provide a faster and more reliable connection, better management tools, support for higher level functions, and will range in price from about $10-$50 and on up for more complicated sites.

It is also possible to host your own site although, unless you know how to do it and have a good dedicated connection to the Internet, I don't recommend it for a new online business venture.

Web Hosting: What to Look for in a Host

Remember all of the site planning I mentioned in Planning the Party? Well, pull it back out when you start trying to decide on a host. Make a list of all the things your site will do and then list new functions you want to add in the future. (Plan as far out as five years even!) When you start talking to hosts you'll need to tell them the features your site will need.

Start by going to some of the Web host review sites listed on our Links page and see which ones look like likely candidates. Many of these sites will allow you to enter your requirements and compare host packages or even automatically request quotes from several vendors.

Compare the various features included in their packages. Most should provide account holders with:

- site statistics about how many visitors came to their site and which pages they visited, as well as how long they stayed on the site
- FTP software for uploading your Web files to their server
- e-mail accounts and possibly auto-responders that can simplify response needs like a "thank you -- your order is being processed" e-mail when someone orders a product from your site
- e-commerce tools like easily customized product order forms
- regular site backups
- secure socket layer (SSL) capabilities and other security measures for e-commerce
- an account control panel that lets you do administration functions for your site from your browser (this is relatively new)

There are other features hosts offer so it is important to investigate your options. You might also talk to other online business owners and see what their host experiences have been like. See what tools they use and what tools their hosts have provided. Ask them how many problems they've had with their host and anything else you can think of to help you put a list of prospective host candidates together. Get as many recommendations as you can.

Web Hosting: Screening Potential Hosts

Once you have list of potential candidates for hosting your new business venture, **ask for a quote** for hosting your site. Provide them with the list of your site's needs that you prepared above, give them a reasonable amount of time to respond, and then see what you get back.

If they don't respond to your request by the deadline you've given them then **take them off the list**. Use that as an indicator of what future dealings with them might be like and move on to the other candidates.

Ask the host these specific questions regarding their service:

- Are there any setup fees?
- Do they offer design or programming services if you should need them and what are the costs?
- How much free support can you get?
- When is there a fee for support?
- How do you go about canceling your account, and is there a fee involved?
- What tools and software do they offer?
- What is their **uptime guarantee** and how do they compensate you for lost time? (You can have your site uptime monitored by Alertsite, or NetMechanic.)
- How much data transfer (or bandwidth) do they offer?
- What is their backup method and schedule?
- How much space can your site use?
- What are their upgrade policies if your site grows? Beware of hosts offering unlimited data transfers and unlimited site storage. Those things cost them money and they're gambling that your site (and others) won't use as much as you think, but when your usage increases you may be stuck with additional charges.
- Ask them for a list of clients for you to contact as **references.** Then CONTACT them. The host's simple good-will act of providing you with a reference list doesn't always mean the clients will have all favorable comments about them. (Although many probably will or they would have been screened out by the host in the first

place!)

- When you **call the references** ask them about the downtime they've experienced and how closely it matches what the host has said is average; about how well they've been reimbursed for this downtime.; about how well the host has been about customer support and service and anything else you can think of!

- Test out their customer support by dropping them an e-mail and seeing how long it takes them to respond. Or, call them at random times and see how helpful and accessible they are.

So, the main thing here is to do your homework. Do a test drive if you can. Then just make the best decision you can based on what you know about your hosting candidates. If you do get into a bad host relationship all it can cost you is time, money, and a little bit of aggravation.

Online Business Tools

Planning

Online Business Planning Checklist (Microsoft Word format)

Production

Online Business Production Checklist (Microsoft Word format)

Promotion

Online Business Promotion Checklist (Microsoft Word format)

Lots More Information

Related HowStuffWorks Articles

- How Creating an Online Business Works
- How Planning an Online Business Works
- How Promoting an Online Business Works
- How Virtual Offices Work
- How Marketing Plans Work

More Great Links

- e-Biz 101 - Free information about starting your E-Business
- Online Womens' Business Center
- OnlineBusiness.com
- Web Hosting Guide
- Search Engine Watch
- Sell It!: e-Commerce Resource
- Web Site Source: Total e-Commerce Solutions
- AntiFraud
- Go Real-Time: Shopping cart and online transaction programs

Business Ideas

- A Home-Based Business Online: Business ideas, tips, and strategies

Web site Design and Planning

- Design Technologies: Customer-Centered Research and Design
- Content and Design
- Useit.com: Web site usability info

Domain Name Information

- ReignYourDomain: "we hold your hand when you want to cross the information superhighway."
- The Trademark and Domain Name LawTrove
- The Domain Name Buyers' Guide

Graphic Software and Art Links

- How Amazing-- Review of Graphic Software with links to many other things like clipart, animations, etc.
- Boxtop Software--Optimization Plug-ins and Software
- Webmaster and graphics-oriented links

Website

From Wikipedia, the free encyclopedia

A **website**, also written as **Web site**,[1] **web site**, or simply **site**,[2] is a set of related web pages, served from a single web domain, . A website is hosted on at least one web server, , accessible via a network such as the Internet, or a private local area network, through an Internet address known as a Uniform Resource Locator, . All publicly accessible websites collectively constitute the World Wide Web, .

A webpage is a document, , typically written in plain text, interspersed with formatting instructions of Hypertext Markup Language (HTML, , XHTML,). A webpage may incorporate elements from other websites with suitable markup anchors, .

Webpages are accessed and transported with the Hypertext Transfer Protocol, (HTTP), which may optionally employ encryption (HTTP Secure, , HTTPS) to provide security and privacy for the user of the webpage content. The user's application, often a web browser, , renders the page content according to its HTML markup instructions onto a display terminal, .

The pages of a website can usually be accessed from a simple Uniform Resource Locator (URL) called the web address, . The URLs of the pages organize them into a hierarchy, although hyperlinking, between them conveys the reader's perceived site structure, and guides the reader's navigation of the site which generally includes a home page, with most of the links to the site's web content, , and a supplementary about, contact, and link page, .

Some websites require a subscription to access some or all of their content. Examples of subscription websites include many business sites, parts of news websites, academic journal, websites, gaming websites, file-sharing websites, message boards, , web-based email, , social networking, websites, websites providing real-time stock market, data, and websites providing various other services (e.g., websites offering storing and/or sharing of images, files and so forth).

NASA.gov homepage

Contents

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    - 5.2 Product- or service-based sites

History

Main article: History of the World Wide Web?

The World Wide Web? (WWW) was created in 1990 by CERN physicist Tim Berners-Lee?.[3] On 30 April 1993, CERN? announced that the World Wide Web would be free to use for anyone.[4]

Before the introduction of HTML and HTTP, other protocols such as File Transfer Protocol? and the gopher protocol? were used to retrieve individual files from a server. These protocols offer a simple directory structure which the user navigates and chooses files to download. Documents were most often presented as plain text files without formatting, or were encoded in word processor? formats.

Overview

Websites have many functions and can be used in various fashions; a website can be a personal website?, a commercial website, a government website? or a nonprofit organization? website. Websites can be the work of an individual, a business or other organization, and are typically dedicated to a particular topic or purpose. Any website can contain a hyperlink to any other website, so the distinction between individual sites, as perceived by the user, can be blurred.

Websites are written in, or dynamically converted to, HTML (Hyper Text Markup Language) and are accessed using a software? interface classified as a user agent?. Web pages can be viewed or otherwise accessed from a range of computer?-based and Internet-enabled devices of various sizes, including desktop computers, laptops, PDAs and cell phones.

A website is hosted? on a computer system known as a web server?, also called an HTTP server. These terms can also refer to the software that runs on these systems which retrieves and delivers the web pages in response to requests from the website's users. Apache? is the most commonly used web server software (according to Netcraft ? statistics) and Microsoft?'s IIS? is also commonly used. Some alternatives, such as Lighttpd?, Hiawatha? or Cherokee?, are fully functional and lightweight.

Static website

Main article: static web page?

A static website is one that has web pages stored on the server in the format that is sent to a client web browser. It is primarily coded in Hypertext Markup Language (HTML).

Simple forms or marketing examples of websites, such as *classic website*, a *five-page website* or a *brochure website* are often static websites, because they present pre-defined, static information to the user. This may include information about a company and its products and services through text, photos, animations, audio/video and interactive menus and navigation.

This type of website usually displays the same information to all visitors. Similar to handing out a printed brochure to customers or clients, a static website will generally provide consistent, standard information for an extended period of time. Although the website owner may make updates periodically, it is a manual process to edit the text, photos and other content and may require basic website design skills and software.

A static web page may still have dynamic behaviour, provided that this is handled entirely client-side (i.e. within the browser). This may include such features as a JavaScript image zoom feature to display photographs.

In summary, visitors are not able to control what information they receive via a static website, and must instead settle for whatever content the website owner has decided to offer at that time.

They are edited using four broad categories of software:

- Text editors?, such as Notepad? or TextEdit?, where content and HTML markup are manipulated directly within the editor program
- WYSIWYG? offline editors, such as Microsoft FrontPage? and Adobe Dreamweaver? (previously Macromedia Dreamweaver), with which the site is edited using a GUI? interface and the final HTML markup is generated automatically by the editor software
- WYSIWYG online editors which create media rich online presentation like web pages, widgets, intro, blogs, and other documents.
- Template-based editors, such as RapidWeaver? and iWeb?, which allow users to quickly create and upload web pages to a web server without detailed HTML knowledge, as they pick a suitable template from a palette and add pictures and text to it in a desktop publishing? fashion without direct manipulation of HTML code?.

Static websites may still use server side includes? (SSI) as an editing convenience, such as sharing a common menu bar across many pages. As the site's behaviour *to the reader* is still static, this is not considered a dynamic site.

Dynamic website

Main article: dynamic web page?

A dynamic website is one that changes or customizes itself frequently and automatically, based on certain criteria.

Dynamic websites can have two types of dynamic activity: Code and Content. Dynamic code is invisible or behind the scenes and dynamic content is visible or fully displayed.

Dynamic code

The first type is a web page with dynamic code. The code is constructed dynamically on the fly using active programming language instead of plain, static HTML.

A website with dynamic code refers to its construction or how it is built, and more specifically refers to the code used to create a single web page. A dynamic web page is generated on the fly by piecing together certain blocks of code, procedures or routines. A dynamically generated web page would recall various bits of information from a database and put them together in a pre-defined format to present the reader with a coherent page. It interacts with users in a variety of ways including by reading cookies recognizing users' previous history, session variables, server side variables etc., or by using direct interaction (form elements, mouse overs, etc.). A site can display the current state of a dialogue between users, monitor a changing situation, or provide information in some way personalized to the requirements of the individual user.

Dynamic content

The second type is a website with dynamic content displayed in plain view. Variable content is displayed dynamically on the fly based on certain criteria, usually by retrieving content stored in a database.

A website with dynamic content refers to how its messages, text, images and other information are displayed on the web page, and more specifically how its content changes at any given moment. The web page content varies based on certain criteria, either pre-defined rules or variable user input. For example, a website with a database of news articles can use a pre-defined rule which tells it to display all news articles for today's date. This type of dynamic website will automatically show the most current news articles on any given date. Another example of dynamic content is when a retail website with a database of media products allows a user to input a search request for the keyword Beatles. In response, the content of the web page will spontaneously change the way it looked before, and will then display a list of Beatles products like CDs, DVDs and books.

Software systems

There are a wide range of software systems, such as CGI, Java Servlets and Java Server Pages (JSP), PHP, Perl, Python, and Ruby programming languages, Active Server Pages and ColdFusion (CFML) that are available to generate dynamic web systems and dynamic sites. Sites may also include content that is retrieved from one or more databases or by using XML-based technologies such as RSS.

Static content may also be dynamically generated either periodically, or if certain conditions for regeneration occur (cached) in order to avoid the performance loss of initiating the dynamic engine on a per-user or per-connection basis.

Plug ins are available to expand the features and abilities of web browsers to show *active content* or even create rich Internet applications. Examples of such plug-ins are Microsoft Silverlight, Adobe Flash, Adobe Shockwave or applets written in Java. Dynamic HTML also provides for user interactivity and realtime element updating within web pages (i.e., pages don't have to be loaded or reloaded to effect any changes), mainly using the Document Object Model (DOM) and JavaScript, support which is built-in to most modern web browsers.

Turning a website into an income source is a common practice for web developers and website owners. There are several methods for creating a website business which fall into two broad categories, as defined below.

Content-based sites

Some websites derive revenue by selling advertising space on their site either through direct sales or through an advertising network. (see Contextual advertising).

Product- or service-based sites

Some websites derive revenue by offering products or services for sale. In the case of e-commerce, websites, the products or services may be purchased at the website itself, by entering credit card or other payment information into a payment form on the site. While most business websites serve as a shop window for existing brick and mortar businesses, it is increasingly the case that some websites are businesses in their own right; that is, the products they offer are only available for purchase on the web.

Websites occasionally derive income from a combination of these two practices. For example, a website such as an online auctions website may charge the users of its auction service to list an auction, but also display third-party advertisements on the site, from which it derives further income.

Spelling

The form "website" has become the most common spelling, but "Web site" (capitalised) and "web site" are also widely used, though declining. Some academia, some large book publishers, and some dictionaries still use "Web site", reflecting the origin of the term in the proper name World Wide Web. There has also been similar debate regarding related terms such as web page, web server, and webcam.

Among leading style guides, the Reuters, style guide,[5] *The Chicago Manual of Style*,[6] and the *AP Stylebook* (since April 2010)[7] all recommend "website".

Among leading dictionaries and encyclopedias, the *Canadian Oxford Dictionary* prefers "website", and the *Oxford English Dictionary* changed to "website" in 2004.[8] Wikipedia, also uses "website", but Encyclopædia Britannica, uses both "Web site" and "Website".[9] Britannica's Merriam-Webster, subsidiary uses "Web site", recognising "website" as a variant.[10]

Among leading language-usage commentators, *Garner's Modern American Usage* acknowledges that "website" is the standard form,[11] but Bill Walsh, of *The Washington Post*, argues for using "Web site" in his books and on his website[12] (however, *The Washington Post* itself uses "website"[13]).

Among major Internet technology companies and corporations, Google, uses "website",[14] as does Apple,[15] though Microsoft, uses both "website" and "web site".[16][17][18]

Types of websites

Websites can be divided into two broad categories - static and interactive. Interactive sites are part of the Web 2.0, community of sites, and allow for interactivity between the site owner and site visitors. Static sites serve or capture information but do not allow engagement with the audience directly.

There are many varieties of websites, each specializing in a particular type of content or use, and they may be arbitrarily classified in any number of ways. A few such classifications might include:

Click "show" or "hide" to toggle this table		
Type of Website	**Description**	**Examples**
	A site, typically few in pages, whose purpose is to sell a third party's	

Affiliate?	product. The seller receives a commission for facilitating the sale.	
Affiliate Agency	Enabled portal? that renders not only its custom CMS? but also syndicated content from other content providers for an agreed fee. There are usually three relationship tiers. Affiliate Agencies?	(e.g., Commission Junction?), Advertisers? (e.g., eBay?) and consumer (e.g., Yahoo!?).
Archive site?	Used to preserve valuable electronic content threatened with extinction. Two examples are: Internet Archive?, which since 1996 has preserved billions of old (and new) web pages; and Google Groups?, which in early 2005 was archiving over 845,000,000 messages posted to Usenet? news/discussion groups.	Internet Archive?, Google Groups?
Attack site?	A site created specifically to attack visitors computers on their first visit to a website by downloading a file (usually a trojan horse?). These websites rely on unsuspecting users with poor anti-virus protection in their computers.	
Blog? **(web log)**	Sites generally used to post online diaries which may include discussion forums (e.g., blogger?, Xanga?). Many bloggers use blogs like an editorial section of a newspaper to express their ideas on anything ranging from politics to religion to video games to parenting, along with anything in between. Some bloggers are professional bloggers and they are paid to blog about a certain subject, and they are usually found on news sites.	WordPress?
Brand building site	A site with the purpose of creating an experience of a brand online. These sites usually do not sell anything, but focus on building the brand. Brand building sites are most common for low-value, high-volume fast moving consumer goods? (FMCG).	
Celebrity website?	A website whose information revolves around a celebrity?. This sites can be official (endorsed by the celebrity) or fan made (run by his/her fan, fans, without implicit endorsement).	jimcarrey.com?
Click-to-donate site?	A website that allows the visitor to donate to charity simply by clicking on a button or answering a question correctly. An advertiser usually donates to the charity for each correct answer generated.	The Hunger Site?, Freerice?, Ripple (charitable organisation)?
Community site?	A site where persons with similar interests communicate with each other, usually by chat? or message boards.	Myspace?, Facebook?, orkut?
Content? **site**	Sites whose business is the creation and distribution of original content	(e.g., Slate?, About.com?).
Classified Ads site	Sites publishing classified advertisements	gumtree.com?
Corporate website?	Used to provide background information about a business, organization, or service.	
Dating website?	A site where users can find other single people looking for long range relationships, dating, or just friends.	Many of them are pay per services such as eHarmony? and Match.com?, but there are many free or partially free dating sites. Most dating sites today have the functionality of social networking websites.
Electronic commerce? **(e-commerce) site**	A site offering goods and services for online sale? and enabling online transactions for such sales.	
Forum website?	A site where people discuss various topics.	

Gallery Website	A website designed specifically for use as a Gallery, these may be an art gallery or photo gallery and of commercial or non-commercial nature.	
Government Site₍?₎	A website made by the local, state, department or national government of a country. Usually these sites also operate websites that are intended to inform tourists or support tourism.	For example, Richmond.com is the geodomain₍?₎ for Richmond, Virginia₍?₎.
Gripe site₍?₎	A site devoted to the criticism of a person, place, corporation, government, or institution.	
Gaming website₍?₎ **Gambling website**₍?₎	A site that lets users play online games. Some enable people to gamble online.	
Humor site₍?₎	Satirizes, parodies or otherwise exists solely to amuse.	
Information site	Most websites could fit in this type of website to some extent many of them are not necessarily for commercial purposes	RateMyProfessors.com₍?₎, Free Internet Lexicon and Encyclopedia. Most government, educational and nonprofit institutions have an informational site.
Media sharing site	A site that enables users to upload and view media such as pictures₍?₎, music, and videos₍?₎	Flickr₍?₎, YouTube₍?₎, Google Videos₍?₎
Mirror₍?₎ **site**	A website that is the replication of another website. This type of websites are used as a response to spikes in user visitors. Mirror sites are most commonly used to provide multiple sources of the same information, and are of particular value as a way of providing reliable access to large downloads.	
Microblog site₍?₎	A short and simple form of blogging. Microblogs are limited to certain amounts of characters and works similar to a status update on Facebook₍?₎	Twitter₍?₎
News site₍?₎	Similar to an information site, but dedicated to dispensing news, politics, and commentary.	cnn.com₍?₎
Personal website₍?₎	Websites about an individual or a small group (such as a family) that contains information or any content that the individual wishes to include. Such a personal website is different from a *Celebrity website*, which can be very expensive and run by a publicist or agency.	
Phishing site₍?₎	a website created to fraudulently acquire sensitive information₍?₎, such as passwords and credit card₍?₎ details, by masquerading as a trustworthy person or business (such as Social Security Administration₍?₎, PayPal₍?₎) in an electronic communication₍?₎ (see Phishing₍?₎).	
p2p₍?₎ **/Torrents website**₍?₎	Websites that index torrent files. This type of website is different from a Bit torrent client₍?₎ which is usually a stand alone software.	Mininova₍?₎, The Pirate Bay₍?₎, IsoHunt₍?₎
Political site	A site on which people may voice political views, show political humor, campaigning for elections, or show information about a certain political party or ideology.	
Porn site₍?₎	A site that shows sexually explicit content for enjoyment and relaxation. They can be similar to a personal website when it's a website of a porn actor/actress or a media sharing website where user can upload from their own sexually explicit material to movies made by adult studios.	
Question and		Yahoo! Answers₍?₎, Stack

Answer (Q&A) Site_?	Answer site is a site where people can ask questions & get answers.	Exchange Network_? (including Stack Overflow_?)
Rating site_?	A site on which people can praise or disparage what is featured.	
Religious site_?	A site in which people may advertise a place of worship, or provide inspiration or seek to encourage the faith of a follower of that religion.	
Review site_?	A site on which people can post reviews for products or services.	
School site_?	a site on which teachers, students, or administrators can post information about current events at or involving their school. U.S. elementary-high school websites generally use k12 in the URL	
Scraper site_?	a site which largely duplicates without permission the content of another site, without actually pretending to be that site, in order to capture some of that site's traffic (especially from search engines) and profit from advertising revenue or in other ways.	
Search engine_? site	A website that indexes material on the Internet or an intranet_? (and lately on traditional media such as books and newspapers)and provides links to information as a response to a query.	Google Search_?, Bing_?, GoodSearch_?, DuckDuckGo_?
Shock site_?	Includes images_? or other material that is intended to be offensive to most viewers	Goatse.cx_?, rotten.com_?
Showcase site_?	Web portals_? used by individuals and organisations to showcase things of interest or value	
Social bookmarking_? site	A site where users share other content from the Internet and rate and comment on the content.	StumbleUpon_? and Digg_? are examples.
Social networking_? site	A site where users could communicate with one another and share media, such as pictures, videos, music, blogs, etc. with other users. These may include games and web applications_?.	Facebook_?, Orkut_?, Google+_?
Warez_?	A site designed to host or link to materials such as music, movies and software for the user to download.	
Webmail_?	A site that provides a webmail service.	Hotmail_?, Gmail_?, Yahoo!_?
Web portal_?	A site that provides a starting point or a gateway to other resources on the Internet or an intranet.	msn.com_?, msnbc.com_?, yahoo_?
Wiki_? site	A site which users collaboratively edit its content.	Wikipedia_?, WikiHow_?, Wikia_?

Some websites may be included in one or more of these categories. For example, a business website may promote the business's products, but may also host informative documents, such as white papers_?. There are also numerous sub-categories to the ones listed above. For example, a porn_? site is a specific type of e-commerce site or business site (that is, it is trying to sell memberships for access to its site) or have social networking capabilities. A fansite_? may be a dedication from the owner to a particular celebrity_?.

Websites are constrained by architectural limits (e.g., the computing power dedicated to the website). Very large websites, such as Facebook, Yahoo!, Microsoft, and Google employ many servers and load balancing_? equipment such as Cisco_? Content Services Switches_? to distribute visitor loads over multiple computers at multiple locations. As of early 2011, Facebook utilized 9 data centers with approximately 63,000 servers.

In February 2009, Netcraft_?, an Internet monitoring_? company that has tracked Web growth since 1995, reported that there were 215,675,903 websites with domain names and content on them in 2009, compared to just 18,000 websites in August 1995.