

Syllabus – Internet and Web Journalism

1. Internet –Introduction, History, evolution and development,

The **Internet** is the global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link devices worldwide. It is a *network of networks* that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries a vast range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and file sharing.

The origins of the Internet date back to research commissioned by the federal government of the United States in the 1960s to build robust, fault-tolerant communication with computer networks. The primary precursor network, the ARPANET, initially served as a backbone for interconnection of regional academic and military networks in the 1980s. The funding of the National Science Foundation Network as a new backbone in the 1980s, as well as private funding for other commercial extensions, led to worldwide participation in the development of new networking technologies, and the merger of many networks. The linking of commercial networks and enterprises by the early 1990s marks the beginning of the transition to the modern Internet, and generated a sustained exponential growth as generations of institutional, personal, and mobile computers were connected to the network. Although the Internet was widely used by academia since the 1980s, the commercialization incorporated its services and technologies into virtually every aspect of modern life.

Most traditional communications media, including telephony, radio, television, paper mail and newspapers are reshaped, redefined, or even bypassed by the Internet, giving birth to new services such as email, Internet telephony, Internet television, online music, digital newspapers, and video streaming websites. Newspaper, book, and other print publishing are adapting to website technology, or are reshaped into blogging, web feeds and online news aggregators. The Internet has enabled and accelerated new forms of personal interactions through instant messaging, Internet forums, and social networking. Online shopping has grown exponentially both for major retailers and small businesses and entrepreneurs, as it enables firms to extend their "brick and mortar" presence to serve a larger market or even sell goods and services entirely online. Business-to-business and financial services on the Internet affect supply chains across entire industries.

The Internet has no centralized governance in either technological implementation or policies for access and usage; each constituent network sets its own policies. Only the overarching definitions of the two principal name spaces in the Internet, the Internet Protocol address (IP

address) space and the Domain Name System(DNS), are directed by a maintainer organization, the Internet Corporation for Assigned Names and Numbers (ICANN). The technical underpinning and standardization of the core protocols is an activity of the Internet Engineering Task Force (IETF), a non-profit organization of loosely affiliated international participants that anyone may associate with by contributing technical expertise.

Research into packet switching, one of the fundamental Internet technologies started in the early 1960s in the work of Paul Baran, and packet switched networks such as the NPL network by Donald Davies, ARPANET, Tymnet, the Merit Network, Telenet, and CYCLADES, were developed in the late 1960s and 1970s using a variety of protocols. The ARPANET project led to the development of protocols for internetworking, by which multiple separate networks could be joined into a network of networks. ARPANET development began with two network nodes which were interconnected between the Network Measurement Center at the University of California, Los Angeles (UCLA) Henry Samueli School of Engineering and Applied Science directed by Leonard Kleinrock, and the NLS system at SRI International (SRI) by Douglas Engelbart in Menlo Park, California, on 29 October 1969. The third site was the Culler-Fried Interactive Mathematics Center at the University of California, Santa Barbara, followed by the University of Utah Graphics Department. In an early sign of future growth, fifteen sites were connected to the young ARPANET by the end of 1971. These early years were documented in the 1972 film

Early international collaborations on the ARPANET were rare. European developers were concerned with developing the X.25 networks. Notable exceptions were the Norwegian Seismic Array (NORSAR) in June 1973, followed in 1973 by Sweden with satellite links to the Tanum Earth Station and Peter T. Kirstein's research group in the United Kingdom, initially at the Institute of Computer Science, University of London and later at University College London. In December 1974, RFC 675 (Specification of Internet Transmission Control Program), by Vinton Cerf, Yogen Dalal, and Carl Sunshine, used the term internet as a shorthand for internetworking and later RFCs repeated this use. Access to the ARPANET was expanded in 1981 when the National Science Foundation (NSF) funded the Computer Science Network (CSNET). In 1982, the Internet Protocol Suite (TCP/IP) was standardized, which permitted worldwide proliferation of interconnected networks.

TCP/IP network access expanded again in 1986 when the National Science Foundation Network (NSFNet) provided access to supercomputer sites in the United States for researchers, first at speeds of 56 kbit/s and later at 1.5 Mbit/s and 45 Mbit/s. Commercial Internet service providers (ISPs) emerged in the late 1980s and early 1990s. The ARPANET was decommissioned in 1990. By 1995, the Internet was fully commercialized in the U.S. when the NSFNet was decommissioned, removing the last restrictions on use of the Internet to carry commercial traffic.[28]The Internet rapidly expanded in Europe and Australia in the

mid to late 1980s and to Asia in the late 1980s and early 1990s. The beginning of dedicated transatlantic communication between the NSFNET and networks in Europe was established with a low-speed satellite relay between Princeton University and Stockholm, Sweden in December 1988. Although other network protocols such as UUCP had global reach well before this time, this marked the beginning of the Internet as an intercontinental network.

Public commercial use of the Internet began in mid-1989 with the connection of MCI Mail and CompuServe's email capabilities to the 500,000 users of the Internet. Just months later on 1 January 1990, PSInet launched an alternate Internet backbone for commercial use; one of the networks that would grow into the commercial Internet we know today. In March 1990, the first high-speed T1 (1.5 Mbit/s) link between the NSFNET and Europe was installed between Cornell University and CERN, allowing much more robust communications than were capable with satellites. Six months later Tim Berners-Lee would begin writing WorldWideWeb, the first web browser after two years of lobbying CERN management. By Christmas 1990, Berners-Lee had built all the tools necessary for a working Web: the HyperText Transfer Protocol (HTTP) 0.9, the HyperText Markup Language (HTML), the first Web browser (which was also a HTML editor and could access Usenet newsgroups and FTP files), the first HTTP server software (later known as CERN httpd), the first web server, and the first Web pages that described the project itself. In 1991 the Commercial Internet eXchange was founded, allowing PSInet to communicate with the other commercial networks CERFnet and Altnet. Since 1995 the Internet has tremendously impacted culture and commerce, including the rise of near instant communication by email, instant messaging, telephony (Voice over Internet Protocol or VoIP), two-way interactive video calls, and the World Wide Web with its discussion forums, blogs, social networking, and online shopping sites. Increasing amounts of data are transmitted at higher and higher speeds over fiber optic networks operating at 1-Gbit/s, 10-Gbit/s, or more.

Worldwide Internet users			
	2005	2010	2016^a
World population ^[38]	6.5 billion	6.9 billion	7.3 billion
Users worldwide	16%	30%	47%
Users in the developing world	8%	21%	40%

Users in the developed world	51%	67%	81%
			^a Estimate.
Source: International Telecommunications Union.			

The Internet continues to grow, driven by ever greater amounts of online information and knowledge, commerce, entertainment and social networking. During the late 1990s, it was estimated that traffic on the public Internet grew by 100 percent per year, while the mean annual growth in the number of Internet users was thought to be between 20% and 50%. This growth is often attributed to the lack of central administration, which allows organic growth of the network, as well as the non-proprietary nature of the Internet protocols, which encourages vendor interoperability and prevents any one company from exerting too much control over the network. As of 31 March 2011, the estimated total number of Internet users was 2.095 billion (30.2% of world population). It is estimated that in 1993 the Internet carried only 1% of the information flowing through two-way telecommunication, by 2000 this figure had grown to 51%, and by 2007 more than 97% of all telecommunicated information was carried over the Internet.

Services of internet: e-mail, chatting, newsgroups,, Chat rooms, bulletin board services etc,

Electronic Mail (email or e-mail) is a method of exchanging messages ("mail") between people using electronic devices. Email first entered limited use in the 1960s and by the mid-1970s had taken the form now recognized as email. Email operates across computer networks, which today is primarily the Internet. Some early email systems required the author and the recipient to both be online at the same time, in common with instant messaging. Today's email systems are based on a store-and-forward model. Email servers accept, forward, deliver, and store messages. Neither the users nor their computers are required to be online simultaneously; they need to connect only briefly, typically to a mail server or a webmail interface, for as long as it takes to send or receive messages.

Originally an ASCII text-only communications medium, Internet email was extended by Multipurpose Internet Mail Extensions (MIME) to carry text in other character sets and multimedia content attachments. International email, with internationalized email addresses using UTF-8, has been standardized, but as of 2017 it has not been widely adopted.

The history of modern Internet email services reaches back to the early ARPANET, with standards for encoding email messages published as early as 1973 (RFC 561). An email

message sent in the early 1970s looks very similar to a basic email sent today. Email had an important role in creating the Internet, and the conversion from ARPANET to the Internet in the early 1980s produced the core of the current services.

Online chat may refer to any kind of communication over the Internet that offers a real-time transmission of text messages from sender to receiver. Chat messages are generally short in order to enable other participants to respond quickly. Thereby, a feeling similar to a spoken conversation is created, which distinguishes chatting from other text-based online communication forms such as Internet forums and email. Online chat may address point-to-point communications as well as multicast communications from one sender to many receivers and voice and video chat, or may be a feature of a web conferencing service.

Online chat in a less stringent definition may be primarily any direct text-based or video-based (webcams), one-on-one chat or one-to-many group chat (formally also known as synchronous conferencing), using tools such as instant messengers, Internet Relay Chat (IRC), talkers and possibly MUDs. The expression *online chat* comes from the word *chat* which means "informal conversation". Online chat includes web-based applications that allow communication – often directly addressed, but anonymous between users in a multi-user environment. Web conferencing is a more specific online service, that is often sold as a service, hosted on a web server controlled by the vendor.

A **Usenet newsgroup** is a repository usually within the Usenet system, for messages posted from many users in different locations using Internet. Despite the name, newsgroups are discussion groups, and are not devoted to publishing news, but were when the internet was young. Newsgroups are technically distinct from, but functionally similar to, discussion forums on the World Wide Web. Newsreader software is used to read newsgroups.

Before the uptake of the World Wide Web, Usenet newsgroups were among the most popular Internet services, and have retained their noncommercial nature in contrast to the increasingly ad-laden web. In recent years, this form of open discussion on the Internet has lost considerable ground to individually-operated browser-accessible forums and big mediasocial networks such as Facebook and Twitter.

Transmission within and at the bounds of the network uses the Network News Transfer Protocol (NNTP), an Internet standard.

The term **chat room**, or **chatroom**, is primarily used to describe any form of synchronous conferencing, occasionally even asynchronous conferencing. The term can thus mean any technology ranging from real-time online chat and online interaction with strangers (e.g., online forums) to fully immersive graphical social environments.

The primary use of a chat room is to share information via text with a group of other users. Generally speaking, the ability to converse with multiple people in the same conversation differentiates chat rooms from instant messaging programs, which are more typically designed for one-to-one communication. The users in a particular chat room are generally connected via a shared internet or other similar connection, and chat rooms exist catering for a wide range of subjects. New technology has enabled the use of file sharing and webcam to be included in some programs. This would be considered a chat room.

A **bulletin board system** or **BBS** (also called *Computer Bulletin Board Service, CBBS*) is a computer server running software that allows users to connect to the system using a terminal program. Once logged in, the user can perform functions such as uploading and downloading software and data, reading news and bulletins, and exchanging messages with other users through email, public message boards, and sometimes via direct chatting. Many BBSes also offer on-line games in which users can compete with each other, and BBSes with multiple phone lines often provide chat rooms, allowing users to interact with each other. Bulletin board systems were in many ways a precursor to the modern form of the World Wide Web, social networks, and other aspects of the Internet. Low-cost, high-performance modems drove the use of online services and BBSes through the early 1990s. *Info world* estimated that there were 60,000 BBSes serving 17 million users in the United States alone in 1994, a collective market much larger than major online services such as CompuServe.

The introduction of inexpensive dial-up internet service and the Mosaic web browser offered ease of use and global access that BBS and online systems did not provide, and led to a rapid crash in the market starting in 1994. Over the next year, many of the leading BBS software providers went bankrupt and tens of thousands of BBSes disappeared. Today, BBSing survives largely as a nostalgic hobby in most parts of the world, but it is still an extremely popular form of communication for Taiwanese youth (see PTT Bulletin Board System). Most BBSes are now accessible over Telnet and typically offer free email accounts, FTP services, IRC and all of the protocols commonly used on the Internet. Some offer access through packet switched networks or packet radio connections.

Fundamentals of internet: WWW, IP, Web page, website, search engines.

The **World Wide Web** (abbreviated **WWW** or **the Web**) is an information space where documents and other web resources are identified by Uniform Resource Locators (URLs), interlinked by hypertext links, and can be accessed via the Internet. English scientist Tim Berners-Lee invented the World Wide Web in 1989. He wrote the first web browser computer program in 1990 while employed at CERN in Switzerland. The Web browser was released

outside CERN in 1991, first to other research institutions starting in January 1991 and to the general public on the Internet in August 1991.

The World Wide Web has been central to the development of the Information Age and is the primary tool billions of people use to interact on the Internet. Web pages are primarily text documents formatted and annotated with Hypertext Markup Language (HTML). In addition to formatted text, web pages may contain images, video, audio, and software components that are rendered in the user's web browser as coherent pages of multimedia content.

Embedded hyperlinks permit users to navigate between web pages. Multiple web pages with a common theme, a common domain name, or both, make up a website. Website content can largely be provided by the publisher, or interactively where users contribute content or the content depends upon the users or their actions. Websites may be mostly informative, primarily for entertainment, or largely for commercial, governmental, or non-governmental organisational purposes.

The terms *Internet* and *World Wide Web* are often used without much distinction. However, the two are not the same. The Internet is a global system of interconnected computer networks. In contrast, the World Wide Web is a global collection of documents and other resources, linked by hyperlinks and URIs. Web resources are usually accessed using HTTP, which is one of many Internet communication protocols.

Viewing a web page on the World Wide Web normally begins either by typing the URL of the page into a web browser, or by following a hyperlink to that page or resource. The web browser then initiates a series of background communication messages to fetch and display the requested page. In the 1990s, using a browser to view web pages—and to move from one web page to another through hyperlinks—came to be known as 'browsing,' 'web surfing' (after channel surfing), or 'navigating the Web'. Early studies of this new behaviour investigated user patterns in using web browsers. One study, for example, found five user patterns: exploratory surfing, window surfing, evolved surfing, bounded navigation and targeted navigation.

The following example demonstrates the functioning of a web browser when accessing a page at the URL <http://www.example.org/home.html>. The browser resolves the server name of the URL (www.example.org) into an Internet Protocol address using the globally distributed Domain Name System (DNS). This lookup returns an IP address such as *203.0.113.4* or *2001:db 8:2e::7334*. The browser then requests the resource by sending an HTTP request across the Internet to the computer at that address. It requests service from a specific TCP port number that is well known for the HTTP service, so that the receiving host can distinguish an HTTP request from other network protocols it may be

servicing. The HTTP protocol normally uses port number 80. The content of the HTTP request can be as simple as two lines of text:

```
GET /home.html HTTP/1.1  
Host: www.example.org
```

The computer receiving the HTTP request delivers it to web server software listening for requests on port 80. If the web server can fulfil the request it sends an HTTP response back to the browser indicating success:

```
HTTP/1.0 200 OK  
Content-Type: text/html; charset=UTF-8
```

The **Internet Protocol (IP)** is the principal communications protocol in the Internet protocol suite for relaying packets across network boundaries. Its routing function enables internetworking, and essentially establishes the Internet.

IP has the task of delivering packets from the source host to the destination host solely based on the IP addresses in the packet headers. For this purpose, IP defines packet structures that encapsulate the data to be delivered. It also defines addressing methods that are used to label the datagram with source and destination information.

Historically, IP was the connectionless datagram service in the original Transmission Control Program introduced by Vint Cerf and Bob Kahn in 1974; the other being the connection-oriented Transmission Control Protocol (TCP). The Internet protocol suite is therefore often referred to as TCP/IP.

The first major version of IP, Internet Protocol Version 4 (IPv4), is the dominant protocol of the Internet. Its successor is Internet Protocol Version 6 (IPv6).

A **web page** (also written as **webpage**) is a document that is suitable for the World Wide Web and web browsers. A web browser displays a web page on a monitor or mobile device.

The web page usually means what is visible, but the term may also refer to a computer file, usually written in HTML or a comparable markup language. Web browsers coordinate various web resource elements for the written web page, such as style sheets, scripts, and images, to present the web page. Typical web pages provide hypertext that includes a navigation bar or a sidebar menu linking to *other* web pages via hyperlinks, often referred to as *links*.

On a network, a web browser can retrieve a web page from a remote web server. The web server may restrict access to a private network such as a corporate intranet. The web browser uses the Hypertext Transfer Protocol (HTTP) to make such requests.

A *static* web page is delivered exactly as stored, as web content in the web server's file system. In contrast, a *dynamic* web page is generated by a web application, usually driven by server-side software. Dynamic web pages help the browser (the client) to enhance the web page through user input to the server.

A **website** is a collection of related web pages, including multimedia content, typically identified with a common domain name, and published on at least one web server. A website may be accessible via a public Internet Protocol (IP) network, such as the Internet, or a private local area network (LAN), by referencing a uniform resource locator (URL) that identifies the site.

Websites can have many functions and can be used in various fashions; a website can be a personal website, a corporate website for a company, a government website, an organization website, etc. Websites are typically dedicated to a particular topic or purpose, ranging from entertainment and social networking to providing news and education. All publicly accessible websites collectively constitute the World Wide Web, while private websites, such as a company's website for its employees, are typically a part of an intranet.

Web pages, which are the building blocks of websites, are documents, typically composed in plain text interspersed with formatting instructions of Hypertext Markup Language (HTML, XHTML). They may incorporate elements from other websites with suitable markup anchors. Web pages 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. The user's application, often a web browser, renders the page content according to its HTML markup instructions onto a display terminal.

Hyperlinking between web pages conveys to the reader the site structure and guides the navigation of the site, which often starts with a home page containing a directory of the site web content. Some websites require user registration or subscription to access content. Examples of subscription websites include many business sites, 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, as well as sites providing various other services. As of 2018, end users can access websites on a range of devices, including desktop and laptop computers, tablet computers, smartphones and smart TVs.

A '**web search engine**' is a software system that is designed to search for information on the World Wide Web. The search results are generally presented in a line of results often referred to as search engine results pages (SERPs). The information may be a mix of web pages, images, and other types of files. Some search engines also mine data available in databases or open directories. Unlike web directories, which are maintained only by human editors, search engines also maintain real-time information by running an algorithm on a web crawler.

Internet content that is not capable of being searched by a web search engine is generally described as the deep web.

Working of internet : networking and its classification

The communications infrastructure of the Internet consists of its hardware components and a system of software layers that control various aspects of the architecture.

Routing and service tiers

Internet service providers establish the worldwide connectivity between individual networks at various levels of scope. End-users who only access the Internet when needed to perform a function or obtain information, represent the bottom of the routing hierarchy. At the top of the routing hierarchy are the tier 1 networks, large telecommunication companies that exchange traffic directly with each other via peering agreements. Tier 2 and lower level networks buy Internet transit from other providers to reach at least some parties on the global Internet, though they may also engage in peering. An ISP may use a single upstream provider for connectivity, or implement multihoming to achieve redundancy and load balancing. Internet exchange points are major traffic exchanges with physical connections to multiple ISPs. Large organizations, such as academic institutions, large enterprises, and governments, may perform the same function as ISPs, engaging in peering and purchasing transit on behalf of their internal networks. Research networks tend to interconnect with large subnetworks such as GEANT, GLORIAD, Internet2, and the UK's national research and education network, JANET. Both the Internet IP routing structure and hypertext links of the World Wide Web are examples of scale-free networks. Computers and routers use routing tables in their operating system to direct IP packets to the next-hop router or destination. Routing tables are maintained by manual configuration or automatically by routing protocols. End-nodes typically use a default route that points toward an ISP providing transit, while ISP routers use the Border Gateway Protocol to establish the most efficient routing across the complex connections of the global Internet.

An estimated 70 percent of the world's Internet traffic passes through Ashburn, Virginia.

Access

Common methods of Internet access by users include dial-up with a computer modem via telephone circuits, broadband over coaxial cable, fiber optics or copper wires, Wi-Fi, satellite and cellular telephone technology (3G, 4G). The Internet may often be accessed from computers in libraries and Internet cafes. Internet access points exist in many public places such as airport halls and coffee shops. Various terms are used, such as public Internet kiosk, public access terminal, and Webpayphone. Many hotels also have public terminals, though these are usually fee-based. These terminals are widely accessed for various usages, such as ticket booking, bank deposit, or online payment. Wi-Fi provides wireless access to the Internet via local computer networks. Hotspots providing such access include Wi-Fi cafes, where users need to bring their own wireless devices such as a laptop or PDA. These services may be free to all, free to customers only, or fee-based.

Grassroots efforts have led to wireless community networks. Commercial Wi-Fi services covering large city areas are in place in New York, London, Vienna, Toronto, San Francisco, Philadelphia, Chicago and Pittsburgh. The Internet can then be accessed from such places as a park bench.[56] Apart from Wi-Fi, there have been experiments with proprietary mobile wireless networks like Ricochet, various high-speed data services over cellular phone networks, and fixed wireless services. High-end mobile phones such as smartphones in general come with Internet access through the phone network. Web browsers such as Opera are available on these advanced handsets, which can also run a wide variety of other Internet software. More mobile phones have Internet access than PCs, though this is not as widely used. An Internet access provider and protocol matrix differentiates the methods used to get online.

Protocols

Internet protocol suite	
Application layer	
•	BGP
•	DHCP
•	DNS
•	FTP
•	HTTP
•	IMAP
•	LDAP
•	MGCP
•	MQTT
•	NNTP
•	NTP

- POP
- ONC/RPC
- RTP
- RTSP
- RIP
- SIP
- SMTP
- SNMP
- SSH
- Telnet
- TLS/SSL
- XMPP

Transport layer

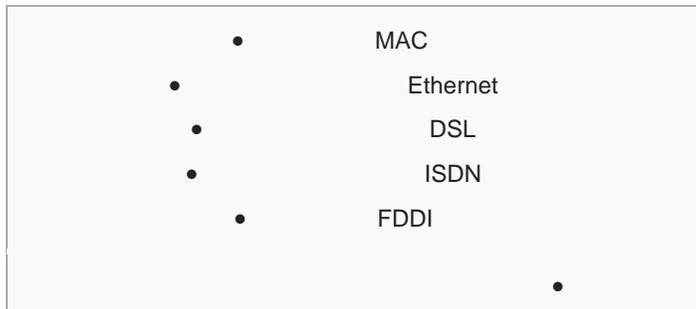
- TCP
- UDP
- DCCP
- SCTP
- RSVP

Internet layer

- IP
- IPv4
- IPv6
- ICMP
- ICMPv6
- ECN
- IGMP
- IPsec

Link layer

- ARP
- NDP
- OSPF
- Tunnels
- L2TP
- PPP



While the hardware components in the Internet infrastructure can often be used to support other software systems, it is the design and the standardization process of the software that characterizes the Internet and provides the foundation for its scalability and success. The responsibility for the architectural design of the Internet software systems has been assumed by the Internet Engineering Task Force (IETF). The IETF conducts standard-setting work groups, open to any individual, about the various aspects of Internet architecture. Resulting contributions and standards are published as Request for Comments (RFC) documents on the IETF web site. The principal methods of networking that enable the Internet are contained in specially designated RFCs that constitute the Internet Standards. Other less rigorous documents are simply informative, experimental, or historical, or document the best current practices (BCP) when implementing Internet technologies.

The Internet standards describe a framework known as the Internet protocol suite. This is a model architecture that divides methods into a layered system of protocols, originally documented in RFC 1122 and RFC 1123. The layers correspond to the environment or scope in which their services operate. At the top is the application layer, space for the application-specific networking methods used in software applications. For example, a web browser program uses the client-server application model and a specific protocol of interaction between servers and clients, while many file-sharing systems use a peer-to-peer paradigm. Below this top layer, the transport layer connects applications on different hosts with a logical channel through the network with appropriate data exchange methods.

Underlying these layers are the networking technologies that interconnect networks at their borders and exchange traffic across them. The Internet layer enables computers to identify and locate each other via Internet Protocol (IP) addresses, and routes their traffic via intermediate (transit) networks. Last, at the bottom of the architecture is the link layer, which provides logical connectivity between hosts on the same network link, such as a local area network (LAN) or a dial-up connection. The model, also known as TCP/IP, is designed to be independent of the underlying hardware used for the physical connections, which the model does not concern itself with in any detail. Other models have been developed, such as the OSI model, that attempt to be comprehensive in every aspect of communications. While

many similarities exist between the models, they are not compatible in the details of description or implementation.

As user data is processed through the protocol stack, each abstraction layer adds encapsulation information at the sending host. Data is transmitted *over the wire* at the link level between hosts and routers. Encapsulation is removed by the receiving host. Intermediate relays update link encapsulation at each hop, and inspect the IP layer for routing purposes.

The most prominent component of the Internet model is the Internet Protocol (IP), which provides addressing systems, including IP addresses, for computers on the network. IP enables internetworking and, in essence, establishes the Internet itself. Internet Protocol Version 4 (IPv4) is the initial version used on the first generation of the Internet and is still in dominant use. It was designed to address up to ~4.3 billion (2^{32}) hosts. However, the explosive growth of the Internet has led to IPv4 address exhaustion, which entered its final stage in 2011, when the global address allocation pool was exhausted. A new protocol version, IPv6, was developed in the mid-1990s, which provides vastly larger addressing capabilities and more efficient routing of Internet traffic. IPv6 is currently in growing deployment around the world, since Internet address registries (RIRs) began to urge all resource managers to plan rapid adoption and conversion.

IPv6 is not directly interoperable by design with IPv4. In essence, it establishes a parallel version of the Internet not directly accessible with IPv4 software. Thus, translation facilities must exist for internetworking or nodes must have duplicate networking software for both networks. Essentially all modern computer operating systems support both versions of the Internet Protocol. Network infrastructure, however, has been lagging in this development. Aside from the complex array of physical connections that make up its infrastructure, the Internet is facilitated by bi- or multi-lateral commercial contracts, e.g., peering agreements, and by technical specifications or protocols that describe the exchange of data over the network. Indeed, the Internet is defined by its interconnections and routing policies.

2. The Fundamentals of Web Design: The web we know today, working of web, history of web, evolution of world wide web, now days the use of internet, sample web pages, how did they are constructed, function and stand point, hands on good web sites , browsing good websites, analyzing a sample site from a function standpoint.

We all know intuitively what makes a website look bad: overused bevel effects, corny clip art, overcrowded layouts. These annoyances are easily corrected by developing with design fundamentals in mind—the same principles used by professional designers and artists alike.

Great websites bring together form and function. In fact, well-designed websites are seen as more credible, according to a Stanford study and are actually easier to use (as studied by researcher Don Norman). So here are five fundamentals to help you keep quality design at the forefront of your practice.

1) Follow the rules...mostly

In design school, they'll give you a list of principles to abide by that assign rules to beauty—elements like layout, order and symmetry. But as you advance, you're then told to break the rules a bit to create places for a viewer's eyes to look by employing elements like variety, tension or contrast.

2) Use imagery and icons to communicate when possible

There are some universal icons that people are trained to respond to. The magnifying glass (search), the house (home page) and floppy disk (save) are ingrained into your users already. Take advantage of those visual shortcuts; all those road signs should be immediately recognizable to you.

3) Color as a design element, not as decoration

Color makes all the difference, especially as our screens get better on our phones and tablets. It's a facet of design that can be a really key part of the story your website wants to tell. Just use color to support content, not decorate a page. And often if you're using a photo, the colors in the design should be sampled from the photos used so your design has a nice unified feel.

I quite like pulling color examples with color swatches – and the Adobe Kuler Web app is a great way to play with different themes and then import them into your design tools. One of the best rules to go with is to use complimentary colors. Which is basically using warm colors and cool colors together to provide balance.

4) Choose fonts that support content

There are literally thousands of fonts to choose from.

It's up to you to mix and match – but remember that it's best practice to use only up to three fonts at a time—a nice headline font, one for the main body of text, then one for any sort of call-out you might need. Often, that means using a sans-serif for the body copy, and for headlines you can get more interesting with either serif or sans-serif.

5) Help from others

All right, you've got your basic design elements, with pretty icons and pictures, with a sound color scheme and fun fonts. What's next?

Getting help from others, of course! And not just random people on the street, but constructive critique from people who really know their stuff, like other designers/developers. This can be instrumental to go from an OK website to one that really pops. If you've never used Behance to post a work-in-progress, I recommend giving it a try. The active community will do more than just tell you “to make the logo bigger” – but give you advice that can make the difference between a good website and a great one.

How does the Internet work? Good question! The Internet's growth has become explosive and it seems impossible to escape the bombardment of *www.com*'s seen constantly on television, heard on radio, and seen in magazines. Because the Internet has become such a large part of our lives, a good understanding is needed to use this new tool most effectively.

This whitepaper explains the underlying infrastructure and technologies that make the Internet work. It does not go into great depth, but covers enough of each area to give a basic understanding of the concepts involved. For any unanswered questions, a list of resources is provided at the end of the paper. Any comments, suggestions, questions, etc. are encouraged and may be directed to the author at rshuler@gobcg.com.

Where to Begin? Internet Addresses

Because the Internet is a global network of computers each computer connected to the Internet **must** have a unique address. Internet addresses are in the form **nnn.nnn.nnn.nnn** where nnn must be a number from 0 - 255. This address is known as an IP address. (IP stands for Internet Protocol; more on this later.)

If you connect to the Internet through an Internet Service Provider (ISP), you are usually assigned a temporary IP address for the duration of your dial-in session. If you connect to the Internet from a local area network (LAN) your computer might have a permanent IP address or it might obtain a temporary one from a DHCP (Dynamic Host Configuration Protocol) server. In any case, if you are connected to the Internet, your computer has a unique IP address.

Protocol Stacks and Packets

So your computer is connected to the Internet and has a unique address. How does it 'talk' to other computers connected to the Internet? An example should serve here: Let's say your IP address is 1.2.3.4 and you want to send a message to the computer 5.6.7.8. The message you want to send is "Hello computer 5.6.7.8!". Obviously, the message must be transmitted over whatever kind of wire connects your computer to the Internet. Let's say you've dialed into your ISP from home and the message must be transmitted over the phone line. Therefore the message must be translated from alphabetic text into electronic signals, transmitted over the Internet, then translated back into alphabetic text. How is this accomplished? Through the use of a **protocol stack**. Every computer needs one to communicate on the Internet and it is usually built into the computer's operating system (i.e. Windows, Unix, etc.). The protocol stack used on the Internet is referred to as the TCP/IP protocol stack because of the two major communication protocols used. The TCP/IP stack looks like this:

Protocol Layer	Comments
Application Protocols Layer	Protocols specific to applications such as WWW, e-mail, FTP, etc.
Transmission Control Protocol Layer	TCP directs packets to a specific application on a computer using a port number.
Internet Protocol Layer	IP directs packets to a specific computer using an IP address.
Hardware Layer	Converts binary packet data to network signals and back. (E.g. ethernet network card, modem for phone lines, etc.)

Networking Infrastructure

The ISP maintains a pool of modems for their dial-in customers. This is managed by some form of computer (usually a dedicated one) which controls data flow from the modem pool to a backbone or dedicated line router. This setup may be referred to as a port server, as it 'serves' access to the network. Billing and usage information is usually collected here as well.

After your packets traverse the phone network and your ISP's local equipment, they are routed onto the ISP's backbone or a backbone the ISP buys bandwidth from. From here the packets will usually journey through several routers and over several backbones, dedicated lines, and other networks until they find their destination, the computer with address 5.6.7.8. But wouldn't it would be nice if we knew the exact route our packets were taking over the Internet? As it turns out, there is a way...

If you use trace route, you'll notice that your packets must travel through many things to get to their destination. Most have long names such as sjc2-core1-h2-0-0.atlas.digex.net and fddi0-0.br4.SJC.globalcenter.net. These are Internet routers that decide where to send your packets. Several routers are shown in Diagram 3, but only a few. Diagram 3 is meant to show a simple network structure. The Internet is much more complex.

Internet Infrastructure

The Internet backbone is made up of many large networks which interconnect with each other. These large networks are known as **Network Service Providers** or **NSPs**. Some of the large NSPs are UUNet, CerfNet, IBM, BBN Planet, SprintNet, PSINet, as well as others. These networks **peer** with each other to exchange packet traffic. Each NSP is required to connect to three **Network Access Points** or **NAPs**. At the NAPs, packet traffic may jump from one NSP's backbone to another NSP's backbone. NSPs also interconnect at **Metropolitan Area Exchanges** or **MAEs**. MAEs serve the same purpose as the NAPs but are privately owned. NAPs were the original Internet interconnect points. Both NAPs and MAEs are referred to as Internet Exchange Points or **IXs**. NSPs also sell bandwidth to smaller networks, such as ISPs and smaller bandwidth providers.

The Internet Routing Hierarchy

So how do packets find their way across the Internet? Does every computer connected to the Internet know where the other computers are? Do packets simply get 'broadcast' to every computer on the Internet? The answer to both the preceding questions is 'no'. No computer knows where any of the other computers are, and packets do not get sent to every computer. The information used to get packets to their destinations are contained in routing tables kept by each router connected to the Internet.

Routers are packet switches. A router is usually connected between networks to route

packets between them. Each router knows about its sub-networks and which IP addresses they use. The router usually doesn't know what IP addresses are 'above' it. Examine Diagram 5 below. The black boxes connecting the backbones are routers. The larger NSP backbones at the top are connected at a NAP. Under them are several sub-networks, and under them, more sub-networks.

When a packet arrives at a router, the router examines the IP address put there by the IP protocol layer on the originating computer. The router checks its routing table. If the network containing the IP address is found, the packet is sent to that network. If the network containing the IP address is not found, then the router sends the packet on a default route, usually up the backbone hierarchy to the next router. Hopefully the next router will know where to send the packet. If it does not, again the packet is routed upwards until it reaches a NSP backbone. The routers connected to the NSP backbones hold the largest routing tables and here the packet will be routed to the correct backbone, where it will begin its journey 'downward' through smaller and smaller networks until it finds its destination.

Domain Names and Address Resolution

But what if you don't know the IP address of the computer you want to connect to? What if you need to access a web server referred to as *www.anothercomputer.com*? How does your web browser know where on the Internet this computer lives? The answer to all these questions is the **Domain Name Service** or **DNS**. The DNS is a distributed database which keeps track of computer's names and their corresponding IP addresses on the Internet.

Many computers connected to the Internet host part of the DNS database and the software that allows others to access it. These computers are known as DNS servers. No DNS server contains the entire database; they only contain a subset of it. If a DNS server does not contain the domain name requested by another computer, the DNS server re-directs the requesting computer to another DNS server.

The Domain Name Service is structured as a hierarchy similar to the IP routing hierarchy. The computer requesting a name resolution will be re-directed 'up' the hierarchy until a DNS server is found that can resolve the domain name in the request. Figure 6 illustrates a portion of the hierarchy. At the top of the tree are the domain roots. Some of the older, more common domains are seen near the top. What is not shown are the multitude of DNS servers around the world which form the rest of the hierarchy.

When an Internet connection is setup (e.g. for a LAN or Dial-Up Networking in Windows), one primary and one or more secondary DNS servers are usually specified as part of the installation. This way, any Internet applications that need domain name resolution will be able to function correctly. For example, when you enter a web address into your web browser, the browser first connects to your primary DNS server. After obtaining the IP address for the domain name you entered, the browser then connects to the target computer and requests the web page you wanted.

Internet Protocols Revisited

As hinted to earlier in the section about protocol stacks, one may surmise that there are many protocols that are used on the Internet. This is true; there are many communication protocols required for the Internet to function. These include the TCP and IP protocols, routing protocols, medium access control protocols, application level protocols, etc. The following sections describe some of the more important and commonly used protocols on the Internet. Higher level protocols are discussed first, followed by lower level protocols.

Application Protocols: HTTP and the World Wide Web

One of the most commonly used services on the Internet is the World Wide Web (WWW). The application protocol that makes the web work is **Hypertext Transfer Protocol** or **HTTP**. Do not confuse this with the Hypertext Markup Language (HTML). HTML is the language used to write web pages. HTTP is the protocol that web browsers and web servers use to communicate with each other over the Internet. It is an application level protocol because it sits on top of the TCP layer in the protocol stack and is used by specific applications to talk to one another. In this case the applications are web browsers and web servers.

HTTP is a connectionless text based protocol. Clients (web browsers) send requests to web servers for web elements such as web pages and images. After the request is serviced by a server, the connection between client and server across the Internet is disconnected. A new connection must be made for each request. Most protocols are connection oriented. This means that the two computers communicating with each other keep the connection open over the Internet. HTTP does not however. Before an HTTP request can be made by a client, a new connection must be made to the server.

When you type a URL into a web browser, this is what happens:

1. If the URL contains a domain name, the browser first connects to a domain name server and retrieves the corresponding IP address for the web server.
2. The web browser connects to the web server and sends an HTTP request (via the protocol stack) for the desired web page.
3. The web server receives the request and checks for the desired page. If the page exists, the web server sends it. If the server cannot find the requested page, it will send an HTTP 404 error message. (404 means 'Page Not Found' as anyone who has surfed the web probably knows.)
4. The web browser receives the page back and the connection is closed.
5. The browser then parses through the page and looks for other page elements it needs to complete the web page. These usually include images, applets, etc.
6. For each element needed, the browser makes additional connections and HTTP requests to the server for each element.
7. When the browser has finished loading all images, applets, etc. the page will be completely loaded in the browser window.

Most Internet protocols are specified by Internet documents known as a **Request For Comments** or **RFCs**. RFCs may be found at several locations on the Internet. See the Resources section below for appropriate URL's. HTTP version 1.0 is specified by RFC 1945.

Application Protocols: SMTP and Electronic Mail

Another commonly used Internet service is electronic mail. E-mail uses an application level protocol called **Simple Mail Transfer Protocol** or **SMTP**. SMTP is also a text based protocol, but unlike HTTP, SMTP is connection oriented. SMTP is also more complicated than HTTP. There are many more commands and considerations in SMTP than there are in HTTP.

When you open your mail client to read your e-mail, this is what typically happens:

1. The mail client (Netscape Mail, Lotus Notes, Microsoft Outlook, etc.) opens a connection to it's default mail server. The mail server's IP address or domain name is typically setup when the mail client is installed.
2. The mail server will always transmit the first message to identify itself.
3. The client will send an SMTP HELO command to which the server will respond with a 250 OK message.
4. Depending on whether the client is checking mail, sending mail, etc. the appropriate SMTP commands will be sent to the server, which will respond accordingly.
5. This request/response transaction will continue until the client sends an SMTP QUIT command. The server will then say goodbye and the connection will be closed.

Transmission Control Protocol

Under the application layer in the protocol stack is the TCP layer. When applications open a connection to another computer on the Internet, the messages they send (using a specific application layer protocol) get passed down the stack to the TCP layer. **TCP is responsible for routing application protocols to the correct application on the destination computer.** To accomplish this, port numbers are used. Ports can be thought of as separate channels on each computer. For example, you can surf the web while reading e-mail. This is because these two applications (the web browser and the mail client) used different port numbers. When a packet arrives at a computer and makes its way up the protocol stack, the TCP layer decides which application receives the packet based on a port number.

TCP works like this:

- When the TCP layer receives the application layer protocol data from above, it segments it into manageable 'chunks' and then adds a TCP header with specific TCP information to each 'chunk'. The information contained in the TCP header includes the port number of the application the data needs to be sent to.

- When the TCP layer receives a packet from the IP layer below it, the TCP layer strips the TCP header data from the packet, does some data reconstruction if necessary, and then sends the data to the correct application using the port number taken from the TCP header.

This is how TCP routes the data moving through the protocol stack to the correct application.

TCP is not a textual protocol. **TCP is a connection-oriented, reliable, byte stream service.** Connection-oriented means that two applications using TCP must first establish a connection before exchanging data. TCP is reliable because for each packet received, an acknowledgement is sent to the sender to confirm the delivery. TCP also includes a checksum in its header for error-checking the received data.

Internet Protocol

Unlike TCP, **IP is an unreliable, connectionless protocol.** IP doesn't care whether a packet gets to its destination or not. Nor does IP know about connections and port numbers. **IP's job is to send and route packets to other computers.** IP packets are independent entities and may arrive out of order or not at all. It is TCP's job to make sure packets arrive and are in the correct order. About the only thing IP has in common with TCP is the way it receives data and adds its own IP header information to the TCP data.

Above we see the IP addresses of the sending and receiving computers in the IP header. Below is what a packet looks like after passing through the application layer, TCP layer, and IP layer. The application layer data is segmented in the TCP layer, the TCP header is added, the packet continues to the IP layer, the IP header is added, and then the packet is transmitted across the Internet.

Sir Tim Berners-Lee is a British computer scientist. He was born in London, and his parents were early computer scientists, working on one of the earliest computers.

Growing up, Sir Tim was interested in trains and had a model railway in his bedroom. He recalls:

"I made some electronic gadgets to control the trains. Then I ended up getting more interested in electronics than trains. Later on, when I was in college I made a computer out of an old television set."

After graduating from Oxford University, Berners-Lee became a software engineer at CERN, the large particle physics laboratory near Geneva,

Switzerland. Scientists come from all over the world to use its accelerators, but Sir Tim noticed that they were having difficulty sharing information.

“In those days, there was different information on different computers, but you had to log on to different computers to get at it. Also, sometimes you had to learn a different program on each computer. Often it was just easier to go and ask people when they were having coffee...”, Tim says.

Tim thought he saw a way to solve this problem – one that he could see could also have much broader applications. Already, millions of computers were being connected together through the fast-developing internet and Berners-Lee realised they could share information by exploiting an emerging technology called hypertext.

In March 1989, Tim laid out his vision for what would become the web in a document called “Information Management: A Proposal”. Believe it or not, Tim’s initial proposal was not immediately accepted. In fact, his boss at the time, Mike Sendall, noted the words “Vague but exciting” on the cover. The web was never an official CERN project, but Mike managed to give Tim time to work on it in September 1990. He began work using a NeXT computer, one of Steve Jobs’ early products.

By October of 1990, Tim had written the three fundamental technologies that remain the foundation of today’s web (and which you may have seen appear on parts of your web browser):

- HTML: HyperText Markup Language. The markup (formatting) language for the web.
- URI: Uniform Resource Identifier. A kind of “address” that is unique and used to identify to each resource on the web. It is also commonly called a URL.

- HTTP: Hypertext Transfer Protocol. Allows for the retrieval of linked resources from across the web.

Tim also wrote the first web page editor/browser (“WorldWideWeb.app”) and the first web server (“httpd”). By the end of 1990, the first web page was served on the open internet, and in 1991, people outside of CERN were invited to join this new web community.

As the web began to grow, Tim realised that its true potential would only be unleashed if anyone, anywhere could use it without paying a fee or having to ask for permission.

He explains: *“Had the technology been proprietary, and in my total control, it would probably not have taken off. You can’t propose that something be a universal space and at the same time keep control of it.”*

So, Tim and others advocated to ensure that CERN would agree to make the underlying code available on a royalty-free basis, forever. This decision was announced in April 1993, and sparked a global wave of creativity, collaboration and innovation never seen before. In 2003, the companies developing new web standards committed to a Royalty Free Policy for their work. In 2014, the year we celebrated the web’s 25th birthday, almost two in five people around the world were using it.

Tim moved from CERN to the Massachusetts Institute of Technology in 1994 to found the World Wide Web Consortium(W3C), an international community devoted to developing open web standards. He remains the Director of W3C to this day.

The early web community produced some revolutionary ideas that are now spreading far beyond the technology sector:

- Decentralisation: No permission is needed from a central authority to post anything on the web, there is no central controlling node, and so no single point of failure ... and no “kill switch”! This also implies freedom from indiscriminate censorship and surveillance.
- Non-discrimination: If I pay to connect to the internet with a certain quality of service, and you pay to connect with that or a greater quality of service, then we can both communicate at the same level. This principle of equity is also known as Net Neutrality.
- Bottom-up design: Instead of code being written and controlled by a small group of experts, it was developed in full view of everyone, encouraging maximum participation and experimentation.
- Universality: For anyone to be able to publish anything on the web, all the computers involved have to speak the same languages to each other, no matter what different hardware people are using; where they live; or what cultural and political beliefs they have. In this way, the web breaks down silos while still allowing diversity to flourish.
- Consensus: For universal standards to work, everyone had to agree to use them. Tim and others achieved this consensus by giving everyone a say in creating the standards, through a transparent, participatory process at W3C.

New permutations of these ideas are giving rise to exciting new approaches in fields as diverse as information (Open Data), politics (Open Government), scientific research (Open Access), education, and culture (Free Culture). But to date we have only scratched the surface of how these principles could change society and politics for the better.

In 2009, Sir Tim established the World Wide Web Foundation. The Web Foundation is advancing the Open Web as a means to build a just and thriving society by connecting everyone, raising voices and enhancing participation.

Please do explore our site and our work. We hope you'll be inspired by our vision and decide to take action. Remember, as Tim tweeted during the Olympics Opening Ceremony in 2012, "This is for everyone".

Creation Web page and viewing

To create a web page, a text editor or a specialized HTML editor is needed. In order to upload the created web page to a web server, traditionally an FTP client is needed.

The design of a web page is highly personal. A design can be made according to one's own preference, or a premade web template can be used. Web templates let web page designers edit the content of a web page without having to worry about the overall aesthetics. Many use all-in-one services for web domain purchases, web hosting service and templates to build customized websites. Web publishing tools such as Tripod and Wordpress offer free page creation and hosting up to a certain size limit. Other ways of making a web page are to download specialized software, like a Wiki, CMS, or forum. These options allow for the quick and easy creation of a web page which is typically dynamic.

In order to graphically display a web page, a web browser is needed. This is a type of software that can retrieve web pages from the Internet. Most current web browsers include the ability to view the source code. Viewing a web page in a text editor will also display the source code.

Pages are usually found with assistance from a search engine, but they can receive traffic from social and other sources.

Overview on website

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 anon-profit 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 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, tablet computers and smartphones. A website is hosted on a computer system known as a web server, also called an HTTP (Hyper Text Transfer Protocol) 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 Nginx, Lighttpd, Hiawatha or Cherokee, are fully functional and lightweight.

Static website

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); Cascading Style Sheets (CSS) are used to control appearance beyond basic HTML. Images are commonly used to effect the desired appearance and as part of the main content. Audio or video might also be considered "static" content if it plays automatically or is generally non-interactive. 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. 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 navigation menus.

Static websites can be 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 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 iWeb allow users to 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

A dynamic website is one that changes or customizes itself frequently and automatically. Server-side dynamic pages are generated "on the fly" by computer code that produces the HTML (CSS are responsible for appearance and thus, are static files). There are a wide range of software systems, such as CGI, Java Servlets and Java Server Pages (JSP), Active Server Pages and ColdFusion (CFML) that are available to generate dynamic web systems and dynamic sites. Various web application frameworks and web template systems are available for general-use programming languages like Perl, PHP, Python and Ruby to make it faster and easier to create complex dynamic websites.

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. For example, when the front page of a news site is requested, the code running on the web server might combine stored HTML fragments with news stories retrieved from a database or another website via RSS to produce a page that includes the latest information. Dynamic sites can be interactive by using HTML forms, storing and reading back browser cookies, or by creating a series of pages that reflect the previous history of clicks. Another example of dynamic content is when a retail website with a database of media products allows a user to input a search request, e.g. 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. Dynamic HTML uses JavaScript code to instruct the web browser how to interactively modify the page contents. One way to simulate a certain type of dynamic website while avoiding the performance loss of initiating the dynamic engine on a per-user or per-connection basis, is to periodically automatically regenerate a large series of static pages.

Multimedia and interactive content

Early websites had only text, and soon after, images. Web browser plug ins were then used to add audio, video, and interactivity (such as for a rich Internet application that mirrors the complexity of a desktop application like a word processor). Examples of such plug-ins are Microsoft Silverlight, Adobe Flash, Adobe Shockwave, and applets written in Java. HTML 5 includes provisions for audio and video without plugins. JavaScript is also built into most modern web browsers, and allows for website creators to send code to the web browser that instructs it how to interactively modify page content and communicate with the web server if needed. The browser's internal representation of the content is known as the Document Object Model (DOM) and the technique is known as Dynamic HTML.

A 2010-era trend in websites called "responsive design" has given the best of viewing experience as it provides with a device based layout for users. These websites change their layout according to the device or mobile platform thus giving a rich user experience.

Spelling

While "web site" was the original spelling (sometimes capitalized "Web site", since "Web" is a proper noun when referring to the World Wide Web), this variant has become rarely used,

and "website" has become the standard spelling. All major style guides, such as *The Chicago Manual of Style* and the *AP Stylebook*, have reflected this change.

Types

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 or users. Static sites serve or capture information but do not allow engagement with the audience or users directly. Some websites are informational or produced by enthusiasts or for personal use or entertainment. Many websites do aim to make money, using one or more business models, including:

- Posting interesting content and selling contextual advertising either through direct sales or through an advertising network.
- E-commerce: products or services are purchased directly through the website
- Advertising products or services available at a brick and mortar business
- Freemium: basic content is available for free but premium content requires a payment (e.g., WordPress website, it is an open source platform to build a blog or website.)

3. The Principal of web Design: Well-designed site from a poorly conceived one, difference between web and print design, focusing on those issues a web designer, discover top ten web design, and critique a sample site from an aesthetic perspective.

Websites that are not well designed tend to perform poorly and have sub-optimal Google Analytics metrics (e.g. high bounce rates, low time on site, low pages per visit and low conversions). So what makes good web design? Below we explore the top 10 web design principles that will make your website aesthetically pleasing, easy to use, engaging, and effective.

1. PURPOSE

Good web design always caters to the needs of the user. Are your web visitors looking for information, entertainment, some type of interaction, or to transact with your business? Each page of your website needs to have a clear purpose,

and to fulfill a specific need for your website users in the most effective way possible.

2. COMMUNICATION

People on the web tend to want information quickly, so it is important to communicate clearly, and make your information easy to read and digest. Some effective tactics to include in your web design include: organising information using headlines and sub headlines, using bullet points instead of long windy sentences, and cutting the waffle.

3. TYPEFACES

In general, Sans Serif fonts such as Arial and Verdana are easier to read online (Sans Serif fonts are contemporary looking fonts without decorative finishes). The ideal font size for reading easily online is 16px and stick to a maximum of 3 typefaces in a maximum of 3 point sizes to keep your design streamlined.

4. COLOURS

A well thought out colour palette can go a long way to enhance the user experience. Complementary colours create balance and harmony. Using contrasting colours for the text and background will make reading easier on the eye. Vibrant colours create emotion and should be used sparingly (e.g. for buttons and call to actions). Last but not least, white space/ negative space is very effective at giving your website a modern and uncluttered look.

5. IMAGES

A picture can speak a thousand words, and choosing the right images for your website can help with brand positioning and connecting with your target audience. If you don't have high quality professional photos on hand, consider purchasing stock photos to lift the look of your website. Also consider using

infographics, videos and graphics as these can be much more effective at communicating than even the most well written piece of text.

6. NAVIGATION

Navigation is about how easy it is for people to take action and move around your website. Some tactics for effective navigation include a logical page hierarchy, using bread crumbs, designing clickable buttons, and following the 'three click rule' which means users will be able to find the information they are looking for within three clicks.

7. GRID BASED LAYOUTS

Placing content randomly on your web page can end up with a haphazard appearance that is messy. Grid based layouts arrange content into sections, columns and boxes that line up and feel balanced, which leads to a better looking website design.

8. "F" PATTERN DESIGN

Eye tracking studies have identified that people scan computer screens in an "F" pattern. Most of what people see is in the top and left of the screen and the right side of the screen is rarely seen. Rather than trying to force the viewer's visual flow, effectively designed websites will work with a reader's natural behaviour and display information in order of importance (left to right, and top to bottom).

9. LOAD TIME

Everybody hates a website that takes ages to load. Tips to make page load times more effective include optimising image sizes (size and scale), combining code into a central CSS or JavaScript file (this reduces HTTP requests) and minify HTML, CSS, JavaScript (compressed to speed up their load time).

10: MOBILE FRIENDLY

It is now commonplace to access websites from multiple devices with multiple screen sizes, so it is important to consider if your website is mobile friendly. If your website is not mobile friendly, you can either rebuild it in a responsive layout (this means your website will adjust to different screen widths) or you can build a dedicated mobile site (a separate website optimised specifically for mobile users).

4. Networking topologies, types of servers, server software ,Internet protocols (TCP/IP, FTP, HTTP)

Network topology is the arrangement of the various elements (links, nodes, etc.) of a communication network

Network topology is the topological structure of a network and may be depicted physically or logically. It is an application of graph theory wherein communicating devices are modeled as nodes and the connections between the devices are modeled as links or lines between the nodes. *Physical topology* is the placement of the various components of a network (e.g., device location and cable installation), while *logical topology* illustrates how data flows within a network. Distances between nodes, physical interconnections, transmission rates, or signal types may differ between two different networks, yet their topologies may be identical. A network's physical topology is a particular concern of the physical layer of the OSI model. Network topology can be used to define or describe the arrangement of various types of telecommunication networks, including command and control radio networks,^[4] industrial field busses, and computer networks.

Examples of network typologies are found in local area networks (LAN), a common computer network installation. Any given node in the LAN has one or more physical links to other devices in the network; graphically mapping these links results in a geometric shape that can be used to describe the physical topology of the network. A wide variety of physical topologies have been used in LANs, including ring, bus, mesh and star. Conversely, mapping the data flow between the components determines the logical topology of the network. In comparison, Controller Area Networks, common in vehicles, are primarily distributed control system networks of one or more controllers interconnected with sensors and actuators over, invariably, a physical bus topology.

Topologies

Two basic categories of network topologies exist, physical topologies and logical topologies

The transmission medium layout used to link devices is the physical topology of the network. For conductive or fiber optical mediums, this refers to the layout of cabling, the locations of nodes, and the links between the nodes and the cabling. The physical topology of a network is determined by the capabilities of the network access devices and media, the level of control or fault tolerance desired, and the cost associated with cabling or telecommunications circuits.

In contrast, logical topology is the way that the signals act on the network media, or the way that the data passes through the network from one device to the next without regard to the physical interconnection of the devices. A network's logical topology is not necessarily the same as its physical topology. For example, the original twisted pair Ethernet using repeater hubs was a logical bus topology carried on a physical star topology. Token ring is a logical ring topology, but is wired as a physical star from the media access unit. Physically, AFDX can be a cascaded star topology of multiple dual redundant Ethernet switches; however, the AFDX Virtual links are modeled as time-switched single-transmitter bus connections, thus following the safety model of a single-transmitter bus topology previously used in aircraft. Logical topologies are often closely associated with media access control methods and protocols. Some networks are able to dynamically change their logical topology through configuration changes to their routers and switches.

Links

The transmission media (often referred to in the literature as the physical media) used to link devices to form a computer network include electrical cable (Ethernet, HomePNA, power line communication, G.hn), optical fiber (fiber-optic communication), and radio waves (wireless networking). In the OSI model, these are defined at layers 1 and 2 — the physical layer and the data link layer.

A widely adopted family of transmission media used in local area network (LAN) technology is collectively known as Ethernet. The media and protocol standards that enable communication between networked devices over Ethernet are defined by IEEE 802.3. Ethernet transmits data over both copper and fiber cables. Wireless LAN standards (e.g. those defined by IEEE 802.11) use radio waves, or others use infrared signals as a transmission medium. Power line communication uses a building's power cabling to transmit data.

Wired technologies

The orders of the following wired technologies are, roughly, from slowest to fastest transmission speed.

- *Coaxial cable* is widely used for cable television systems, office buildings, and other work-sites for local area networks. The cables consist of copper or aluminum wire surrounded by an insulating layer (typically a flexible material with a high dielectric constant), which itself is surrounded by a conductive layer. The insulation helps minimize interference and distortion. Transmission speed ranges from 200 million bits per second to more than 500 million bits per second.

- *Ribbon cable* (untwisted and possibly unshielded) has been a cost-effective media for serial protocols, especially within metallic enclosures or rolled within copper braid or foil, over short distances, or at lower data rates. Several serial network protocols can be deployed without shielded or twisted pair cabling, that is, with "flat" or "ribbon" cable, or a hybrid flat/twisted ribbon cable, should EMC, length, and bandwidth constraints permit: RS-232, RS-422, RS-485, CAN, GPIB, SCSI, etc.
- *Twisted pair wire* is the most widely used medium for all telecommunication. Twisted-pair cabling consist of copper wires that are twisted into pairs. Ordinary telephone wires consist of two insulated copper wires twisted into pairs. Computer network cabling (wired Ethernet as defined by IEEE 802.3) consists of 4 pairs of copper cabling that can be utilized for both voice and data transmission. The use of two wires twisted together helps to reduce crosstalk an delectromagnetic induction. The transmission speed ranges from 2 million bits per second to 10 billion bits per second. Twisted pair cabling comes in two forms: unshielded twisted pair (UTP) and shielded twisted-pair (STP). Each form comes in several category ratings, designed for use in various scenarios.
- An *optical fiber* is a glass fiber. It carries pulses of light that represent data. Some advantages of optical fibers over metal wires are very low transmission loss and immunity from electrical interference. Optical fibers can simultaneously carry multiple wavelengths of light, which greatly increases the rate that data can be sent, and helps enable data rates of up to trillions of bits per second. Optic fibers can be used for long runs of cable carrying very high data rates, and are used for undersea cables to interconnect continents.

Price is a main factor distinguishing wired- and wireless-technology options in a business. Wireless options command a price premium that can make purchasing wired computers, printers and other devices a financial benefit. Before making the decision to purchase hard-wired technology products, a review of the restrictions and limitations of the selections is necessary. Business and employee needs may override any cost considerations.^[10]

Wireless technologies

- *Terrestrial microwave* – Terrestrial microwave communication uses Earth-based transmitters and receivers resembling satellite dishes. Terrestrial microwaves are in the low gigahertz range, which limits all communications to line-of-sight. Relay stations are spaced approximately 50 km (30 mi) apart.
- *Communications satellites* – Satellites communicate via microwave radio waves, which are not deflected by the Earth's atmosphere. The satellites are stationed in space, typically in geostationary orbit 35,786 km (22,236 mi) above the equator. These Earth-orbiting systems are capable of receiving and relaying voice, data, and TV signals.

- *Cellular and PCS systems* use several radio communications technologies. The systems divide the region covered into multiple geographic areas. Each area has a low-power transmitter or radio relay antenna device to relay calls from one area to the next area.
- *Radio and spread spectrum technologies* – Wireless local area networks use a high-frequency radio technology similar to digital cellular and a low-frequency radio technology. Wireless LANs use spread spectrum technology to enable communication between multiple devices in a limited area. IEEE 802.11 defines a common flavor of open-standards wireless radio-wave technology known as Wifi.
- *Free-space optical communication* uses visible or invisible light for communications. In most cases, line-of-sight propagation is used, which limits the physical positioning of communicating devices.

-

Exotic technologies

There have been various attempts at transporting data over exotic media:

- IP over Avian Carriers was a humorous April fool's Request for Comments, issued as **RFC 1149**. It was implemented in real life in 2001.
- Extending the Internet to interplanetary dimensions via radio waves, the Interplanetary Internet.

Both cases have a large round-trip delay time, which gives slow two-way communication, but doesn't prevent sending large amounts of information.

Classification

The study of network topology recognizes eight basic topologies: point-to-point, bus, star, ring or circular, mesh, tree, hybrid, or daisy chain.^[16]

Point-to-point

The simplest topology with a dedicated link between two endpoints. Easiest to understand, of the variations of point-to-point topology, is a point-to-point communications channel that appears, to the user, to be permanently associated with the two endpoints. A child's tin can telephone is one example of a *physical dedicated* channel.

Using circuit-switching or packet-switching technologies, a point-to-point circuit can be set up dynamically and dropped when no longer needed. Switched point-to-point topologies are the basic model of conventional telephony.

The value of a permanent point-to-point network is unimpeded communications between the two endpoints. The value of an on-demand point-to-point connection is proportional to the number of potential pairs of subscribers and has been expressed as Metcalfe's Law.

Bus

In local area networks where bus topology is used, each node is connected to a single cable, by the help of interface connectors. This central cable is the backbone of the network and is known as the bus (thus the name). A signal from the source travels in both directions to all machines connected on the bus cable until it finds the intended recipient. If the machine address does not match the intended address for the data, the machine ignores the data. Alternatively, if the data matches the machine address, the data is accepted. Because the bus topology consists of only one wire, it is rather inexpensive to implement when compared to other topologies. However, the low cost of implementing the technology is offset by the high cost of managing the network. Additionally, because only one cable is utilized, it can be the single point of failure. In this topology data being transferred may be accessed by any node.

Linear bus

The type of network topology in which all of the nodes of the network that are connected to a common transmission medium which has exactly two endpoints (this is the 'bus', which is also commonly referred to as the backbone, or trunk) – all data that is transmitted in between nodes in the network is transmitted over this common transmission medium and is able to be [received](#) by all nodes in the network simultaneously.

Distributed bus

The type of network topology in which all of the nodes of the network are connected to a common transmission medium which has more than two endpoints that are created by adding branches to the main section of the transmission medium – the physical distributed bus topology functions in exactly the same fashion as the physical linear bus topology (i.e., all nodes share a common transmission medium).

Star

In local area networks with a star topology, each network host is connected to a central hub with a point-to-point connection. So it can be said that every computer is indirectly connected to every other node with the help of the hub. In Star topology, every node (computer

workstation or any other peripheral) is connected to a central node called hub, router or switch. The switch is the server and the peripherals are the clients. The network does not necessarily have to resemble a star to be classified as a star network, but all of the nodes on the network must be connected to one central device. All traffic that traverses the network passes through the central hub. The hub acts as a signal repeater. The star topology is considered the easiest topology to design and implement. An advantage of the star topology is the simplicity of adding additional nodes. The primary disadvantage of the star topology is that the hub represents a single point of failure. Since all peripheral communication must flow through the central hub, the aggregate central bandwidth forms a network bottleneck for large clusters.

Ring

A ring topology is a bus topology in a closed loop. Data travels around the ring in one direction. When one node sends data to another, the data passes through each intermediate node on the ring until it reaches its destination. The intermediate nodes repeat (re transmit) the data to keep the signal strong. Every node is a peer; there is no hierarchical relationship of clients and servers. If one node is unable to re transmit data, it severs communication between the nodes before and after it in the bus.

Advantages:

- When the load on the network increases, its performance is better than bus topology.
- There is no need of network server to control the connectivity between workstations.

Disadvantages:

- Aggregate network bandwidth is bottlenecked by the weakest link between two nodes.

Centralization

The **star topology** reduces the probability of a network failure by connecting all of the peripheral nodes (computers, etc.) to a central node. When the physical star topology is applied to a logical bus network such as Ethernet, this central node (traditionally a hub) rebroadcasts all transmissions received from any peripheral node to all peripheral nodes on the network, sometimes including the originating node. All peripheral nodes may thus communicate with all others by transmitting to, and receiving from, the central node only. The failure of a transmission line linking any peripheral node to the central node will result in the isolation of that peripheral node from all others, but the remaining peripheral nodes will be unaffected. However, the disadvantage is that the failure of the central node will cause the failure of all of the peripheral nodes.

A **tree topology** (a.k.a. **hierarchical topology**) can be viewed as a collection of star networks arranged in a hierarchy. This tree has individual peripheral nodes (e.g. leaves) which are required to transmit to and receive from one other node only and are not required to act as repeaters or regenerators. Unlike the star network, the functionality of the central node may be distributed.

As in the conventional star network, individual nodes may thus still be isolated from the network by a single-point failure of a transmission path to the node. If a link connecting a leaf fails, that leaf is isolated; if a connection to a non-leaf node fails, an entire section of the network becomes isolated from the rest.

Decentralization

In a partially connected mesh topology, there are at least two nodes with two or more paths between them to provide redundant paths in case the link providing one of the paths fails. Decentralization is often used to compensate for the single-point-failure disadvantage that is present when using a single device as a central node (e.g., in star and tree networks). A special kind of mesh, limiting the number of hops between two nodes, is a hypercube. The number of arbitrary forks in mesh networks makes them more difficult to design and implement, but their decentralized nature makes them very useful. In 2012 the Institute of Electrical and Electronics Engineers (IEEE) published the Shortest Path Bridging protocol to ease configuration tasks and allows all paths to be active which increases bandwidth and redundancy between all devices.

This is similar in some ways to a grid network, where a linear or ring topology is used to connect systems in multiple directions. A multidimensional ring has a toroidal topology, for instance.

A *fully connected network*, *complete topology*, or *full mesh topology* is a network topology in which there is a direct link between all pairs of nodes. In a fully connected network with n nodes, there are $n(n-1)/2$ direct links. Networks designed with this topology are usually very expensive to set up, but provide a high degree of reliability due to the multiple paths for data that are provided by the large number of redundant links between nodes. This topology is mostly seen in military applications.

Web server refers to server software, or hardware dedicated to running said software, that can serve contents to the World Wide Web. A web server processes incoming network requests over the HTTP protocol (and several other related protocols).

The primary function of web server is to store, process and deliver web pages to clients. The communication between client and server takes place using the Hypertext Transfer Protocol

(HTTP). Pages delivered are most frequently HTML documents, which may include images, style sheets and scripts in addition to the text content.

A user agent, commonly a web browser or web crawler, initiates communication by making a request for a specific resource using HTTP and the server responds with the content of that resource or an error message if unable to do so. The resource is typically a real file on the server's secondary storage, but this is not necessarily the case and depends on how the web server is implemented.

While the primary function is to serve content, a full implementation of HTTP also includes ways of receiving content from clients. This feature is used for submitting web forms, including uploading of files.

Many generic web servers also support server-side scripting using Active Server Pages (ASP), PHP, or other scripting languages. This means that the behaviour of the web server can be scripted in separate files, while the actual server software remains unchanged. Usually, this function is used to generate HTML documents dynamically ("on-the-fly") as opposed to returning static documents. The former is primarily used for retrieving or modifying information from databases. The latter is typically much faster and more easily cached but cannot deliver dynamic content.

Web servers are not only used for serving the World Wide Web. They can also be found embedded in devices such as printers, routers, webcams and serving only a local network. The web server may then be used as a part of a system for monitoring or administering the device in question. This usually means that no additional software has to be installed on the client computer, since only a web browser is required (which now is included with most operating systems).

The **Internet protocol suite** is the conceptual model and set of communications protocols used on the Internet and similar computer networks. It is commonly known as **TCP/IP** because the foundational protocols in the suite are the Transmission Control Protocol (TCP) and the Internet Protocol (IP). It is occasionally known as the **Department of Defense (DoD) model**, because the development of the networking method was funded by the United States Department of Defense through DARPA.

The Internet protocol suite provides end-to-end data communication specifying how data should be packetized, addressed, transmitted, routed, and received. This functionality is organized into four abstraction layers which classify all related protocols according to the scope of networking involved. From lowest to highest, the layers are the link layer, containing communication methods for data that remains within a single network segment (link); the internet layer, providing internetworking between independent networks; the transport

layer handling host-to-host communication; and the application layer, which provides process-to-process data exchange for applications.

Technical standards specifying the Internet protocol suite and many of its constituent protocols are maintained by the Internet Engineering Task Force (IETF). The Internet protocol suite predates the OSI model, a more comprehensive reference framework for general networking systems.

The **File Transfer Protocol (FTP)** is a standard network protocol used for the transfer of computer files between a client and server on a computer network.

FTP is built on a client-server model architecture and uses separate control and data connections between the client and the server. FTP users may authenticate themselves with a clear-text sign-in protocol, normally in the form of a username and password, but can connect anonymously if the server is configured to allow it. For secure transmission that protects the username and password, and encrypts the content, FTP is often secured with SSL/TLS(FTPS). SSH File Transfer Protocol (SFTP) is sometimes also used instead; it is technologically different.

The first FTP client applications were command-line programs developed before operating systems had graphical user interfaces, and are still shipped with most Windows, Unix, and Linux operating systems. Many FTP clients and automation utilities have since been developed for desktops, servers, mobile devices, and hardware, and FTP has been incorporated into productivity applications, such as web page editors.

The **Hypertext Transfer Protocol (HTTP)** is an application protocol for distributed, collaborative, and hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web.

Hypertext is structured text that uses logical links (hyperlinks) between nodes containing text. HTTP is the protocol to exchange or transfer hypertext.

Development of HTTP was initiated by Tim Berners-Lee at CERN in 1989. Standards development of HTTP was coordinated by the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C), culminating in the publication of a series of Requests for Comments (RFCs). The first definition of HTTP/1.1, the version of HTTP in common use, occurred in RFC 2068 in 1997, although this was made obsolete by RFC 2616 in 1999 and then again by the RFC 7230 family of RFCs in 2014.

A later version, the successor HTTP/2, was standardized in 2015, and is now supported by major web servers and browsers over TLS using ALPN extension where TLS 1.2 or newer is required.^[3]

6. Illustrations & Web Imaging Planning a website using a structured document.
Site Navigation Types. Creating web illustrations like buttons, banners & Bars.
Typography for Web. HTML/DHTML & HTML Editor tools : Dream weaver

Sitemapping is the visual process of outlining a website's structure, high-level functionality and navigation scheme. The end deliverable can be a sketch, image, PDF, or presented in a tool like SlickPlan (my full list of sitemapping tools towards bottom).

A website's sitemap should be defined early in the website planning process. There's only a handful of activities that should precede this step (e.g. Business Objectives, User Research).

A website's sitemap is a deliverable of Information Architecture

How to plan & create a website structure with a site map

Here's the overview:

1. Prepare for the activity of sitemapping
2. Brainstorm the types of content
3. Define primary navigation
4. Flesh out second & third level structure & content
5. Don't forget about utility pages
6. Create notes and high-level specifications for each page
7. Designate the type of design template
8. Iterate. Iterate. Iterate.

Now, let's deconstruct each step.

Step #1 — Prepare for the activity of sitemapping

Before jumping into your site map design, you'll need to prime the pump by addressing **three areas**:

1. **Time** – A strong sitemap isn't designed in 20 minutes. Does your organization have the necessary collaboration time?

2. **People** – Key stakeholders should contribute to the sitemap design. Who are these people? Are they the right people?
3. **Research** – What are the website’s objectives? Who are our users? What kind of information do they need? What does our analytics tell us?

Step #2 — Brainstorm the types of content

Before you start defining navigational elements (Step #3), you’ll need to discuss your website’s content. What services/products are we marketing? How much company info will be presented? Do we have testimonials? What helpful resources can we provide?

Don’t focus on where that content goes in the sitemap just yet (Step #4). Give yourself the freedom to think openly — even wildly! Bad content ideas will naturally work their way out with time.

Step #3 — Define primary navigation

Also referred to as “1st Tier”, “Main”, “Top Level”, or “Global”, primary navigation is typically found at the top of a website in a horizontal design. Though there’s a case against vertical navigation, some websites still take this approach (e.g. Amazon).

Your sitemap’s primary navigation should...

1. **Be concise** – each element should target 1 to 5 words (‘About’, ‘Contact Us’) rather than full sentences
2. **Use common language** – avoid naming navigation that only make sense internally. Use the KISS principle (Keep It Simple Stupid)
3. **Communicate top-down hierarchy** – can someone easily peruse or find information?
4. **Allow the site to grow** – your primary navigation shouldn’t need re-tooled every time you add new content or features

Step #4 — Flesh out second/third level structure & content

With primary navigation established, it's time to drill deeper into each section.

For most websites under 50 pages, a second level of structure should be sufficient. For larger websites, third level is typically needed to maintain a solid hierarchy. I've even seen some websites go four levels deep (this is pretty typical of academic websites where there's gobs of content).

Unlike your primary nav where the number of elements should be concise, secondary/tertiary levels of content is somewhat unlimited — within reason of course. The challenge with multiple levels is designing menu systems that allow for easy scanability and findability.

Step #5 — Don't forget about utility pages

Privacy policies, disclaimers, legal information — all critical pages that need a home in your website. Don't lose track of these in your sitemap. Carve out a spot for them in your footer or elsewhere. This content could take weeks or even months to finalize!

Step #6 — Create notes and high-level specifications for each page

"We'll just have some basic content for this page."

No. NO. NO!

Take a moment to think, specifically, about each page's content. What existing assets are available? What new assets need created? How deep do our archives go? What will be our blog topics?

Step #7 — Designate the type of design template

Specifying a page's design type warms the engine for UI (User Interface) design

Is this page a photo gallery? Conversion form? Table of contents? PDF?

This activity can become the curious case of chicken or the egg. How can you identify what design template your content needs when the content isn't finished?

The key here is that you're not actually designing the user interface (UI), you're identifying the **type of content**. This identification helps guide the content curation process and warms the engine for UI design down the road.

HELPFUL HINT: Designate every page's template. If you don't know it yet, label it "TBD" and iron out as you iterate.

Final Step — Iterate. Iterate. Iterate.

Choose a sitemapping tool with version control

Version 1 of your sitemap will almost never be the final and best version. Create a new version as your sitemap undergoes heavy change. You can always revert to a previous version.

I like to create new versions for different days of brainstorming. New day = new version.

Adobe Dreamweaver is a proprietary web development tool from Adobe Systems. It was created by Macromedia in 1997 and developed by them until Macromedia was acquired by Adobe Systems in 2005.

Adobe Dreamweaver is available for macOS and for Windows.

Following Adobe's acquisition of the Macromedia product suite, releases of Dreamweaver subsequent to version 8.0 have been more compliant with W3C standards. Recent versions have improved support for Web technologies such as CSS, JavaScript, and various server-side scripting languages and frameworks including ASP (ASP JavaScript, ASP VBScript, ASP.NET C#, ASP .NET VB), ColdFusion, Scriptlet, and PHP.

Features

Adobe Dreamweaver CC is a web design and development application that combines a visual design surface known as Live View and a code editor with standard features such as syntax highlighting, code completion, and code collapsing as well as more sophisticated features such as real-time syntax checking and code introspection for generating code hints to assist the user in writing code. Combined with an array of site management tools, Dreamweaver lets its users design, code and manage websites, as well as mobile content. Dreamweaver is an Integrated Development Environment (IDE) tool. You can live preview of

changes for the frontend. Dreamweaver is positioned as a versatile web design and development tool that enables visualization of web content while coding.

Dreamweaver, like other HTML editors, edits files locally then uploads them to the remote web server using FTP, SFTP, or WebDAV. Dreamweaver CS4 now supports the Subversion (SVN) version control system.

Since version 5, Dreamweaver supports syntax highlighting for the following languages out of the box:

- ActionScript
- Active Server Pages (ASP).
- C#
- Cascading Style Sheets (CSS)
- ColdFusion
- EDML
- Extensible HyperText Markup Language (XHTML)
- Extensible Markup Language (XML)
- Extensible Stylesheet Language Transformations (XSLT)
- HyperText Markup Language (HTML)
- Java
- JavaScript
- PHP
- Visual Basic (VB)
- Visual Basic Script Edition (VBScript)
- Wireless Markup Language (WML)

Support for ASP.NET and JavaServer Pages was dropped in version CS5.

Users can add their own language syntax highlighting. In addition, code completion is available for many of these languages.

Internationalization and Localization

Language availability

Adobe Dreamweaver CS6 is available in the following languages: Brazilian Portuguese, Simplified Chinese, Traditional Chinese, Czech, Dutch, English, French, German, Italian, Japanese, Korean (Windows only), Polish, Russian, Spanish, Swedish and Turkish.

Specific features for Arabic and Hebrew languages

The older Adobe Dreamweaver CS3 also features a Middle Eastern version that allows typing Arabic, Persian, Urdu, or Hebrew text (written from right to left) within the code view. Whether the text is fully Middle Eastern (written from right to left) or includes both English and Middle Eastern text (written left to right and right to left), it will be displayed properly.