Website Design and Maintenance Tools

1.1 Introduction

One of the most surprising things when you look at small businesses is how many of them don't have a website. You would think that in this day and age everybody would know how important a website is for all businesses. Clearly that is not the case. Any business that does not have a website is missing out on one of the most powerful marketing tools available to them.

The main reason that it is important for businesses to have a website is how people are likely to find you. These days most people will go online and research products and companies before they make a purchase, if you don't have a website you are missing out on all of this potential business. Even if people don't buy your product online they are still likely to research it online so you have to have a website so these people can learn about your business.

A website is also important because it helps you establish credibility as a business. Most people just assume that you have a website since the vast majority of businesses do, at least the vast majority of big companies do. There are actually still quite a few small businesses that don't have a website and without one this is exactly what they will remain. If you don't have a website that you can refer people to potential customers are going to assume that you are a small time company that does not take their business seriously. Once you establish this reputation it is going to be hard to make sales.

A website will not only give you credibility but it will also help to give the impression that your company is bigger and more successful than it may actually be. One of the great things about the internet is that the size of your company does not really matter. There is no reason that you can't get your site to rank in Google ahead of a large multinational competitor and funnel off some of their traffic. This is a big part of the reason that a website is even more important for a small business than a big one, it tends to level the playing field.

Clearly there are still a lot of small businesses that do not have websites, there are various reasons for this but mostly it comes down to the belief that they are expensive. It is rather surprising how much small business owners believe a website will cost them. In truth a website can be built for very little money and if you are on a tight budget you can even get free websites. Remember you don't need a giant ten thousand page website for your business, just a simple site that tells people about your company and your products will be more than enough.

1.2 Website design and maintenance tools

There are a range of website design and maintenance tools that are used by developers when developing websites. We shall look at some of the popular ones;

1. HTML Editor

A HTML editor is a software where you can easily design a website and have a flexibility for create content using WYSIWYG (What You See Is What You Get) interface. The websites can be created without much of a problem if you have HTML Editors. HTML editors help in easy handling of web pages. Although it is possible to write web page using text editor, most of the web designers and programmers find html editors handy. HTML editors provide the features that are not available with plain text editors.

The simple concern in IT technology is to enable easy-to-use software without spending much time in coding through the entire application. HTML editors come in handy for a layman to publish WebPages for the internet. There are many advantages in using the html editors for creating WebPages and developing websites.

What are some of the popular html editors?

Some of the readily available html editors can be downloaded for free from the internet which are available either in trial version or have a free version to help one to easily create websites. Learning HTML is a great way to start if a person wants to effectively make use of internet. Once a little understanding is achieved for a web structure then html editors come in handy for live publishing and in these times popular websites html editors or WYSIWYG editors comes with a tool bar to make life even simpler where a Microsoft word like interface is given for as to designing, making changes and embedding images. Some of the popular html editor software's are:

· Front page from Microsoft

· Dreamweaver from Adobe.

· Coffeecup html editor

· Ist lyr which is available online

· Taco HTML Editor

· Espresso for Mac systems

Advantages of HTML editors

Some of them can be discussed along the following lines:

· Site navigation becomes easy and user does not have to remember all the html tags for creating the web pages.

· One can easily create CSS, xhtml and other features without much of problem using some of the popular html editors available in the market.

· Some html editors come along with form validations and have a compatibility to work with multiple browsers without affecting the look and feel of the website.

· Most html editors also do come with SSI (Server Side Includes), which means the web pages are generated on the server side and one can customize many of the files and features on the website.

· Html editors come very handy when creating tables, borders around images, changing the background colour to reflect the concerned business style within no time.

An HTML editor is handy not just for experienced coders but equally good for a beginner to learn the nemesis of html coding. HTML editors are even in built within a web page in case of CMS

system where in a user needs to write an article, a blog, comments, feedback etc. These editors present with in the website framework are called WYSIWYG editor, RTF editors etc.

Disadvantages

WYSIWYG HTML editors are fine for beginners or if you want to create a web site quickly and don't want to fiddle around with HTML code. However, if you plan to develop web sites for a living – make a career out of web development – you need to learn HTML properly.

§ A lot of HTML code churned out by the editors is superfluous which makes the web pages bulky in file size and as you will know, a large file downloads slowly that a smaller one. Also search engines need to wade through all this code to get to the meat of the page – the actual text contents.

§ WYSIWYG editors let you ignore certain aspects that are important to say the least. For instance, the need for the image ALT attribute should be explicitly mentioned by the editors and images should not be included without the ALT text. If the purpose of a WYSIWYG editor is to hold a beginner's hand and guide him/her through the process of creating a web page, the programs should tell the importance of certain HTML attributes and tags.

FYI, the ALT text is used by search engines and thus it's a good idea to have your chosen keywords appear there.

Another example is the heading tags of a web page. These are very important from a search engine's point of view. Thus, you need to put your keywords in an <h1> or <h2> tag and not just have text that "look" big and appear as a heading.

§ Several editors have been accused of letting users employ "browser specific HTML tags". These tags, as their name suggest, will appear well on certain web browser and ignored by others. These tags are also generally not compliant with the HTML standards set by the W3C (World Wide Web Consortium).

§ Most editors still use HTML tables to layout a page. This is an older technique replaced by Cascading Style Sheets.

§ HTML written by the WYSIWYG editors is usually not correct or validated. I am not saying that all web pages need to have valid HTML – in fact the web pages of some of the most popular web sites in the world would not validate if you checked it out. But as I mentioned above, if you are plan to make a career in web development you should know that your HTML code needs to be validated and not just look pretty in a web browser.

§ HTML was meant for **document structure not document design**. However, WYSIWYG HTML editors work on exactly the opposite line of thought. One needs to understand that HTML determines the different elements on a page such as a heading, paragraph, list etc. How these elements will *look* is the prerogative of the web browser. Also, with Cascading Style Sheets (CSS), the design and "visual" of a web page is segregated from the actual content. Thus, the content of the web page resides in HTML while the look (colours, positioning etc.) lies in the CSS rules.

§ WYSIWYG HTML editors might help beginners create web pages quickly but an experienced web developer can code equally fast (if not faster). Furthermore, pages developed by experts are optimized and adhere to standards.

§ WYSIWYG editors simply do not provide enough support and help in optimizing your web site for search engines. This is vital! You can have the most beautiful looking web site in the world but if no one's able to locate it... well! And this is what we will discuss next.

2. Word Processors

Word processors like Microsoft Word, WordPerfect or OpenOffice Writer are some of the most popular web authoring tools available. Users can create a Web page just as they would a printable document and then save it in HTML format, creating a quick and easy web page. Because users are usually familiar with the word processor on their computers, creating HTML pages with the same program represents a low learning curve. These usually present content in a what you see is what you get format, or WYSIWYG, meaning how the page appears on the screen is how it will appear when it's online.

Advantages

Microsoft Word has rudimentary facilities to make it slightly easier for you to put an existing document onto your website.

1. It can convert your document into a web page so that it can be displayed like a normal web page in a browser.

2. You can create links that point to other websites or other pages on your own website. This can be done either automatically by Word when you type a web address (like "http://www.example.com/") or manually.

Disadvantages

The following are some of the drawbacks of using Microsoft word when designing a website;

· You will lose the ability to embed code supplied by other websites into your web page. Some sites, including thesitewizard.com, provide special facilities which you can add to your website to extend it in some way. Such facilities are often provided in the form of code known as either HTML code, CSS code, JavaScript or some other thing. For example, there are numerous free web statistics services that you can use so that you can find out how many visitors are using your website and so on. Such services typically require you to insert some type of code into your web page. It doesn't seem to be possible to insert such code using Word.

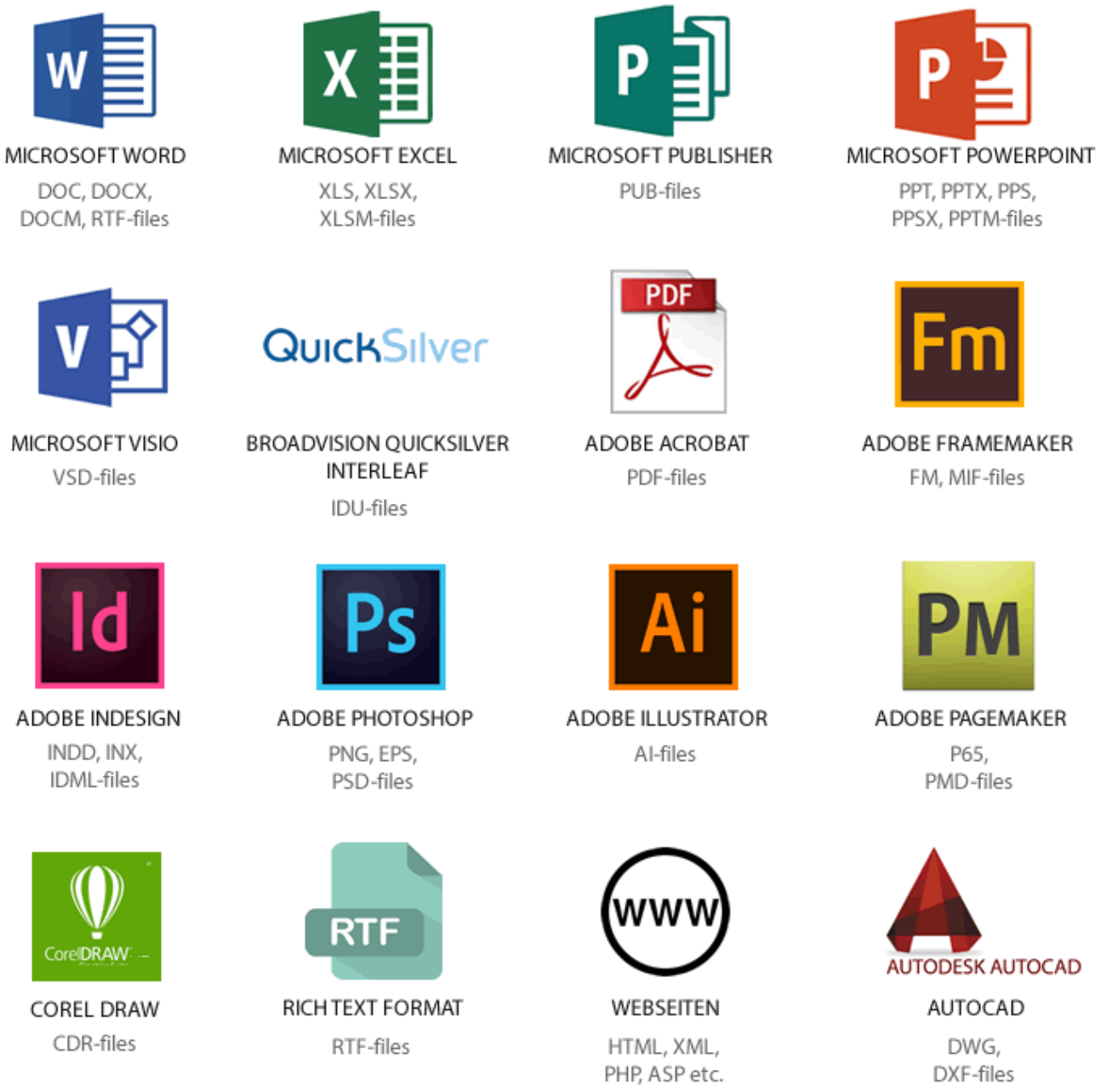
· Consequently, you will also lose the ability to create interactive features such as a putting a feedback / contact form on your site, inserting navigation menu buttons that work like what you see in the left hand column of thesitewizard.com, and so on.

· You will not be able to easily publish your document to your website from within your word processor. While Office 2007 (and perhaps 2010 too) appears to have some ability to integrate with some blog providers, it doesn't seem to have an integrated facility to publish ordinary web pages via FTP. For those wondering what "FTP" is, in layman's language, it's basically the method used to transfer web pages from your computer to the Internet. But don't worry. It's still possible to publish your document. You'll just have to use a separate program, called an FTP client, to do it.

· Word also does not provide an easy way for you to update and change the design of all the pages on your website should you decide to change it in the future. If you have many pages on your website, and you decide that you want to change the design, you will have to manually change them on every page yourself.

3. Desktop Publishing Programs

Desktop publishing programs, like Adobe InDesign and Scribus are designed for producing material like newspapers, magazines, books and Web pages. Like word processors, desktop publishing programs provide a WYSIWYG interface. Their advanced Web authoring options, such as page layout and style elements, give users more control over the page's appearance. These programs also support multimedia objects, like images, graphics or audio files. Completed pages can be converted to both HTML and CSS files.



Advantages

· Enhanced appearance with page layouts: A page layout refers to the process of arranging or re-arranging text/graphics on a page. A customer should read your content and then take the next step of buying your products/services. With the help of DTP, you can improve the page layout and create an effective design by balancing the contrast, space and colours that would grab the attention of your customers.

- Artwork Inclusion – DTP is about more than just formatting and laying out blocks of text. It requires art, and your software should give you simple, effective ways to integrate art within your content.

Disadvantages

· Publisher templates are set up to auto-flow, which means that text too large for one column will flow into the next and then, where applicable, onto the next page. Users who create their own publications may set up auto-flow as well, from the "Text Box Tools" tab which opens when you add text boxes – just click the "Create Link" button. Auto-flow is ideal when you're copying and pasting large blocks of text, as you won't have to position, cut and rearrange the text yourself. Everything adjusts to the amount of space you require. One disadvantage of auto-flow is that it doesn't technically tell you that you're cut off. If you paste something into a full text box, it will flow into another text box if the boxes are linked. But if that text box is full and no others are linked, your text simply stops. You have to manually enlarge the text box or create another text box and link the flow to get the full set of text.

· After you've created a Publisher text box or clicked into an existing one, all that's left to do is type away. Once you've completed a long string of off-the-cuff typing, you may see a Publisher screen filled by default with green and red squiggly lines. These are part of Publisher's automatic review process. Publisher alerts you to where it thinks you've misspelled something or entered a potential grammatical error. This may be useful when you've stared at something too long and missed a problem or simply to catch issues. But when typing proprietary information such as specific business names, processes or codes, all those error indications can get annoying and disr uptive. The constant worry that something is incorrect – even when it is not – may get tedious.

4. Online Web Page Builders

Website hosting sites usually offer their customers many web-authoring tool options to create and maintain their web pages online. Tools can include Web page builders, shopping systems, audio/visual editors and domain options. The builders incorporate many web authoring tools, including word processing, graphic editing, templates and layout schemes. Webpage builders have two main editing options: HTML or a non-HTML interface. Users who have limited HTML knowledge can use the non-HTML interface to drop and drag items to create layouts and use the text option to type in content.

Advantages

· No Need for In-depth Coding: Web building programs were created for people who are not computer programmers. They have all the scripts and HTML built into the system so you do not have to write it. Even if you are competent at a few programming languages, a builder will save you time and aggravation. Something as simple as a missing space in a line of code can return errors. There is no need to do extensive testing to make sure all the parameters and inputs work as they are supposed to work. Why waste time writing code that has already been written?

· Visually Appealing: Designing a website that attracts people requires at least a basic ability in graphic design. Three is a need for a good sense of style. You need to understand what visually appeals to people in order to keep them on the page and draw more traffic. You want everything to look professional. Most web builders come with graphic abilities. Even if you cannot flatten layers or understand the difference between a JPG and a TGA image, you can still get pictures, graphs and photos onto the website. You can easily use online sites to create a logo and upload it

on pre-selected templates offered by Website builder programs, and make your site visually appealing.

· Ease of Use: Using a web builder software or online program gives you the ability to upgrade your content easily. No need to write new code every time you need to make a change to the site. In most cases, you can write any text in the "back room" area and it will automatically be posted where and how you want it when you finish. Any images you need to add can be dropped into the area.

Even if you make websites all the time, mistakes can happen. Using a web building program minimizes errors and keeps things running smoothly. You probably use a word processing program, a spreadsheet program and a graphics program created by someone else; a web building program is the same idea.

· For a more navigable learning curve: One of the most significant advantages of using online website builders is that merely by following a couple of simple steps, the user gets a brand new website that is ready to go live on the Internet. Choosing a specific design, filling in the necessary content and details is all that it takes and this allows almost any user to build a website that meets their needs. This is immensely useful since it allows users without any knowledge of HTML or PHP to use the online website builders to create the website of their choice, which might otherwise have turned into a confusing and long-winded process. For novices, website builders prove to be the automatic choice.

Disadvantages

· The user must never compromise on the flexibility of the website but most of the layouts offered by online website builders are usually too limited to satisfy the imaginative needs. Websites developed with the aid of online website builders tend to have a universal look and feel and professionals will easily be able to tell a site builder on the first look. No matter how much expertise the user has with online website builder tools, they will never devise a way to edit the original HTML code in order to add some personalization to the layout.

· The user can never claim ownership to the site since the actual copy of the site files, such as PHP, JPGs, HTML, and others that go into the development of the website will never be provided to them. Moreover, the user agreement of the online website builder does not guarantee any reimbursement for any loss, attacks, misplacement and deletion of the web files.

· The bigger the website gets, the more potential there is for something to go wrong, especially during the maintenance of a huge inventory. Moreover, if the website requires any sort of added functionality, the online website builders are unable to implement Java, PHP and SQL.

1.3 File formats associated with websites

The different types of files that a URL can refer to can be classified as:

1. **text files**
2. **picture or graphic image files**
3. **sound files**
4. **movie files**

Each one can be discussed separately.

1. (Plain) Text files(ASCII format, extension .txt)

Every browser in use today have the text file format as one of its basic file formats (i.e. 80 column text). Text file are represented as 7-bit ASCII (American standard code for information interchange) characters, and can be produced by all word processors (basically any text editor). Text files are used for very simple documents where the data to be displayed has to be semantically characterised. The list below states some of the text file formats that could be used on the net.

a. SGML & HTML files.

SGML (Standard Generalised Markup Language) is a software tool that is used to define Markup languages. It is a complex piece of software that is defined by the International Standards Organization, and enables its use for broad range publishing, from conventional single medium publishing on paper to online multimedia/hypermedia publishing. Hence, with SGML, a user can 'markup' a piece of text to his/her liking. Marking up refers to the pieces of text that is added to the data in files called tag elements that would semantically or logically, rather that physically (for e.g. 10 dpi Times Roman etc.) describe the way the data is presented. For example, in a word processor, the software uses propriety codes to indicate for example, how pieces of text should be printed, what font to be used, how paragraphs are aligned, line breaks etc.

HTML (Hypertext Markup Language) is one instance of SGML. It is the tool used to markup the text for display on the web. The SGML definitions of HTML syntax is contained in a special SGML document called a Document-Type-Definition (DTD), for e.g. html.dtd. This file is used in association with SGML parsing programs like sgmls written by James Clark, to check for markup errors.

HTML ----------> Extension - .html (UNIX)
.htm (PC/Windows and Macintosh)

Editors aimed at HTML are vast. Several editors are available for various computing environments (Mac, MS-Windows, UNIX etc.). For a comprehensive computing environments (Mac, MS-Windows, UNIX etc.). For a comprehensive list, a good starting place is at URL:
http://union.ncsa.uiuc.edu/HyperNews/get/www/html/editors.html

b. Bookmaster files.

Bookmaster is a text markup language that is used mainly in publishing. In particular, it is an advanced version of the Generalized Markup Language (GML). Bookmaster enables high quality publications with visual appeal, clarity, and elegance. Furthermore, it allows flexibility and control over the publications and reduces the turnaround time for publishing. Like HTML, the writers simply specify the elements of their text. Bookmaster take scare of most of the publishing work like text formatting and type setting.

Bookmaster ----------> Extension - .bkm
Used by IBM and other large corporations for high quality, larger scale publishing from memos to technical documentation.

c. RTF (Rich Text Format)

RTF was developed by Microsoft as an open format for exchanging text and graphics that can execute on different personal computers and operating systems. It is another document formatting language but is more superior to HTML files in that RTF files can contain a vast variety of objects such as footnotes, headers, multilingual text, geometric and raster graphics, symbol sets, tables etc.

RTF ----------> Extension - .rtf (UNIX and Mac)
Any word processing or publishing package can be used to create and edit RTF files for e.g MS-Word, Wordperfect, Prosfessional Write etc. Rtftohtml is a filter used to translate RTF to HTML for display on web.

Note on Macintosh text file formats

Most of the files available for the Macintosh on the net is encoded in a file format known as binhex. This is due to the unique structure of files on the mac. When mac files are downloaded, they cannot be directly viewed or edited. Binhexing a mac file encodes it into a plain text file of ASCII format. Thus, to use it, it has to be decode. The most widely used and freely available software tool(can be pulled off the net) is StuffIt Expander. This is a decompression program that can uncompress not only binhex files, but also various other encoded files that are from different platforms.

Binhex ----------> Extension - .hqx
BinHex 4.0 encodes mac file into .hqx.
BinHex13 used in DOS/Windows to deencode.

d. Poscript files

Postscript is a page description language developed by John Warnock of Adobe Systems and appeared in 1985 in the Apple LaserWriter. It si a programming language optimized for printing graphics and text (on paper or vdu). Instead of the usual method of transmitting graphics and character information to a printer telling it where each dot should be placed on the page, postscript enables a way for the printer(laser) to interpret mathematically how the shapes and curves fit the page. In other words, the page to be printed is described in a device independent way such that the same document can be printed on any poscript print(whether a Linotron of a Laser write, for example), if it is in a postscript file. Device independence implies without any reference to the specific features such as printer resolution etc, of the target printer. [But in practice, it is known that some postscript files make certain assumptions about the target device].

The postscript language is interpreted and stack-based like an RPN calculator where operands(numbers) and operands(*,+ etc) are pushed onto the stack. The top two elements of the

stack are used to perform, some mathematical operation and the result pushed nack into the top of the stack.

Postscript ---------> Extension - .ps
Text files but not human readable, and different form
.pdf postscript files which are specific to Adobe Acrobat.
Use public-domain postscript file viewer called
Ghostscript(Windows). For the Mac, the .ps files
has to be decompressed first.

e. Other text files

- Source program files for e.g. .C C files etc. Can be downloaded via FTP
- Integrated application software files such as Ability (offers spreadsheets, word processing, database, buisness graphics, communications, and prsentation graphics)
- DIF files (data interchange format)
- Certain database files like dBase II
- And many more.....

The advantage of text files in ASCII format is that they are portable between different electronic email systems. [File formats such as DIF - marketed by Lotus Corp., aim to provide a program independent method for storing data]. Generally, conversion of text files(or any files) into other formats would result ----------

2. Picture or graphic images(Binary format)

The majority of web pages today contain embedded in them many kinds of images. The graphic images are of two types.

1. Simple images - which are just embedded on the pages for display or decoration purposes.
2. Clickable image maps - which are actually picture icons representing thumbnail sketches.

There are very many formats for storing digital data corresponding to graphic images with their related advantages and disadvantages. Most web browsers (exclusion text-only ones like Lynx, Mosiac) can display only a handful of these formats inline. The format of about 90% of these files is binary. The five most universally accepted formats for 2-D graphics are:

1. Graphical interchange format - GIF (GIF87 and GIF89A)
2. Joint Photographic Experts Group - JPEG
3. X-Bitmap/X-Pixelmap
4. Portable Network Graphics - PNG

Each one can be discussed separately.

a. GIF

This is the most widely used raster graphics file format on the web. It was devolved by CompuServe and stores images in a compressed format. All browsers can display GIF inline.

GIF Colour encoding format

GIF files are represented by a maximum of only 256 colors (8-bit colour). Hence, the graphic can be black and white, grey scale, or color images. A GIF image is first analysed by an image analysis algorithm to determine the set of 256(8-bit colour) or lesser colours that best describe the colours in the image. It next creates a colour table where each pixel colour is mapped to a number in the range 0-255, representing a colour in the table, closest to the actual colour. The resulting GIF image consists of an array of these colour indices plus a colour map with the desired mappings.

GIF file compression The 'raw' GIF file(after encoding) is large. It could be compressed to smaller file by optimizing the colour table using the LZW(Lempel-Ziv Welch algorithm) method of compression. Repeated sequences of colour is encoded using a shorter strings. For example, the colour code following the number of pixels in sequence representing a colour can be encoded as 50R where R is the code for the colour, instead of RRR.....RRRR. Compression ratios of 1.5:1 to 2:1 can be successfully achieved.

There are two common versions of GIF(Extension .gif):

- GIF87
- GIF89A

GIF89A has more features than GIF87 for example, colour transparency so that it allows the back ground to show through.

Software- Lview Pro can be used in the Windows environment.(It supports
both versions, provides conversion to GIF, and also image editing)
Macgzip for mac to extract and view gifs.

b. JPEG

JPEG is a standard method of storing photographic images in a compressed digital form. It is an extremely sophisticated image format that supports infinte number of colours, instead of only 256 colours. In general, JPEG is far better that GIF for either full-colour or greyscale images of natural, real world scenes. It works well on photographs, naturalistic artwork, and similar material. Consequently, JPEG handles only still images. Most graphical browsers in use today support JPEG.

JPEG Compression

JPEG uses a 'lossy' compression method. This means that the decompressed file would not be exactly the same (bit-to-bit) as the original picture. This is possible because the human eye perceives small colour changes less accurately than small changes in brightness. In other words, the idea is to exploit the limitations of the human eye. The degree of lousiness can be varied by adjusting compression parameters in the software. Hence, this is a useful property of JPEG that enables a tradeoff between file size against output image quality. Infact, the resulting file can be made extremely small resulting in poor quality, else the file can be made to have high quality in which case there compression is lesser. Consequently, JPEG decoders can trade off decoding speed

against image quality by using fast but inaccurate approximations to the required calculations. Furthermore, there are 2 types of JPEG image analysis for compression. They are:

1. Simple or Baseline JPEG -Most widely used form. Does one top-to-bottom scan of the picture?
2. Progressive JPEG -This divides the file into a series of scans. The first scan produces a low quality image which occupies very less space. Gradual scans add more data to this first scan file, thus increasing in size. This is not widely used as baseline JPEG, but is more suitable for compressing images in real time.

Current JPEG specifications defines two different coding methods for the final output of the compressed data. They are:

- Huffman Coding
- Arithmetic coding (patent owned by IBM, AT&T, and Mitsubishi)

The choice has no effect on output image quality. But arithmetic doing produces a smaller compressed file (approx. 5% to 10% smaller than the file produced by Huffman coding). The state of the art image compression techniques are fractals and wavelets.

Hardware requirements- JPEG represents uncompressed full colour images in normally 24 bits/pixel. So an SVGA video adapter that is VESA compatible or greater needs to be used. This has a resolution upto 1280 by 1024 with 16,777,216 colours. Various resolutions call for different amounts of video RAM:

Resolution	Colour depth	VRAM
640X480	24-bit	1M
800X600	24-bit	2M
1024X768 & above	24-bit	4M

It is claimed that using a Math coprocessor during compression/decompression of JPEG images speeds up things. But JPEG uses only integer arithmetic. So an FPU chip would not do much. DSP chips do speed up repetitive integer arithmetic. Hence, programming a DSP chip for JPEG can yield significant speed ups.

Video processor

Many of the graphics accelerator boards on the market today use a fixed function accelerator chip. The circuitry on the card does many of the time consuming video tasks such as drawing lines, circles etc., and the CPU still directs the card by passing graphics primitive commands from applications. But the latest trend and that which is more suitable for JPEG is to employ a chip technology called coprocessing. In this case, the video card includes its own dedicated processor, freeing the CPU to carry out other tasks. The preferred bus system is PCI. But its extension, the mezzanine bus is more preferable although nor essential. PCI video cards with plug and play support require little configuration.

JPEG ----------> Extension - .jpg (DOS/Windows)
.jpeg
.jfif

JPEGView for Mac to view PICT(Mac JPEG compressed
file), GIF, JPEG, TIFF.
LviewPro, PolyView for Windows.

c. X-Bitmap/X-Pixelmap(.xbm/.xpm)

X-Bitmaps are a common format on UNIX platforms, and are often found in older image and icon libraries. Here, a bit is used to represent each pixel of the graphics. Consequently, only black and white images are supported. Transparency is possible as in GIF since the white portion is treated as the colour of the underlying background (making way for attractive designs). X-Pixelmap is the colour equivalent of X-Bitmap. Here, 8 bits represent each pixel(256 colours). Obviously, both methods are very inefficient in terms of storage space required. It is quite uncommon outside the UNIX environment.

d. PNG(.png)

This format is now gaining popularity but is not yet universally supported. It was designed to be a public-domain successor to GIF. It provides additional features inclusive of the GIF features of transparency, interlacing, and image compression. Added features include improved transparency so images can fade in, and features like colour and gamma correction.

Brief comparison between GIF and JPEG for the WWW

1. JPEG(full colour or grey scale) is very efficient for storing photographic, realistic images where there is a continuous variation in colour. GIF is suitable for representing simple pictures like line drawing, thumbnail sketches, simple cartoons etc. In this case, GIF can compress much better than JPEG.
2. JPEG compression is a lossy method but GIF is a lossless method. Furthermore, JPEG losses accumulate with consecutive compressions and decompressions due to continuous editing. An image should be converted for publishing in JPEG, if it can be guaranteed that there would be no further modifications of the image.
3. Using JPEG, a trade-off between image file size against image quality is possible. This is useful when-
    - the hardware available could not support 24-bit colour(less VRAM) or the modem is not fast enough.
    - the transmission of the file over the network has to be faster (this calls for smaller file sizes)
    - factors such as whether the image file is to be archived
    - to enable uniform viewing of the image. Different users have displays with different capabilities. This is essential to avoid quantisation loss.
    - The complexity of the decoder needs to be simplified.
    - storage space requirements.
4. Various compression ratios can be achieved depending on its use for e.g. 2:1(losses), 30:1, 50:1, etc. There are software to enable GIF file size to be reduced(by using the fact that a

pixel need not always be represented by 8 bits) for e.g. BatchMaster(Windows), Debabelizer(Macs) etc.

Other types of binary image files

1. . cgm files - the ISO 1987 standard computer graphics metafile based on$ graphical language.
2. .pdf files - Adobe Acrobat postscript file. Use Adobe Acrobat reader w$ file for Windows/Mac platforms.
3. .tiff/.tif files - Tagged Image file format. An extension of the Aldus Tiff format. This was an attempt to define a standard JPEG base file format. It is a high quality format which records all the characteristics of the image.
4. .rgb files - the RED GREEN BLUE file format of Silicon Graphics used by most visualization software packages as the internal image format.
5. .bmp files - Windows Bitmap files that can be created using Ms-Windows Paintbrush.
6. .ppt files - Windows PowerPoint 3.0 graphics files from Microsoft.

There are many other image files in binary format representing 2-D raster and 3-D graphics.==========

3. Sound files

There are several files formats for storing and editing digitized sound, pertaining to different platforms, that can be used on the net. Sound files are binary files. By generalizing, sound files can be categorized into two types:

- Self-Describing formats. -These files contain information about the device parameters and encoding method as header data. Consequently, this can support a family of encoding formats. Typically header information would be for e.g. parameters of the sampling device, human-readable descriptions of the sound, copywright notice etc. Encoding data would describe the actual storage of sound samples in files e.g. short int or long int, signed or un signed, big endian or litte endian etc.
- 'Raw' formats -These are headerless files and thus the device parameters and encoding are fixed.

Sound files are large files. Hence, transmission over the net would always be slow. For e.g. One audio minute saved to a .wav file requires 2.5M to 10M of disk space, depending on recording options. compression sound files have been used employing methods such as Huffman encoding or simple silence deletion.

Types of sound files used on the net

3. .au or .snd files - first used on the SUN played using Waveform Hold and MODIFY/Windows. Sound player, SoundApp for Macs.

4. .wav files - Windows sound files

5. MIDI files - Musical Digital Interchange files define programs written in MIDI language that lets user store, edit, and playback music in tandem with MIDI compatible electronic musical instrument like a keyboard synthezer. Takes much less space than .wavfiles.(typically, 1M->500K).

The only problem is that different users on the web could be using different makes of sound cards. The absence of an industry standard sound card adds to this problem. For example, the quality of midi reproduction varies between sound cards using wavetable synthesis for MIDI reproductions. Further, some sound cards use Adaptive differential pulse code modulation to reduce file size. Any 16-bit sound card would provide good quality reproduction of sound.

4. Movie Files

A few years ago, Live TV on the computer was still at a developing stage. Today. the availability of fast and sophisticated hardware plus complex software algorithms have enabled Live Tv to become a reality, via the WWW. The standard movie file format for the net is MPEG(Motion Pictures Experts Group). MPEG is an ISO standard technique of compressing digital data. The MPEG standards that have been defined are:

- MPEG I - widely available format
- MPEG II & IV

Note: Digital motion video can be accomplished with JPEEG, if the hardware is fast enough to process 30 images/s. This is usually called M-JPEG and haas no defined standard.

MPEG Compression

MPEG uses many of the same techniques as JPEG, but adds interframe compression to exploit the similarities that usually exist between successive frames. This exploitation of redundancy between successive frames to achieve maximum compression is a feature not possessed by JPEG real-time video compression. This feature makes MPEG more suitable for Digital video compression.

MPEG uses I frame intraframe compression, and P and B frame interframe compression. Intraframe compression (I-picture) means that pictures are coded independent of any other picture, and considers only the redundant information pertaining to the current. For example, if a section of a video picture or frame shows an object that is of just one colour, then every pixel corresponding to that object need not fully specify that colour. Thus, this section could be defined as containing colour x, and not specify colour x for each of the objects pixels many times over. Interframe compression considers B pictures (interpolated pictures). Here, if frame x has an object in it that is in the exact same position in frame n+1, then the information for that object need not be transmitted in its entirety for both frames. This process is sometimes referred to as bidirectional prediction. Intraframe compression applies between P frames, B frames, and I frames. B frames require the most computation, but that their importance stems from the fact that they enable the high compression attainable under MPEG.

Advantages of using MPEG standard file for net

8. **Platform independence**
Many graphics and video cards from manufacturers support MPEG playback. Windows 95 and NT support MPEG playback from within the OS.

9. **Device independence**
Several vendors manufacture MPEG encoding solutions. This drives down prices and ensures continued supply of encoders.

10. **Quality**
MPEG - compressed video is the highest quality available at bit rates below 200 Kb/s.

Its disadvantages

11. needs a lot more computation than JPEG, especially with B pictures

12. editing MPEG frames is a problem due to intraframe compression. This disadvantage has enabled other methods like M-JPEG to become popular for video files.

MPEGII extension of MPEG adds support for interlaced video as well as other improvements. This is used for video production and television (HDTV).

Hardware support

MPEG offers a varied range of video resolutions and data rates. Optimized data rates of 1.2Mbps (CD-ROM data rate) have been approached. At 30 frames/s and resolution of 352X240 pixels, it is claimed that the quality of the video would be comparable to VHS. To view MPEG playback incorporating .avi files i.e. audio and video interleave, the basic pc station on the net must have minimum specification similar to that defined by MPC standard level 3.

- processor: 75MHz Pentium
- memory: 8M
- hard disk: 540M
- drive: 1.44M 3.5"
- CD-ROM: quad speed
- video: 16-bit, 640X480, 1M
- other I/O: serial, parallel, MIDI, game port
- OS: Ms Windows 3.1
- modem: dual standard V.32 or higher (speeds close to 14400 bps preferred)

Examples of video cards aimed at MPEG aaare Intel smart video board, Broadway(tm), etc.

MPEG ----------> Extension - .mpg
.mpeg

Software - Microsoft video for windows for capturing, compressing, and playing videos.
VMPEG playback of .avi on net
Apple Quicktime for Windows/mac
Quicktime VR player for Macs.