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We're Running Out of IP Addresses!

Not only are we running out of fossil fuels, we are depleting something else: IP addresses. IP addresses are used to uniquely identify devices attached to a Local Area Network. They route messages to web sites on the Internet. Back in the middle to late 60's when the Internet was being designed, the developers settled on the use of a 32-bit binary number as the fundamental means to identify locations on the Internet. Known as an "IP Address", it is usually written out as a series of four numbers, each ranging from 0 to 255, separated by dots. An example of a typical IP address would be 192.168.0.1 or 10.0.0.4. At the time, the developers could not imagine that there was any way to use up the 4,294,967,296 unique addresses that the 32 bits provided (Remember, this was the 1960's. personal computers didn't exist).

But that was then and this is now. The personal computer arrived on the scene in the early 1980's. By the 1990's, people wanted to do more than use personal computers as standalone devices. In the corporate setting, computers were connected together on Local Area Networks that used IP addresses as a means to identify devices connected to the network. Some far-thinking companies and individuals began developing Internet web sites that announced their existence to the world and/or provided reference information or items for sale. People began to use these new ways of getting information and buying things. When

these people went home, they wanted to do more than word processing or play games. Those Internet sites were useful.

So more and more computers got on the Internet, and more and more Internet web sites sprang up to service the people who got on the Internet, which generated more demand for home computers, which generated demand for more web sites to service the needs of the Internet users. The end result? All of those home computers, corporate computer networks, and web sites are gobbling up IP addresses. IP addresses could become a scarce commodity.

NAT: A temporary solution...

The problem of limited IP addresses has been known to people in the industry for many years and a number of tweaks to the details of how IP addresses are used has bought computer scientists the time needed to come up with a



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permanent solution to the problem. Known as Network Address Translation (NAT), its operation is very similar to the way the telephone system works in a large office. When a call is placed to a specific individual in that office, the person placing the call dials the 10-digit telephone number. When the call is answered, the caller enters the extension number for the individual they wish to speak to. Contacting a specific individual is a two-step process.

NAT works in a similar two-step fashion. The IP address is analogous to the 10-digit telephone number. But in addition to the IP address, NAT converts the internal IP address of the workstation to a port number and adds it to the message. The use of the port number is similar to the use of the extension number.

This allows all of the Internet traffic generated by all of the workstations at a single site to share the same IP address, thus appearing to originate from a single location. That IP address is the public IP address of the router that is connected to the Internet. A workstation that sends a message to the Internet has its IP address on the local area network converted to a "port number" by the router. When the website returns a response, the router receives the message, converts the port number into the local IP address, and delivers it to the workstation with that IP address.

IPv6: The permanent solution...

On July 25, 1994, the Internet Engineering Task Force (IETF) began work on the problem and issued several "Requests For Comment" on standards that defined an Internet addressing scheme that profoundly increases the number of available IP addresses in the current Internet addressing scheme known as IPv4 (Internet Protocol version 4).

Instead of a 32-bit IP address, Internet Protocol version 6 (IPv6) uses a 128-bit address. Instead of 4,294,967,296 unique addresses, it has 340,282,366,920,938,463,463,374,607,431,768,211,456 unique addresses. To put it another way, every one of the 6.5 billion people on planet Earth could be given a number of IP addresses equal to the number of stars in the

observable universe – and more IP addresses would be left unassigned than currently exist in the present IP addressing scheme. Now that's a lot of IP addresses.

What's different about IPv6?

To users, the biggest difference with an IPv6 is how the IP address will be represented. In the current IPv4 system, an example of an IP address would be: 192.168.0.1. In IPv6, it's quite different: 2001:db8:0:d802:2d0:b7ff:fe88:eb8a. Internally, many of kludges and tweaks needed to keep IPv4 working are no longer needed, which simplifies how messages are examined before they are routed to the next destination. IPv6 also was designed to allow easier implementation of security schemes. When fully implemented, IPv6 will improve things on the Internet.

Moving from IPv4 to IPv6...

The planners at the IETF recognized that changing a concept as fundamental to the Internet as IP addressing would require a lot of time and a lot of planning. Many of the obvious issues have been identified to allow vendors to focus resources on solutions. We are already seeing more products labeled as IPv6 capable or compatible. One of the biggest names in the computer industry, Microsoft, has added IPv6 to Microsoft Windows Vista, Windows Server 2008, Windows Server 2003, Windows XP with Service Pack 1 or 2. Many other vendors have also implemented IPv6.

When will the switch to IPv6 happen?

Not in the near future. Discussions are still going on as to whether IPv6 should be targeted for full implementation in 5, 10, or 15 years. There are no do-over's for this change.

When Canada converted to metric weights and measures, they allocated 10 years to complete the process. Critics said that wasn't long enough. In the U.S., we are currently in the process of switching our entire television broadcast system from analog to digital. The process was begun in 1996 and was scheduled to complete on February 18, 2009. It has been extended to June 12, 2009. It takes time to do things right.



Microsoft Ready To Release Internet Explorer 8

On January 29 of this year, Microsoft announced the availability of the “Release Candidate” for Internet Explorer 8 (IE8). In terms of the Microsoft product development cycle, the creation of a Release Candidate (RC) is the last step in the development process. The RC contains all of the code in its final form. It is provided so that vendors whose products must interact with the Microsoft product have one last opportunity to verify correct operation and make any last-minute changes. It is a clear signal that IE8 is going to replace Internet Explorer 7 (IE7) some time in the near future.

How will it happen?

Microsoft will deploy IE8 as an update to supported Microsoft operating system products. If your computer workstation is configured to automatically receive and install updates, it will be downloaded and installed automatically. You don't need to do anything.

What's new and different in IE8?

Superficially, IE8 still looks a lot like its predecessors. It won't be necessary to

re-learn how to use the features that exist in IE7. But, there are several new features that could be very helpful to you.

Compatibility Mode

Many websites on the Internet were designed for use with older browsers and do not comply with the current standards for web design. The bad news is IE7 worked around the bad code in the screens and never complained (so the problems with the sites were never fixed). The default assumption in IE8 is that web sites fully comply with current design standards. If IE8 receives non-compliant web pages, it doesn't crash, but it doesn't necessarily work correctly either. Parts of the web page may appear misaligned, might be missing, or just don't work. If this happens, click the “Compatibility View” toolbar button (next to the “Refresh” button) in the upper right portion of the screen to change the way IE8 handles web page information. IE8 will then process web page information in the same manner that IE7 used to do it. The problems with the web page should go away!



Clicking the Compatibility Mode button may be acceptable when unexpectedly encountering a non-compliant web site, but what about a site that will be visited regularly? IE8 allows users to maintain a list of sites that should be displayed using Compatibility View. With a couple clicks (Tools > Compatibility View Settings), a web site can be added to a list of sites that should be viewed in Compatibility Mode.

Accelerators

For power users of the Internet, Accelerators can be a time saver. They provide instant access to such things as maps, web searches, email, translation, and blogging. To use an Accelerator, a user highlights a word or phrase on a web page and a blue Accelerator icon appears. After clicking that icon, a selection list is displayed. From a list of choices, the user chooses the desired action such as driving directions, translate, get the definition, etc. Accelerators eliminate the need for users to copy a word or phrase from one web page, then bring up another web page and paste it into that web page and perform the desired action.

Microsoft has supplied IE8 with a variety of Accelerators to choose from along with the ability to add more as they are developed by web sites or in-house staff. We examined the code used to perform several Accelerator functions. We doubt that the average user will attempt to build their own Accelerators, but anyone who is comfortable with programming and has a modest understanding of XML could probably create their own Accelerator. We will also go out on a limb and predict that creation of Accelerators might become so prevalent that people who are unable to create their

own Accelerators will be able to download and use someone else's creation.

Web Slices

Instead of viewing an entire web page, Web Slices allow users to only display the part of a web page that he/she is interested in. This might be of value to a user who wishes to track a specific auction item, track certain sport scores, or check the weather for a certain city. If you use Web Slices to subscribe to a block of information on a web page, the information becomes available in a toolbar which Microsoft calls the Favorites bar. The Favorite bar allows users to organize all of the Web Slices.

There is one issue with this feature that could reduce its impact: Web developers must build their web pages with this development software that implements this feature. Don't look forward to this feature being widely available on web pages when IE8 first arrives on the scene. We expect that the availability of Web Slice content will steadily increase as IE8 moves into the mainstream.

Suggested Sites

One reviewer of IE8 summarized the Suggested Sites as: "If you loved that site, try this one". When requested to do so, IE8 searches the browser history on the user's workstation and collects information about sites already visited. It then uses a secure connection to contact a Microsoft site with the collected information. The Microsoft site then suggests other sites that might have useful content.

We can see potential value in this feature, but we also see several issues that could limit its perceived value. This feature is



dependent on finding information in the browser history file. Without an adequate amount of history information, it might be difficult to focus the scope of the suggested sites. Having a large amount of history could be “information overkill”. We also have concerns about the quality of the search engine that determines what sites should be suggested. And lastly, we have concerns about the objectivity of the list of suggested sites. Are the sites listed at the beginning of the list “most relevant” or “most favored” by Microsoft? Only time will tell.

One final concern centers around the user community’s trust of Microsoft. By default, this option is disabled. When choosing to enable this feature, it clearly states that users will be providing Microsoft with information contained on his/her computer. Microsoft also claims that they will not warehouse this information. Anyone who has questions about Microsoft’s intentions will want this feature disabled.

InPrivate

InPrivate Browsing: To quote Microsoft regarding this feature “Surf the web without saving your history, shop for that special gift with confidence knowing your family won’t accidentally find out, or use a shared computer without leaving a trace. Help protect your privacy with the new InPrivate Browsing and InPrivate Filtering features”. Once InPrivate Browsing is selected, IE8 will not retain information about browsing history, temporary Internet files, form data, cookies, user names and/or passwords. When a user steps away from a workstation running IE8, it’s as if he/she was never there.

InPrivate Blocking: Many web sites today pull content from multiple sources, but that can create problems. Sometimes, the third party site does more than provide content, ads and images. It is not uncommon for the third party site to include tracking cookies that report back to them regarding the users activities on the Internet. Most users don’t know that this activity is taking place. InPrivate Blocking controls which third party sites will be prevented from receiving information about user activities.

Users can invoke this feature and either wait for it to detect unwanted activity with third party web sites, or users may manually enter a list of blocked sites. Unfortunately, this feature is turned off by default and can only be enabled on a per session basis. When the browser is closed, the feature is automatically turned off.

Conclusions...

In the minds of those who reviewed IE8, it is not held in the same esteem as Safari, Firefox and Opera. But collectively, the feeling is IE8 has made significant progress in closing the gap between itself and its rivals. It would be easy to rattle off a list of shortcomings, but we would rather focus on the positive. Some of us have installed it and used it: Microsoft has produced a good web browser.





WNYLC Web Statistics For January 2009

Total Hits.....495,774
 Number of Pages Viewed.....160,941
 Total Visitors.....60,807
 Average Hits/Day.....15,992
 Average Pages /Day.....5,191
 Top Web Browsers Used:
 Internet Explorer 7.x.....42%
 Internet Explorer 6.x.....25%
 Firefox.....12%
 Safari.....<1%

Top 5 Operating Systems Used:
 Windows XP.....58%
 Windows 2000.....3%
 Windows Vista.....13%
 Windows 98.....<1%
 Mac OS.....1%



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