SWCP PORTAL
Providing News, Views, & Clues from Your Local Internet Experts 201102

Where's the rabbit ears?

TV and the Internet

By Jay Nelson, Editor

The Internet is *not* television. Despite blatant similarities, your computer is altogether a different beast from your TV set. These deep, hidden disparities will have a huge but largely unsuspected impact on the shape of both television and the Internet. The attempt to force the technologies together may determine the fate of broadcasting, home entertainment, and Net neutrality.

Receivers v. Monitors

Nowadays the screens of televisions and computers look almost identical, with gorgeous colors, crisp graphics, and smooth motion. The only way to tell them apart may be by checking out what's hooked up to them.

It wasn't always that way. Both types of display originally used bulky **cathode ray tubes**, but were worlds apart in intent and function. Old-timers may recall that primitive picture tubes were rounded squares with tiny flickering gray images, while early computer monitors were also small, with dark backgrounds and glowing green or orange characters, too crude to be called ugly.

Apple took a big step forward in 1983 with **GUI** (*Graphical User Interface*), and a computer screen that showed graphics in black and white and even imitated gray. Each technological generation since has brought monitors and TV sets closer. But it wasn't until 2009 when broadcast TV in America finally went digital that the two technologies really started coming together.

This sort of technical evolution is called **convergence**. Ultimately it will result in interactive TV programs and **smart TVs** with full keyboards and Net access indistinguishable from media-loving tablets, smartphones and laptops. We're almost there, but the underlying differences still present significant challenges.

Monitors and TV screens are built to different specifications and therefore can't be easily interchanged. Good old American TV is based on the **NTSC standard** of 525 interlaced lines of pixels (only 480 of which are visible). The screen was originally set to a ratio of 4 by 3. Meanwhile computer monitors employed an altogether different set of specs. It works out that compared to a monitor displaying 1024 by 768 pixels, an old-fashioned television screen has much less: only 640 by 480 pixels.

This discrepancy in resolution might be acceptable on a small (14" diagonal or less) screen, but even on a 27" screen the TV pixels would be 4 times as large of those on a computer screen. In other words, just like TV versus HDTV, the bigger the screen the more glaring the difference in resolution will be.

Also, television is generally watched from across a room, while computers are viewed over the width of a desktop or less. **Screen refresh rates** and length of time a phosphor dot would continue glowing were also different. These distinctions are not trivial, though new screens are much more compatible than the old.

Nonetheless, the similarities were so inviting that attempts to use TV screens as computer displays to surf the Net were made back in 1996 with **WebTV** and others, none of which were successful. **GoogleTV** is a much more recent attempt that just might work.

If so, it will be partly due to improvements in cabling. While modern HDTV has a far greater resolution than the television we grew up with – up to 1080 lines vertically – now just a single cable, called an **HDMI** (*High Definition Multimedia Interface*), is needed to connect an HDTV to your laptop, instead of the multiple cables and adapters previously required between an analog TV and a PC. HDMI cables can replace up to 11 separate wires for connecting home theatre components, and ultimately is intended for use with upcoming 3D TV.

Remotes v. Keyboards

Obviously, one big difference between the Internet and television are the **input devices**. Even the most sophisticated remote control is very limited compared to a full keyboard and mouse. Some new HDTVs designed for Net access do have those capabilities and all TV remotes will get ever more complex.

Memory is another clear difference. Unlike the gigabytes in your laptop, old TVs had barely enough to hold half a picture frame for a moment. They could store nothing. But that too is rapidly changing, often with add-on **DVRs** like TiVo with big hard drives capable of managing and storing even incoming HDTV data, so that one can pause and even fast-forward to catch up during live events like sports or concerts on the big home screen.

Continued on back

SOUTHWEST CYBERPORT 5021 Indian School NE, Suite 600, Albuquerque, NM 87110-8910 USA
help@swcp.com | Phone: (505) 232-7992 | swcp.com | Member, AIBA keepitquerque.org

Continued from front

Broadcast v. Streaming

These differences are fairly minor compared to how the displays actually acquire their pictures. **Broadcast television** is transmitted through the air using radio waves. The same continuous signal stream is picked up by separate receivers simultaneously. There is no kind of confirmation needed, so it doesn't matter technically if there's just one set tuned in or one million.

Cable and satellite provided somewhat different ways for the signal to reach the audience's receivers. But the model is similar: one signal one way, no feedback – at least beyond being able to order pay-per-view.

The Internet was *not* designed to work that way at all. The Net does not allow broadcast: it's based entirely on **packet switching** and data flowing in both directions at once. **Feedback** is essential. On the Net, each show is sliced up into tiny data packages, every one sent forth to find its own way across the networks to finally be rebuilt into moving pictures in the receiving computer.

Sender and receiver must work together. Instead of downloading the whole file, the video is thrown on the computer screen after just a small portion has been received. So the moving image barely keeps ahead of incoming data. It's generally not saved as a file. It also helps if the frame size is small, which is why YouTube looks like it was made for cell phones rather than PCs.

Trying to watch a movie over the Internet is anything but simple. In physical terms, it would be like calling up the studio, having them cut the film up into thousands of tiny strips and individually mail each one to you. On your end, you would have to check that each segment arrived, send a message back to the studio confirming this or asking it to resend missing ones, and then reassemble all of them in the right sequence before you could watch the film. And it all must be done on the fly.

Whew! It's amazing it would work even for just one viewer. Now imagine that you have millions, all wanting the same show. But each viewer is different, started watching at different times, with different kinds of devices each clamoring for data all at once. It's a recipe for an unimaginable digital traffic jam.

Only the incredible and ever-increasing speed of modern electronics makes it possible at all. But various clever tricks are still needed to **stream video**. Preventing noticeable delays requires *very* swift connections. Big tubes are needed to handle all that data. Far larger ones will be essential for streaming HDTV, already here, and 3DTV, just starting out this year.

How well this scheme works in practice can be easily seen in how often your video pauses and the little thingie spins round as the next segment frantically loads. Judging by how frequent this is even using the best connections, there's still a long, long way to go.

Open v. Closed

TV, broadcast, satellite, or cable, all use distinct **channels** for different outlets. Fox has its own, Disney another, even though locations may vary by system and region. The FCC has carefully divided up the spectrum and the map so that nobody's signal jams another.

But on the Internet, there's no such distinction. Every provider relies upon the same wires. Under the traditional system of **Net Neutrality**, even though big chunks of the network are owned by competing companies, it's all been regarded as a single uniform information superhighway. All traffic was treated the same.

However, video streaming is like filling that highway up with impatient fleets of vehicles, leading to traffic jams and slowdowns. This naturally causes resentment among companies when their data flowing across their own sections of the network gets delayed or detoured by that of rivals hogging the same connections.

It doesn't really matter if those competitors are Netflix or illegal file-sharers. The issue is not about legality but **commerce**. The FCC's recent decision to retain certain standards for wired connections and letting wireless carriers do as they please is probably just the beginning. But the writing is on the screen, as it were. **The superhighway may wind up as a toll road.**

Big business exists to make money. It aims to turn the Internet into a **consumer medium** exactly like it did TV, yet another means of pushing goods and entertainment. Human liberation and creativity are of value to it merely to the extent that they promote trade.

Yet the Internet is the greatest means of communication ever invented. Southwest Cyberport believes in its potential to help raise humanity as well as the economy. We remain committed to providing the best Internet access to you, inviting you to sieze the many opportunities to participate online and produce your own content. The future, after all, still belongs to you.

Correction. *Last month, the source blamed for the cables posted by Wikileaks was incorrectly identified as a US Marine instead of actually a US Army PFC. The author regrets the error.*

Net Notes

Out of Addresses

On Thursday, January 27, 2011, it finally happened. As long predicted, the Internet ran out of addresses.

The nonprofit group that assigns numerical addresses known as **IP numbers** to service providers announced that they had allocated the last free addresses under the current system. It should take about 9 months before the addresses are all used up.

The old system is called **IPv4**, used since the beginning of the Net, with 4.3 billion addresses available, enough for only 3/5 of the current world population.

The old system will be replaced by **IPv6**, ready since 1999. IPv6 has **340 undecillion** addresses — so it can assign numbers to 340 trillion groups of a trillion networks, each one containing a trillion devices. In other words, if all the IPv4 addresses were represented physically by a golf ball, it would take a sphere the size of the Sun to contain all available IPv6 addresses.

Experts are therefore reasonably confident that the new system will never run out of room. — *CNN*