



TECHNICAL COLUMNS

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IP TRAIN

By RON HRANAC

SCTE's Rocky Mountain Chapter recently sponsored a day-long technical seminar on the subject of IP—Internet protocol. The seminar, held in Englewood, Colo., was well attended, and the three speakers covered the basics of IP, IP in the cable network, and IP in the home network. Copies of the speakers' PowerPoint presentations are available online at <http://chapters.scte.org/rockymtn/>.

“And the point of mentioning this?” you might be wondering.

I'm glad you asked. There's a train headed our way, and the train's not slowing down. That train is IP.

In the world of data communications and internetworking one will find all kinds of protocols. Protocols are rules or specifications that define how data is transmitted from one place to another, how data network hardware interoperates with other data network hardware, and even how end-user devices such as computers communicate with other computers. IP is no different. It's a collection of rules that define how data gets around the Internet—hence, the name Internet protocol. It's important to understand that IP is not limited to just the Internet, though. IP can be and is used in many kinds of networks, including our own cable networks!

Allow me to digress for a bit.

Not new to learning

The cable industry has seen all kinds of new technologies over the years. Remember low-level sweep, feedforward and power doubling amplifiers? Videociphers, addressable converter/descramblers and interdiction? Frequency agile modulators? All neat gadgets that required us to learn something new.

In the 1970s, the hot technology of the day included satellite and microwave. Back then we were busily installing television receive only (TVRO) antennas and their associated pieces and parts: low noise amplifiers (LNAs), 4 GHz-capable feedlines, power dividers and satellite receivers. We had to learn about this new technology, how it worked, how to maintain it (remember the crossed string trick to check for antenna warpage?), and how to deal with gremlins such as terrestrial microwave interference and twice-per-year solar transit outages. Quick side note: Solar transit outages have absolutely nothing to do with sunspots.

Around the same time, we started to deploy multichannel amplitude modulated link (AML) microwave. We had to learn another technology. Microwave brought with it path calculations; fade margins; fresnel zones; rectangular, elliptical and circular waveguide; dishes; radomes; and of course the excellent Hughes AML seminars taught by the likes of James “Randy” Randolph and Dane Walker.

When the late 1980s rolled around, we saw the introduction of a brand new cable network architecture now known as hybrid fiber/coax (HFC), which uses multichannel AM fiber optics technology. The then new fiber technology included link budgets; Fabry-Perot and distributed feedback (DFB) lasers; optical time domain reflectometers (OTDRs); nodes; fusion splicers; depressed-clad versus matched-clad single mode fiber;



concerns about polarization mode dispersion (PMD) and more. Once again we found ourselves learning about a new technology.

Cable modems arrived on the scene in the 1990s, bringing even more to learn about: cable modem termination system (CMTS); Data Over Cable Service Interface Specification (DOCSIS); 64- and 256-QAM (quadrature amplitude modulation) digitally modulated signals; constellation; modulation error ratio; packets; and even apparently mundane things like carrier-to-noise ratio versus signal-to-noise ratio. Toss in telephony, digital video, video on demand, high definition television...well, you get the picture. More new technology means more stuff to learn.

Whether or not you subscribe to the argument that one day everything on our networks will be IP, I seriously think it's something we need to be familiar with. IP eventually will become just another tool in our toolbox, one that we'll likely take for granted. But before we get to the "take for granted" stage, we need to understand it.

That means training.

IP training essential

My suggestion is to learn as much as you can about this thing called IP. The pages of CT have included several articles on the subject—a good example is the February 2003 issue (<http://www.broadband-pbimedia.com/archives/ct/0203/index.html>)—and will continue to do so in the future. Introductory seminars like the previously mentioned SCTE Rocky Mountain Chapter's as well as the Society's national seminars (October's Seminar Central in San Jose featured several IP-related topics) are a good place to start, as are any of several excellent books. Indeed, one of the very best books on IP is *Internetworking with TCP/IP—Principles, Protocols, and Architectures*, 4th Ed., by Douglas E. Comer; Prentice Hall, ©2000, ISBN 0-13-018380-6.

Here are a few others that I've recently added to my reference library:

The latter two are bundled with CD-ROMs that feature hands-on exercises, practice and simulation questions, and network simulation software so the user can practice configuring a small router or switch. By the way, I'm not suggesting that CCNA certification is necessary to understand IP, just that CCNA exam prep materials contain a wealth of excellent background information on internetworking and IP basics.

Web resources

As one might expect, the Internet is a good place to learn about IP. A couple Web sites of interest include <http://www.learn tcpip.com>, <http://www.howtosubnet.com> and <http://publib-b.boulder.ibm.com/Redbooks.nsf/RedbookAbstracts/gg243376.html?Open>.

For those of you who prefer instructor-led training, check out some of the CCNA basics courses offered by Ascolta (<http://www.ascolta.com>), Global Knowledge (<http://www.globalknowledge.com>) and Sunset Learning (<http://www.ccti.com>).

And don't forget about the vendor community. Cable industry vendors have long been a great source of both general and product- or technology-specific training. Check with your data networking, CMTS and cable modem manufacturers to see what they might have available.

So, about that IP train. It is indeed rolling down the tracks at full throttle, and all of us have a choice. We can move out of the train's way and watch it go by, or we can hop on for what's going to be a sometimes hectic, but fun ride. All aboard!

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