

# Technology

VIDEO

## Cram Those Bits

If you want the freedom to watch whatever you want, whenever you want, your cable company will have to buy a video-stuffing box. RGB Networks makes these things. Cisco is in hot pursuit | By Dorothy Pomerantz

**W**HEN ABC CHIEF ANNE Sweeney announced in April that her network would be offering hits like *Desperate Housewives* and *Lost* on the Internet for free, it was a blow to cable firms that had been hoping to sell those shows for a buck through their video-on-demand services.

Viewers can now watch *Lost* over the air on Wednesday night, stream it the next day over the Internet or download it onto an iPod to watch on the train ride home. They don't need video-on-demand. They don't even need cable.

In a world hurtling toward watching what you want when you want it, the cable industry is at risk of falling behind. Only 14 million of the 65 million U.S. homes with cable have video-on-demand today and, for those who do, it's glitchy. Because of network constraints, cable companies can make only 40 video-on-demand programs available to 500 households at the same time. The 41st family that wants to watch, say, last night's episode of *The Sopranos* is out of luck.

RGB Networks, a privately held upstart in San Mateo, Calif., believes it has a way to bring efficiencies to cable—and help out the telephone companies furiously building their own fiber-optic video networks. “The cable com-

panies need to provide more programming to compete,” says RGB’s 44-year-old cofounder, Adam Tom. “Their number one issue is bandwidth. Their capacity is reaching its limits.”

Tom’s solution is a pizza-box-size video router that sits in various spots on the network, either at the cable’s operations center, known as a “headend,” or in a hub closer to the home. An RGB box does all the video processing and compressing needed to squeeze 40% more space out of the existing bandwidth, allowing cabling to get 16 more *Sopranos* streams to those 500 households. RGB’s router also frees up space in the headend by doing the work of 30 older boxes.

“They’re allowing us to grow,” says RGB fan Douglas Ike, head of new video technology for Adelphia Communications. “They’re helping us cram more streams into the same space.”

RGB is currently in talks with Comcast and Verizon Communications, which is offering video over fiber networks in seven states. Eventually RGB will pitch to Internet video firms, too.

Video-on-demand servers traditionally send down video at a constant bit rate in a single stream. RGB can produce more on-demand streams by performing—on a single chip—two bandwidth-saving feats called statistical multiplexing and variable-bit-rate compression. Statistical mul-



tiplexing mixes together all the broadcast video streams so ones that don't change often, like a talking head, take up less room, creating more space for streams of complex video, like an action film. Variable-bit-rate compression sends the fat scenes down the pipe faster than the thin ones. The set-top box puts the channels back together for viewing.

RGB can do it all with one router by taking full advantage of the power of its field-programmable gate-array (FPGA) chips. Video processors that handle one stream per chip leave lots of circuits underused. RGB sends 30 streams through the chip so all circuits are in continuous use.

Tom and the two other RGB founders have been in cahoots in video networking since the early 1990s. At a company called Imedia, they designed a now-standard device called a “cherry picker,” a box that gathers video from satellites and antennas to send out to homes. They sold Imedia to Terayon Communication Systems in 1999 but left in 2000. After taking a year off, they began looking for a new venture.

As more video was moving to on-demand, they realized that the current technology (which they helped design) wasn't going to be able to handle all of the additional streams. They started RGB in 2001 with \$200,000 of their own money. On the strength of the VOD router idea, they gathered \$5 million in venture capital from Accel Partners and Kleiner Perkins Caufield & Byers in 2003.

But then they realized the cable industry had a more pressing problem: how to eliminate all the older, bandwidth-hogging analog signals in its pipes. Only 30 million cable homes in the U.S. have upgraded to digital, which uses about one-tenth the bandwidth of analog.

In late 2004 Tom pitched his backers on getting to market quicker with an altered version of hardware that merely