



Telecosm

What's next? Infinite bandwidth. Not metaphorically infinite, but in actuality: great rivers of instant global communication too cheap to meter. Infinite bandwidth, says techno-optimist Gilder, will be bigger than computers, bigger than the Web, and bigger than the Internet itself. It is the Next Next Thing. The telecosm establishes not only a new infrastructure, but also a new culture and new economy. Gilder's vision is so cosmic, so wild-eyed, so nerdy and technical, and so hyperbolic that in the end I believe him.

—KK

Telecosm

How Infinite Bandwidth Will Revolutionize Our World

George Gilder
2000, 351 pages
\$26
The Free Press

The economist's focus on scarcity stems from the fact that shortages are measurable and end at zero. They constrain an economic model to produce a clearly calculable result, an identifiable choke point in the industrial circuitry. Abundances are incalculable and have no obvious cap. They tend to end in a near zero price and thus escape economics altogether. As the price declines and their role in the economy becomes more vast and vital, their role in economic analyses diminishes. When they are ubiquitous, like air and water, they are invisible... "externalities." Yet abundances are the driving force in all economic growth and change. In free economies, scarcities find their meaning chiefly in the abundances they engender and constrain.

Nations, companies, and individuals that exploit the "free" abundance (that is, the resource with the plummeting price) gain market share against all rivals.

Every age defines itself by the resource it wastes. Our agrarian forefathers wasted human time. The Victorians wasted coal and iron, the 20th century

wasted electricity. Over the past decade, the world had to learn to waste transistors. Now it needs to learn how to waste bandwidth, and begin rebuilding the world yet again.

Amazingly, most technology prophets fail to come to terms with the power of exponents. You double anything annually for long—whether deforestation in ecological nightmares or transistors on silicon in the awesome routine of microchip progress—and you soon can ignite a sudden moment of metamorphosis: a denuded world or a silicon brain.

As Metcalf explains: "Ethernet works in practice but not in theory." The same could be said of all the devices of the microcosm and telecosm. Both the supreme sciences that sustain computer and communications technology—quantum theory and information theory—are based on probabilistic rather than deterministic models.

Companies that try to banish chance by relying on market research and focus groups do less well than companies that freely make mistakes and learn from them. Because of an ability to absorb shocks, stochastic systems in general are more stable than deterministic ones.

The law of the telecosm dictates that the higher the frequency, the shorter the wavelength, the wider the bandwidth, the lower the power, the smaller the antenna, the slimmer the cell and ultimately, the cheaper and better the communication. The working of this law will render obsolete the entire idea of scarce spectrum and launch an era of advances in telecommunications comparable to the recent gains in microchips.

Beginning with the super high frequency spaces above 28 gigahertz microwaves and with all the excess government spectrum now being privatized, the FCC should open up unlicensed spectrum for all to use. Not only can numerous radios operate at non-interfering levels in the same frequency band, they can also see other users' signals and move to avoid them. In baseball jargon, they can hit 'em where they ain't; in a football idiom, they run for daylight. If appropriately handled, these technologies can render spectrum not scarce but abundant.

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Crypto

The dashing story of how a bunch of long-hair mavericks wrested control of encryption from the secret society of spooks and installed it on the Web servers of the world, making the Internet world safe for private communication, and for eBay. Crypto is the first truly political movement of the digital era, which doubles the impact of this great tale. Bonus: this book is also the best lay explanation of modern cryptography.

—KK

Crypto
When the Code Rebels Beat the Government Saving Privacy in the Digital Age
Steven Levy
2000, 300 pages
\$24
Viking



For years, people at The Fort could be reasonably confident that when they devised a breakthrough technique like differential cryptanalysis, such information would be unlikely to tumble into the public domain. Those days were over. Consider that the IBM group had come across the T Attack on its own, without the help of government. Differential cryptanalysis was ultimately a mathematical technique just waiting to be rediscovered by someone outside the Triple Fence interested in sophisticated codes. The NSA couldn't hold on to such mathematical machinations any more than an astronomer discovering a previously unknown nebula could cover up the skies to mask its presence to future stargazers.

This was to be the reality of the dawning era of public crypto: Whether the NSA liked it or not, bright minds were inevitably going to reinvent the techniques and ideas that had been formerly quarantined at Fort Meade—and maybe come up with some ideas never contemplated even by the elite cryptographers behind the Triple Fence.

Digital signatures offer another advantage. Since it is impossible for a digitally signed message to be produced by anyone but the person who holds the private key that scrambles it, a signer cannot reasonably deny his or her role in producing the document. This *non repudiation* feature is the electronic equivalent of a notary public seal.

"That first encounter practically blew the roof of my head off," was how Niacin put it. "As sex, it was one of the most amazing experiences I've had, VR or RL.... I almost passed out.... I was at work, all faint and shaky, practically coming in my pants.... I was afraid to move."

And exu, though she tended to be a little less indelicate in her descriptions of what happened that day, was clearly reduced to a similar state of distraction. Logged in from her workplace as well, she too felt almost physically rent by the gap between her mundane surroundings and the place into which her psyche had abruptly been thrust, a place which—well, "What was it like?" I asked, and exu:

"Like white hot. Like nuclear," she said. "It was really like melting into the screen."

My Tiny Life

Julian Dibbell's story of his multi-year obsession with online MUDS—where he dwelt among virtual communarians, encountered virtual sex, virtual rapes, and virtual executions in a wholly virtual, but tiny, life—is by far the most fast-forward look yet at where real life is headed. Jaded me, I actually got a case of future shock reading it.

—KK

My Tiny Life
Crime and Passion in a Virtual World

Julian Dibbell
1999, 304 pages
\$15
Owl Books

