
FOREWORD

There is probably something in the world of technology more important than the subject of wireless broadband, but I'm pressed to think what it is.

Wireless broadband is the point of a spear which, in every country in the world, will drive progress in education, economic development, health and medicine, agriculture, markets, family welfare, technological and scientific advances, and general communications.

One can say that these things are equally true of wired broadband, but it's more true on paper than on the ground. Or, in more stark terms, wired broadband, while it offers fatter pipes today via glass fiber, is generally for the urban well-to-do. And even in enlightened countries which have a more socialized view of bandwidth (Iceland leaps to mind, as well as Japan, South Korea and Sweden), the problem of rural delivery remains.

In fact, we seem, as a planet, to be on the verge of a mammoth deployment of bandwidth, and my guess is that the great preponderance of those cycles will be delivered wirelessly. Today, we see this in Western cities as a trend in voice from wireline to wireless which is breathtaking at the carrier boardroom—and Wall Street analyst—level. At the same time, this impending revolution is clear from the low cost, rapidity and appetite for wireless broadband deployments in the poorest and most rural environments, from Vietnam to India to Africa.

In general, I've been willing to make a rather treacherous bet: that a correlation will emerge, after a decade or two, between a country's deployment of bandwidth (technically, its penetration), and its economic growth. As I write this, Kevin Rudd has just won the office of Prime Minister in Australia on a platform that includes widescale provision of broadband, and what we at SNS Project Inkwell call one to one computing in schools, where each child has a Net-connected computer. At the same time, the United States is in the midst of a presidential race, and neither candidate has mentioned bandwidth, and I strongly doubt they will.

Yes, my economic bet is on Australia in that race. So this is not purely a technical discussion or issue, and in my opinion, those who take the subject to heart, and get out ahead early, will be the winners, almost regardless of individual pursuit or other national agendas.

There is a rather fascinating aspect of bandwidth consumption which further tilts the bandwidth table in favor of wireless: carriers and everyone else in the technology world consistently underestimate even the near-term future demand for bandwidth. “I’m running as fast as I can,” seems to be the basic point of view expressed by most carriers, but most of them are about to get a very rude awakening, brought on by accelerated demand by their customers and accelerated provision by their competitors.

A few years ago, providing residential customers with 256 thousand bits per second through any medium was considered adequate; today, in downtown Paris, 12 million is normal. A few years ago, families in the United States were used to spending \$50 per month for telecommunications needs. Today, those same families are spending twice that and more for bundles that include Internet and voice communications, video entertainment, gaming, and other services, often reallocating budgets in ways that have caught most providers by surprise.

How much bandwidth will be enough tomorrow? Five years ago, the Canadian province of Saskatchewan—a global leader in bandwidth—did internal estimates that 25 Mbps would be enough per home. Today that figure seems shy. Yesterday, a single video stream used about 1.5 Mbps; today, high-definition TV runs around 14 million, and Asian companies are making TVs that sample at half again higher rates. How many independent screens will there be per home? In many cities, the idea of independent viewing in the bedroom, living room, den, and kitchen is not far-fetched, but suddenly we’re talking about a 60 Mbps home.

Don’t use such skinny numbers around my friend Larry Smarr, however. Larry is the founder and director of the world’s most advanced visualization laboratory, CalIT2, and he regularly tells our Future in Review conference participants that 100 Gbps (billion bits per second) is about the right number. Of course, Larry is driving a wall-sized screen with 220 million pixels (dots), but he’d tell you that you, too, will have one someday, or something as close to it as you can afford.

One more example of near-term unfulfilled demand will help illustrate the dramatic importance of wireless broadband. Consider K12 education, which promises to become the largest market segment for computers sometime during this next decade. While everyone is wondering where the funds will come from for one computer for each student (and teacher), most planners are overlooking a more important question: bandwidth.

How much does one student need? Do they want to watch movies? Of course! Well, that’s about 1.5 Mbps. Does the teacher want them to be able to watch the same movies as the other children in the class? Of course! How many kids in the room, maybe 30? All right, that’s 45 Mbps. And how many classrooms in the building? Perhaps 15 or more, plus a library, assembly room, etc.; perhaps the building needs 675 Mbps. Whoa! How do you get it, and who is going to pay for it? This may be the largest problem facing modern elementary education today.

It is this insatiability for cycles which puts wireless in the foreground: wires (and fiber) just can’t keep up. For the moment, and as long as fiber remains the

fatter pipe, one can picture the globe as though two kinds of wildfire were consuming it: first comes the wireless provision, followed in the cities by the wired provision. If wireless becomes the fatter pipe—and there are reasons to think this could happen—all fiber bets are off.

As though the global trends named here were not sufficient drivers to warrant attention to wireless broadband, there is another, equally compelling set of accelerants, all coming under the umbrella title of mobility. On every level, from lifelong residence to lifestyle to work, humans are becoming more mobile by the decade, and wireline bandwidth, while growing, is increasingly not appropriate to our needs. Cars today have more computers in them than houses, but get a small fraction of the comparative bandwidth. That will change.

Finally, it is worth noting that wireless bandwidth will be the Great Equalizer of this century, providing citizens and countries equal access to the world's information and commerce. Countries which, like China (yet to move to 3G), choose to put politics ahead of this trend, will become case examples of what not to do, while those such as India which push aggressively for wireless bandwidth will be emulated worldwide, for the hope and prosperity which this form of being connected can bring.

In this book, Vern Fotheringham and Chetan Sharma have done a remarkable job in laying out every aspect of this critically important and demanding topic. Read it from cover to cover; enjoy it all; and be satisfied in knowing what every modern planner, manager, and educated citizen should know about the world's future.

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*Friday Harbor, Washington
August 2008*

