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International Perspectives

Wiring the Wilderness in Alaska and the Yukon

Breaking down the partitions that divide the digital world.

The Internet's global spread has been so extensive and rapid—almost 200 countries have been connected during the last dozen years—that the Net is beginning to be noticed for its absence as well as for its presence. Access is not yet as universal as many believe it could and should be. As a consequence of these shortfalls, the world is being partitioned into information age "haves" and "have-nots," called a "digital divide."

A digital divide may be defined as "a substantial asymmetry in the distribution and effective use of information and communication resources between two or more populations"[9]. There are a number of divides even if only the Internet is considered, with distinctions between populations based on urbanization, nationality, geographic isolation, gender, income, education, language, occupation, and ethnicity. Multiple distinctions make for stark gaps. Thus, poor, semiliterate, ethnic minorities in small, isolated rural villages in the world's poorest countries are not as likely, by probabilities that differ by orders of magnitude, to be frequent or sophisticated users as are people not characterized by any of these traits. It is doubtful if one-hun-

dredth of 1% of the people in such villages worldwide are minimally regular Internet users, easily qualifying as a "substantial asymmetry" against the 10%–70% of the urban populations of some of the most wired nations. Since there are millions of villages scattered around the world, wiring them, as well as bridging other digital divides, is attracting the attention of many governments and international organizations [1, 4, 5, 7, 8].

Is the time ripe for dramatic progress? The decreases in

costs and increases in technological choices that characterize both computing and telecommunications technologies, including the means to overcome once insurmountable geographic difficulties, should enable much to be done.

What would qualify as successfully solving this problem? A modest answer might consist of

providing access, at a cost affordable with disposable incomes, to the village population of at least a large region within a country. Bandwidth would have to be at least adequate for comfortably visiting most Web sites. Another answer might also require a respectable segment of this population—10% is substantial by global averages—to actually use the Internet.

Access

Satellite and other wireless technologies have progressed to the point where it is not too difficult in theory to provide reasonable physical access to even the most isolated villages. The key question is: Who pays?

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The answer: Not the villagers. With few exceptions (mostly villages with natural resources that can be exploited for extraction or tourism), the great majority of remote villages barely get by as subsistence agricultural, fishing, or crafts communities. Technological advances aside, it still costs far more to bring adequate bandwidth to a user in a village of 150 people in, say, Chile's Tierra del Fuego, Siberia, or to the mountains of Bhutan, than to almost anybody else on the planet. Paying the real costs of access is just not within their individual or community means.

So if costs are high and the villagers cannot pay, who does? Directly or indirectly, the answer is going to have to be government or international organizations such as the World Bank. Thus far, for most of the world's villages, the answer is "nobody," and that answer is not going to change anytime soon. There are too many people in too many villages in too many countries. Even in nations such as Nepal or Uganda, where their governments give the problem some positive attention, they are simply financially and otherwise incapable of doing much for such large fractions of their populations [3].

Has this divide been bridged anywhere? Are there places where this digital divide exists in all its dimensions, but where it is not so overwhelming in scale, and where national or local governments are rich enough and well enough dis-

posed toward this problem, that efforts could realistically be made to deal with it? We went looking for such solutions in May and June 2000 in Alaska and Canada's Yukon Territory.

Except for a few places that can be counted on one's fingers, these northern expanses are populated by villages or towns of less than 10,000 people. The great majority of the villages have less than 500 people, are minimally (often not

at all) connected by roads to anywhere, import far more than they export, and are settled mostly by Native Alaskans or people of Canada's First Nations. There are few year-around, cash-economy jobs, and many of these (postmaster, school staff, and maintaining a dirt airstrip, to name a few) are government positions. Wealthy national/state/territory governments have professed commitments to getting more people connected and to subsidizing the small, and mostly poor, indigenous peoples. Some of this has already been done through the provision of basic telephony. So, if there is going to be an existence of proof that the village digital divide can be bridged somewhere, it is likely to be here.

Indeed, both countries have supplied the Internet to most of the villages above the Anchorage-Whitehorse latitudes, including the 12 we randomly visited. Both have done so through subsidies. Alaska has generously funded school facilities in its villages, and the Internet comes into almost every school via 56Kbs–128Kbs satellite links. These are up to 90% subsidized by the E-Rate legislation passed by the U.S. Con-

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gress in 1996 to update its Universal Services Fund, which is designed to bring affordable telecommunications to all of its citizens and administered by the Federal Communications Commission. A similar subsidy to the village health clinics is also in the preliminary stages of implementation as part of new telemedicine efforts. In addition, a few dozen village governments have time-limited access to the Internet via an 800-number, dial-up supported by the Department of the Interior; all of the 227 Recognized Tribal Organizations in Alaska are expected to have such access within a year.

The Canadian Yukon Territorial government (YTG) has adopted a policy of subsidizing

Internet access to its more remote communities so that the cost of a dial-up connection is the same as in its capital, Whitehorse. Currently, the local ISPs serving these remote communities pay the lesser of 20% of the bandwidth costs or 30% of their gross receipts. This means that ISPs have been paying for 20% of the bandwidth costs for serving these communities. A major infrastructure upgrade to bring more bandwidth into these communities is being undertaken by the YTG. It is trying to gain approval through its regulatory commission of a contribution fund, whereby all utility customers contribute through their rates to pay for the increased village bandwidth.

The American/Alaskan connections are rigidly restricted ("stovepiped"), with as many as three to five separate pipes into a single village. For example, only students and teachers for school purposes, while physically on the school grounds, may use the E-Rate links. That leaves the links unused or underutilized for perhaps as much as 70% of their total annual capacity, producing undesired side effects in that a child cannot use the Internet outside of school hours and the summer, and has to stop using it once he or she graduates. If others want to use the Internet, they have to get their own equipment and pay 7–12 cents/minute for an often poor, long-distance dial-up connection—something few can afford. There is not enough

potential market for a private ISP to set up in these high-cost villages to serve the other citizens, particularly as the stovepiped subsidies have eliminated some of the large customer groups. A few villages are better off because of peculiar circumstances such as relatively cheap microwave phone access to a nearby town. McGrath, a village of 430 people in central Alaska, is unusual in that it supports its own ISP set up by the local electric power company. But in most places, the net result has been the establishment of a new digital divide within each village—one that separates students and government people from parents, senior citizens, and everyone else.

The Canadian/YT arrangements are much less discriminating. They subsidize connections to whole villages. So, for example, a 56Kbs link to Old Crow north of the Arctic Circle is 80% paid for by the YTG and used by the entire village. YKNet, an ISP two-thirds owned by the nonprofit Yukon Net Operating Society and one-third by the Whitehorse phone company, pays the other 20%. YKNet then is able to provide any citizen 120 hours/month of Internet access via local dial-up modems for $24.95 (Canadian), which is well within the disposable income of most families or small businesses. As of early June 2000, YKNet served about a dozen villages and towns. At least four additional ISPs provided comparable services to other

places in northwestern Canada.

So Alaska and the Yukon have established the necessary access criteria we've defined, although the Alaskan solutions have opened up a digital divide of their own within most villages. There is great dissatisfaction in the villages as well as within the Alaskan state government about this stovepiping. Strenuous efforts are currently under way to remove, modify, or reinterpret these restrictions, which were developed for the rest of the U.S., where circumstances are very different.

Beyond Access
But what about the more difficult usage conditions for closing the village digital divide? Are user levels up to at least 10%, and is use effective in that most people "can find relevant content, know-how to use the technologies to satisfy their own needs, and are engaged and represented in the policy process"? [9]

The 10% level is easily satisfied in Alaska since at least 20% of the populations of almost all villages consist of school-age children and their teachers. There are over 800 Internet subscriptions among the 10,000 villagers in the Yukon. Most of these are to homes, and it is common for two or more members of a family to use the same account. So the Yukon also meets this threshold.

As to finding relevant content, Alaska/Yukon villagers start with an enormous advantage over the vast majority of villagers world-

wide in that almost all are native speakers of English, literacy is above 90%, and they have disposable incomes in U.S./Canadian dollars. (More typical of villages worldwide are low literacy rates in languages hardly favored, or even known, in cyberspace. Between high costs, no telecommunications, no convertible currency, and literacy disadvantages, the Internet is often a nonstarter for these people.) Not surprisingly, this is reflected in use of the Net for educational, entertainment, and shopping purposes among young people. For example, some of the most popular Web pursuits that we observed during our visits were concerned with snowmobiles and North American sports. There is a seasonal element to Internet use, with the heaviest home use coming at the end of the long, dark winters.

In making arguments for closing the village digital divide, the economic values of information and contacts on the Net are often cited. Farmers will be able to find better prices for their produce, fishermen can find timely data on weather and fish runs, native artists will lower transaction costs and eliminate middlemen, and so forth. Some of this happens [6], but so far it is not bringing wholesale prosperity to any village we could find, and much of it is embryonic.

Other important needs that might be satisfied with the aid of the Internet relate to health and education. Virtually every Alaskan village has a clinic staffed by at least a health aide, who has less training than a registered nurse. Telemedicine has significant potential, especially to enable villagers to be seen by a doctor in a reasonable amount of time and with considerably less expense, and there have been some interesting experiments and demonstrations [8]. Educational use is supposed to be included in the curriculum of every school. We found actual use varies considerably from school to school, and is dependent on the staffs' interests and knowledge. There would seem to be a natural market for distance education, but so far this has not developed.

Government is important to the economies and welfare of all of the villages, often providing the largest sources of money and jobs. The Internet has the potential to increase, change, and improve the ways in which the communities and their citizens deal with government. It also provides new opportunities for native governments to deal with each other. These possibilities are just beginning to be explored.

There has been at least one significant example of regional political activism using the Net. A large herd of about 150,000 Porcupine River caribou migrates between northern Yukon Territory and northeastern Alaska. Many people in both Canada and the U.S. are concerned that the herd is endangered by oil exploration and future extraction possibilities. This has become a common cause between the native governments in the area against the oil companies. The issue has obtained some prominence on the Internet and has facilitated political action among the native governments of the indigenous inhabitants on both sides of the border.

It also doesn't hurt to keep in mind that new technologies and content may come with unintended and undesirable side effects. When satellite television first came to approximately 250 people of Huslia in the late 1970s, community life in the village reportedly shut down for two years.

Of the dozen villages we visited, the one that seemed to be doing best at making something of the Internet for itself was Old Crow, with about 270 people (90% native) in the Canadian Yukon. Computing and the Internet are used extensively by the native government organizations. In fact, the village is in the final stages of constructing a large, modern public building fully wired with provision for about 40 computers. The people who will actually use it designed the interior. It was the most impressive IT-related facility we have ever seen in a poor, remote part of the world that has been put there by and for the local population. Computers are used in Old Crow's school, although access to the Internet is not stovepiped as it is in Alaska. Old Crow is home to

approximately 80 computers, with at least 10% of its population connected to the Internet. The more knowledgeable people in town and the YKNet ISP try to provide an informal but fairly effective help service to the user community [2].

One of the most glaring problems we observed in all of the villages we visited was slow movement up the learning curve for the local populations. There was considerable receptivity to and curiosity about the Internet. Almost all the users we met spoke well of their experiences and of a desire for more frequent and extensive use. But most people, especially in the smaller villages, were struggling with basic applications and often complained of slow connections. They didn't have people available who could help them, either in person or online, except perhaps with only minimal technical aid. Having even one knowledgeable, enthusiastic, local "guru" can make a significant difference in making the Internet more rapidly and effectively utilized.

ALASKA AND NORTHERN CANADA have demonstrated that where there is the political will to provide Internet access in poor, small, remote villages, it is possible to do so. A few other wired countries (Finland and Sweden, among others) may be making similar progress, although with more homogeneous populations.

While it is premature at best to say the Internet will remake village communities, its acceptance so far shows promise that it will prove to be a valued addition to the variety and quality of life. Assuming some cost impediments will be overcome, we might conjecture that the fractions of the populations that will use the Net are comparable to those of the parent countries. ▣

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COMMUNICATIONS

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