



Digital-Divide Efforts Are Getting More Attention

Greg Goth

Worldwide efforts to mitigate the digital divide between technology-haves and have-nots have moved forward in recent months. From small projects that are flourishing with donated equipment and nascent agreements with local telecommunications providers to a proposal to distribute 100 million to 200 million new laptops to schoolchildren in developing nations within two years, a new sense of possibility is enlivening the Internet community.

“Our network has grown from 3,000 members to over 7,000 in the last year alone,” says Andy Carvin, director of the Digital Divide Network (DDN), a global resource for those interested in projects enabling wider Internet access. Carvin attributes much of the increase to a Web-site redesign in 2004 that lets members create blogs and maintain discussion forums as well as read research and articles on various digital-divide initiatives – all for free (www.digitaldivide.net).

“It’s a place where people can come and publish research, find other people’s research, and ask questions,” Carvin says. “And it’s not just community activists who are members, but also private-sector people and government officials. We really see the Web site as a platform where multiple stakeholders can meet on what’s relatively neutral ground.”

Global Proposals

The Benton Foundation and the US National Urban League established

the DDN in 1999, after then-US president Bill Clinton challenged technology leaders to act more in concert to address the disparity between those with telecommunications access and those without. Originally designed as an online clearinghouse of news and resources regarding the digital divide, the DDN left the Benton Foundation in February 2003 to become part of the new Center for Media & Community (CMC), an institute of the Education Development Center in Newton, Massachusetts. Although the EDC receives much of its funding from US federal contracts, Carvin says, the DDN is funded primarily via philanthropic and private-sector contributions.

“In some ways it’s kind of ironic,” he says, comparing the network’s origins and its current organization. “As the digital divide has become less of a policy discussion in the US, it’s become much more of a policy discussion everywhere else.”

One global organization created to address improved global access issues is the United Nations Information and Communications Technologies (UN ICT) Task Force (www.unicttaskforce.org). Task force program officer Samuel Danofsky says UN Secretary General Kofi Annan founded the office in September 2001 in response to a request by the UN’s Economic and Social Council. Danofsky says the task force’s organizational scheme was a first for the UN.

“What’s unique with the ICT Task

Force is that its membership consists not only of government representatives, but also people representing private-sector companies and non-government organizations. This is the first time this has happened in UN history. [The UN] recognized that this is an issue where we need expertise from all these stakeholders.”

The task force was originally supposed to dissolve in 2004, but Danofsky says UN officials agreed that its work needed to continue, and extended it through December 2005. Its mission will likely continue after December under a different organizational scheme.

“The secretary general has recognized [that] this is an issue we are not done with, so he has asked the task force to investigate how these discussions can continue after it has ceased to exist,” Danofsky says.

The task force is organized into four working groups, one of which, an enabling environment working group, has been trying to define open access across cultural boundaries. It is also entertaining new concepts such as FiberAfrica, proposed by Rahul Tongia, a research engineer at Carnegie Mellon University’s Engineering and Public Policy faculty.

Tongia is working on a proposal to create a coordinated fiber-optic infrastructure in Africa (www.contrib.andrew.cmu.edu/~tongia/FiberAfrica-ending_a_digital_divide.pdf). He and his colleagues say such an effort, in which the infrastructure’s builders – whom Tongia best envisions as a public-private

partnership – cooperatively make the basic fiber architecture available to all stakeholders, would be economically feasible; they estimate that for “just about US\$1 per person one-time capital costs, the majority of Africans could [get] (virtually) free data connectivity within walking or cycling distance.”

Tongia says the FiberAfrica proposal represents a leapfrog opportunity. With fewer legacy needs and regulatory hurdles than in developed portions of the world, a scalable and ultimately continental backbone could be laid as quickly as its stakeholders mandate. In addition, he says, improving technological capabilities might help address the climatic and epidemiological problems that affect Africa more significantly than other nations and continents.

“Critics might believe that Africa’s limited development is due to poor governance and corruption,” Tongia says in his proposal. “The truth is that Africa has been burdened with several debilitating challenges. The rains are seasonal and erratic, and the overwhelming majority of agriculture is rain-based, instead of based on irrigation. The soil is also highly depleted, reducing productivity dramatically. On top of this, Africa also bears the burden of a triad of endemic diseases – HIV/AIDS, malaria, and tuberculosis. While ICT will not directly help with these, it can play a powerful supportive role in improving the efficiency and transparency of all development efforts.”

Ultimately, Danofsky believes the UN’s organizational resources, coupled with the work that researchers such as Tongia are doing, could help last-mile global-access efforts better coordinate.

“There are a lot of these small, quite successful efforts out there, but there’s no scale in them. And that is one of our jobs – to raise awareness of these initiatives and of the possibilities and opportunities, to sort of come together and see how they can work together to create a greater impact.”

Is Scale Really Needed?

However, two veterans of the digital-divide community say trying to coordinate ground-level efforts with those undertaken by huge organizations could be extremely difficult, both logistically and philosophically.

In 2000, Charles Moore, a former Verizon employee, established Opportunity Access in Cahuita, Costa Rica, (www.oa.icomm.ca) with seven computers, a projector, and a modest bankroll. Today, the organization has 213 computers in 20 labs serving 3,000 public school students; it also provides computer and technical support to social-service agencies. One of the project’s hallmarks is providing career-track computer and networking skills for adults, and Moore says he and local officials work well together without assistance from a larger coordinating body.

“It is difficult for us to put the required time into gaining support from larger multinational organizations,” he says. “Although we have applied, the courtship is too time-consuming. Without a full-time development staff and the funds and overhead associated with one, we cannot compete with the larger nonprofit organizations when it comes to building relationships with the UN or others.

“Costa Rica has one telecommunications provider that is affiliated with the government, and the service is priced fairly and adequately. We have been very successful in dealing directly with the local school directors and providing quality service – we do have an agreement with the Ministry of Education on a national level.”

Moore says connectivity is still an issue. The project’s central training facility is connected to the Internet via 56-Kbit-per-second dial-up and internally networked via 100-Mbit-per-second switched Ethernet.

“We do the best we can with dial-up, but broadband will greatly enhance our programs,” he says. “DSL has been in the plans for the commu-

News in Brief

Intel and **Nokia** have joined forces to accelerate the development and deployment of a standard for mobile wide-area wireless networking technology. **WiMax**, part of the IEEE’s 802.16 standard, promises to deliver wireless broadband access over a significantly greater range than WiFi, the 802.11 wireless LAN technology. Nokia and Intel will focus their efforts on **IEEE 802.16e**, a mobile WiMax version that both companies expect will be finalized next year.

More information on the announcement is available at http://press.nokia.com/PR/200506/998014_5.html; further WiMax information is available through www.wimaxforum.org.

At its annual **CEO Forum** in Washington, DC, the **Business Software Alliance** met with US cabinet members and congressional leaders to make recommendations on legislative priorities, including trade measures, patent system reform, and efforts to fight cybercrime and software piracy. The BSA also issued letters to members of Congress calling for the immediate passage of the **Central American Free Trade Act**. BSA spells out its overall trade priorities in a new paper, “**Trade in the Digital Age**,” which was the final installment of its CEO Initiative for the Future.

Information on the CEO Forum is available at www.bsa.org/usa/press/newsreleases/2005-CEO-Forum.cfm; papers outlining BSA priorities for trade, cybersecurity, and intellectual property are available at www.bsa.org/ceoinitiative.

The **Internet Engineering Task Force** has appointed **Ray Pelletier** as its first **IETF administrative director**. As IAD, Pelletier will oversee, review, and establish agreements on various IETF activities, including the global budget, meeting planning, secretariat, and document publication. Previously, Pelletier was director of information systems for the US Navy’s

continued on p. 10

News in Brief

continued from p. 9

Judge Advocate General's Corps, where he managed a US\$10 million automation program.

More information is available at www.isoc.org/isoc/media/releases/050531pr.shtml.

After years of steady increase, organizational **spending on IT security** is leveling off, according to the head of the **Gartner** security research team. In opening remarks at the company's annual IT Security Summit in June, Victor Wheatman said that new challenges nonetheless continue to arise because new technology often "obliterates" the security architecture of its predecessors, creating new IT security threats such as phishing, spyware, voice-over-IP vulnerabilities, and attacks on wireless and mobile devices.

For more information, see www.gartner.com/press_releases/asset_128533_11.html.

The **Working Group on Internet Governance** has released a report summarizing **its members' responses to the WGIG's questionnaire** on Internet governance. The report, public responses to the questionnaire, and the WGIG's mid-June open consultation will help define the group's official position, which will be presented in November at the second phase of the **World Summit on the Information Society** in Tunis.

The WGIG's Web site is at www.wgig.org; the questionnaire summary is available at www.wgig.org/docs/IG-questionnaire-response.pdf.

The **International Telecommunication Union** has finalized work on the ITU-T recommendation for **very-high-bit-rate digital subscriber line 2 (VDSL2)**, which will let telecoms offer services such as high-definition TV, high-speed Internet access, and VoIP over standard copper telephone cable.

continued on p. 11

nity since 2002 and is available in major cities of Costa Rica. The local central office has had a fiber cable installed for over three years, but there is no equipment to light it up."

In 2000, former Apple executive and software entrepreneur Donna Auguste began a digital-divide project in east Africa through her Leave a Little Room Foundation (www.leavealittleroom.org). Auguste says that trying to scale efforts might not properly consider widely divergent local needs — in fact, local needs might not include broadband connectivity or even dial-up.

For example, she says, one of the clinics in northern Tanzania with which the foundation works finds that "the email access we provide is useful, but what is even more powerful for them is a shortwave radio between their location and one that's about 30 miles away, which is the closest location with a vehicle. When they have an urgent medical situation, they don't have any transportation, so that shortwave radio is a lifeline for them. They need it even more than a laptop and Internet access."

Auguste says the most important thing to consider in establishing or expanding a digital-divide project is that it must be locally sustainable. The original satellite foundation used to provide Internet access to clinics and schools in Tanzania has burned out, and its owner is no longer in business. So, although those locations don't currently have Internet access, Auguste says she has successfully negotiated with CelTel, a Tanzanian mobile communications operator, to build a cell tower in the region the satellite served.

"They won't be able to put a whole bunch up because there's just not enough voice business to support it, but we're going to give them data business through the single tower and extend the reach of that tower with repeaters, LANs, WiMax, and Wi-Fi. Ultimately, we will bring more data

transport onto that one tower. The company has been very supportive — they had a field engineer spend four days in the region last year, measuring and calculating repeater locales."

Mother Lode or Impossible Dream?

Perhaps the most groundbreaking digital-divide project on tap is the MIT Media Lab's effort to manufacture and distribute hundreds of millions of US\$100 laptop computers in the next several years (<http://laptop.media.mit.edu>). Media Lab founder Nicholas Negroponte has been traveling the globe promoting the idea, spawning numerous discussions about not only its feasibility, but the digital-divide problem in general.

"Most people are very positive because it has brought attention to the issue," the UN's Danofsky says, "but there is also skepticism about the realism. However one may feel, we do need innovative ideas that bring attention to this issue, and these ideas can be discussed and maybe improved upon, so we see it as a very positive thing."

Negroponte has already invested in one digital-divide project at a school named for him and his wife, Elaine, in Preah Vihear Province, Cambodia.

"The project in Cambodia is almost four years old and is by no means rigorous and exemplary in today's terms," he says. "What the project did show, to me, at least, is something so obvious in retrospect — the importance and need for laptops."

Negroponte specifies three needs that he wishes to address with the \$100 laptop project: "One, one laptop per child, which is something I could not afford personally and something we have learned from the experiments of Seymour Papert in Maine. Two, a \$100 laptop, versus machines bought on eBay or discounted by Panasonic. Our average price in Cambodia was about \$800 per laptop. That is far too high. Furthermore,

these laptops use too much power. Three, the connectivity architecture in the future will be very heterogeneous, by no means limited to satellite links. I estimate that we will use any means to connect to the backbone. More importantly, it will pop out of the box as an element in a mesh network, so that kids can share devices and make their own network. Furthermore, one or two access points can serve a whole village.”

Negroponte says the laptops, which will feature the Linux operating system, 500-MHz processors, and one Gbyte of memory, will also be preconfigured with either 802.11b or 802.11g capabilities and numerous USB ports. They’ll also be battery powered, and users will be able to charge them with “human power – cranking, peddling, treadling, and the like,” Negroponte says. “Power is critical, in part because

we are spending almost US\$10 per day for fuel in our village. That is okay for an unsustainable model like the school in Preah Vihear Province. As for the battery, we are targeting three hours. To be totally honest, battery cost is one of our biggest challenges.”

DDN director Carvin says the buzz surrounding the Media Lab proposal is a healthy thing for the digital-divide issue, whether the project takes off under its original concept or not.

“My attitude is, the more the merrier, because I’ll be very surprised if we ever come up with a single device that’s best for everything. The more players that are out there, and the more we recognize [that] there is room for everybody at the table, I think the more likely we’ll make more progress. ☐

Greg Goth is a freelance technology writer based in Connecticut.

News in Brief

continued from p. 10

VDSL2 is interoperable with existing DSL equipment and can deliver up to 100 Mbytes per second up and downstream — roughly 10 times faster than ADSL. ITU said that many operators are likely to use this technology on copper cables within office and residential buildings that use fiber-optic lines to connect to the public-switched telephone network.

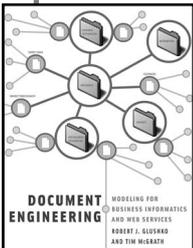
More information is available at www.itu.int/newsroom/press_releases/2005/06.html.

COME SEE OUR NEW LOOK!

Please visit *IEEE Internet Computing's* newly redesigned Web site at

www.computer.org/internet/

New books from The MIT Press



Document Engineering Analyzing and Designing Documents for Business Informatics and Web Services

Robert J. Glushko and Tim McGrath

“Provides a thorough, common-sense approach to designing the documents used in service-oriented architectures. Well written and packed with examples, it is timely reading for architects, developers, and managers.” — Ronald Bourret, author of *XML and Databases*

400 pp., \$34

now in paperback

Spinning the Semantic Web Bringing the World Wide Web to Its Full Potential

edited by Dieter Fensel, James Hendler,
Henry Lieberman, and Wolfgang Wahlster
foreword by Tim Berners-Lee

“If you’re a technical communicator who works with the World Wide Web (WWW) and would like a glimpse into the Web’s future, this collection of articles by Web gurus is for you.” — *Technical Communication*

392 pp., 98 illus. \$23 paper



The Semiotic Engineering of Human-Computer Interaction

Clarisse Sieckenius de Souza

“Her clear focus on software as a medium for communication can have a profound effect on the way we understand and design the software and systems that permeate our lives.”

— Terry Winograd, Stanford University

Acting with Technology series • 312 pp., 61 illus. \$40

Perspectives on Free and Open Source Software

edited by Joseph Feller, Brian Fitzgerald,
Scott A. Hissam, and Karim R. Lakhani
foreword by Michael Cusumano
epilogue by Clay Shirky

“The most comprehensive collection of writings on open source software that I have seen.”

— Martin Fink, Vice President, Linux, Hewlett-Packard

496 pp., 40 illus. \$40

To order call 800-405-1619.

<http://mitpress.mit.edu>