

PCs for the poor: Which design will win?

By [Michael Kanellos](#)

Staff Writer, CNET News.com

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It's easy to list the benefits of bringing inexpensive computers to the billions of people who live in rural villages and urban centers in the developing world.

[Village computers](#) allow kids to take classes in areas where schools have closed and let adults learn pricing strategies for their agricultural products. A van rigged with a satellite connection and printers produces inexpensive books for kids in [Uganda](#).

In some countries, like Egypt, a growing technology base holds the promise of a rising middle class, and eventual [political stability](#).

Only about 1 billion, or 16 percent of the 6.5 billion people living today, use the Internet, according to a running tally at [Advanced Micro Devices](#).

Designing machines that are resilient, powerful and cheap enough to reach those not yet online, though, has proven a lot tougher than expected. [India's Simputer](#), an inexpensive handheld, flopped. Brazil has [worked for years on a Linux PC for the poor](#), to no avail.



"Initiatives of this sort need serious consideration from everyone. Developing nations need to start teaching about technology early in schools," said Luis Anavitarte, an analyst at Gartner. "But the reality kind of changes when we look at the costs and the functionality of these devices."

Recently, some new ideas have come to the forefront. Here's a quick rundown of their pros and cons.

The Negroponte machine

What it is: This \$100 machine from Nicholas Negroponte and the MIT Media Center runs Linux. The machines can connect to the Internet through each other by way of mesh networking. The system ideally will allow people to connect to the Web even though the wireless, fiber and/or phone system might be spread somewhat thin. Electricity delivery will be innovative: There's a hand crank on the side, and the units can conceivably be powered by bikes or solar power.

Pros: Several partners have lined up behind the computer. Red Hat will produce software, Taiwan's [Quanta](#) will make the machines; and AMD will supply the processors. When they emerge at the end of the year, the first 5 million to 15 million units will get shipped to China, Brazil, India, Argentina, Egypt, Nigeria and Thailand.

Cons: To hit the low price, the machine's makers have to leave some things out. The unit comes with only a 500MHz processor and 500MB of local storage (in the form of flash memory--the laptops won't include drives). The units don't sport mainstream applications. Even with these cost-cutting measures, it remains to be seen whether the \$100 price point can be achieved in volume manufacturing. "\$100 is an extremely optimistic figure," said Gartner's Anavitarte. More likely, the device will cost more, he added. That means governments will have to subsidize it. Unfortunately, the presidents who have welcomed the program have not outlined their fiscal plans.

In addition, computers without hard drives have historically flopped because of slow performance. Small screens have been a turnoff as well. And there's at least nominal PC access, through Internet cafes, in some of these countries. It's an open question, too, how well mesh networking will work.

The thin client

What it is: [Thin clients](#) are inexpensive, lightweight terminals that rely on servers to store data and crunch numbers. They're used by banks, airlines and insurance companies in the west, and entrepreneurs such as [India's Rajesh Jain](#) and academics like [Deepak Phatak](#) and Ashok Jhunjhunwala are promoting them for rural use.

Pros: Because they don't need fast processors or a hard drive, thin clients can be produced for about \$100, including a used monitor. Some designs use an existing TV to cut costs further. The fact that the software is centralized on a server also makes it easier to handle upgrades and control viruses. Interestingly, local leaders, rather than multinationals, are behind this one.

Cons: Thin clients rely on servers, so if the server goes out, the terminals go down. Users have also said that thin clients can run slowly if too many people log on to the server, but proponents say the technology has steadily improved.

The SUV PC

What it is: These PCs are made to run in harsh environments. They run on car batteries or solar power and are hermetically sealed to keep out dust. [Intel](#) and [Via Technologies](#) have come out with prototypes.

Pros: The machines tackle the huge issues of dust and electricity, and replacement parts are easy to find. The fact that these are standard PCs also means that villagers gain real-world job skills through their use. In a program in Kerala, India, schoolkids are learning how to

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