Using Open Source in Community-Based Projects

One state in Brazil has created a project that links public schools with each other, the state's education department and the general community. Open-source software was key in making this project viable at little cost.

Core Topic
Government: E-Government Applications and Infrastructure Technologies and Standards

Key Issue
What new applications and devices support e-government?

Brazil's southernmost state, Rio Grande do Sul, has created a network to extend lessons to far-flung schools, enabling them to communicate and collaborate with each other, and to improve overall administration. The *Rede Escolar Livre,* or Free Education Network, provides a model for sharing knowledge — and the experiences that come from linking schools and students to the Internet — using limited resources (in terms of PCs and Internet connections).

Problem: The political impetus for the project came from a teachers strike in Rio Grande do Sul, which caused the state's governor to promise better working conditions and an improved educational environment. Rio Grande do Sul wanted to enhance the educational experience for public-school students throughout the state by allowing the central administration to establish better processes and monitor schools' progress by enabling the schools to share ideas and collaborate on projects, including sharing lesson plans between educators. The project required computers, networks, software, Internet access and more. Moreover, the state has an area of more than 100,000 square miles, and the population numbers more than 10 million. The amount and kind of IT equipment in use varies widely among the state's 3,300 public schools. The first version of this project estimated that at least 20,000 PCs would be needed.

Unfortunately, fiscal constraints limited the scope of the project — the budget was to come mostly from the national Fund for Universalization of Telecommunications Services, which was placed on hold (see "Brazil's Election Outcome Will Negatively Impact Telecom"). The state government needed to consider a lower-cost alternative. By replacing software licenses with open-source operating systems and applications, planners could save 49 million reals without sacrificing functionality.

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Objective: The government of Rio Grande do Sul wanted to create an Internet-based system to increase access to educational information and resources, as well as to better integrate the diverse teaching establishments that make up the state's public school network. The planners expected to install 20,000 computers in 2,100 schools, and to meet the requirements of three different audiences:

- Teachers and students, who can register online and collaborate on projects

- Members of the general community with Internet access, who can view and collaborate on these projects

- The Secretary of Education, which can obtain statistical data about projects developed in schools

Approach: The state government and its IS organization (PROCERGS) launched the Free School Network in 1Q01 after forming partnerships with public and private enterprises, such as CRT Brasil Telecom, Conectiva and Projetos Samurai. The program was designed to benefit schools with more than 100 students that are far from Porto Allegre (200 kilometers, on average) and have no installed computer equipment. The planners were to create, distribute, maintain and update a standard configuration for the environment.

The overall package that was provided to schools consisted of computer equipment, local networks, free educational and administrative software and applications, Internet access, teacher training, and distance education (or even e-learning). The educational and administrative applications included:

- Education Portal, which was launched at the World Education Forum in 2001 and enables the Secretary of Education to communicate with schools, students, teachers, public officials and the community in general.

- Easy School Site, which allows schools to build, publish and update their Web sites simply and rapidly.

- Free Builder, which allows students to research and develop projects, and publish them on the Internet. This application also helps educators to evaluate these experiences.

The project created computer labs with 10 PCs connected via a local network and having Internet access. The infrastructure uses open-source solutions, such as operating systems and servers (for example, Web servers, e-mail and firewalls). Each school is expected to administer its own environment. Initially, each maintained e-mail accounts, updated Web content and files, and backed up data.

These labs were expected to form a virtual school community by connecting to the other state schools, to regional educational coordination centers and to the Secretary of Education. The Free School Network also was integrated with Rio Grande do Sul's own state-run network, with 35 points of presence in the cities with the largest concentration of public organizations. Thus, the Free School Network and the state agencies in the same city can save money by sharing a communications channel and updates of their software infrastructure, such as intranets and e-mail.

Results: As of July 2002, the Free School Network had reached 950 schools — although infrastructure limitations have enabled only 42 schools to be fully served The Network runs the three applications listed above, as well as control systems.

The general community responded positively to the Free School Network via the "Participative Budget," a local political mechanism for defining the priorities of the Rio Grande do Sul state administration. Although the project's results are difficult to quantify, participants expect the network likely will provide economic and social benefits by educating people, creating jobs and generating revenue, which can be reinvested in the project or used for new social programs.

Despite the lack of an appropriate open-source paradigm and the intensive use of the Network's applications, the project has thus far proven the viability and reliability of using free software at low cost.

The Free School Network offers a model for the use of open-source software in public- and private-sector enterprises nationwide — and even worldwide. Other projects could use the model to save time and money in planning and recruitment. Organizations considering open-source software for similar projects must perform a careful analysis of local conditions to achieve similar results when implementing this type of solution on a large scale.

During the initial rollout, the Free School Network's managers needed to resolve a first round of problems, such as extreme difficulty in updating computers, the lack of standardization and getting diverse environments to provide comparable responses. However, based on the resource limitations already mentioned, the decentralized process for installing hardware and networks did not improve the original disparity between schools' IT environments. For example, some schools had more than 5,000 students and two labs, but no Internet connection, while others had an Internet connection, but no lab.

Critical Success Factors/Lessons Learned: Rio Grande do Sul's experience with the Free School Network provides the following lessons:

- **Organization:** The leaders communicated a strong economic and social vision to project teams, who were pushed to the limit, yet responded positively. This vision and an understanding of the needs the project was to address contributed to its success. Project managers fostered collaboration that, in turn, facilitated better decision making inside the project and with partners. In addition, the president of the project took part from the beginning, providing stability. However, the project's size and complexity, and the big investment needed, required more direct leadership to optimize investments and meet deadlines.

- **Backing:** The project teams, partners, general community and the Secretary of Education cooperated in providing investments and aligning to the project's goals. Private companies established partnerships to donate equipment and services.

- **System:** The planners used the Debian operating system (www.debian.org), based on its social contract and global free software statements. Open-source software proved viable. Some of the Free School Network's partners and investors (such as a government-owned bank and IT product vendors) use some of the functionality created during the project. A more-specific configuration for the use of open-source systems could improve network performance and results, while more frequent collaboration among participants could optimize resources and deliver additional benefits.

Bottom Line: The Free School Network in Rio Grande do Sul highlights the benefits as well as the challenges of using open-source software for this type of community-based project. The keys to success include collaboration involving all participants (students, teachers and the general community), partnerships with clear goals and respect for local factors (social, economical, cultural and political).