Case study: Kyrgyzstan's experience in promoting Open Source for national ICT development

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ABSTRACT

The paper discusses the importance of Open Source (OS hereinafter) technology for national Information Communication Technology (ICT hereinafter) development and E-Government for developing countries as a general strategy for overcoming the digital divide.

The paper highlights the opportunities presented to the developing countries by the growing world-wide movement for use of OS systems, namely, the ability to promote the transfer of technological know-how and the growth of local IT professionals, the possibility of providing IT solutions within the limited financial means of a developing country, and the ability to strengthen the legal use of software.

The paper's goal is to describe the specific strategy adopted by Kyrgyzstan to orientate its ICT policy towards the wide use of OS technologies in Kyrgyzstan. In addition the paper considers the ways and approaches to satisfy informational needs of the country within legal and financial means by use of Open Source technology.

Keywords: Open Source technology, ICT development, E-Government**,** ICT policy, National ICTD strategy, Information Systems

1. BACKGROUND

During the December 2003 UN World Summit in Geneva on the Informational Society the Kyrgyz Republic delegation presented suggestions on intensifying the use of Open Source systems by the developing countries as a general strategy for overcoming the digital divide.
Following the conclusion of the UN Summit, the Government of the Kyrgyz Republic planned inclusion of the OS initiatives into the implementation activities of the National ICTD Strategy.

The authors of this paper have participated in discussions on the strategy and defined the implementation steps. The paper will describe these specific steps and analyze the current results and future potential of the strategy.

2. OPEN SOURCE - STATE OF TECHNOLOGY

Main characteristics of OS technologies are:

a. *Openness*. The technology is distributed together with the source code that can be freely examined and modified to extend system's functionality as needed.

b. *High Quality*. Open Source systems are typically of very high quality because of professional peers of the authors easily discovers the shortcomings in the system through examination.

c. *High Level of Security*. For the same reason as above, any security flaws are quickly identified, the knowledge of them is disseminated and corrective actions defined.

d. *Human Networking*. Work on OS systems typically results in high level of interactions between the IT professionals anywhere in the world.

e. *Low cost*. The lifetime cost of a typical OS system is considerably lower than the corresponding proprietary system.

The economic model of OS systems is based on the assumption that wide distribution of the technology creates conditions for widening the user base that can support commercial informational services. Thus, companies or individuals create OS systems and then sell services related to them, such as support, commercial products that extend base of OS systems, creation of informational content, general e-commerce services, etc.

The validity of the basic economic assumption has been proven over the last decade of ICT development.

The most general example is the development of Internet, which is largely based on OS systems. The exponential growth in the worldwide use of Internet was enabled first of all by free OS software. As the number of Internet users grew, it became possible to provide services to them. The companies that invested in OS technology were then well positioned to take advantage of the resulting economic activity. Another interesting example is the IBM's decision almost thirty years ago to open up the architecture of IBM PC. The use on PCs skyrocketed and it is now most widely used computer. Though many companies supply PCs, IBM obviously benefited from the growth of PCs.

On the other hand, Apple did not open its architecture. It does not have to compete with the other manufacturers but the overall volume of Apple use is low.

As a generalization, it can be stated that "*The use of OS technologies stimulates economic activity in general, and in ICT sector in particular*". In the last few years, the idea of the OS as an attractive business model has gained wide acceptance in the industry. In addition to companies such as SUN, Netscape, IBM that have long included OS in their strategy, now even extremely proprietary firms, such as Oracle, are opening up their systems to some degree.

For developing countries, OS technologies present especially attractive opportunities:

- Saving resources by developing more cost-effective OS solutions for information systems in the government, industry and public sectors.

- Directing internal investment to local ICT industry by using local companies and individual IT professionals to build and maintain OS-based systems.

- Developing local IT talent by providing opportunities to participate in OS projects and to join the world professional community of OS developers.

- Attracting foreign investment from international donor organizations and ICT industry in the developed countries.

- Reducing piracy of intellectual property by substituting free or low cost OS systems for expensive proprietary products.

Of particular importance to the developing countries is the interest that is shown to OS technologies by the different international donor organizations. Many organizations have recently established OS initiatives for developing countries. For example, UNDP Asia Pacific has International Open Source Network program that focuses on Free/Open Source Software (FOSS) (see http://www.iosn.net/).

3. OPEN SOURCE AND KYRGYZSTAN'S NATIONAL ICTD STRATEGY

Kyrgyzstan has adopted National strategy "ICT for Development", which envisions ICT as the engine for general economic development of the country. The major components of the strategy are e-commerce, e-government, e-education and public sector. In all of these areas, OS technologies provide a mechanism for achieving the strategic goals.

ICT development requires active growth of the local community of the IT professionals. As noted above, OS projects provide the local IT professionals to accumulate and share experience. Especially important in that regard is the educational potential of the OS projects, for students, young and seasoned professionals to work together. Kyrgyzstan has many universities but their IT programs often lack focus and are uncoordinated. OS projects can be used to involve students from different universities in practical work that will gain them professional recognition and increase their value on the labor market.

As local capabilities to develop and support OS system grow, the government and industry will be able to use local firms to build cost-effective OS solutions. In this iterative process, the more OS systems are used in the country, the greater is the growth of the local ICT industry and the greater are possible savings for government and industry in building more OS systems. Starting from few projects, the process should result in consistent economic growth.

As in many developing countries, most information systems in Kyrgyzstan are based on pirated software. With the exception of the internationally audited projects, almost all systems include illegal software. This situation is causing significant problems, particularly in light of Kyrgyzstan's WTO obligations to protect intellectual property. Punitive measures are insufficient to solve the problem of software piracy. What is needed is a way to satisfy informational needs of the country within legal and financial means. OS technology due to its low cost provides the opportunity to replace pirated systems with OS systems. That is why, the expensive proprietary software should be used when it is truly needed (i.e., it provides unique functionality required for a project) and when there are means to pay for such proprietary software. In all other cases, free or low cost OS solution should be found or developed. Many such solutions exist today yet the organizations in Kyrgyzstan lack the knowledge to implement them. Building up the capability of the local industry to provide such solutions will put Kyrgyzstan on the road to solving the piracy problem.

4. PRACTICAL STEPS TO PROMOTE USE OF OPEN SOURCE IN KYRGYZSTAN

In order to effectively execute a strategy for maximizing the use of and the benefits of OS technology in Kyrgyzstan, one of the authors, Alexey Semyonov, acting as UNDP consultant for Kyrgyzstan, proposed creation of an independent structure devoted to this purpose. Specifically, the proposal called for the creation of a new NGO, Foundation "Open Technologies" (FOT). In accordance with this proposal, the consulting activities during the mission were structured to achieve the following:

- To establish the feasibility of the proposed approach through meetings with all stakeholders.

- To verify that there is sufficient local interest and support for the proposal to succeed.

- To perform the necessary initial steps for the creation of the organization.

- To define the initial projects for FOT.

- To start the work of FOT.

To finalize the plans for new organizations and to gauge the potential support it may receive, the authors of the paper conducted consultation meetings with all major stakeholders of the ICT strategy, in industry, education, government and public sectors. Altogether, 10 major local companies, 5 leading universities, 4 major non-governmental organizations and numerous Government agencies were involved in the discussions.

Overall, the consultation meetings achieved the following:

- Proved the soundness of the basic premises for FOT creation

- Confirmed high level of local interest, including willingness to participate in and finance FOT projects

- Demonstrated that initial pledges of financial support are sufficient to create FOT and start its work. $23, 700 were pledged in the initial consultations with the local ICT companies. UNDP and the Soros Foundation pledged additional support following the creation of FOT. Other potential donors indicated that they could provide support once FOT begins active work.

Results of consultations with the industry and public organizations were presented to the ICT Council of the Government of the Kyrgyz Republic. The Council expressed

strong support of the initiative and the intention of the Government to actively help FOT projects. The Council stressed the desirability of widening the initiative to include companies and universities outside the capital area, especially, in the southern region of the country.

The consultation meetings clarified the vision of FOT. Based on the consensus developed during those meetings and in the follow-up contacts, the authors formulated the following main directions of FOT activities and the mechanisms that FOT can use to perform them in order to achieve its strategic goal of stimulating the use of OS technologies in Kyrgyzstan:

1) Coordination of OS activities between all interested parties in commercial, government, educational and public sectors

- Facilitation of communication between the organizations in the different sectors through meetings, forums, publications, discussions, etc.

- Formulation on the basis of consensus suggestions for educational policies for the universities and the Ministry of Education that would support the advancement of practical knowledge of OS technologies and raise the professional level of young IT specialists

- Coordination with other educational organizations such as National IT Center to provide advanced training and education for OS technologies

- Formulation of suggestions for the government ICT policies aligned with the increased use of OS technologies and the development of local ICT capabilities.

2) Creation of knowledge resources to facilitate the use of OS technologies

- Creation of a web site for FOT information

- Collecting links to existing knowledge resources related to OS technologies

- Translating and distributing some of the knowledge resources, such FOSS primers on the use of OS technologies

- Creation of a local directory of OS professionals and companies to facilitate provision of OS related services.

3) Promoting legal use of software

- Conducting, together with the State Committee for the Protection of Intellectual Property, educational campaigns to promote legal use of commercial software and how it can be substituted with free or low cost OS solutions if the financial resources are not sufficient for the use of commercial products.

4) Developing specific OS projects (schematic representation of these activities is shown in the figure below)

- Identifying in consultations with all stakeholders priority projects that can stimulate local ICT development, solve existing problems for information systems, and provide educational experience to students and young IT professionals

- Coordinating the execution of development projects. i.e., providing overall technical leadership, defining architecture and conceptual design, defining components and distributing implementation of components between different local players, such as universities and local companies.

- Integrating, documenting and packaging completed projects

- Distributing completed projects as free and open source software and promoting their use

- Providing clear attribution, recognition and certification of the intellectual achievement of the developers of the project, and coordinating such certification program with the State Committee for protection of intellectual property

- Establishing a referral program for possible additional commercial services related to the free products, i.e., facilitating contacts between possible clients interested in a particular and the companies or individual professionals who worked on those products.

5) Establishing and maintaining professional links to the outside world

- Establishing contacts with world organizations devoted to OS technologies, such as Open Software Foundation, Apache Foundation and others

- Promoting locally built products to the international IT community

- Facilitating contacts between the world IT professional organizations and the local companies and individuals

6) Attracting investment

- Maintaining contact with international donor organizations for support of local projects

- Establishing contacts with foreign ICT companies for possible support of FOT projects, i.e., creation of free and open source software that presents interest to particular companies

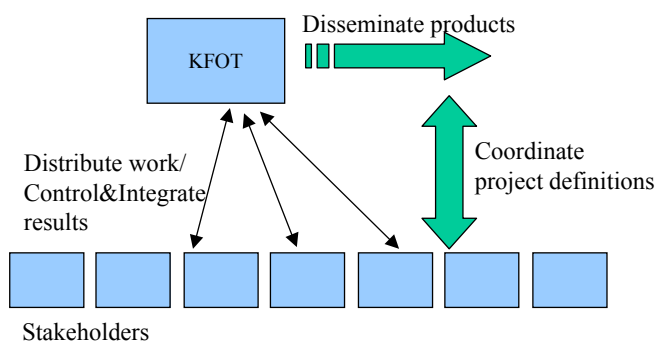- Facilitating contacts between foreign ICT companies and the local ones for possible commercial work.

Figure: Scheme of FOT's activities during development projects

5. FIRST RESULTS AND ON-GOING ACTIVITIES.

The first month after the summarizing of the vision and plans was taken up with the activities necessary to create FOT. Significant legal work was performed to create a non-governmental organization representing commercial, non-commercial, and educational entities. As of this writing, FOT has been established as a legal entity; it has received initial funding and started to work.

One of the authors of this paper, Mr. Semyonov, has defined a list of initial projects and activities. These were discussed and approved by the Governors Board.

1) *Creation of FOT website.* The first draft of the website (a simple announcement of intention to form FOT and a list of link that might be of interest to those learning about OS technologies) was created temporarily on Prime Task's server www.prime-task.kg. Now the domain name for FOT is being selected and registered.

2) *Kyrgyz Language Standardization.* The work to be done to ensure that the Kyrgyz language is supported by an international standard is more organizational than technical.

3) *Development wizard for multi-language Web applications.* This wizard utility will create the necessary framework for any application that is deployed in Web-based J2EE architecture with MySQL or other OS database. It will automatically create the necessary database tables and Java classes to support a dynamic switch of the user interface between different languages based on user preferences.

4) *Chess Web server.* Creation of a highly functional free chess server will provide good visibility for FOT and those students who can be attracted to participate in the development. This development project has very diverse technical content and is extremely suitable as an educational one for the students.

5) *Other projects* that can be undertaken at a somewhat later time are:

- Distance learning tool (based on the systems of Kyrgyz National State University)

- Base portal for government organizations

- Base system for local government (communal property management)

- NGO discussion / conference electronic space (based on the software from the Andrei Sakharov Foundation)

- Coordination with Ministry of Education on the curriculum for ICT specialists

6) The above list of initial projects was supplemented with an initiative requested by the Soros Foundation, which is interested in defining, assembling, and distributing a package of office support software for non-governmental organizations. This project is important in two ways. First, it would save funds and provide technical solution to organizations that are often unable to solve their office problems effectively. Second, non-governmental organizations are sometimes subject to political pressure if their IT setup contains any unlicensed components. Use of open source package will resolve the problem.

The package should be self-contained, easy to install, and configurable through a GUI administrative tool, i.e., in addition to the productivity software, it should include the operating system distribution and all the supporting software, such as networking utilities.

All projects are currently in different stages of implementation work. For example, standardization of the Kyrgyz language is proceeding and a Java editor has been created to enable the use of Kyrgyz on-line. Web server project is started. The Andrei Sakharov Foundation is providing small stipends for students participating in the project.

6. CONCLUSION

From the above it is seen that the OS initiative has the potential to focus implementation of the National ICTD strategy and enable rapid ICT development in Kyrgyzstan. This model is also probably applicable to other developing countries that view ICT as a strategic tool for economic development.