The Information Support System of Corporate Software Resources Development

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***Abstract*—The complex of the infrastructure, information and software solutions that focus on the creation of the information support system of corporate software resources development is described in the article. There are the SB RAS Foundation of algorithms and programs information system, subsystem of the registration the SB RAS institutes software developments in the Foundation, the free software repository, the free software demonstration platform, etc.**

Keywords-open source software, free software, proprietary software, licensing, scientific software, software environment

I. INTRODUCTION

In the Russian Federation State Program "Information Society (2011-2020)" for the period up to 2015 the one of the priorities is the creation of the national software platform (NSP), which includes the coordinated set of the solutions based on open standards and unified technologies in the field of operating systems, tools and application software. The creation and development of the NSP, in our opinion, should be based on the principles of multipolarity and balance:

- **Multipolarity** should assume the existence in the NSP of several centers in the field of use of different operating systems (OS) and related system software tools.
- **Balance** should provide consistent scheme using a combination of software with different license statuses.

On the other hand, the NPP platform should be well coordinated with the interests and needs of corporate software environments and provide an effective solution of problems of the core corporation business on the basis of the corporate program resources foundations. The development of the corporate software resources as part of the NSP involves implementation of the infrastructure, methodological and technological solutions complex, which are discussed in this article by the example of **the Foundation of Algorithms and Programs of the Siberian Branch of the Russian Academy of Sciences (SB RAS FAP)** [1]. The main activities of the Foundation are:

- The software and databases developed in the SB RAS institutes registration process, cataloging and promotion organization.
- The corporate free and open source software (FOSS) repository and free OS distributions creation for the SB RAS employees.
- The most significant system and application software technical and consulting support centers creation. Free OS, platforms, application software training implementation.
- Creating the coordination and cooperation system for the scientific software production to ensure the competitiveness of software developed in the SB RAS. The Siberian Branch institutes develop system and application software prototypes, intended for research or using the results of ongoing basic research. It is planned to organize a technological platform to bring these prototypes to an industrial level.

Organizational, methodical and expert activities carried out by the SB RAS Scientific Coordination Council on mathematical modeling, algorithmic and software resources. The SB RAS FAP is based at the Institute of Computational Mathematics and Mathematical Geophysics. The current Foundation activity support is provided by the special group of the base institute employees.

II. THE SB RAS FOUNDATION OF ALGORITHMS AND PROGRAMS INFORMATION SYSTEM

The information system [2] is developed to the SB RAS FAP activities support. Its site (http://fap.sbras.ru) contains the following information sections and services:

- **News.** The SB RAS FAP, free and proprietary software, high-load systems news and information on conferences, competitions and grants.
- **Documents.** The Scientific Coordination Council, the Foundation and legal documents.
- **The software and databases developed by the SB RAS institutes registration.** The SB RAS institutes and other organizations create a large number of scientific software and databases, many of which unfortunately does not go beyond the individual institute or laboratory. It is the centralized information collection about existing software and databases on the SB RAS FAP basis. Also the Foundation assists in its

improvement and progress to achieve as much as possible users' audience wide coverage.

- **The FOSS repository.** The Ubuntu OS corporate distribution for the SB RAS, the Ubuntu and Fedora packages repository mirrors, the FOSS under Linux based operating systems catalogue. This service should solve the SB RAS institutes transfer onto free operating systems problem, ensure users' OS and software timely updating and provide users with information about scientific software for Linux based operating systems.
- **The FOSS demonstration platform.** Given subsystem is designed to provide support and promotion for software and databases developed by the SB RAS institutes and the third-party FOSS.
- **Users support area.** The aim of this service is users support during their transfer onto free OS and software, as well as their software and database registration in the SB RAS FAP.
- **The technological platform for software development in the SB RAS** (currently under development).

III. Registration the SB RAS institutes software developments in the Foundation

The software and databases developed by the SB RAS institutes registration subsystem is designed to provide:

- The software, algorithms and information resources developed by the SB RAS organizations registration.
- The software and databases and / or its informational materials funding in the SB RAS FAP, providing access to its.
- Organizational and informational support to the registered in the Foundation software and databases licenses and, in fact, the products themselves distribution.

The SB RAS FAP accepts software, algorithms and databases developed by the staff of the SB RAS (or others) and having scientific, technical, organizational or educational purpose. In the initial period of the Foundation operation software and databases are accepted only, since there is no legal basis for the developed algorithms rights recognition currently. Drafting all the materials and submit them to the SB RAS FAP is carried out by the software and databases authors. Application for registration is carried out on the Foundation's website (http://fap.sbras.ru). The registered user fills out the application form, which specifies all the necessary data: the development thematic focus, information about the applicant, information about the developers, etc.

The SB RAS organizations developments are included in the Foundation in the presence of the positive decision of the SB RAS Scientific and Coordination Council on mathematical modeling, algorithmic and software resources. The software and databases examination for inclusion in the Foundation is made by corresponding expert group of the Council. The systematic electronic catalog on the SB RAS FAP site (http://fap.sbras.ru) is formed from the software and databases information cards and it is available to all users.

IV. The free software repository

One of the SB RAS FAP activities is FOSS promotion. As part of this task are created and made accessible to users following the Foundation software developments:

- **The Ubuntu OS corporate distribution for the SB RAS.** The DVD with the distribution image can be freely downloaded from the Foundation website (http://fap.sbras.ru). It is intended for the distribution kit acquaintance and installation on the users' computers. The Ubuntu OS for the SB RAS users installed build will immediately set up to use the local Ubuntu packages repository mirrors. The basis of the created image is the original Ubuntu CD, which was brought in a number of improvements related to specific tasks. On the image also added additional FOSS (for the moment the image contains more than 200 additional software), which may be interesting to the SB RAS members. Using this image in live mode, users can familiarize with the system without installing it on their computers.
- **The local Ubuntu packages repository mirrors.** Each repository contains a list of packets stored in it, indicating the version, and other necessary information. The local mirror of the official Ubuntu repositories is created on the SB RAS FAP data warehouse server. There are mirrored the recent Ubuntu OS releases (from 09.04 to 12.04). Synchronization with the official servers is daily. Of all the supported hardware architectures are mirrored the two most popular: i386 and amd64, also are mirrored packets containing the source code of the software. Besides mirroring the official Ubuntu repositories the SB RAS repositories also contain an additional set of scientific and common FOSS, as well as the SB RAS institutes software developments repository.
- **The SB RAS software developments integration to the FOSS repository.** One of the important aspects of the SB RAS software development promoting is the process of its integration into the SB RAS corporate and world software repositories. At the moment the process of integrating the SB RAS software developments in the corporate distribution is worked through, which will allow to simplify the technical part of the work for their future inclusion in the core Ubuntu OS distribution.

V. The free software demonstration platform

In providing information to support the software and databases developed by the SB RAS institutes, as well as promotion FOSS in the institutes **the free software demonstration platform** [3] is organized on the SB RAS FAP basis. The platform primary goals are granting to free software

potential users full volume of information available for each program and also its work demonstration on the Foundation technological capacities. The SB RAS FAP demonstration platform includes the following main components:

- The free software demonstration pages catalogue (scientific and a system-wide).
- The demonstration server preloaded with the SB RAS corporate Ubuntu OS distribution, FOSS, developed in the SB RAS, and third-party FOSS.

The demonstration pages are the free software for Linux OS catalogue, in particular software from the Ubuntu OS SB RAS corporate variant. For the SB RAS institutes free software and databases developments are given its distribution kits or source codes. The catalogue consists of standardized individual pages for each provided program. On the SB RAS FAP site (http://fap.sbras.ru) the catalogue is displayed in index form with search. At the first stage selected samples system-wide free software for Linux OS and also the Siberian Branch institutes recommended free software are added in the catalogue. Further inclusion free software for Microsoft Windows family OS in the catalogue is planned.

The demonstration server is the dedicated server preloaded with the SB RAS corporate Ubuntu OS distribution and free software set. The creation purpose is free software, developed in the SB RAS institutions, and third-party free software demonstration by its run on the dedicated server with restricted access for authorized users. Thus users not only can see the free software description, receive all necessary documentation and distribution, but also to estimate its real work needlessly in its previous installation on their own computers. Access to the server is carried out by RDP (remote desktop protocol), VNC (virtual network computing), NX protocols. Following major scientific and system-wide free software packages passed approbation and installed on the demonstration server by the current moment: mathematical free software, mechanic subject free software and system-wide free software.

VI. The Technological Platform for Software Development in the SB RAS

The aim of the technological platform [4] creation is to software development process support in the SB RAS institutes. There are a large number of platforms that provide their services for software development in the world today. The disadvantage of existing solutions is the development projects diversity because of the universality of platforms themselves. The SB RAS FAP technological platform is developed with a focus on scientific software. The aims of the creation and continued operation of the platform are:

- An integration and involvement of the SB RAS employees to jointly develop software in accordance with FOSS concept.
- A software authors direct interaction with users.
- The SB RAS software developments transformation from experimental versions to complete software products, their inclusion into the SB RAS corporate Ubuntu OS distribution.

This platform will be the unified set of all the necessary tools to organize joint activities of the developers in the remote access mode access via the Internet. It is necessary to identify the following main components of the platform:

- Version control system.
- Bug tracking system.
- Project management system.

The technology and demonstration platform will be integrated into the single software complex with the other services that already exist on the SB RAS FAP site (http://fap.sbras.ru).

VII. Conclusion

There are currently created and put into operation the site of the SB RAS Foundation of algorithms and programs (http://fap.sbras.ru), are defined the basic architectural components of the developed platforms, approbation of the found decisions is made for their subsequent integration into the Foundation information subsystem.

One of the important aspects of the Siberian Branch software platform formation, besides an effective balance search between the purchase of proprietary software and use of free software, is also strengthening own software development in the SB RAS institutes, with its subsequent use in the interests all of the Siberian Branch. The centralized use of services described in the article in the Siberian Branch for FOSS development and promotion will allow avoiding additional costs for software and hardware maintenance in each of the SB RAS individual organization.

For successful development of the SB RAS software platform balanced model, based on FOSS and proprietary software, it is necessary to organize programs of the SB RAS employees' professional skills preparation and improvement.

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