Speech By Dr.A.P.J.Abdul Kalam at NCAR 2010

Vision for Free Software Movement

I am delighted to inaugurate the National Convention for Academics and Research – 2010 on "Computing Freedom for Technology, Education and Research" being organized by the Free Software Movement of India (FSMI) at IIIT, Hyderabad. I am happy to know that this First NCAR 2010 is being organized for spreading awareness of Free/Libre and Open Source Software (FOSS/FLOSS), and provide a platform for sharing of experiences and views in its use in Academia/Research Communities and to Foster a collaborate approach to education in developing and improving educational aids including software tools. I am happy that the convention is focusing on wide range of topics through dedicated track sessions on academic and research areas like scientific computing and visualization, embedded technologies, Networking and Security, Cloud computing, to Indian Language technologies and application specific domains of Mobile, GIS. My greetings to the distinguished scientists, technologists, participants, faculty members and students. People create knowledge for people. We are entering into an era, particularly India has to have the culture "People create knowledge for people, without commercial motives" example Wikipedia. Open source movement has made all of us responsible to the society. Today when I see hundreds of free software movement specialist assembled from various parts of the country, I would like to discuss on the subject "**Vision for Free Software movement".**

Can we create brand in Free Software?

When I look at Free Software Movement of India (FSMI), and see the number of experts assembled here at the NCAR 2010, I am thinking of what is the unique thing that can make a big revolution in India using Free Software movement in India. In India, we have witnessed the initiative for creating a **Bharathi OS** – open source free Operating System software pioneered by CDAC. What is the primary reason for its less usage than expected? What is needed to popularize such an effort to make it usable within government, academia and private sector, to propel the open and free software movement? Why should always look for the solution has to come from foreign source? Why not we think of creating a system or product in open environment and free software which can revolutionize the world and attract the OEM to adopt the software which we have designed? We need to understand what is the vision and clear roadmap and the support needed to launch such as effort which can meet the growing need of the world? What is the system or product or service which is going to result into out of the free software movement, which will benefit the world? What is the kind of brand that we are poised to build for the future global community out of the free software movement? That is the kind of the vision only will attract the young and creative minds to participate in this movement to contribute for the betterment of the global community.

Android - a success story in Open Software movement

There are number of initiatives across the world towards the open source or free software movement which is gaining importance in the computing, communication domain. Recently we have witnessed how Android platform has revolutionized the mobile communication system.
Android is based upon a modified version of the Linux kernel. Google and other members of the Open Handset Alliance collaborated to develop and release Android to the world. The Android Open Source Project (AOSP) is tasked with the maintenance and further development of Android Unit sales for Android OS smart phones ranked first among all Smartphone OS handsets sold in the U.S. in the second and third quarters of 2010, with a third quarter market share of 43.6%.

Android has a large community of developers writing application programs ("apps") that extend the functionality of the devices. There are currently over 100,000 apps available for Android. Android Market is the online app store run by Google, though apps can be downloaded from third party sites Developers write in the Java language, controlling the device via Google-developed Java libraries.

The unveiling of the Android distribution on 5 November 2007 was announced with the founding of the Open Handset Alliance, a consortium of 79 hardware, software, and telecom companies devoted to advancing open standards for mobile devices. Google released most of the Android code under the Apache License, a free software and open source license. Here you look at when free software is ready for adoption to multiple hardware and software vendors, it has reached its objective and benefits everybody. That means value addition to the free software helps the business to grow and it benefits the people too.

I understand that the Android operating system software stack consists of Java applications running on a Java based object oriented application framework on top of Java core libraries running on a Dalvik virtual machine featuring JIT compilation. Libraries written in C include the surface manager, OpenCore media framework, SQLite relational database management system, OpenGL ES 2.0 3D graphics API, WebKit layout engine, SGL graphics engine, SSL, and Bionic libc. The Android operating system consists of 12 million lines of code including 3 million lines of XML, 2.8 million lines of C, 2.1 million lines of Java, and 1.75 million lines of C++.

Today, competing with iphone and ipod of Apple make, number of different mobile companies have adopted and ported the Android OS as their mobile and tablet platform and it is giving equal and better competition to the proprietary technologies and reaching throughout the world. What is the message? That means any open source or free software when it is value added with hardware, when it is tested to meet the factors such as reliability, adoptability, usability and interoperability to work with any independent platform and it meets the user requirements, then it stands for the test of time and win over the competition against the proprietary software in any domain. What is that one system from the Free Software Community of India can evolve like an Android platform which is the brand evolved over the free and open Linux Kernel? What is the one IT system which can be used to take a different shape to meet the various requirements of One billion people in various sectors of the economy, which can make an impact on a day to day functioning of the country? Which can bring a value addition to the

quality   of   Life   of   the   people   in   India?

We need to find a system or a product or a service which is can be integrated into the ICT hardware and communication system of the world and that will bring a revolution in make a difference to the life of the people. Can the technologists and scientists working in Scientific computing, scientific visualization, Embedded technologies, networking and security, GIS and Remote sensing, Bio informatics and Open source Biology, Cloud computing, mobile applications, natural language processing area can jointly work together to create a system, product and service – comprising of hardware, software, network and communication in a free and open source environment? Is that device can be branded from India?

Can we create that type of brand in free software which will bring revolution in thinking and action and will act as a global change agent? Scientists, technologists, IT industry, Academia assembled here should think and act to create a system to meet that objective. That is the vision which will drive the Free Software Movement of India and the students and the creative research minds to contribute and to achieve that vision. What is that one single vision which will kindle the ignited minds to work together? Let us debate and find an answer for that Vision?

Let me now talk about the major breakthrough of the free software movement the world has witnessed through the launch of Wikipedia.

Wikipedia

Wikipedia was formally launched on 15 January 2001 by Jimmy Wales and Larry Sanger using the concept and technology of a wiki pioneered by Ward Cunningham. The earliest known proposal for an online encyclopedia was made by Rick Gates in 1993, but the concept of an open source web-based online encyclopedia was proposed a little later by free software exponent Richard Stallman. He described the usefulness of a "Free Universal Encyclopedia and Learning Resource" in 1999. His published document "aims to lay out what the free encyclopedia needs to do, what sort of freedom it needs to give the public, and how we can get started on developing it. On 17 January 2001, two days after the start of Wikipedia, the Free Software Foundation's GNUPedia project went online, competing with Nupedia, but today the FSF encourages people "to visit and contribute to [Wikipedia]" Today Wikipedia includes 15 million freely usable articles in over two hundred languages worldwide, and content from a million registered user accounts and countless anonymous contributors.

What is the message here? That means the community is developing knowledge for the consumption by the community. I am thinking how this can be extended to Health care, agriculture, safe drinking water and energy, where everyone has a question and whoever knows the answer volunteers to answer in the full public eye of evaluation by   everyone.

In this context, I would like to share an experience of India in healthcare domain through Open Source movement. Now let me now focus on an Open Source Software movement which has brought a change in the healthcare domain in India based on the new and innovative approach in soliciting the contribution from the young minds across the world.

Open Source Drug Discovery (OSDD)

The Open Source Drug Discovery (OSDD) programme is a CSIR led team India consortium with global partnerships, with a vision to provide affordable healthcare to the developing world.
Market forces discourage research- based pharmaceutical companies from developing drugs for infectious diseases like Tuberculosis (TB), Malaria, and Leishmaniasis (Kala Azar) that predominantly affect the developing world. Without a market attractive to global pharmaceutical industry, it would be naïve to expect drug discovery for infectious diseases to become a lucrative standard business model. In the wake of the failure of market forces we need to explore new models of drug discovery. This is where OSDD offers a promising new model.

OSDD has chosen TB as the first target disease. The current TB therapy was developed in the 1960's. The therapy is a combination of four drugs which has to be administered under observation of the physician for six to eight months. In India, an estimated 370,000 deaths due to TB occur each year. This amounts to over 1,000 deaths a day, or 2 TB deaths every 3 minutes. This disease which affects mostly our poor is a huge problem for the nation. OSDD aims to discover better and more effective drugs for TB by involving large number of researchers based on the open source philosophy that more eye balls make all bugs shallow.
The Open Source approach has been successfully adopted in software and collaborative approach is known in science. OSDD's effort to do discovery in the open with the aim of collaborate, share, discover makes it highly participative. It enables manifold expansion of resources for research.

Launched on 15 September 2008, OSDD has more than 4500 registered users from over 100 countries and more than 150 projects on TB drug discovery. A large part of the funding of OSDD comes from the commitment of the Government of India of Rs 46 crores for the 11th plan period. OSDD offers a model of open innovation in pharmaceutical research as it concurrently carries out research in many areas of drug discovery.

With many eminent scientists playing an active role, OSDD also has a large number of youngsters who want to do science and make a difference. From remote regions of the country they get connected through the website and network with peers to solve challenging problems in drug discovery.

One of the OSDD project which has made a big impact is the collaborative annotation of the bacteria causing TB, namely Mycobacterium tuberculosis (Mtb). The scientific purpose was to improve the understanding of the biology of the organism to develop better tools to tackle the pathogen. It was done through a collaborative project involving about 800 researchers from India and abroad. They finished the task of re-annotation which involved reading of published literature from 1960 onwards and capturing the data in those papers. The task, which some experts estimated would take 300 man years was accomplished in four short months; amply demonstrating the power of collaborative research and what youth-power can do, given the right platform and guidance.

Enthused by this result OSDD is currently pursuing a collaborative Chem-informatics programme where about 400 researchers are participating.

All such top end research calls for a highly sophisticated collaborative platform. M/s Infosys has created a web 2.0 collaborative platform using open source tools in collaboration with OSDD for TB research. This was done pro bono by Infosys showing their commitment to support a scientific project seeking to develop drugs for the diseases that affect predominantly the poor.

OSDD provides an alternative way of looking at Intellectual Property as a tool of research. In the wake of failure of the patent driven model for drug discovery, OSDD treats its entire work as a collective property of the community while each contributor gets credit of the work done though a micro attribution system. The drugs that come out of OSDD are promised to be manufactured on a non exclusive basis, like a generic drug, removing the monopoly attached to drug production. This will ensure that the drugs are available and affordable in the developing world. OSDD has innovative ways of looking at patents as a concept. It is currently working on optimizing a patented molecule as a drug. OSDD plans to use this patent to ensure the drugs are affordable in the market by ensuring non exclusive licensing. This is an innovative way of using patents to the benefit of poor patients.

CSIR has given a clarion call to all ignited minds, be they students, researchers, scientists, academicians, doctors, software professionals, traditional healers or industry experts to join the battle against infectious diseases by joining OSDD.

Dear friends, the major idea is that what was started by the SW Community has been picked for use in every sphere of our life. This also leads to the fact that all our problems are no longer local to us and we all become responsible citizens and let use this free and open source software movement and find innovative solution. I have an idea, why not we launch such movement to bring the core competence of multiple nations to bring an innovative solution to the problem of safe drinking water.

Open Source Initiative of Safe Drinking Water

Friends, I would like to discuss a very significant societal area of drinking water which needs technological and industrial partnerships to develop. Clean drinking is a global problem with about 1 billion people lacking access to it. Each year more than 3.5 million deaths occur solely due the diseases borne out of water, which means that unclean water is killing seven human beings every minute around the world. Clean water is an issue in India as well. World Bank estimates that 21% of communicable diseases in India are related to unsafe water. In India, diarrhea alone causes more than 1,600 deaths daily. Hence clean water for all is a very important societal mission where the scientific community and the industry have to find synergies.

With a combined effort of technology, societal leadership and the spirit of entrepreneurship the problem of clean drinking water for the billion in the world can be solved by the technology and the leadership. My question is, Can we create an Open Source initiative to find a solution to the Safe Drinking water for 2 Billion people to assess the safe drinking water requirement, problem identification, gap identification, proposing the solution, technology selection, implementation and its sustainability. Can the Free Software Movement of India (FSMI) Community create an Open Source Network for Safe Drinking water? Can the NGO's, Industry, Corporate Social Responsibility Initiatives of Corporate, Academy, Government contribute for this effort and bring the solution to the needy areas through this

initiative in a Open Source Service model, which will bring technological, financial and entrepreneurial solution to solve the safe drinking water problem across the world.

Conclusion

Technology is a non-linear tool, which brings fundamental changes in the society. Today the technologies are disruptive and bring phenomenal changes the way we think, act and perform. It brings changes to the economy in an unprecedented manner than our thinking process and adoptability. The question is how we prioritize our task, how we collaborate, how we strategize and how we innovate and create new technologies to meet our national development agenda. Hence creation of IP is the one of the important ingredient of the one's own innovation. Even that is changing due to the success of open source movement. Open source movement necessitates the participation of multiple minds and provides a platform for creativity to blossom. But that platform will become success and yield positive result only when we pass through the rigorous test of sustainable factors such as: reliability, quality, performance and sustainability. Many flowers will blossoms out of this open movement, but only certain will sustain only if we built on these sustainable factors. India needs innovative technological solution in Water, Energy, healthcare, education, agriculture, aerospace, defence technologies and other critical technologies. How the ICT communities assembled together can chalk out a roadmap to lay the path for creating such a system which will create an impact which has never ever been witnessed in the history of humanity? It igs not the question of free software movement alone will yield such a system, it is the vision of creating an integrated system coupled with all the components of ICT integrating computing, communication and sensing and the service model in an integrated way will bring the innovations to flourish to serve the humanity. For that we need to launch the world knowledge platform for Open Source and free software, which combines the core competence of many nations with the innovation eco-system in place which will become the launch pad for many innovations which are waiting to be launched. That is the vision for Free software movement which will bring the creative and innovative young minds to work together.

With this, I greet all the participants of National Convention for Academics and Research (NACR 2010) to chalk out, debate and finalize the road map for the vision. I wish all success in their efforts to create a free software leading to an integrated system or product for finding solution for the challenges of the world. My greetings and best wishes to all of you.